ERICACEAE (H. Sleumer, Leyden)

Trees or shrubs, very rarely herbs or fleshy saprophytes. *Leaves* spiral, sometimes opposite or pseudowhorled, simple, entire, crenate or serrate, mostly evergreen and ± coriaceous (Malesia), exstipulate (stipule-like perulae of axillary buds occur in *Diplycosia* and *Vaccinium p.p.*). *Flowers* bisexual (rarely functionally unisexual; or the plant dioecious in extra-Mal.), characteristically regular, (4–)5 (rarely 6–7)-merous. *Inflorescences* terminal or axillary, entirely covered by perulae in bud, mostly in racemes, these sometimes arranged to panicles or condensed to umbels, or reduced to few-flowered fascicles, or even to a solitary flower. *Sepals* (reduced in *Monotropastrum* and *Wirtgenia*) very rarely free, generally connate below to a calyx tube, the latter free or ± adnate to the ovary, persistent, whether or not accrescent in fruit, lobes imbricate or open in bud. *Corolla* campanulate to funnel-shaped, urceolate or cylindric, sometimes slightly zygomorphous, caducous, lobed to various degree, lobes imbricate (sometimes ± contorted), rarely valvate in bud. *Stamens* usually 10 (rarely 5, 8, or up to 20), obdiplostemonous, rarely haplostemonous, inserted at the outer margin of the disk between its lobes, or slightly attached to the base of the corolla; filaments free (Malesia); anthers dorsifixed to almost basifixed, the 2 cells (thecae) not rarely extending into free or connate tubules, these muticous or sometimes (bi)aristate distally by the prolonged back-wall, opening by terminal or introrse, very rarely extrorse pores or slits, not rarely with projecting dorsal appendages or spurs; pollen in tetrads, simple in *Monotropoideae*. *Gynoecium* syncarpous, 5- or pseudo-10-, rarely 2–4- or 6–7-celled. *Disk* hypogynous or epigynous, often fleshy and nectariferous, entire or mostly 5–10-lobed. *Ovary* 1, superior, half-inferior or inferior, generally with as many cells as carpels; placentation central, with 1 or 2 lamellas per cell, each bearing mostly numerous, rarely 1, anatropous or obliquely amphitropous, 1-tegumented ovulus. Style 1; stigma obtuse, capitate or peltate, whether or not 5–7-lobed. *Fruit* a 5(–7)-valved, septicidal or (sometimes lately or irregularly) loculicidal capsule, which may be ± included by the accrescent, ± fleshy calyx, or a rather dry to fleshy berry (Malesia). *Seeds* usually numerous, small, whether or not winged or tailed at one or both ends; testa thin, often reticulate; embryo cylindric, small, with copious endosperm.

Distribution. About 125 genera with approximately 3500 *spp.*, predominantly woody, distributed all over the world.

In *Malesia* 12 genera, with a total of about 740 *spp.* Five genera are endemic or nearly so, *viz Wirtgenia* and *Pernettyopsis* in the Malay Peninsula, *Costera* in Sumatra, Borneo, the Philippines, Talaud, and Morotai, *Dimorphanthera* in the Philippines, Moluccas, New Guinea and adjacent islands, and *Diplycosia* which occurs throughout Malesia with 1 *sp.* in S. Annam.

Two other genera, *viz Monotropastrum* and *Agapetes*, find their main area of distribution in SE. Asia and Malesia, the latter extending to Queensland, New Caledonia, and Fiji.

Of the remaining genera, two are restricted to the northern hemisphere but have one station in northwest Malesia, *viz Pyrola* (Europe, Asia, N. and Central America) which occurs in N. Sumatra, and *Lyonia* (SE. Asia, N. and Central America) which occurs in the Malay Peninsula.

The other three are still wider distributed. The colossal genus *Rhododendron* is most abundantly developed in Asia, with some dozens of species in N. America and Europe, and extends towards the southeast as far as N. Queensland (1 *sp.*), the Solomon Is. and New Britain (3 *spp.*), with many species in Malesia.

Vaccinium occurs in both temperate and tropical America, in East Africa (Madagascar inclusive), the Pacific, and all over Asia and Malesia, but not in Australia.

The area of *Gaultheria* extends over the Americas, SE. Asia, Malesia, SE. Australia (incl. Tasmania), and New Zealand.

The non-endemic *Ericaceae* found in Malesia show a close alliance with those of SE. Asia, and the same can be said of the few *Ericaceae* found in N. Queensland, the Solomon Is., the New Hebrides, Samoa, and Fiji. Australian-antarctic relations within the Malesian *Ericaceae* are probably expressed only by *Gaultheria mundula* (eastern part of New Guinea), which seems to be nearest to some species of the genus found in SE. Australia (incl. Tasmania), New Zealand, and possibly in temperate S. America.

More than half of the Malesian species occur in New Guinea and are endemic there, two excepted.

Ecology. Malesian *Ericaceae* occur predominantly in the lower and upper montane forest, both terrestrial and epiphytic. Quite a number is found above the timber line, mainly dwarf shurbs in subalpine grassland or even in true alpine vegetation, ascending in Borneo (Mt Kinabalu) and in the Main Range of New Guinea to 4000–4400 m. A few live at low altitudes, as some species of *Vaccinium* on coastal sands, species of *Costera*, or some species of *Rhododendron* on rocks near the sea or even as epiphytes on mangrove trees.

Two saprophytic genera, *viz Monotropastrum* and *Wirtgenia*, are echlorophyllose, humicolous herbs, growing in shady places in the lower montane forest, apparently very rare (or overlooked due to their ephemeral appearance?), and only known from a few places in Sumatra and the Malay Peninsula.

As to climate, *Ericaceae* in general prefer the wet montane to subalpine subtropical and tropical, and the (mostly rather dry) warm-temperate zone; they extend into the arctic and subantarctic zone. They are predominantly found on acid, *i.e.* sandy, humous or peaty soil. A few are reported from limestone, but it is not clear in how far they grow there on humus-covered soil. For example, STRESEMANN found dense brushwood *Rhododendron* under *Casuarina* on steep limestone ridges in the Ora Mts in W. Ceram, together with *Podocarpus*, *Myrtaceae*, and *Nepenthes*, May 1911. BRASS found in New Guinea several *Rhododendrons* on limestone rock.

Malesian *Ericaceae* are mostly of proportionally small size, but some may under favourable conditions grow into trees up to *c.* 15 m or are high lianas (*Dimorphanthera*). By their heliophilous preference they occur most abundant as epiphytes in the forest and are not infrequently gregarious or co-dominant terrestrially on steep slopes, volcanic terrain, ridge-crests, glades and other sterile places in the mountains as 'ericoid brushwood'.

In Sumatra FREY-WYSSLING found on the volcano Kerintji above the forest border at 3000 m a brushwood consisting largely of *Gleichenia* and *Ericaceae* (*Vaccinium miquelii*, *Rhododendron retusum* and *Gaultheria leucocarpa*) (Trop. Natuur 22, 1933, 1–10). From the Gajo Lands (Atjeh) VAN STEENIS reported the important role of *Ericaceae* in the brushwood and glades of the high non-volcanic mountains (Tijd. Kon. Ned. Aardr. Gen. 55, 1938, 751, f. 12). On the volcano Dempo in Bencoolen FORBES found *Vaccinium miquelii* dominating the zone above 2500 m where it may be a tree with a diameter of 40 cm (Wanderings, 1885, 209).

On the Javanese volcanoes, especially on the wetter western peaks, *Vaccinium varingiaefolium* and *Rhododendron retusum* are gregarious and essential co-dominants in the brushwood of slopes, crests and peaks, and are even obvious from a far distance when the new shoots expose their pink or red flush. Other co-dominants of this gnarled forest, either mossy or not, are *Rapanea*, *Myrica javanica*, and *Leptospermum flavescens*.

On the mountains of the Malay Peninsula and Borneo *Ericaceae* are common, but they attain their greatest and most profuse development in North Borneo on Mt Kinabalu where again they are important co-dominants in the upper zones.

From the Philippines, Celebes, and the Moluccas no special great importance as constituents of vegetation are known, but in the New Guinean mountains they are as gregarious at high altitude as on Mt Kinabalu, *e.g.* on Mt Arfak. From the Balim Valley BRASS reported that *Rhododendron brassii* composed nearly pure, greyish stands best developed on forest edges and in glades between low-tree thickets, seldom extending far beyond the territory of conifers (J. Arn. Arb. 22, 1941, 321). He reported from the same area, at the mouth of the Bele Valley, at 2100 m, a distinctive shrub community *c.* 3–4 m high, of *Vaccinium acrobracteatum* on a patch of loose sand, associated with *Gahnia*, *Myrtaceae*, *Rhododendron inconspicuum* and *R. herzogii*.

On Mt Wilhelmina he found *Vaccinium dominans* in dense, 5–6 m high, often wind-clipped forest, co-dominant with *Rapanea* from 3500–3800 m (*l.c.* 327). On Mt Albert Edward on the Wharton Range, from 3200 m upwards, forests were dominated by *Podocarpus papuanus* and *Libocedrus papuana*, and at higher altitude by a *Vaccinium* with the conifers rising in open stand above the canopy; this forest type was considerably interrupted by grassy glades, hollows and lake basins (*l.c.* 336). The Rev. CRUTTWELL found *Rhododendron christianae* locally forming pure stands well recognizable at flowering time from the air.

By their heliophile ecology and their ability to stand sterile, acid, or poor soil conditions *Ericaceae* are not rarely found as pioneers or in secondary vegetation in open or fired places, on landslides, in clearings made by man following burning, logging, gold digging, or making roads, on volcanic sands and rock, on lapilli, near craters, on lavastreams, and rockwalls.

In almost every crater or solfatara field in Sumatra, Java, and the Lesser Sunda Is. one can observe that in approaching such terrain the percentage of the Ericaceous component increases, and they are among the lot which comes closest to the sulphur vents, notably *Gaultherias*, *Rhododendron javanicum*, *R. retusum*, *Vaccinium laurifolium*, and *V. varingiaefolium*, often associated with *Dianella javanica*, *Gahnia javanica*, *Pleopeltis feei*, and some *Carex*. The advanced pioneers often attain queerly clipped or prostrate shape, and wind forms (fig. 101–104) as described by VAN STEENIS from Mt Papandajan (Trop. Natuur 24, 1935, 141–145, f. 2–5) and from Mt Idjen (*ibid.* 29, 1940, 182, f. 9). On the solfatara fields of Samosir I. in Lake Toba, N. Sumatra, *Rhododendrons* are conspicuous. *Vaccinium varingiaefolium* is also able to withstand a partial burial by acid volcanic mud and lapilli, as observed on summit of Mt Tjeremai above Cheribon, N. Central Java.

To a certain extent *Ericaceae* may also be fire-resistant as described by JUNGHUHN from Mt Lawu, where he found a pyrogenous grassland thinly set with *Vaccinium varingiaefolium*. On the west slope of the Latimodjong Range, SW. Central Celebes, near Rante Lemo, the large-flowered, 3–4 m high *Rhododendron vanvuurenii* forms pure stands in pyrogenous grassland, at c. 1000 m; also near Rante Pao. LANE-POOLE reported *Vaccinium striicaule* to be able to stand fire in the grasslands of Mt Saruwaged, associated with tree ferns and *Rhododendron*; this *Vaccinium* originally grows below *Dacrydium* and *Libocedrus*, and after these have been burned it stays in the open grassland between 3300 and 4000 m (For. Res. Papua, 1925, 179–180).

The *root-system* of Malesian *Ericaceae* is, particularly in crater fields and near solfataras, very horizontal, and roots may attain large dimensions in such places. This is of course common to almost all plants growing on sterile rocky, impervious or badly drained soils; it may also be ascribed in part as a reaction to the heat of the deeper soil in crater fields. Such roots have also a distinctly corky bark, and VON FABER holds that this would be a protection to heat (Die Kraterpflanzen Javas, 1927, 71–75, f. 7–9).

The stem-base and upper part of the root of *Vaccinium* is often swollen and superficially resembles a lignotuber. It is obviously a storage organ and is already found in epiphytic seedlings (VON FABER, *l.c.*); such seedlings have also a proportionally very large root-system.

Dispersal. Not much is known about the dispersal of Malesian *Ericaceae* besides what DOCTERS VAN LEEUWEN has observed on Mt Pangrango in W. Java. The very small seeds of *Rhododendron* are presumably dispersed by wind (see what is said *sub Rhododendron* below). The fruits of genera as *Diplycosia*, *Gaultheria*, *Vaccinium*, *Costera*, *Agapetes*, and *Dimorphantera* are fleshy, and, so far as known, eaten by birds, rodents and small mammals. The seeds are small, and besides in *Rhododendron*, have a hard testa; they may be disposed in a viable state with the excrements of animals within a certain distance. DOCTERS VAN LEEUWEN made observations on bird dispersal of berries of *Vaccinium* and *Gaultheria* on Mt Pangrango in W. Java (Verh. Kon. Ak. Wet. A'dam sect. 2, 31, 1933, 198–212, and in Flora 118/119, 1925, 86). His son, HANS, examined stomach contents of birds on the Central Javanese volcanoes Sumbing and Sindoro and had similar results, the chief birds being species of the genera *Zostera* and *Merula* (Treubia 10, 1929, 443, 446).

Galls. No *Zoocecidia* specific for a distinct genus or species are hitherto known from Malesian *Ericaceae* (*cf.* DOCTERS VAN LEEUWEN, The Zoocecidia of the Netherlands East Indies, 1926, 439, and Pangrango, 1933, 198 *seq.*).

Anomalous flowers, due to a fungus or insects, are not rarely found in *Vaccinium* (see there). On the leaves of both *Vaccinium* and *Rhododendron* spots occur due to the parasitic *Exobasi-*

dium, described by RACIBORSKI. In Java this does not lead to the formation of galls; however, very large *Exobasidium* galls are found on *Rhododendron atjehense* in N. Sumatra. Fig. 48.

The roots of *Ericaceae* possess endotrophic mycorrhiza which, according to VON FABER, are spread by seed; they cause gall-like thickened malformations on the roots (Die Kraterpflanzen Javas, 1927, 71–75, f. 7–9).

Wood anatomy. DEN BERGER, Determinatietabel houtsoorten van Malesië, Veenman, Wageningen (1949) 31, 35 (hand lens). METCALFE & CHALK, Anat. Dic. 1 (1950) 823, 831; MOLL & JANSSONIUS 4 (1920) 269; RECORD, Trop. Woods 32 (1932) 11. Primitive features present: conspicuous many-barred scalariform perforation plates in *Rhododendron* and in some species of *Vaccinium*, pits to ray cells opposite, ground tissue composed of fibre tracheids, wood parenchyma practically absent. RECORD *l.c.*: a relationship to the *Theaceae* seems to be strongly indicated. – C.A.R.-G.

Phytochemistry. *Ericaceae* were rather intensively investigated since PLUGGE showed in 1882 and 1883 that many members contain a toxic constituent, called andromedotoxin by him. From the chemical point of view the family may be characterized as follows at present:

(i) Polyphenolic substances and tannins are accumulated by all members investigated. Leucoanthocyanins, flavonols (including derivatives of myricetin), catechins and a number of phenolic β-glucosides like arbutin (*Arbutus, Arctostaphylos, Pyrola, Vaccinium*), monotropitoside (*i.e.* the former gaultherin, a glucoside of methyl salicylate; in *Gaultheria* and *Monotropa*), betuloside (= rhododendrin; in *Rhododendron*) and lyonoside (in *Lyonia*) represent the polyphenolic group of plant constituents. The tannins are galli- and ellagitannins in some members and condensed tannins in others; many species contain mixtures of both types of tannins.

(ii) Triterpenes, in many instances predominantly free ursolic acid, are deposited in large amounts in the very often thick cuticule of the leaves.

(iii) The well known toxic constituents of the family are diterpenes. Andromedotoxin (= rhodotoxin = grayanotoxin-I), desacetylandromedotoxin (= grayanotoxin-III) and desacetylanhydroandromedotoxin (= grayanotoxin-II) are the best known representatives of these principles. They have been demonstrated to be present in members of the genera *Kalmia, Rhododendron, Andromeda, Chamaedaphne, Leucothoë, Lyonia, Pernettya* and *Pieris*, but have not been detected in *Pyroleae* and in *Vaccinioideae*.

The tendency to accumulate still other constituents seems to be more restricted in the family. Many *Ericaceae* bear, besides ordinary trichomes, abundantly glandular hairs. The latter seem to produce often essential oils in quantity. For species of *Cassiope, Ledum* and *Rhododendron* investigations of the essential oils were performed. The herbaceous members, reunited by many authors in the separate family *Pyrolaceae*, produce besides arbutin a number of closely related glucosides (homoarbutin, pyrolatin, renifolin). From the latter the naphtoquinone chimaphilin probably arises after enzymatic splitting of the glucoside and oxydation of the aglykon, processes which take place when the plants are dried. Another β-glucoside present in all *Pyrolaceae* (including *Monotropa*) is monotropeoside, which belongs to the so-called pseudoindicans or iridoid plant constituents. It seems highly probably that some members of arborescent *Ericaceae* (*e.g. Arbutus*) contain such compounds too.

In concluding we may state that chemistry agrees very well with the inclusion of *Pyrolaceae* in *Ericaceae*. With regard to possible relationships of *Ericaceae* nothing of convincing nature can be said. In many respects chemistry of *Ericaceae* reminds of amentiferous families (*e.g. Betulaceae, Fagaceae*) on the one hand and *Saxifragaceae, Hamamelidaceae*, and *Rosaceae* on the other hand. In the light of present-day knowledge biochemical resemblance between *Ericaceae* and *Theaceae* seems to be less striking than the resemblance between *Ericaceae* and, for instance, *Saxifragaceae sensu lato*. For references I refer to my 'Chemotaxonomie der Pflanzen' vol. 4 (1965). — R. HEGNAUER.

Uses. Apart from ornamental purpose but few useful plants are found among Malesian *Ericaceae*. The hard timber, due to the small size, is only occasionally used for implements. Fruits are reported to be partly sweet or at least palatable in all genera of the subfamily *Vaccinioideae*, but no regular use by men is known except of *Vaccinium myrtoides* in the Philippines. The leaves of several species of *Gaultheria* have a strong smell and contain wintergreen-oil (methyl-salicilate); they are used externally against rheumatism, or internally as medicinal tea.

In New Guinea the big, scented flowers of *Rhododendron* and the ones of *Dimorphanthera* are locally used for decoration.

Wild *Rhododendron* species from Malesia are cultivated in Europe, N. America, Hawaii, and Australia; their hardiness, even of "alpine" species, in temperate zones is questionable. Seeds or cuttings of wild species of *Rhododendron* for horticultural purposes should be taken and airmailed; the pods should be almost ripe, not yet open, or just apically opening.

Taxonomy. The family *Ericaceae* is taken here in a wide sense, including *Pyrolaceae*, *Monotropaceae*, and *Vacciniaceae*, which are kept as proper families by various authors, though their close connection within the *Ericales* is generally admitted. Of the 5 subfamilies the *Rhododendroideae*, *Arbutoideae*, *Monotropoideae*, and *Vaccinioideae* are represented in Malesia; the *Ericoideae* are confined to Europe and Africa.

No precursory work on Malesian *Ericaceae* as a whole has been done. J. J. SMITH devoted many papers to Malesian *Ericaceae*. Local revisions have been made by J. J. SMITH and Miss J. AMSHOFF for Java, by H. F. COPELAND for the Philippines, by J. J. SMITH and R. SCHLECHTER for parts of New Guinea, and the genera *Agapetes*, *Dimorphanthera*, *Diplycosia*, *Gaultheria*, and *Vaccinium* for the whole of New Guinea were previously treated by the author.

In connection with the present work precursory revisions and/or supplements for the whole of Malesia (partly including the adjacent regions, as far as this seemed to be necessary) have been published by the author on *Agapetes* (Nova Guinea, Bot. *n.* 1, 1960, 1–7; Blumea 12, 1964, 344), *Costera* (Blumea 11, 1961, 3–4), *Dimorphanthera* (Nova Guinea, Bot. *n.* 7, 1961, 73–102; Blumea 12, 1963, 137–142; *ibid.* 12, 1964, 344–345), *Diplycosia* (Reinwardtia 4, 1957. 119–161; Blumea 11, 1961, 4–8; *ibid.* 12, 1963, 116–123; *ibid.* 12, 1964, 342–343), *Gaultheria* (Reinwardtia 4, 1957, 163–188; Blumea 11, 1961, 1–3; *ibid.* 12, 1963, 114–116; *ibid.* 12, 1964, 342), *Rhododendron* (Reinwardtia 5, 1960, 45–231; Blumea 11, 1961, 113–130; *ibid.* 12, 1963, 90–114; *ibid.* 12, 1964, 339–341), and *Vaccinium* (Blumea 11, 1961, 9–112; *ibid.* 12, 1963, 123–137; *ibid.* 12, 1964, 343–344).

The treatment given here is tentative in many respects, especially for Borneo and New Guinea, which islands are hardly more than superficially known in many parts of their mountains which are so rich in *Ericaceae*. Up till now every larger recent collection from these islands has yielded new species and localities, mainly in the genera *Rhododendron* and *Vaccinium*. Therefore, the range of even the more common Bornean and New Guinean *Ericaceae* is still imperfectly known in detail.

Generic delimitation. In general there is no difficulty in the delimitation of the genera in Malesia, but in the *Vaccinioideae* generic distinction is unclear. Though *Costera* and *Dimorphanthera* are distinct 'Sippen' by their discrete area of distribution, the characters by which they are distinguished from *Vaccinium* are of no great importance within the subfamily. The distinction between *Agapetes* and *Vaccinium* is even less distinct, and without a clear geographical background, it is merely based on convenience. As a closer insight in and reconsideration of generic limits would involve a complete revision of the subfamily I have refrained from taking premature steps on a local basis.

Phytography. The descriptions of most species treated in this work are based on herbarium specimens; the size of fleshy organs, as corollas and soft fruits is therefore given in the dry state; ± 20 % (sometimes up to 40%) must be added to get the size in the fresh state. The author has studied *Ericaceae* in the field during a short stay in the Philippines (Luzon: Mountain Province), in the Malay Peninsula (Cameron Highlands) and in North Borneo (Mt Kinabalu), and a prolonged one in New Guinea (Vogelkop Peninsula, Cycloop Mts, Eastern Highlands, Bululo-Wau area) which enabled him to take measurements of such fleshy organs of numerous species on the spot; these have been added to the descriptions for the use of field collectors.

Notes for collectors. In general both flowers and fruit are necessary for determining the genus; fruiting material alone is generally insufficient for this purpose, and in *Vaccinioideae* it is as worthless as sterile material.

For identification of species within the genera the presence of flowers is a *conditio sine qua non*. Collectors should never collect sterile material in this family.

KEY TO THE GENERA

1. Ovary superior or nearly so, *i.e.* the calyx free at anthesis (if accrescent only seemingly connate with the fruit). Fruit mostly a capsule, rarely berry-like or a true berry.
2. Fruit a septicidal capsule (RHODODENDROIDEAE-RHODODENDREAE) . . . . . **1. Rhododendron**
2. Fruit a loculicidal capsule or a berry.
3. Echlorophyllose, saprophytic, humiculous herbs. Leaves scale-like, ± imbricate along the fleshy stem. Below the petals a whorl of leaves, here called 'sepals'. Roots fleshy. Pollen simple (MONOTROPOIDEAE).
4. 'Sepals' 5. Anthers horseshoe-shaped, the cells linear, confluent only at the apex. Ovary fusiform, gradually narrowed to the rather long cylindric style. . . . . **2. Wirtgenia**
4. 'Sepals' 0–2. Anthers subreniform, the cells subglobular, connected lengthwise. Ovary ovoid or pear-shaped, narrowed to a very short and thick style. . . . . **3. Monotropastrum**
3. Shrubs or trees with green leaves. Pollen in tetrads (ARBUTOIDEAE).
5. Calyx small and remaining so, not accrescent nor becoming succulent in fruit. Fruit a capsule.
6. Low suffruticose plants with creeping stem and ± basal leaves. Raceme solitary, terminal (PYROLEAE) . . . . . **4. Pyrola**
6. Erect shrubs or trees with many, normally lateral racemes (ANDROMEDEAE) . . . **5. Lyonia**
5. Calyx large from the beginning or ± accrescent, surrounding the ripe fruit, mostly becoming ± succulent in fruit. Fruit a capsule or a berry (GAULTHERIEAE).
7. Fruit a berry with scanty pulp. Calyx lobes large from the beginning, as long as or longer than the corolla, ± spreading, neither accrescent nor becoming fleshy . . . . . **6. Pernettyopsis**
7. Fruit a capsule, sometimes rather thin-walled and tardily splitting. Calyx lobes small initially and shorter than the corolla, ± accrescent and succulent in fruit, finally ± incl. the capsule.
8. Anther-cells not elongate into tubules, muticous, or rarely (bi)aristate by the elongate back-wall of each cell . . . . . **7. Gaultheria**
8. Anther-cells passing into short or mostly elongate apical tubules, these connate to or free from each other and never aristate. . . . . **8. Diplycosia**
1. Ovary inferior or nearly so, *i.e.* the calyx at anthesis at least partly connate with the ovary. Fruit a (sometimes rather dry) berry, crowned by the persistent calyx lobes and the disk (VACCINIOIDEAE).
9. Stamens isomorphous, equal or slighty unequal in length; tubules not expanded apically.
10. Corolla generally small to medium-sized (0.4–1.5, rarely up to 2, occasionally (*Vaccinium pilosilobum*) up to 3 cm) and membranous, rarely somewhat fleshy.
11. Flowers solitary or in few-flowered fascicles which are axillary or not rarely extra-axillary. Pedicels rather long and filiform, not articulate with the calyx (ovary) . . . . . **9. Costera**
11. Flowers in axillary racemes, sometimes reduced to a solitary flower. Pedicels mostly relatively short and/or stoutish, rarely slender, manifestly articulate with the calyx (ovary). **10. Vaccinium**
10. Corolla generally large and fleshy ((0.8–)1.7–4.5 cm). (Pedicels mostly articulate, rarely continuous with the calyx) . . . . . **11. Agapetes**
9. Stamens manifestly dimorphous and very unequal in length; tubules expanded, *i.e.* conspicuously ear-shaped. . . . . **12. Dimorphanthera**

1. RHODODENDRON

LINNÉ, Sp. Pl. 1 (1753) 392; SLEUM. Bot. Jahrb. 74 (1949) 511; Reinwardtia 5 (1960) 47; Blumea 11 (1961) 113; Jahrb. Rhodod. Ges. Bremen (1963) 7; Blumea 12 (1963) 90; *ibid.* 12 (1964) 339. — **Fig. 1—53, 104.**

Evergreen or deciduous (in Mal. 1 *sp.*) shrubs or small trees, terrestrial or epiphytic, the subsequent new shoots marked by distinct nodes. Stem often thickened at the base; roots not rarely large with soft tips in epiphytic specimens. *Leaves* petioled, rarely sessile, spirally arranged or opposite, or mostly in 3–8-merous pseudowhorls, ± coriaceous, entire or crenulate, whether or not clothed with scales and/or hairs. *Flowers* in a mostly terminal, sometimes lateral, ± condensed umbelliform raceme which is occasionally reduced to a single flower. Flower buds with numerous perulae varying in shape and size from the outer to the inner ones, early or late caducous. Bracteoles 2 at the base of each pedicel. *Calyx* cup- or disk-shaped, sometimes merely rim-like, ± deeply 5(–7)-partite to subentire, often oblique, persistent. *Corolla* tubular or campanulate to funnel-shaped, sometimes salver-shaped, regular or somewhat zygomorphous, 5(–7)-lobed to various degree;

lobes imbricate in bud, erect to expanded, sometimes even horizontally spreading at anthesis. *Stamens* 5–10(–14), inserted at the base of the corolla, often unequal; filaments linear to filiform; anthers dorsifixed, in general introrse, very rarely extrorse, whether or not appendiculate at the base, opening by round terminal or ± oblique and more elliptic sublateral pores; pollen agglutinate. *Disk* mostly thick and ± prominent, 5–10(–14)-lobed. *Ovary* superior, 5(–7)-locular, placentas bifid, bearing numerous ovules; style mostly as long as, rarely shorter than the stamens; stigma capitate to turbinate, sometimes almost peltate, crenate to deeply lobed. *Capsule* dehiscent from the top, firstly by whether or not throwing off a soft-celled outer stratum, then dividing its valves into a star-shaped figure, valves thin to very thick, straight or twisting in later stages, the central column persistent. *Seeds* very numerous, minute, whether or not bearing appendages or thread-like tails at both ends; testa thin, reticulate; albumen fleshy.

Distr. Approximately 850 *spp.* in all, of which *c.* 525 occur in Asia (mainly in tropical and subtropical E. and SE. Asia), *c.* 25 *spp.* in N. America, 9 *spp.* in Europe, 1 *sp.* in Australia (N. Queensland), in *Malesia c.* 280 *spp.*, about half of them in New Guinea incl. New Britain and the Solomon Is. (Bougainville to Malaita), not extending into the proper Pacific flora. Fig. 1.

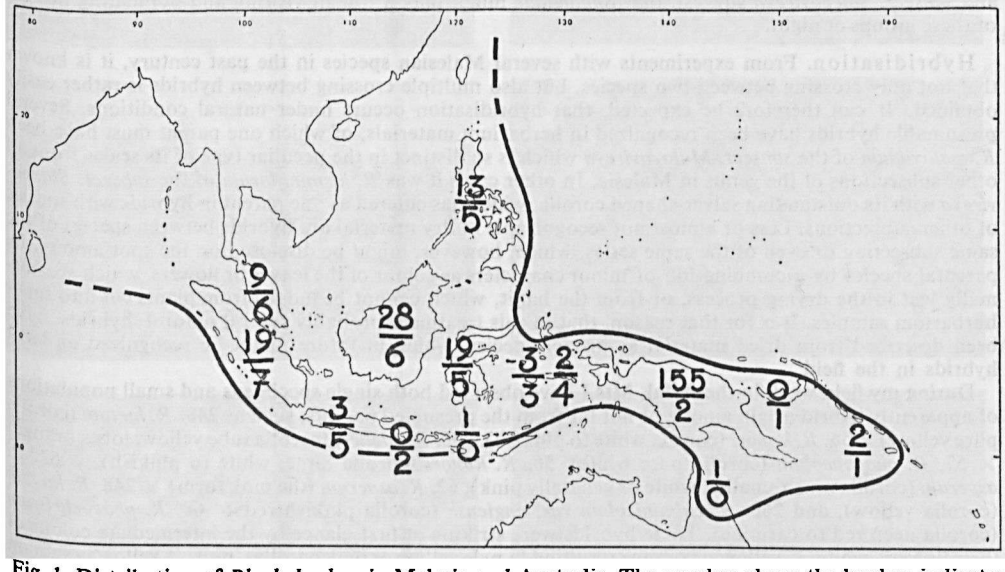


Fig. 1. Distribution of *Rhododendron* in Malesia and Australia. The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

The bulk of the Malesian species belong to the lepidote *sect. Vireya*, which outside Malesia has 2 *spp.* in Indochina (*R. triumphans* YERSIN & CHEVAL. and *R. chevalieri* DOP in S. Annam), and 1 *sp.* in Australia (*R. lochae* F. v. M. in NE. Queensland). Only 5 elepidote *spp.* are native in Malesia, all closely related to continental, Asia-centred groups, extending into the Philippines (Luzon), the Malay Peninsula, and Sumatra.

Ecol. Most species occur as terrestrial substage shrubs or as epiphytes in the mountain forest, especially in the moss forest, and only occasionally (and then apparently always as epiphytes) in lowland forest, even in the mangrove (*R. brookeanum* and *R. longiflorum*). Terrestrial in general in the fringes of the upper forest belt and adjacent savannahs, they may grow there occasionally as epiphytes on *Podocarpus* and tree-ferns. They become dwarfs in the alpine zone in grassland and on rocks, reaching altitudes of about 4000 m both in Borneo (Mt Kinabalu) and in New Guinea. In most epiphytic species flowering seems to be rather irregular, so that flowers may be found during the whole year, other (and predominantly the terrestrial) species have a more pronounced flowering time.

Dispersal. Each capsule contains very numerous light seeds, each in most of the Malesian species provided with a narrow wing or tail at both ends. These seeds are apparently easily carried by wind, especially from epiphytic specimens living in the crowns of high forest trees. The fact, that landslides, or artificially cleared ground (abandoned cultures, air strips), or sluiced areas of gold mines in Borneo and New Guinea are often quickly grown with *Rhododendron* species from the neighbouring forests, points to wind as the main factor in natural dispersal.

RIDLEY (Dispersal, 1930, 127) thinks, that these seeds are attached by their tails to the branches of the trees on which they grow, but there is no proof of that.

Pollination. The only observations on pollination in Malesian *Rhododendron* refer to *R. retusum* from Sumatra and Java. According to DOCTERS VAN LEEUWEN "the anthers in the adult bud lie close under the hood formed by the corolla lobes; they are all open, and the pollen hangs in threads from the anthers. In this stage the stigma lies at a distance of about 2 mm below the anthers, and is not yet receptive. The flowers are therefore distinctly protandrous. Not much is changed on the first flowering day; during the second and the third flowering-day the style elongates, and as the now receptive stigma brushes past the anthers, it will come in contact with the pollen-masses hanging down from the latter. Finally the stigma projects 1 or 2 mm beyond the corolla". *R. retusum* has been seen visited bij a honeybird (*Aethopyga eximea*) and bumble-bees (DOCTERS VAN LEEUWEN, Verh. Kon. Ak. Wet. A'dam sect. 2, 31, 1933, 204).

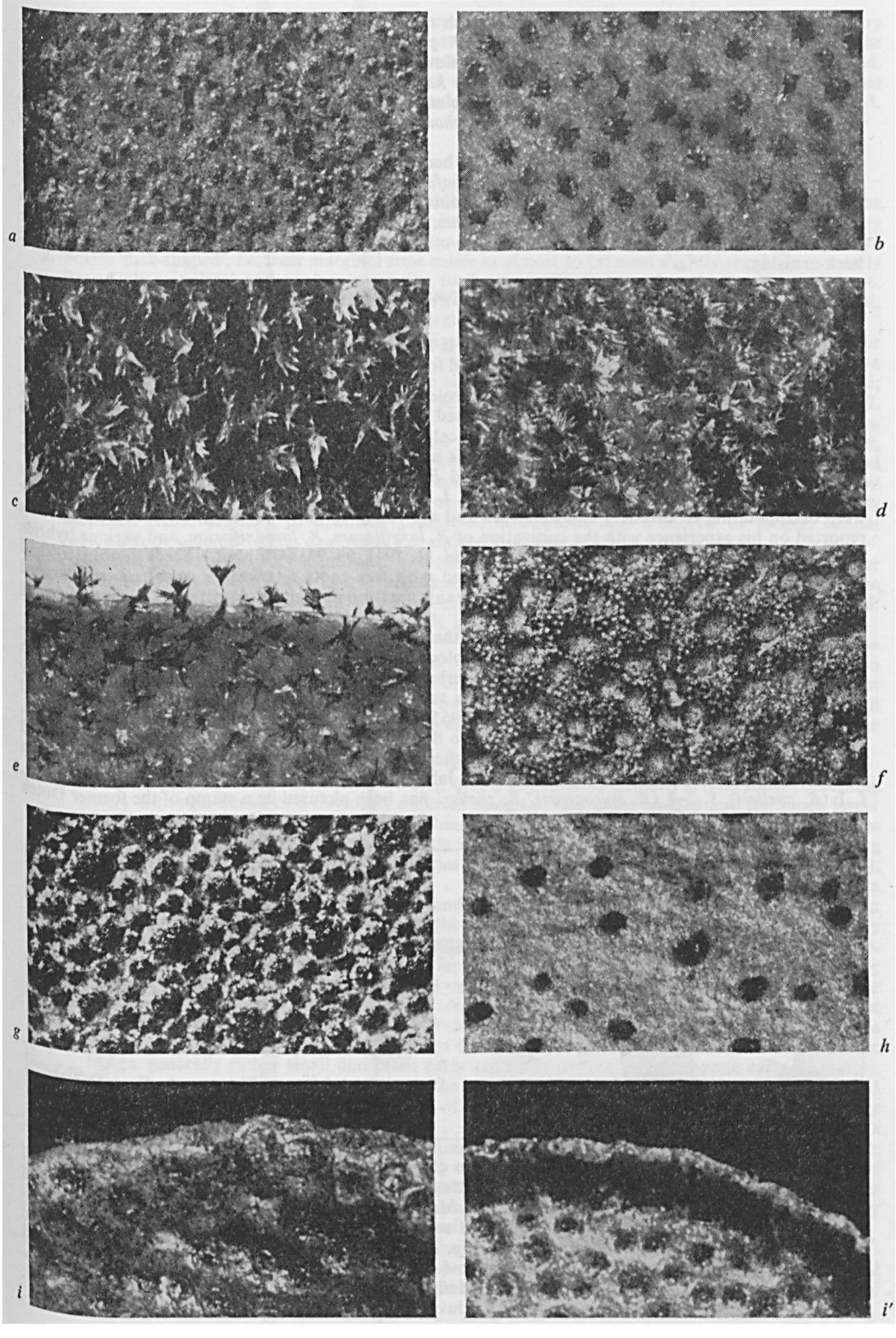
During his stay in New Guinea (Kubor Range, Western Highlands), Mr W. VINK has observed many times at 3600 m altitude that *Rhododendron* flowers were visited by the sooty honey sucker bird *Melidectes fuscus fuscus* (DE VIS), taking honey from the red, tubular corollas.

The salver-shaped, partly sweet-scented flowers of the species belonging to *subsect. Siphonovireya* and *subsect. Solenovireya* suggest, that *Sphingidae* might play a role in visiting and pollinating flowers of these groups at night.

Hybridisation. From experiments with several Malesian species in the past century, it is known that not only crossing between two species, but also multiple crossing between hybrids is rather easily obtained. It can therefore be expected, that hybridisation occurs under natural conditions. Several presumable hybrids have been recognized in herbarium materials, of which one parent must have been *R. malayanum* of the *subsect. Malayovireya* which is so distinct in the peculiar type of its scales from all other subsections of the genus in Malesia. In other cases it was *R. jasminiflorum* of the *subsect. Solenovireya* with its outstanding salver-shaped corolla, which has entered as one parent in hybrids with species of other subsections. Less or almost not recognizable in dry material are hybrids between species of the same subsection or even of the same series, which, however, might be disclosed on the spot among the parental species by a combination of minor characters as colour of the leaves or flowers, which are normally lost in the drying process, or from the habit, which cannot be judged from plants cut into small herbarium samples. It is for that reason, that in this treatment probably several natural hybrids have been described from dried material as proper species, which in future might be recognized as local hybrids in the field.

During my field work in the Arfak Mts I have observed both single specimens and small populations of apparently hybrid origin among or not far from the presumed parents, such as 248. *R. laetum* (corolla pure yellow) × 56. *R. konori* (corolla white to pinkish), 255. *R. zoelleri* (corolla tube yellow, lobes orange) × 57. *R. phaeopeplum* (corolla pure white), 56. *R. konori* (corolla large, white to pinkish) × 62. *R. asperum* (corolla much smaller, white or generally pink), 62. *R. asperum* (the pink form) × 248. *R. laetum* (corolla yellow), and 268. *R. culminicolum var. angiense* (corolla pinkish red × 68. *R. phaeochristum* (corolla deep red to carmine). These hybrids were striking at first glance by the intermediate colour of their flowers, white × yellow or orange resulting in pale yellow or pink corollas, pink × yellow in salmon shades of various degree. The pods found on such hybrids were intermediate in size and density of indument, *and regularly full of seeds.* Hybrids between species of *subsect. Euvireya* (268. *R. culminicolum*

Fig. 3. Main types of scales on the undersurface of leaves and used in the key to the subsections of *Rhododendron sect. Vireya*, all × 20. *a.* Rather small sessile and moderately stellate-incised scales on a dry leaf of *R. inconspicuum. b.* Rather large subsessile (subdendroid) and more deeply stellate scales on a fresh leaf of *R. dianthosmum. c.* Stalked (dendroid) scales on a fresh leaf of *R. leucogigas. d.* Tomentum (felt) of densely set dendroid and deeply stellate-lacerate scales on a fresh leaf of *R. beyerinckianum. e.* Dendroid and deeply stellate scales, each scale on top of an epidermal tubercle, on leaf margin of a fresh leaf of *R. bryophilum. f.* Epidermal tubercles (papillae) on old dry leaf of *R. konori*, the scales already gone. *g.* Scales typical for the species of *subsect. Malayovireya* on a dry leaf of *R. malayanum. h.* Disk-shaped and sessile scales on a dry leaf of *R. retusum. i–i'.* Disk-shaped and sessile scales on upper surface (*i*) and undersurface (*i'*) of a dry leaf of *R. gaultheriifolium*, also showing the crenulation of the leaf margin by impressed scales (*a* SLEUMER & VINK 4261, *b–e* cultivated at Proefstation voor de Boomkwekerij (Experim. Station for the cultivation of trees and shrubs) at Boskoop, Holland, *f* KOSTERMANS 2248, *g* MEIJER *s.n.* from Mt Sago, Sumatra, *h* VAN OOSTSTROOM 13310, *i–i'* SLEUMER 4156).


a
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var. angiense, 248. *R. laetum*, 255. *R. zoelleri*) with rather scattered flattish scales, with such of *subsect. Phaeovireya* (62. *R. asperum*, 56. *R. konori*, 68. *R. phaeochristum*) with dense, dendroid scales, showed an intermediate type and/or density of scales on flowers and leaves. The enormous variation in size of corolla and fruit around the Anggi Lakes of *R. konori* is probably due to introgression of local *R. asperum* into the very abundant *R. konori*. Combination of 5-merous species (*R. asperum*, *R. zoelleri*) with normally 7-merous species (*R. konori*, *R. phaeopeplum*) resulted in specimens with 6- or 5- *and* 6-merous flowers.

Such hybrids have in New Guinea exclusively been found in burned or otherwise devastated places within the surrounding *Castanopsis-Quercus-Nothofagus* forest, where the parental species grow rather scattered and often as epiphytes under natural conditions. Obviously species of the forest invade such open places covered by regrowths of *Pteridium*, *Gleichenia*, grasses, sedges, *Lycopodium*, *etc.*, they may become terrestrial, multiply considerably, can meet each other and thus get a better chance for crossing and back-crossing.

Vern. *Tjantigi*, J, S; New Guinea: *waradé*, Kapauku, *tschop-schai*, Manikiong, *krobua*, Kebar, *rohn*, Mendi.

Uses. Although the wood is hard, no real use is known as apparently the stems are to small in diameter in general. The flowers are occasionally used for decoration purposes by the natives.

Cultivation. The genus plays an important role in horticulture. In the first place, the most hardy species from temperate regions have been cultivated outdoors, but more and more less hardy and more showy ones have been introduced from the tropical and subtropical mountains of SE. Asia into those parts of Europe and America, where the winter is not too strong. W. Malesian *Rhododendrons* such as *R. longiflorum*, *R. javanicum*, *R. malayanum*, and *R. jasminiflorum* have been cultivated in European glasshouses since a hundred years (*cf.* HENSLOW, J. R. Hort. Soc. 13, 1891, 240–283). Apparently they were disappointing to breeders and amateurs and are today confined to Botanic Gardens. HOLTTUM reported on his experience with the cultivation of *R. longiflorum*, *R. jasminiflorum*, and various hybrids at Singapore (M.A.H.A. Mag. 9, 1939, 34–37; *ibid.* 11, 1941, 93–95, with phot.). Seeds germinated and seedlings grew best on finely broken brick mixed with fern-roots (*Asplenium nidus*) or on chopped (tree-)fern-roots only, probably due to the favourable aeration in such a substratum. The first flowering began at *c.* 2½ years from seed.

A new interest started when the first species of the upper montane part of New Guinea, *R. beyerinckianum*, with its deep blood-red flowers, came into bloom from a seven years old seedling in the Edinburgh Botanical Garden in 1956. Through the Rijksherbarium at Leyden, seeds of about 40 *spp.* of New Guinean *Rhododendron* have been distributed to various nurseries (Boskoop, Seattle) and Botanical Gardens (Edinburgh, Kew, San Francisco) since 1955, several of which (*R. macgregoriae*, *R. wrightianum*, *R. leptanthum*, *R. zoelleri*) have already come into flower. Among others I introduced the big-flowered 238. *R. leucogigas* from the Cycloop Mts in northern New Guinea in 1961 by cuttings, one of which has flowered in 1964 at Boskoop, *cf.* SCHNEIDER, Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) 29–33, f. 1 (*R. zoelleri*), f. 2–4 (*R. leucogigas*). *R. zoelleri* has been pictured on a stamp of the former Dutch New Guinea.

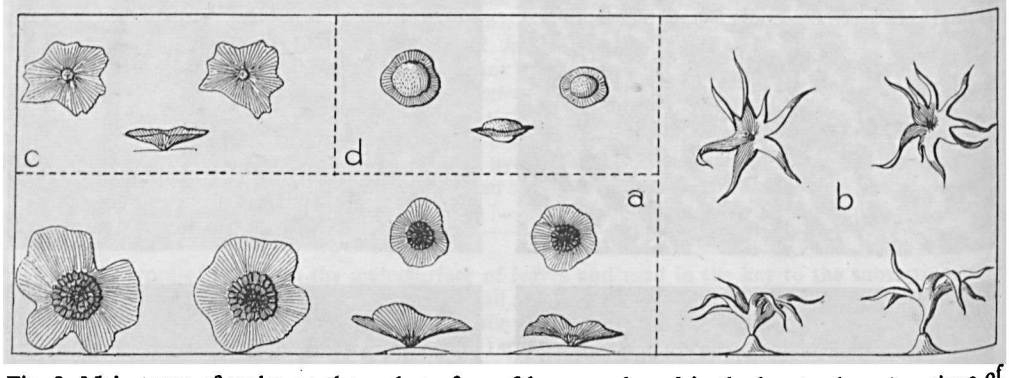

Fig. 2. Main types of scales on the undersurface of leaves and used in the key to the subsections of *Rhododendron sect. Vireya*, all × 70. *a.* Scale variously lobed, with dark chestnut coloured centre and of two different sizes, exclusively found in *subsect. Malayovireya* (*R. malayanum*). *b.* Scale deeply stellate-incised or -lacerate and stalked ("dendroid") to various degree (*R. konori*); on top of an epidermal tubercle exclusively found in *subsect. Phaeovireya*. *c.* Scale moderately substellately angled or dented and sessile (*R. javanicum*). *d.* Scale entire or almost so and sessile, exclusively found in *subsect. Pseudovireya* (*R. quadrasianum var. cuneifolium*). (*a* MEIJER *s.n.*, Mt Sago, Sumatra, *b.* KOSTERMANS 2248, *c* JUNGHUHN *s.n.*, Java, *d* SINCLAIR 9084).

Notes. When not stated otherwise all measurements given in the descriptions are taken from dry specimens; to get the full life size of fleshy organs as corollas, fruits, *etc.*, generally ± 20 % should be added. The colours mentioned are those taken from the collectors labels or observed by me in the field.

For the determination of the lepidote species the detail examination of the various types of scales on which the different subsections are mainly based, and the use of a lens are indispensable. See fig. 2–3.

KEY TO THE SUBGENERA, SECTIONS AND SUBSECTIONS

1. Plants lepidote, *i.e.* covered with scales (= epidermal trichomes) at least on the undersurface of the young leaves, mostly also on the tips of the branchlets and in the floral region. Seeds manifestly appendaged by ± long tails or wings at both ends. . . . . 1. SUBG. RHODODENDRON *sect.* **Vireya**
2. Scales 'disk-shaped', *i.e.* their marginal zone entire or almost so (at most slightly-regularly or mostly irregularly-crenulate) and narrow in relation to the generally darker, often thick or swollen centre. (Scales on the branchlets and/or the pedicels sometimes on top of thick, persistent, epidermal, wart-like protuberances, never so on the blades). — Fig. 2d.
3. Corolla generally short-tubular, rarely funnel-shaped or (tubular-)campanulate; lobes erect or spreading. *Spp.* 1–25 . . . . . **1.** *Subsect.* **Pseudovireya**
3. Corolla trumpet-like or salver-shaped, tube elongate and ± narrow, straight or slightly curved; lobes equalling ½ or less of the total length of the corolla, spreading ± horizontally. *Spp.* 26–32. **2.** *Subsect.* **Siphonovireya**
2. Scales 'star-shaped', *i.e.* their marginal zone distinctly—regularly or irregularly—lobed, dented, incised or lacerate to various degree on the branchlets and the foliage (sometimes less deeply dented or even subentire and more disk-like on the corolla and/or the ovary), narrow to wide in relation to the mostly darker, generally but slightly or not thickened centre. Centre either flat to slightly deepened (scale 'sessile'), or distinctly protracted downwards into a shorter or longer, slender foot, stem or column (scale 'dendroid', *i.e.* stalked). — Fig. 2a–c.
4. Scales in general markedly 'dendroid', and each on top of a distinct and permanent, bluntish or subapiculate, tubercle; upper and/or undersurface of the leaves ± rough to the touch after the scales are gone. (Marginal zone of the scales usually wide and deeply, often narrowly incised; extreme forms similar to stellate hairs, which, however, are absent). *Spp.* 33–74. — Fig. 2b. **3.** *Subsect.* **Phaeovireya**
4. Scales usually 'sessile', rarely 'subdendroid' (sometimes so in *subsect. Solenovireya*, rarely in *subsect. Euvireya*), and each either on top of a low and rather inconspicuous, apparently not permanent epidermal tubercle, or mostly on no tubercles at all; leaves quite smooth at least at full age on both faces. (Marginal zone of the scales narrow to wide; centre often ± sunk into the epidermis of the leaves).
5. Centre of the scales rather large and very dark (sooty or dark chestnut or blackish brown). Marginal zone of the scales relatively wide, ± deeply and broadly obtusely several-lobed, becoming silvery with age. Scales of 2 obviously different sizes, *i.e.* very many smaller and few much larger ones irregularly mixed, all very dense, touching or at least in part overlapping each other. (Scales of a similar type, but smaller, less distinctly unequal and spaced for their greater, overlapping for their smaller number: hybrids of the species of this subsection with species of other subsections). *Spp.* 75–88. — Fig. 2a. . . . . **4.** *Subsect.* **Malayovireya**
5. Centre of the scales mostly rather small and variously coloured (though never as dark as in *subsect. Malayovireya*). Marginal zone of the scales wider or narrower, mostly but moderately (up to ± halfway) lobed or dented. Scales all equal in size, very dense to very spaced. — Fig. 2c.
6. Scales very dense, touching or slightly overlapping each other, generally rather large, still forming a coherent layer on the undersurface of ± mature leaves which persists for a rather long time (the pits which remain, when the proper scales have finally gone, dense to very dense, at least denser than in *subsect. Euvireya*). *Spp.* 89–102 . . . . . **5.** *Subsect.* **Albovireya**
6. Scales lax to subdense, rarely dense, always distinctly spaced on the undersurface of ± mature leaves, generally rather small and often early caducous (or the marginal zone early dissolute).
7. Corolla trumpet-like or salver-shaped, the straight or somewhat curved tube elongate and narrow, lobes relatively short, equalling ½ of less of the total length of the corolla and spreading ± horizontally. *Spp.* 103–136 . . . . . **6.** *Subsect.* **Solenovireya**
7. Corolla either tubular, campanulate or funnel-shaped, tube generally wider and shorter than in *subsect. Solenovireya*, lobes equalling ½ or more of the total length of the corolla, erect or funnel-shaped, rarely horizontally expanded. *Spp.* 137–276. . . . . **7.** *Subsect.* **Euvireya**

1. Plants elepidote, *i.e.* without any scales. Seeds whether or not provided with short, irregular, mostly one-sided appendages, but no proper tails at both ends.
8. Flower buds (or inflorescences) strictly terminal (solitary).
9. Flowers and leafy branchlets (new foliate shoots) from different buds, the first from terminal (strictly floral) buds, the latter from lateral buds, *i.e.* from the axils of the leaves of the past season. Hairs, if bristle-like, not flattened.

10. Leaves persistent. *Spp.* 277–279. . . . 2. SUBG. HYMENANTHES *sect.* **Hymenanthes** *subsect.* **Irrorata**
10. Leaves deciduous. *Sp.* 280. . . . . 3. SUBG. PENTANTHERA *sect.* **Pentanthera**
9. Flowers and leafy branchlets (new foliate shoots) from the same terminal bud, the latter from the axils of the lowest, scale-like perulae of the recent season. Hairs often bristle-like and flattened. Leaves persistent or deciduous. *Spp.* 281–286. . . . . 4. SUBG. TSUTSUTSI *sect.* **Tsutsutsi**
8. Flower buds (or inflorescences), although seemingly 'terminal', really lateral (mostly several together), coming from the axil(s) of the uppermost leaf (or leaves). Leaves persistent. *Spp.* 287–288. 5. SUBG. AZALEASTRUM *sect.* **Choniastrum**

1. Subgenus Rhododendron

Rhododendron sect. Eurhododendron ENDL. Gen. (1839) 759 *p.p.*; DC. Prod. 7 (1839) 721 *p.p.*; MIQ. Fl. Ind. Bat. 2 (1859) 1057. — *Rhododendron subg. Lepidorrhodion* KOEHNE, Deutsch. Dendrol. (1893) 449; SLEUM. Bot. Jahrb. 74 (1949) 530.

Plants lepidote, *i.e.* covered with scales (epidermal trichomes) at least on the undersurface of the young leaves, generally also on the branchlets and in the floral region.

1. Section Vireya

(BL.) COPEL. *f.* Philip. J. Sc. 40 (1929) 136, 151; SLEUM. Bot. Jahrb. 74 (1949) 536; Reinwardtia 5 (1960) 50. — *Vireya* BL. Bijdr. (1826) 854; G. DON, Gen. Syst. 3 (1834) 846; STEUD. Nom. Bot. ed. 2, 2 (1841) 774 ('*Viereya*'). — *Rhododendron subg. Vireya* (BL.) CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 462; COPEL. *f.* Am. Midl. Nat. 30 (1943) 604.

Seeds manifestly appendaged by ± long tails or wings at both ends.

Distr. E. Asia, Australia (N. Queensland), and *Malesia.*

1. Subsection Pseudovireya

(CLARKE) SLEUM. Bot. Jahrb. 74 (1949) 537; Blumea Suppl. 4 (1958) 47; Reinwardtia 5 (1960) 50. — *Rhododendron subg. Pseudovireya* CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 464. — *Rhododendron sect. Zygomorphanthe* SCHLTR, Bot. Jahrb. 55 (1918) 145 *p.p.* — *Rhododendron sect. Discovireya* SLEUM. Bot. Jahrb. 74 (1949) 539.

Scales disk-shaped, *i.e.* their marginal zone entire or almost so (at most slightly—regularly or mostly irregularly—crenulate) and narrow in relation to the generally darker, often thick or swollen centre, on the branchlets and/or the pedicels sometimes on top of thick, persistent, wart-like stalks. *Corolla* mostly ± shortly tubular, rarely funnel-shaped or (tubular-)campanulate, lobes erect to spreading.

Distr. E. Asia, *Malesia.* Fig. 4.

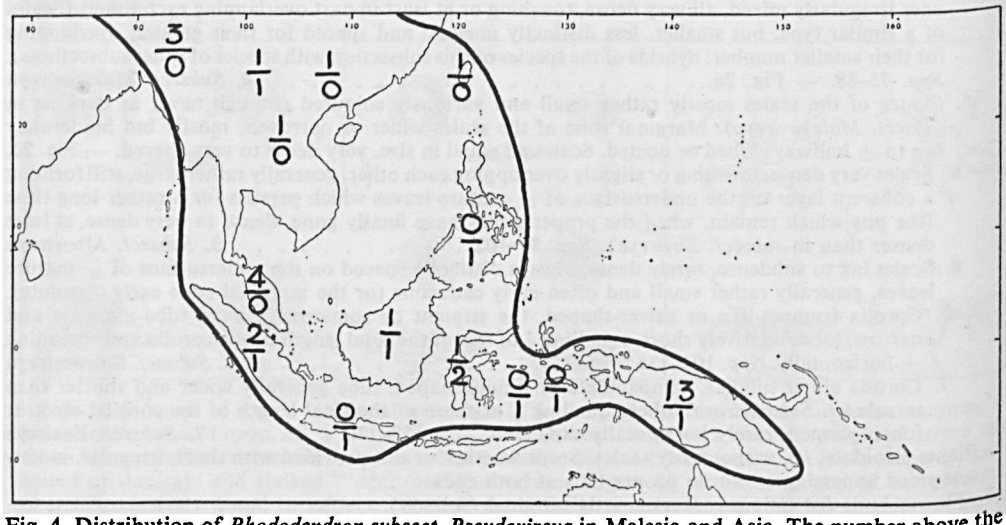

Fig. 4. Distribution of *Rhododendron subsect. Pseudovireya* in Malesia and Asia. The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

KEY TO THE SPECIES

1. Branchlets covered at the tips with scales on stalks (*c.* 0.5 mm), densely verruculose in the older parts by the remaining stalks when the scales are gone.
2. Calyx long-ciliate, *i.e.* laxly or ± densely set with rather long whitish hairs at the margin.
3. Leaves obovate to oblong-obovate, arranged in distinct pseudowhorls, (1.5–)2.5–4(–6.5) by (0.8–)1.2–1.8(–3) cm. (Umbels (2–)4–10-flowered) . . . . . **1. R. retusum**
3. Leaves lanceolate or oblong-lanceolate, spirally arranged, very dense together, 6–12 by 2–3 mm. **2. R. taxoides**
2. Calyx very laxly and shortly ciliate, or not ciliate.
4. Flowers solitary or more rarely in twos.
5. Corolla 1–1.3 (rarely up to 1.5) cm long in all. Leaves 4–9 mm long.
6. Leaves entire or nearly so, the margin hardly or not thickened and but slightly revolute.
7. Leaves elliptic or elliptic- or oblong-obovate, obtuse or subacute at apex, laxly lepidote underneath. Pedicels very slender, lepidote and shortly patently hairy **3. R. pulleanum *var.* pulleanum**
7. Leaves broad-obovate to nearly rounded, often retuse, ± densely lepidote beneath. Pedicels rather stoutish, densely lepidote, very sparsely or not hairy . . . . . **4. R. nummatum**
6. Leaves well visibly crenulate by impressed scales at the ± thickened margin, ovate or elliptic-ovate, obtusely acuminate . . . . . **5. R. gaultheriifolium**
5. Corolla (1.5–)1.7–2.4 cm long in all (when 1.5 cm long, then the leaves at least in part longer than 10 mm). Leaves 6–20 mm long.
8. Leaves elliptic, or ovate- or oblong-elliptic, gradually subacuminate towards the apex, subobtuse. **6. R. oreites**
8. Leaves narrowly to broadly obovate, or suborbicular, obtuse or retuse at apex.
9. Leaves ± elongate-obovate, 6–9(–10) by (2–)2.5–4 (rarely in part up to 6) mm **7. R. erosipetalum**
9. Leaves obovate to broadly obovate or suborbicular, or, if oblong- or elliptic-obovate, the smallest at least 5 mm wide in the same specimen.
10. Leaves obovate-suborbicular, 7–10 by 5–8 mm. . . . . **8. R. hameliiflorum**
10. Leaves obovate or broadly obovate, or oblong- or elliptic-obovate.
11. Leaves 6–10 by 4–6 mm. . . . . **3. R. pulleanum *var.* maiusculum**
11. Leaves (8–)10–25 by (5–)6–12(–18) mm.
12. Anthers 1–1.2(–1.5) mm long. Capsules 1–1.5(–1.8) cm long . . . . **9. R. lindaueanum**
12. Anthers 2 mm long. Capsules 7–8 mm long . . . . . **10. R. spathulatum**
4. Umbels 3–5-flowered.
13. Leaves minutely, though well visibly crenulate, ovate to elliptic- or oblong-ovate or elliptic, rarely obovate-elliptic, slightly or not revolute at the margin.
14. Leaves 0.7–1.8 by 0.5–1.2 cm; scales very dense, partly touching each other on the undersurface of the leaves; nerves ± inconspicuous beneath. . . . . **11. R. saruwagedicum**
14. Leaves (1.5–)2–3.5 by (1.2–)1.5–2(–2.2) cm; scales less dense, all distant from each other on the undersurface of the leaves; nerves ± conspicuous beneath. . . . . **12. R. invasorium**
13. Leaves quite entire, obovate-spathulate or broadly oblanceolate, much revolute at the margin; nerves mostly distinctly prominent beneath . . . . . **13. R. perakense**
1. Branchlets covered at the tips with scales on very low stalks, or sessile, inconspicuously verruculose or mostly smooth when the scales are gone.
15. Corolla distinctly funnel-shaped or campanulate.
16. Leaves reticulate beneath. Branchlets dirty brown-velutinous at the tips . . **14. R. vanderbiltianum**
16. Leaves not reticulate beneath. Branchlets papillose-puberulous, or not hairy at all at the tips.
17. Leaves oblong-obovate or narrowly elliptic, sometimes almost lanceolate, 0.5–1.1 cm wide. **15. R. seimundii**
17. Leaves elliptic, or elliptic-suborbicular, or (broadly) obovate, (1.5–)1.8–2.3(–3) cm wide. **16. R. scortechinii**
15. Corolla tubular or nearly so, at most slightly widened towards the limb.
18. Umbels (4–)6–12-flowered (with longish subpatent hairs at the pedicels when 4- or 5-flowered).
19. Leaves 0.8–1.8 cm by 2–3 mm . . . . . **.17. R. adinophyllum**
19. Leaves 2.5–3 by 1.2–1.9 cm . . . . . **18. R. cyrtophyllum**
18. Flowers solitary or in twos (very rarely up to 4 in an umbel, but then the pedicels not longish subpatent-hairy).
20. Calyx lobes distinct, elongate-subovate-triangular, obtuse, ± 2 mm . . . **.19. R. ericoides**
20. Calyx lobes broadly ovate-rounded, obtuse, up to 1 mm, or generally rather inconspicuous.
21. Leaves lanceolate, subacute at apex and base, 4–6 by 1.5–2.5 mm. **20. R. nanophyton *var.* nanophyton**
21. Leaves ovate, or oblong, or elliptic, or (elongate-)obovate, ± obtuse at apex and/or base.
22. Corolla 2.5–3.2 cm long in all.
23. Ovary densely and exclusively lepidote.

24. Leaves ovate to elliptic-ovate or elliptic, 5–8(–12) by 3–5(–8) mm . . **21. R. schizostigma**
24. Leaves obovate, 1.9–4.3 by 0.7–1.9 cm. . . . . **22. R. meliphagidum**
23. Ovary densely hairy *and* lepidote (scales almost covered by the hairs) . . . . **23. R. vinkii**
22. Corolla 1–1.8 (rarely up to 2.5) cm long in all.
25. Leaves obovate-oblong, 2.5–4(–6) by 1.5–2(–2.5) mm. **20. R. nanophyton** *var.* **petrophilum**
25. Leaves longer.
26. Branchlets besides the scales bearing no hairs at all. Corolla lobes distinctly erose-denticulate at apex . . . . . **24. R. ciliilobum**
26. Branchlets besides the scales generally short-pubescent or patent-puberulous at the tips (and may be on the petioles). Corolla lobes entire. . . . . **25. R. quadrasianum**

1. Rhododendron retusum [REINW. Verh. Bat. Gen. 9 (1823) 32, *nom. nud.*] (BL.) BENN. in Benn. & Br. Pl. Jav. Rar. (1838) 86 *in text*, 88, t. 20; DC. Prod. 7 (1839) 724; HASSK. Cat. Hort. Bog. (1844) 161; MOR. Syst. Verz. (1846) 42; PLANCH. Fl. Serres 5 (1849) 477–480 h; ZOLL. Syst. Verz. 2 (1854) 137; HOUTTE, Fl. Serres 10 (1854–55) t. 1044; HOOK. Bot. Mag. (1855) t. 4859; LEMAIRE, Ill. Hort. 2 (1855) t. 70; MIQ. Fl. Ind. Bat. 2 (1859) 1058; *ibid.* Suppl. 1 (1860) 251, 586 (*f. angustifolia*); Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 44; BL. Fl. Jav. Pl. inéd. (1863–83) t. 7 & 7B, f. 2, A & B; BOERL. in Veth, Midden Sumatra 4, 2 (1884) 22; KOORD. Junghuhn Gedenkb. (1910) 185; Exk. Fl. Java 3 (1912) 5, f. 2; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 106; J.J.S. in K. & V. Bijdr. 13 (1914) 110; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 58; MILLAIS, Rhodod. (1917) 235; KOORD. Fl. Tjib. 3 (1918) 4; HOCHR. Candollea 2 (1925) 491, *incl. var. macranthum* HOCHR. *l.c.* 492; SP. MOORE, J. Bot. 63 (1925) Suppl. 57; DOCTERS VAN LEEUWEN, Trop. Natuur 16 (1927) 190, f. 33; Pangrango (1933) 204, t. 29A; J.J.S. in Merr. Contr. Arn. Arb. 8 (1934) 122; STEEN. Trop. Natuur 24 (1935) 143; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 3; SLEUM. Reinwardtia 5 (1960) 54; STEEN. Endeavour 21 (1962) 189, t. 6; SLEUM. Blumea 12 (1963) 90. — *Vireya retusa* BL. Bijdr. (1826) 856; G. DON, Gen. Syst. 3 (1834) 848. — *Azalea retusa* (BL.) O. KTZE, Rev. Gen. Pl. 2 (1891) 386, 387. — **Fig. 104.**

KEY TO THE VARIETIES

1. Corolla strictly tubular, 2–2.5(–3) cm long in all, lepidote and hairy outside.
2. Style lepidote at the base, bearing no hairs at all. . . . . **1.** *var.* **retusum**
2. Style laxly patent-hairy at the base or in the lower half . . . . . **2.** *var.* **trichostylum**
1. Corolla tubular-campanulate, *c.* 1.4 cm long in all, exclusively lepidote outside. **3.** *var.* **epilosum**

1. *var.* **retusum.**

Shrub or small tree, (0.3–)2–4(–7) m, in general terrestrial, erect or occasionally creeping as pioneer; stem or trunk nodose, dark brown, irregularly branched; branches grey-corticated. Branchlets terete, younger parts red, densely clad with stalked roundish rather soon caducous scales, the remaining stalks in form of thickish warts, which make the upper 3–4 internodes brownish-blackish verruculose; internodes 2–6 cm. *Leaves* in 4–7-merous pseudowhorls at the upper nodes, obovate to oblong-obovate, apex rounded or mostly retuse, base cuneate into the petiole, subcoriaceous to coriaceous, dark green and shining above, paler to almost whitish green and ± dull beneath, laxly to subdensely lepidote on both faces initially, early glabrescent above only (scales disk-like, marginal zone narrow and ± entire, centre rather large and thick, manifestly impressed), margin ± distinctly recurved, (1.5–)2.5–4(–6.5) by (0.8–)1.2–1.8(–3) cm, midrib impressed above, strongly raised beneath, nerves 4–6(–8) pairs, lower ones ± ascendent, higher ones irregularly spreading, all slightly impressed above in fully mature leaves only, otherwise but faintly visible, ± obsolete beneath, reticulation 0; petiole stoutish, grooved above, lepidote or finally rugose, 1–5 mm. *Umbels* (2–)4–10-flowered; flowers erect in the early bud stage, pendulous afterwards. Outer perulae subulate to ovate-acuminate, inner ones gradually increasing in size and broadly ovate to spathulate, shortly acute, ± lepidote outside, inner ones sericeous in their lower part, all ± densely and longish white-ciliate, up to 1.3 by 0.8 cm. Bracteoles linear to filiform, up to 6 mm. Pedicels rather slender, densely ± patently hairy (to nearly villous), lepidote only at the apex, (0.5–)1.2–1.5(–2) cm. *Calyx* small, oblique, shortly 5-lobed or -dentate, *c.* 4 mm ø, densely lepidote outside, lobes *c.* 1 mm long ciliate. *Corolla* tubular, light red to intense scarlet, or flame- or orange-red, 2–2.5 (rarely up to 3) cm long in all, tube rather straight-cylindric, base slightly 5-saccate or dilated in form of a ring, 4–6 mm ø at the very base, dilated upwards to 8 mm, laxly to rather densely yellow-lepidote and short whitish hairy outside, glabrous inside, lobes erecto-patent or somewhat spreading, broadly oblong to suborbicular, 4–6 by 3–5 mm. *Stamens* 10, alternately slightly unequal, mostly ± exserted; filaments linear, somewhat widened below, glabrous; anthers broad-oblong, truncate at the top, *c.* 1.5 by 1 mm. *Disk* glabrous. *Ovary* oblong-conical, 5-angular or -grooved, densely lepidote, not hairy at all, *c.* 4 mm, rather abruptly narrowed to the style, the latter filiform, lepidote at the base only, otherwise glabrous, accrescent during anthesis, finally slightly exserted; stigma capitate, shortly 5-lobed. *Capsule* erect, oblong-fusiform, lepidote, 1–1.5(–1.8) by 0.4–0.5 cm, on a hairy pedicel 1.8–2.4 cm. *Seeds* oblong, *c.* 2 mm, winged in two opposite directions, wings membranous, obcuneate, irregularly incised distally.

Distr. *Malesia*: Sumatra, Java (especially in W. Java; in central Java only known from Mt

Prahu (Diëng) and Mt Merapi; in E. Java from Mt Ardjuno).

Ecol. In subalpine forests or shrubberies, in mossy *Vaccinium* forest, as well in a soil rich in humus (also in the moss-cushions of old fallen trees) as on sandy, stony or rocky grounds, often near craters and solfataras, there forming very low and small-leaved, windridden forms, the root-system of which extends near the surface of the ground, the stems able to root; locally not rare, (1350–)1500–3400 m. *Fl.* Jan.-Dec.

Pollination. After DOCTERS VAN LEEUWEN "the flowers are distinctly protandrous. During anthesis the style elongates, and the then receptive stigma brushes past the anthers, coming in contact with the pollen-masses, which hang down from the anthers in threads. In the basal annular part of the corolla nectar is secreted. The flowers are visited by small honey birds (*Aethopyga*) and bumble-bees, which apparently take part in the pollination".

Vern. *Bunga tjankė*, Sumatra (Kerintji), *tjantigi*, J, S, *tjantigi beureum*, S.

2. *var.* **trichostylum** SLEUM. Reinwardtia 5 (1960) 55.

Leaves 1.5–2.5 by 0.7–1.4 cm. Style laxly patent-hairy at the base or in the lower half.

Distr. *Malesia*: N. Sumatra (Atjeh: Goh Lembuh, Putjuk Angasan, Bur ni Tèlong), on forested slopes, 1350–2700 m.

3. *var.* **epilosum** J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 446; SLEUM. Reinwardtia 5 (1960) 55.

Corolla tubular-campanulate, *c.* 1.4 cm long in all, besides the scales not hairy at all outside.

Distr. *Malesia*: Central Sumatra (Padang Highlands: Mt Gombak), once found in low forest at 2330 m.

2. **Rhododendron taxoides** J. J. S. Nova Guinea 18 (1936) 92, t. 18, 2; SLEUM. Reinwardtia 5 (1960) 55.

Shrub, 0.4–1.5 m. Branchlets very densely set with leaves in their upper and with very numerous scars in the lower defoliate part respectively, and rather densely with caducous scales on short stalks, which remain in form of small, rather dense warts. *Leaves* scattered, lanceolate to oblong-lanceolate, apex obtusely acuminate, base shortly broad-attenuate, obtuse, stiffly coriaceous, shining green above and light green with brown scales beneath, glabrous above at full maturity, beneath rather laxly lepidote, more densely so on the midrib (scales sessile, rounded or nearly so, entire to irregularly undulate, marginal zone rather narrow, centre large, thick, dark and impressed), recurved at the whole margin, not rarely ± convex in dry specimens, edge somewhat thickened and crenulate by impressed scales, 6–12 by 2–3 mm, midrib very slightly grooved towards the base above, thick and obtusely raised beneath, nerves ± indistinct; petiole rather thick, lepidote, 1.5–2 mm. *Flowers* mostly in twos, sometimes solitary. Perulae narrow-ovate to obovate, apiculate, outer ones laxly lepidote dorsally, inner ones ± densely sericeous, ciliate, up to 6 by 3 mm. Bracteoles linear, pubescent, up to 5 mm. Pedicels slender, subdensely covered with shortly stalked scales and short hairs, 8–9 mm. *Calyx* oblique, small, disk-shaped, wavy, *c.* 3 mm ø, shortly obtusely 5-lobed, lepidote, margin laxly set with white hairs (*c.* 0.5 mm). *Corolla* dark red, 1.4–1.5 cm long in all, tubular, somewhat oblique and curved, rather densely lepidote outside except the upper part of the lobes, which bears some sparse hairs, glabrous inside, tube 1–1.2 cm long, *c.* 2.5 mm ø at base, widened up to 5 mm ø below the lobes, the latter ± erect, suborbicular to ovate, subtruncate-obtuse, minutely irregularly crenulate, ciliolate, *c.* 3 by 2–3 mm. *Stamens* 10, unequal, the longest nearly equalling the corolla; filaments filiform, glabrous; anthers subelliptic, *c.* 1 mm. *Disk* glabrous. *Ovary* obliquely conical, 5-ribbed, *c.* 2.5 by 1.5 mm, densely lepidote, gradually tapering to the glabrous and *c.* 1 cm long style; stigma thick-obconical, lobulate. *Capsule* obliquely fusiform, sparsely lepidote, *c.* 9 by 3 mm.

Distr. *Malesia*: W. New Guinea (Mt Doorman), on open slope or summit on serpentine rocks, 3250–3520 m. *Fl.* Oct.

3. **Rhododendron pulleanum** KOORD. Nova Guinea 8 (1912) 879, t. 154, 4; J. J. S. *ibid.* 12 (1914) 130; *ibid.* 18 (1936) 90; SLEUM. Reinwardtia 5 (1960) 56. — *R. minimifolium* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 98 *p.p.*

var. **pulleanum.**

Terrestrial or epiphytic shrub, up to 2 m, much branched. Branchlets terete, covered in the uppermost part with stalked scales, lower parts glabrescent though still densely verruculose by the remaining stalks, old parts smooth and grey-corticate. *Leaves* ± scattered or subopposite, rather dense along the branchlets, elliptic or elliptic- or oblong-obovate, apex subacute or mostly obtuse, base ± cuneate, coriaceous, deep green above, paler beneath, glabrous above, laxly lepidote beneath (scales brownish reddish, sessile, round, rather large, marginal zone narrow, entire or nearly so, centre thick, slightly or not impressed), edge ± revolute, or whole blade ± convex above in dry specimens, 4–7(–9) by 2.5–5 mm, midrib ± obscure above, slightly prominent beneath, nerves obsolete above, faintly visible beneath; petiole rather slender, 1–1.5 mm. *Flowers* solitary. Perulae ovate to oblong-ovate, subacute, unequal, up to 7 by 2–4 mm, glabrous, whitish ciliate. Bracteoles linear to narrow-spathulate, very shortly hairy, 5–7 mm. Pedicels very slender, nearly filiform, densely lepidote and finely patently hairy, *c.* 7 mm. *Calyx* oblique, lepidote, shortly 5-dented, 3 of the teeth short-triangular (1 mm), 2 other larger (1.5–3 mm), ± spreading. *Corolla* tubular, red, 1.3–1.5 cm in all, rather densely lepidote outside, glabrous inside, tube cylindric, straight, 10–12 mm long, 3–4 mm ø at base, 5–6 mm ø below the lobes, the latter erect, obovate-oblong, 2–3 (rarely up to 4) by 2–2.5 mm. *Stamens* 10, not or slightly exserted; filaments linear, filiform, glabrous; anthers oblong-obovate, truncate, *c.* 1 mm. *Disk*

glabrous. *Ovary* ovoid-conical, entirely covered with scales, *c.* 3 mm, rather gradually tapering to the style, the latter thickish, lepidote at the very base, glabrous otherwise, attaining *c.* 1 cm in length; stigma subclavate, moderately thickened, indistinctly 10-lobed.

Distr. *Malesia*: W. New Guinea (Nassau Mts).

Ecol. In mossy forest, or mostly in dense low scrub on exposed summits or in open dwarfish moss grown *Vaccinium* forest, 1420–2600(–3450?) m. *Fl.* Jan.–Dec.

var. **maiusculum** SLEUM. Reinwardtia 5 (1960) 56; Blumea 11 (1961) 113.

Leaves 6–10 by 4–6 mm. *Corolla* 1.7–2 cm long in all. Pedicels densely lepidote and entirely epilose, otherwise ± as *var. pulleanum*.

Distr. *Malesia*: Central New Guinea (on open sandy crest of ridge at 2300 m near Lake Habbema and in alpine shrub vegetation on Mt Antares at 3300–3400 m, said to be common in both places). *Fl.* July, Oct.

Note. This variety approaches *R. hameliiflorum* in many respects.

4. Rhododendron nummatum J. J. S. Nova Guinea 18 (1936) 91, t. 17, 2; SLEUM. Reinwardtia 5 (1960) 56; Blumea 11 (1961) 113; *ibid.* 12 (1963) 90; *ibid.* 12 (1964) 339.

Stiff, erect, terrestrial or epiphytic shrub, 0.3–0.5 (rarely up to 1.5) m, much and closely branched. Branchlets slender, terete, tips densely clad with stalked scales, lower parts verruculose where the scales have gone, finally glabrescent and dark greyish blackish corticate. *Leaves* scattered, more dense towards the tips, broad-obovate to nearly rounded, apex rounded-obtuse, not rarely slightly retuse, base ± broadly attenuate or rounded, coriaceous, somewhat convex above, initially rather densely lepidote on both faces, glabrous above at maturity (scales round, rather large, sessile, marginal zone entire or nearly so, centre thick, slightly or not impressed), margin slightly or not revolute, lamina mostly flat or but slightly convex, 4–9(–13) by 3.5–8(–9) mm, midrib prominent beneath only, otherwise ± obsolete as are the 2 or 3 nerves; petiole slender, 1–1.5 mm. *Flowers* pendent, solitary, or rarely in twos. Perulae narrow-ovate, subacute to obtuse, glabrous, ciliolate, up to 3 mm. Bracteoles linear-spathulate, short hairy distally, up to 4 mm. Pedicels rather stoutish, densely lepidote (the scales on very short stalks), very sparsely or not hairy, 5–6.5 mm. *Calyx* oblique, small, irregularly 5-lobed, lepidote dorsally, lobes triangular, obtuse, denticulate, up to 0.5 mm. *Corolla* pink or (dark) red, whether or not with yellow at the base, tubular, slightly zygomorphous, tube cylindric, straight, sparsely to subdensely lepidote outside, glabrous inside, *c.* 1 by 0.35 cm, lobes erect, ovate-orbicular, irregularly denticulate, laxly lepidote outside in their lower half, 1.2–1.8 by 1.5–2 mm. *Stamens* 10, ± included; filaments linear, slightly dilated towards the base, glabrous; anthers 0.8–1 mm. *Disk* glabrous. *Ovary* cylindric, 5-ribbed, covered with rusty scales, *c.* 3 mm, attenuate to the rather thickish style, which is laxly lepidote in its lower half and attains 4–5 mm in length; stigma subclavate-capitate, indistinctly 10-lobed. *Capsule* narrow-oblongoid, 8–13 by 2.5–3 mm, distinctly 5-ribbed.

Distr. *Malesia*: New Guinea (Main Range from Mt Doorman and the Hellwig Mts to Mt Victoria, also on Mt Saruwaged).

Ecol. In sheltered ravine, forest borders, open mossy bush, rest clearings in ridge crest forest, stunted shrubbery on ridge top or open hill side or open clayey ground of old gold workings, on rocks, often together with mosses and lichens when terrestrial, 2060–3250 m. *Fl. fr.* Jan.-Oct.

5. Rhododendron gaultheriifolium J. J. S. Nova Guinea 18 (1936) 90, t. 17, 1; SLEUM. Reinwardtia 5 (1960) 56; Blumea 11 (1961) 113; *ibid.* 12 (1963) 90.

var. **gaultheriifolium.**

Slender shrub, 0.4–2.5(–5) m, branches numerous, rather stout, erect, terete. Branchlets slender, tips covered with stalked scales, lower parts densely verruculose. *Leaves* scattered, more crowded towards the ends of the branchlets, ovate, rarely elliptic-ovate, shortly obtusely acuminate, base rounded to subtruncate, rigidly coriaceous, light or yellowish green, paler below, subdensely lepidote on both faces (scales ± round, sessile, entire, centre dark, rather thick and ± impressed especially on the undersurface), margin ± thickened and revolute, irregularly crenulate by the impressed scales, (5–)6–9 (rarely and but partly in the same specimen up to 12) by 4–7 mm, midrib slightly impressed above, a little raised beneath, nerves indistinct; petiole lepidote, ± 2 mm. *Flowers* ± nodding, solitary or in twos. Outer perulae subulate and ± densely lepidote, inner ones ovate-acuminate, apiculate, puberulous and lepidote dorsally in the upper part, ± puberulous inside, densely ciliate, up to 7 by 4 mm. Bracteoles linear, glabrous, up to 7 mm. Pedicels slender, densely lepidote and ± laxly minutely pubescent, 5–8(–9 mm). *Calyx* oblique, disk-shaped, densely lepidote outside, obtusely 5-lobed, occasionally one or a few lobes elongate-triangular, acute, up to 1 mm. *Corolla* deep red or sordid to brownish red, sometimes greenish yellow or orange, tubular, somewhat zygomorphous, 11–13 mm long, densely yellow-lepidote outside except a wide margin of the lobes, glabrous inside, lobes besides the scales laxly hairy outside in their upper half and distinctly ciliate, tube straight, somewhat widened upwards, 8–10 mm long, 2.5-3 mm ø at the base, *c.* 5 mm below the lobes, the latter erect or a little spreading, ovate-quadrangular, rounded at the apex and irregularly crenulate-denticulate, *c.* 3 by 2.5 mm. *Stamens* 10, slightly unequal; filaments red, linear at the base, filiform upwards, glabrous, 9–10 mm; anthers *c.* 1 mm. *Disk* glabrous. *Ovary* red, conical, densely lepidote, *c.* 2.5 mm, gradually attenuate to the style, the latter thick, lepidote at base, otherwise glabrous, *c.* 7 mm; stigma shortly club-shaped, irregularly

lobed. *Capsule* erect, narrow-conical, longitudinally 5-ribbed, densely lepidote, 8–9 by 3.5–4 mm, on stoutish pedicel 1–1.5 cm.

Distr. *Malesia*: New Guinea (Oranje Mts, Mt Doorman, and in the Eastern and Western Highlands).

Ecol. In shrubberies bordering the (sub)alpine forest, occupying patches of wet sandy or peaty soil, or on the more sterile peaty ridges, also in grassland above the timber line, between summit rocks, locally common, occasionally dominant, 2900–4150 m. *Fl.* Feb.-Oct.

var. **expositum** SLEUM. Reinwardtia 5 (1960) 56; Blumea 11 (1961) 113.

Shrub of erect ascending or prostrate habit, 0.05–1 m. *Leaves* very coriaceous and shining, (2–)3–4(–5) by 3–4 mm. *Flowers* dark red or orange red. *Capsule* 6–7 by 2.5–3 mm. The alpine form with smaller leaves and capsules.

Distr. *Malesia*: W. New Guinea (Mt Wilhelmina and Mt Antares).

Ecol. Xerophytic shrub on sterile limestone slopes, on exposed sandstone crests or in alpine rocky grassland, locally common, 3300–3800 m. *Fl. fr.* July, Sept.

6. Rhododendron oreites SLEUM. Reinwardtia 5 (1960) 57.

var. **oreites.**

Erect, slender, terrestrial, sparsely branched shrub, 2–2.5 m. Branchlets terete, 1.5–2 mm ø, tips densely set with stalked scales, glabrescent and verruculose-rugose in the lower parts. *Leaves* scattered, crowded especially at the upper part of the new shoots, oblong-elliptic, gradually subacuminate towards the apex, subobtuse, base broadly attenuate into the petiole or subtruncate-rounded, coriaceous, subdensely persistently lepidote on both faces (scales round, the narrow marginal zone entire or subentire, centre rather large, thick, somewhat impressed), revolute at the lower part of the edge, which is subcrenulate by the impressed scales, 8–12 by 4–6 (rarely up to 8) mm, midrib slightly impressed above, prominent beneath, nerves very slightly or not visible at all; petiole rather slender, lepidote, *c.* 2 mm. *Flowers* solitary. Outer perulae triangular, inner ones ovate to oblong, apiculate, firmly membranous, lepidote dorsally at the apex, otherwise glabrous, rather long and densely ciliate, up to 5 by 2.5 mm, often surrounding the base of the pedicel at anthesis or still in fruit. Bracteoles filiform, laxly hairy, *c.* 6 mm. Pedicels slender, with dense scales on very short stalks, not hairy at all, *c.* 1 cm at anthesis, up to 1.5 cm in later stages. *Calyx* oblique, cupular, *c.* 2.5 mm ø, shortly 5-lobed, lobes subacute or obtuse, appressed to the corolla, *c.* 1 mm. *Corolla* tubular, slightly zygomorphic, red, 1.6–1.7 cm long, *c.* 3 mm ø at the base, widened to *c.* 6 mm below the lobes, densely lepidote outside, glabrous inside, the margin of the lobes excepted, lobes nearly rounded, the marginal part glabrous or very laxly and shortly hairy outside, glabrous inside, edge crenulate or erose-denticulate, not ciliate, 3–4 mm ø. *Stamens* 10, as long as the corolla, slightly unequal; filaments glabrous, linear below, filiform distally; anthers brown, obovate-oblong, *c.* 1 mm. *Disk* glabrous. *Ovary* shortly ovoid-cylindrical, ± densely covered with very slightly stalked or sessile scales, *c.* 4 mm by 1.5 mm, gradually tapering to the rather slender and glabrous style, which equals the corolla at anthesis, but exceeds it in later stages. *Capsule* cylindric, (0.8–)1–1.2 by *c.* 0.35 cm, deeply 5-grooved, rather densely lepidote, valves not or slightly twisted.

Distr. *Malesia*: W. New Guinea (Mt Wilhelmina).

Ecol. In subalpine forest or forest borders, or in shrubberies, occupying patches of wet sandy or peaty soil, common, 2900–3650 m. *Fl. fr.* Sept.-Oct.

var. **chlorops** SLEUM. Reinwardtia 5 (1960) 58.

Erect, sparsely branched shrub, 1–2.5 m. *Leaves* elliptic or ovate-elliptic, 11–15 by 5–8 mm. *Corolla* greenish yellow.

Distr. *Malesia*: W. New Guinea (Lake Habbema), once collected, said to be plentiful in a shrubby opening in the forest at 3000 m. *Fl. fr.* Oct.

7. Rhododendron erosipetalum J. J. S. Nova Guinea 18 (1936) 91, t. 18, 1; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 479; SLEUM. Reinwardtia 5 (1960) 58; Jahrb. Rhodod. Ges. Bremen (1963) f. 30; Blumea 12 (1963) 90.

Erect and spreading shrublet or shrub, (0.1–)0.5–2 m, epiphytic or terrestrial. Branchlets slender, tips densely clad with stalked scales, lower parts verruculose where the proper scales have gone and the stalks remained. *Leaves* ± scattered, often somewhat crowded in the upper part of the branchlets, narrow-obovate, apex obtusely attenuate or mostly rounded, not rarely slightly retuse, gradually cuneate at the base, coriaceous, dark green above, paler beneath, glabrous above at full age, rather laxly lepidote beneath (scales round, their marginal zone narrow, entire, the centre darker, thickish, slightly impressed), somewhat revolute at margin, 6–10(–13) by (2–)2.5–3.5(–4, rarely in part up to 6) mm, midrib slightly or obscurely impressed above, raised beneath, nerves obsolete; petiole 1–1.5 mm. *Flowers* solitary. Perulae ovate, apiculate, subsericeous and laxly lepidote dorsally, shortly white-ciliate, up to 4 by 3 mm. Bracteoles filiform, up to 5 mm. Pedicels slender, laxly to subdensely covered with scales and minute, whitish, ± patent hairs, 8–10 mm, accrescent to 15 mm in final stages. *Calyx* small, disk-like, 5-angular or shortly obtusely 5-lobed, lepidote. *Corolla* tubular, somewhat curved and a little compressed laterally, deep pink to dark red, all over ± laxly lepidote, moreover minutely hairy at the upper part of the lobes outside, glabrous inside, (1.5–)1.8–1.9 cm long in all, 3–4 mm ø at base, gradually widened to 5–6 mm ø below the lobes, the latter unequal, obliquely ovate or

ovate-oblong, ± rounded at the apex, though minutely denticulate-erose there, 3–4 by 3 mm. *Stamens* 10, unequal, some slightly exserted from the corolla; filaments narrow-linear, glabrous; anthers *c.* 1.2 mm. *Disk* glabrous. *Ovary* obliquely conical, longitudinally 5-ribbed, densely lepidote, *c.* 3 mm, tapering to the style, the latter glabrous, somewhat thickened upwards to the club-shaped irregularly lobed stigma, *c.* 1.3 cm. *Capsule* subcylindric, deeply 5-grooved, (0.8–)1–1.5 by *c.* 0.3 cm. *Seeds* shortly tailed at both ends, 0.15–2 mm.

Distr. *Malesia*: W. New Guinea (Vogelkop Peninsula: Arfak Mts, Tohkiri, Tamrau and Nettoti Range).

Ecol. Rarely on burnt open summit, mostly on edge of (moss) forest or summit scrub on peaty soil, 1400–2650 m. *Fl. fr.* Jan.-Dec.

Vern. *Mambau*, Kebar.

8. Rhododendron hameliiflorum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 98; SLEUM. Reinwardtia 5 (1960) 58.

Very low, perhaps creeping shrublet. Branchlets slender, tips densely covered with stalked scales, or verruculose in the lower parts where the scales have gone. *Leaves* scattered or subopposite, broadly obovate to suborbicular, apex rounded or minutely retuse, base broadly attenuate or mostly rounded, coriaceous, rather laxly lepidote initially (scales round, entire, flattish, the large dark centre slightly impressed), early glabrescent above, persistently lepidote beneath, entire, margin not or very slightly recurved, 7–10 by 5–8 mm, midrib impressed above, prominent beneath, nerves ± obsolete; petiole 1.5–2 mm. *Flowers* solitary or rarely in twos. Perulae oblong-obovate, sparsely pubescent dorsally, densely white-ciliate. Pedicels slender, densely lepidote, 5–6 mm. *Calyx* small, obscurely 5-lobed. *Corolla* tubular, 1.7-2 cm by 3–4 mm, subdensely lepidote all over outside, glabrous inside, lobes obovate-suborbicular, not erose, *c.* 4 by 3 mm. *Stamens* 10, nearly equalling the corolla in length; filaments linear, glabrous; anthers 1 mm. *Disk* glabrous. *Ovary* subconical, *c.* 3 mm, densely lepidote, tapering to the style, which is laxly lepidote in its lower ¼, glabrous elsewhere, and equals or slightly exceeds the corolla in length; stigma club-shaped.

Distr. *Malesia*: W. New Guinea (Mt Carstensz), between 2350 and 3350 m, once collected.

9. Rhododendron lindaueanum KOORD. Nova Guinea 8 (1912) 878; J. J. S. *ibid.* 12 (1914) 129, *incl. var. latifolium* J. J. S. *l.c.* 130, t. 29A; *ibid.* 12 (1917) 498; *ibid.* 18 (1936) 89; SLEUM. Reinwardtia 5 (1960) 58, *incl. var. psilacrum* SLEUM. *et var. cyclopicum* SLEUM. *l. c.* 59; Blumea 12 (1960) 90. — *R. retusum* [*non* (BL.) BENN.] WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 94. — *R. fuchsioides* SCHLTR, Bot. Jahrb. 55 (1918) 147.

var. **lindaueanum.**

Low shrub, 0.25–2(–3) m, terrestrial or epiphytic; branches stoutish. Branchlets terete, slender, tips densely covered with stalked scales, lower parts verrucose by the remaining stalks. *Leaves* scattered, mostly ± densely together at the upper 2 or 3 nodes, sometimes 2–4 arranged in a kind of whorl, obovate to spathulate or sometimes oblong- or elliptic-obovate, apex rounded, not rarely slightly retuse, base cuneate, coriaceous or subcoriaceous, dark green above, greyish green below, a little shining and laxly lepidote or completely glabrescent at maturity above, persistently laxly lepidote beneath (scales red-brown, disk-shaped, marginal zone narrow, entire, centre thick, not or slightly impressed), margin ± markedly revolute, lamina not rarely ± convex, (0.8–)1–2.5 by (0.5–)0.8–1.3 (–1.8) cm, midrib ± distinctly impressed above, prominent beneath, nerves 3–4(–5) pairs, lower 1–2 ones ascending, upper ones spreading, anastomosing, faintly impressed above, somewhat raised beneath, occasionally hardly visible; petiole stoutish, lepidote or verruculose, (1.5–)2–2.5 mm. *Flowers* solitary. Perulae unequal, outer ones narrow-ovate, subacute, lepidote outside, inner ones larger, broadly ovate to suborbicular, lepidote and/or greyish sericeous dorsally at least in the upper part, ciliate, up to 7 by 4 mm. Bracteoles linear to spathulate, hairy towards the top, up to 7 mm. Pedicels slender, densely lepidote and whether or not laxly short hairy, 7–10 mm. *Calyx* minute, oblique, lepidote, obtusely 5-denticulate, whether or not shortly ciliate, lobes *c.* 0.5 mm, spreading or reflexed. *Corolla* tubular, slightly zygomorphic and laterally compressed, straight, somewhat pouched at the base, deep red to pink, laxly lepidote all over outside, glabrous inside, (1.7–)1.8–2.4 cm long in all, tube 1.6–1.8(–2) cm, *c.* 2.5 mm ø at base, 4–5 mm at the throat, lobes ovate-oblong, obtuse, 3–4(–5) by ± 2.5 mm, erect or slightly spreading, often provided with minute hairs near the apex outside and ciliate. *Stamens* 10, slightly or not exserted, unequal; filaments filiform, glabrous; anthers blackish purple, oblong-ovate, 1–1.2(–1.5) mm. *Disk* glabrous or rarely slightly hairy. *Ovary* narrowly ovoid-conical, densely lepidote, *c.* 2.5 by 1.5 mm, gradually tapering to the style, the latter 1–1.3 cm at anthesis, accrescent and slightly exserted in later stages, glabrous, swollen distally to a club-shaped, shortly and irregularly 10-lobed stigma. *Capsule* subcylindrical, 1–1.5(–1.8) by 0.3–0.4 cm, densely lepidote, deeply 5-grooved.

Distr. *Malesia*: New Guinea (Arfak Mts to Mt Saruwaged), many collections.

Ecol. In forest, generally epiphytic, but also terrestrial in swampy, shrub-covered places, or in alpine scrub on exposed summits, on poor, often clayey or sandy soil, 1250–2500(–3200) m. *Fl.* Jan.-Dec.

Vern. *Kieta, koglé*, Kapauku, *tambies*, Hattam.

var. **bantaengense** J. J. S. in Fedde, Rep. 30 (1932) 163; H. J. LAM, Blumea 5 (1945) 576, *in text*; SLEUM. Reinwardtia 5 (1960) 59.

Differs from the typical variety by longer *calyx* lobes (*c.* 1 mm) which are ± appressed to the corolla. *Corolla* lobes not ciliate.

Distr. *Malesia*: SW. Celebes (Mt Bantaeng or Peak of Bonthain), in brushwood at 2800–2890 m.

10. Rhododendron spathulatum RIDL. J. Str. Br. R. As. Soc. *n.* 61 (1912) 25; J. Fed. Mal. St. Mus. 6 (1915) 49; Fl. Mal. Pen. 2 (1923) 220; SLEUM. Reinwardtia 5 (1960) 59.

Shrub up to 1.5 m, epiphytic or on moss-covered ground, with slender branches. Branchlets dark brown, slender, the upper 3 or 4 internodes densely clothed with stalked scales, verruculose when the scales have gone, older parts smooth and soon greyish corticate; internodes 0.5–2 cm. *Leaves* in spaced 3–7-merous pseudowhorls at the upper nodes, obovate-spathulate, apex rounded, mostly slightly retuse, base cuneate, coriaceous, laxly impressed-lepidote to glabrous and ± shining above, more densely and rather minutely lepidote and dull beneath (scales round, marginal zone narrow, entire or nearly so, centre rather dark and thick, manifestly impressed), entire or minutely crenulate, margin flat or slightly revolute, 1–2 by 0.5–1 cm, midrib mostly impressed above in the lower half, prominent beneath, nerves 3–4 pairs, faintly impressed above and raised beneath, or almost invisible; petiole rather slender, ± 2 mm, lepidote. *Flowers* solitary, or rarely in twos. Perulae ovate, subacute, lepidote dorsally upwards, ciliate, up to 5 by 3 mm. Pedicels slender, densely lepidote, sometimes also minutely laxly hairy, 6–8 mm. *Calyx* oblique, very small, lepidote, obscurely obtusely 5-lobed. *Corolla* tubular, slightly dilated towards the mouth, ± zygomorphous and ± laterally compressed, rather straight, dark red or salmon red, 2–2.2(–2.6) cm long in all, tube 1.8–2.2 cm, *c.* 3 mm ø at base, 5–6 mm below the lobes, laxly lepidote outside, glabrous inside, lobes obovate, somewhat spreading, manifestly ciliate, 4–5 by 2.5–3 mm. *Stamens* 10, unequal, manifestly exserted; filaments glabrous, linear; anthers oblong, 2 by 0.8 mm. *Disk* glabrous. *Ovary* broadly ellipsoid, densely lepidote, epilose, 2.5 by 1.5 mm, gradually attenuate into the glabrous style which is finally long exserted; stigma capitate, indistinctly lobed. *Capsule* short-cylindric or conical, 7–8 by 2.5–3 mm, densely lepidote.

Distr. *Malesia*: Malay Peninsula (Perak: Mt Kerbau; Pahang: Mt Siku, Ulu Telom).

Ecol. Mossy forest, locally plentiful on Mt Kerbau, 1525–2135 m.

11. Rhododendron saruwagedicum FOERSTER in Fedde, Rep. 13 (1914) 222; SCHLTR, Bot. Jahrb. 55 (1918) 148; SLEUM. Reinwardtia 5 (1960) 59, *incl. var. alpinum*; Blumea 11 (1961) 113; *ibid.* 12 (1963) 91; *ibid.* 12 (1964) 339. — Fig. 5.

Small tree or tree-like shrub, rarely up to 12 m high and with a trunk up to 12 cm ø, reduced to a small shrub hardly 0.4 m high at alpine altitudes, much branched. Branchlets terete, ± erect, ultimate parts densely clad with stalked rusty scales, verruculose in the lower parts where the scales have gone. *Leaves* scattered, laxly set, more congested distally, but not in distinct, spaced pseudowhorls, ovate to ovate-elliptic, sometimes oblong-ovate, apex obtusely acuminate, base rounded to subtruncate, coriaceous, ± shining above, nearly rubiginose and ± dull beneath,

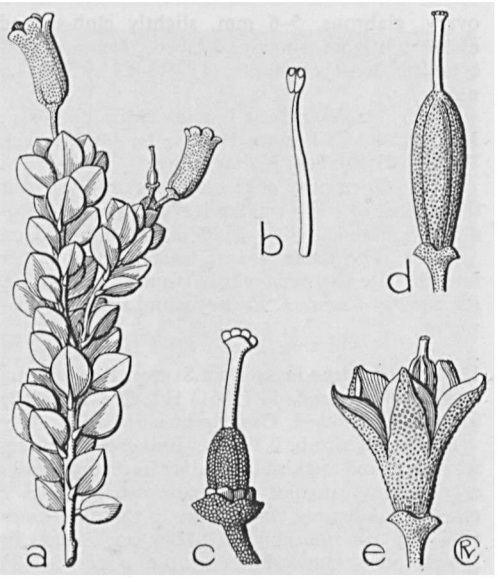

Fig. 5. *Rhododendron saruwagedicum* FOERSTER, small-leaved alpine form. *a.* Branchlet with flowers, × 2/3, *b.* stamen, × 2, *c.* ovary and style, × 2, *d.* young fruit, × 2, *e.* ripe fruit, × 2 (*a–e* PULLEN 223).

densely lepidote above still at maturity, or at least the impressed centre of the scales well visible there, very densely covered with copper-coloured or rusty scales beneath (scales sessile, round, partly in touch with each other, marginal zone narrow and entire or nearly so, centre thickish, manifestly impressed), minutely crenulate by the impressed scales along the subrevolute margin, (0.7–) 1–1.8 by (0.5–)0.7–1(–1.2) cm, midrib impressed above, rather strongly raised beneath, nerves 3–4 pairs, lower 1–2 curved-ascending, higher ones more spreading, all very slightly impressed above in fully mature leaves, slightly raised beneath, or sometimes hardly visible on both faces; petiole stoutish, lepidote, 1–2 mm. *Flowers* (3–)4–5 per umbel. Outer perulae elongate-triangular, densely lepidote, inner ones elliptic-ovate to obovate, ± apiculate, sericeous and lepidote dorsally in the upper part, up to 8 by 6 mm. Bracteoles linear to linear-spathulate, finely hairy, up to 6 mm. Pedicels rather stoutish, densely rubiginous-lepidote, not hairy, 6–9 mm. *Calyx* minute, indistinctly obtusely 5-lobed. *Corolla* tubular, slightly zygomorphous, straight or a little curved, rather densely yellow-lepidote outside, completely glabrous inside, dull red, 1.2–1.3(–1.5) cm long in all, *c.* 3 mm ø at base, widened to *c.* 5 mm at the mouth, lobes 4 or 5, ± erect, obovate to suborbicular, *c.* 3 by 2–3 mm, not ciliate, *Stamens* 8 or 10, subequalling the corolla in length; filaments linear, glabrous; anthers ± obovate, 1 mm. *Disk* glabrous, with thick, prominent lobes. *Ovary* narrow-ellipsoid, all over covered with scales, *c.* 4 by 1.5 mm, with 4 or 5 longitudinal ribs; style abrupt with the

ovary, glabrous, 5–6 mm, slightly club-shaped distally; stigma shortly 5-lobed. *Capsule* subcylindric, densely lepidote, (11–)13–15 by 3.45–4.5 mm.

Distr. *Malesia*: New Guinea (Morobe Distr.: Mt Saruwaged; Eastern Highlands: Mt Michael; Western Highlands: Kubor Range).

Ecol. Open bush edge or sheltered forest near timberline, or (with smaller leaves) in open (sub)-alpine grassland, 3050–3820 m. *Fl.* March-Oct.

Note. The scales are at least in part rather intermediate between those found in *subsect. Pseudovireya subsect. Euvireya*, and *subsect. Albovireya*.

12. Rhododendron invasorium SLEUM. Reinwardtia 5 (1960) 60; Blumea 11 (1961) 113; *ibid.* 12 (1963) 91; Jahrb. Rhodod. Ges. Bremen (1963) f. 11.

Erect, stiff shrub, 0.3–1 m. Branchlets densely set with round thickish stalked scales on the younger, somewhat angular and redbrown parts (*c.* 2 mm ø), subdensely verruculose in the older ones (3–4 mm ø); internodes (1–)2–6 cm. *Leaves* in 3–4-merous pseudowhorls at the upper 2(—3) nodes, 1 or 2 additional ones scattered in the upper third of the internodes, elliptic or more rarely obovate-elliptic, apex rounded, the apical gland rather indistinct, base very broadly attenuate or rounded, rarely very slightly cordate, coriaceous, sordid-olivaceous to dark green and a little shining above, rather densely lepidote on both faces initially, glabrescent above with age, subdensely and persistently lepidote beneath (scales rather small, distant from each other, intensely rufescent, orbicular, entire, the rather large centre much impressed), margin cartilagineous, not revolute, regularly minutely crenulate, (1.5–)2–3.5 by (1.2–)1.5–2(–2.2) cm, midrib narrow and depressed above, as broad and prominent as the petiole in its lower part, gradually less so distally beneath, nerves 4–6 pairs, irregular, curved-anastomosing, impressed above but in mature leaves, prominent beneath, veins laxly reticulate, rather indistinct; petiole flattened, *c.* 3–4 by 1.5 mm. *Umbels* 3–4-flowered. Flower buds obovoid, *c.* 1 by 0.5 cm. Outer perulae broadly ovate, inner ones oblong-obovate, obtuse, very densely lepidote at the upper part of the mediane dorsally, the margin shortly fimbriate, 4–8 by *c.* 4 mm. Pedicels stoutish, densely substipitate-lepidote, 1–1.5 cm. *Calyx* obliquely disk-shaped, densely lepidote dorsally, obscurely lobed, *c.* 3 mm ø. *Corolla* tubular, deep scarlet or magenta, a little zygomorphous, somewhat dilated apically, 1.5–1.8 cm long in all, densely lepidote outside, glabrous inside, tube 1–1.2 cm, 3–4 mm ø at base, lobes erect, obovate, 5–6 by *c.* 4 mm. *Stamens* 10, unequal, the longer ones attaining half the length of the corolla lobes; filaments linear below, filiform above, quite glabrous; anthers obovate, 1.8 by 0.6 mm. *Disk* glabrous. *Ovary* conical, abrupt with the style, very densely lepidote, *c.* 4 by 2 mm; style lepidote at the base, glabrous for the rest, 5–6 mm; stigma capitate, shortly 5-lobed.

Distr. *Malesia*: New Guinea (Morobe Distr.: Wau-Edie Creek area).

Ecol. Common on open gravelly or clayey ground of old gold workings, coloniser in sluiced area, at 1800–2000 m. *Fl.* May-Sept.

13. Rhododendron perakense. K. & G. J. As. Soc. Beng. 74, ii (1905) 76; RIDL. Fl. Mal. Pen. 2 (1923) 216; SLEUM. Reinwardtia 5 (1960) 60.

Small shrub, up to *c.* 1.8 m, whether or not epiphytic. Branchlets slender, terete, tips densely covered with stalked scales, otherwise densely verruculose at the upper 3–5 internodes, which are 0.5–4 cm long. *Leaves* in 3–5(–7)-merous pseudowhorls at the apical nodes, early caducous at the lower nodes, obovate-spathulate or broadly oblanceolate, apex rounded-obtuse, sometimes minutely retuse, base cuneate into the petiole, coriaceous, stiff, glabrous above at full maturity, laxly to subdensely and more persistently lepidote beneath (scales sessile, round, entire or undulate at the narrow marginal zone, centre impressed, rather large and thick), edge much recurved, 1.3–1.8(–2) by (0.5–)0.6–1 cm, midrib much impressed above, very stout and prominent beneath, nerves 2–3 pairs, spreading, ± slightly immersed above, mostly well raised beneath, veins obscure; petiole rather slender, grooved above, lepidote, 2–3 mm. *Flowers* 3–5 per umbel. Outer perulae subulate, lepidote dorsally, inner ones ± ovate, obtuse, lepidote at the top outside, densely white-ciliate, up to 6 by 3 mm. Bracteoles not seen. Pedicels slender, densely clad with stalked scales, not hairy at all, 6–7 mm long at anthesis, up to 10 mm in fruit. *Calyx* minute, shortly obtusely 5-lobed, densely lepidote. *Corolla* white or bright yellow, tubular below, campanulate distally, laxly lepidote outside, glabrous inside, seen only in not yet fully developed state, at least 10 mm long, shortly 5-lobed. *Stamens* 10; filaments linear, somewhat dilated towards the base, glabrous; anthers *c.* 1 mm. *Disk* glabrous. *Ovary* conical, *c.* 2 mm, densely lepidote; style glabrous; stigma subcapitate. *Capsule* subcylindric, 9–10 by *c.* 2.5 mm, deeply 5-furrowed longitudinally, lepidote, valves a little twisted. *Seeds* very narrow, *c.* 3 mm incl. the longish tail at both ends.

Distr. *Malesia*: Malay Peninsula (Cameron Highlands).

Ecol. In mossy summit forest, locally common, at *c.* 1830 m. *Fl. fr.* April, Aug.

14. Rhododendron vanderbiltianum MERR. Not. Nat. Ac. Nat. Sc. Philad. 47 (1940) 5; SLEUM. Reinwardtia 5 (1960) 61. — Fig. 6.

Dwarf shrub, up to 1 m high. Branchlets ± crooked, slender, tips shortly sordid-brownish velvety and very laxly lepidote, older parts glabrous. *Leaves* in 3–7-merous pseudowhorls at the upper 2 or 3 nodes (internodes 0.3–2 cm), ovate or oblong-ovate to elliptic, apex broadly acuminate, acutely apiculate, base broadly cuneate to rounded, coriaceous, shining on both faces especially above, subdensely impressed-lepidote to entirely glabrescent on the upper surface, the puberulous midrib excepted, ± densely lepidote

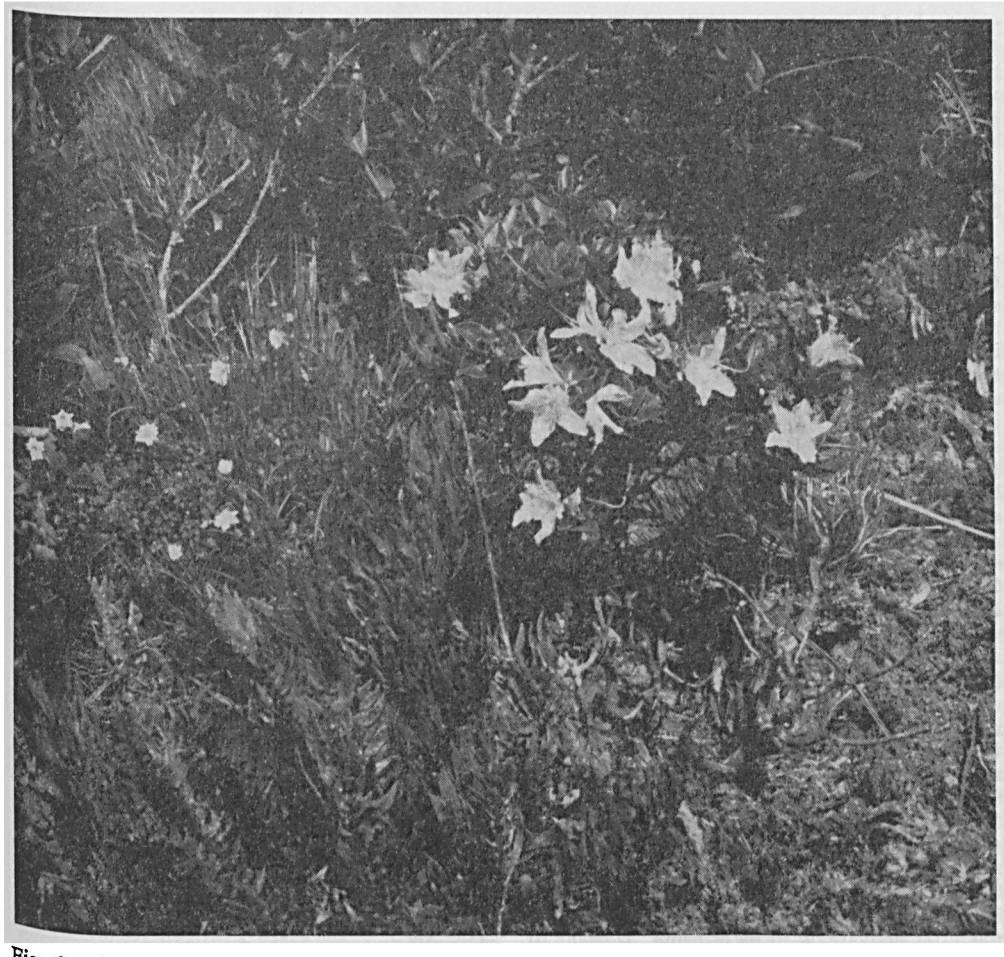

Fig. 6. *Rhododendron vanderbiltianum* MERR., Mt Goh Lembuh, 3000 m, N. Sumatra (VAN STEENIS 9039) (VAN STEENIS, 1937).

beneath (scales sessile, roundish, margin entire or nearly so, rarely crenulate, centre large in relation to the marginal zone, thick, dark, impressed), margin cartilagineous, crenulate, very slightly or not revolute, (1–)1.5–2.3 by (0.8–) 1–1.5(–1.7) cm, midrib flat or slightly prominent on both faces, nerves 4–5 pairs, ± ascending, rather inconspicuous, veins and veinlets obsolete above, but mostly slightly raised beneath, forming a fine dense reticulation; petiole flattened, puberulous, 1.5–2.5 by 1 mm. *Umbels* 2–5-flowered. Perulae ovate to obovate-spathulate, apiculate, glabrous or sericeous and laxly lepidote in the upper dorsal part, densely ciliate to lanate-fimbriate, up to 1 by 0.6 cm. Bracteoles linear-spathulate, ± laxly hairy, nearly woolly at the very apex, up to 6 mm. Pedicels stoutish, densely lepidote, laxly to subdensely short-hairy, 5–9 mm. *Calyx* small, obtusely 5-dented (1 mm), densely lepidote, sometimes moreover very laxly hairy, not ciliate. *Corolla* funnel-shaped, white to cream or pale lemon, sometimes bright yellow, 1.8–2.2 cm long in all, deeply 5-lobed, ± laxly lepidote outside, the margin of the lobes excepted, whether or not slightly to subdensely hairy in longitudinal stripes along the faintly pronounced angles of the corolla tube, which bears a laxly hairy zone inside above the base but is glabrous otherwise inside, tube 0.8–1 cm long. *c.* 3 mm ø at base, 7–8 mm at the throat, lobes somewhat unequal, slightly spreading, subobovate-spathulate to suborbicular, *c.* 1.3 by 0.8–1.3 cm. *Stamens* 10, unequal, included; filaments linear, glabrous at the base, patently hairy for 2–4 mm upwards, then again glabrous to the top; anthers broadly oblong, *c.* 2 mm. *Disk* glabrous. *Ovary* conical, the apex truncate, covered with overlapping scales, occasionally bearing also some short hairs at the apex, 2.5–3 by 1.5–2 mm; style abrupt, slender, glabrous, finally attaining nearly 2 cm; stigma short-obconical, rather small, 5-lobed. *Capsule* (perhaps submature) *c.* 6 by 2.5 mm.

Distr. *Malesia*: N. Sumatra (Atjeh, Gajolands: Mts Losir, Lembuh and Kemiri).

Ecol. Open heath scrub or open heathy plains with *Quercus*, *Pinus* and other species of *Rhododendron*, locally common, 2100–3300 m. *Fl.* Jan.-April.

15. Rhododendron seimundii J. J. S. Gard. Bull. S. S. 8 (1935) 262; SLEUM. Reinwardtia 5 (1960) 61.

Shrub. Branchlets slender, apical 2 or 3 internodes 0.7–6 cm, patent-papillose-puberulous (lens!), tips moreover laxly clad with sessile scales. *Leaves* in 4–7(–10)-merous pseudowhorls at the upper 1–2(–3) nodes, oblong-obovate to narrow-elliptic, sometimes nearly lanceolate, apex broadly attenuate, mostly obtuse and ending in a small somewhat protruding gland, base attenuate into the petiole, coriaceous, rugulose when dry, shining above, initially laxly lepidote, finally glabrous above, rather dull and laxly lepidote beneath (scales sessile, round, margin entire or nearly so, centre thick, darker, manifestly impressed), edge entire or minutely crenulate by the impressed scales, slightly revolute, 1.3–2.8 by 0.5–1.1 cm, midrib sunk above, strongly raised beneath, nerves obsolete, sometimes faintly visible underneath; petiole rather slender, lepidote and puberulous, 2–3(–4) mm. *Umbels* 2–4-flowered. Perulae ovate, obtuse, ± densely short-pubescent dorsally, ± laxly lepidote, ciliate, up to 7 by 4 mm. Bracteoles filiform, hairy, up to 6 mm. Pedicels slender, ± densely clothed with sessile scales, furthermore whether or not minutely hairy, 9–12 mm. *Calyx* oblique, inequally obtusely 5-lobed, lepidote, not ciliate. *Corolla* funnel-shaped, 1.6–1.9 cm long in all, 1.5–2.5 cm across the limb, laxly lepidote outside, margin of the lobes excepted, glabrous inside, tube 8–9 mm long, *c.* 2.5 mm ø at base, 4–6 mm below the lobes, the latter obovate, 9–10 by 6–7 mm. *Stamens* 10, very slightly or not exserted; filaments linear, glabrous; anthers oblong, *c.* 1.5 mm. *Disk* glabrous. *Ovary* ovoid-conical, obtuse, 5-grooved longitudinally, densely lepidote, *c.* 2.5 by 2 mm, gradually attenuate to the style, which is glabrous and ± 1.6 cm long; stigma capitate, 5-lobulate. *Capsule* 8 by 2.5 mm.

Distr. *Malesia*: Malay Peninsula (Pahang: Mt Tahan), 1675 m. *Fl.* Feb.-March.

16. Rhododendron scortechinii K. & G. J. As. Soc. Beng. 74, ii (1905) 76; RIDL. Fl. Mal. Pen. 2 (1923) 219; SLEUM. Reinwardtia 5 (1960) 61. — *R. orion* RIDL. J. Fed. Mal. St. Mus. 5 (1914) 39; Fl. Mal. Pen. 2 (1923) 217.

Epiphytic or terrestrial shrub, sometimes subarboreous. Branchlets terete, wrinkled and red-brown at the tips, ± smooth below, the ends rather densely covered with flat scales. *Leaves* in 3–5(–7)-merous pseudowhorls at the upper 2 or 3 nodes (internodes 1.5–5 cm), elliptic to elliptic-suborbicular or (broadly) obovate, apex obtuse to rounded and with a small terminal gland, sometimes a little notched, base narrowed to the petiole, upper surface light green, caducously lepidote, finally completely glabrous and shining, undersurface yellowish when fresh, paler brown when dry, densely lepidote (scales sessile, round, marginal zone narrow, entire or nearly so, centre thick, dark, rather large and ± impressed), edge strongly recurved, (2.5–)3–5 by (1.5–)1.8–2.5(–3) cm, midrib sulcate above, thick and obtusely prominent beneath, nerves 4–6 pairs, spreading, anastomosing, slightly to deeply depressed above, distinct and normally much raised beneath, veins ±obsolete; petiole grooved above, lepidote, 2–4 (–5) by 1.5–2 mm. *Umbels* 4–7-flowered. Perulae ovate to spathulate, obtuse, ± sericeous and lepidote in the upper dorsal part, ciliate, up to 7 by 4 mm. Bracteoles linear, slightly hairy, up to 5 mm. Pedicels 1.5–2 cm, rather stoutish, ± densely lepidote, not hairy at all. *Calyx* short-cupular, lepidote, with 5 ovate, obtuse, whether or not ciliate teeth (1 mm). *Corolla* yellow, sometimes paler or even white, or yellow at the lobes, orange at the tube, widely funnel-shaped, *c.* 1.8 cm long in all, 1.5–2 cm wide at the limb, ± densely set with dark scales outside except the margin of the lobes, glabrous inside, tube 9–14 mm long, 3–4 mm ø at base, 8–10 mm at the throat, lobes broadly obovate to suborbicular, 6–8 by 5–7 mm. *Stamens* 10, unequal, the longest as long as the corolla or slightly exserted; filaments linear, dilated (0.5 mm) at the base, filiform upwards, glabrous; anthers oblong, *c.* 1.8 mm. *Disk* glabrous. *Ovary* conical, densely covered with scales, *c.* 2.8 by 1.8 mm, gradually tapering to the style, the latter glabrous, finally somewhat exserted; stigma turbinate-capitate, slightly 5-lobed. *Capsule* subfusiform, (1–)1.3 by 0.35 cm, shortly apiculate, densely lepidote, on pedicel up to 3.2 cm.

Distr. *Malesia*: Malay Peninsula (Main Range from Perak to Selangor).

Ecol. Summit vegetation, 1465–2135 m. *Fl. fr.* Jan.-April.

17. Rhododendron adinophyllum MERR. Not. Nat. Ac. Nat. Sc. Philad. 47 (1940) 3; SLEUM. Reinwardtia 5 (1960) 61. — Fig. 7.

Shrub, 1–1.5 m. Branchlets erect, terete, rather stoutish, very densely and ± imbricately set with spiral, ± ascending leaves in their upper and with wartlike scars in the lower defoliate part, tips rather densely covered with very shortly or not stalked scales, lower parts glabrescent, smooth. *Leaves* narrow lanceolate, gradually acuminate, tip obtuse, base attenuate into the petiole, stiff-coriaceous, shining above only, mostly glabrous at full maturity, but sometimes with vestiges of the scales above, rather densely lepidote beneath (scales sessile, ± rounded, margin entire to undulate, narrow, centre rather large and dark, markedly impressed), edge thickened revolute and crenulate by impressed scales, (8–)11–16(–18) by 2–3 mm, midrib ± impressed above, obtusely raised beneath especially in the lower half, nerves obsolete; petiole rather slender, 1–2 mm. *Umbels* (4–)6–12-flowered. Perulae ovate to obovate, apiculate, dorsally lepidote and sericeous in the upper part, fimbriate, up to 7 by 4 mm. Bracteoles



Fig. 7. *Rhododendron adinophyllum* MERR., Mt Goh Lembuh, 3000 m, N. Sumatra (VAN STEENIS 9062) (VAN STEENIS, 1937)

filiform, hairy, up to 6 mm. Pedicels slender, all over densely longish and whitish patent-pilose, laxly lepidote upwards, 1–1.3(–1.5) cm. *Calyx* oblique, small, undulate, whitish hairy and lepidote outside and at the margin, glabrous inside, subacutely obtusely 5-lobed (1–1.5 mm). *Corolla* tubular, bright crimson to scarlet, all over subpatently long-hairy and laxly lepidote outside, glabrous inside, tube (10–)12–13 mm, *c.* 3 mm ø at the base, *c.* 5 mm below the lobes, the latter straight to subpatent, obovate, apex rounded, 4–5 by 4 mm. *Stamens* 10, slightly or not exserted, unequal; filaments linear, glabrous; anthers oblong-ellipsoid, *c.* 1.5 mm. *Disk* glabrous. *Ovary* ovoid-conical, densely clothed with overlapping scales, 2.5–3 by 2 mm, rather abruptly attenuate to the glabrous style (4–5 mm); stigma elongate-obconical, subtruncate. *Capsule* elongate-ovoid to subovate-oblong, densely lepidote, 5-ribbed, *c.* 11 by 4 mm, crowned by a glabrous style *c.* 1 cm long with a turbinate-capitate stigma, on a glabrescent pedicel up to 1.8 cm.

Distr. *Malesia*: N. Sumatra (Atjeh, Gajolands: Mts Losir, Lembuh, Putjuk Angasan and Kemiri).

Ecol. In open places, summit heath scrub, 2600–3460 m. *Fl.* Jan.-April.

18. Rhododendron cyrtophyllum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 97; SLEUM. Reinwardtia 5 (1960) 61.

Shrub. Branchlets rather stoutish, terete, tips densely covered with sessile or very shortly stalked roundish scales, lower parts glabrescent, ± smooth, internodes 2–4 cm. *Leaves* in 3–5-merous pseudo-whorls at the upper nodes, sometimes scattered but close together, elliptic or ovate-elliptic, apex gradually attenuate, obtuse, apiculate, base rounded or subtruncate, thin-coriaceous, rather stiff, subdensely to laxly lepidote on both faces initially (scales round, entire, marginal zone narrow, centre thick, very little or not impressed), glabrescent above with age, persistently lepidote beneath, edge much revolute, 2.5–3 by 1.2–1.9 cm, midrib slightly impressed above, very prominent beneath, nerves 5–6 irregular pairs, spreading, a little raised above, more distinctly so beneath, reticulation obscure; petiole stoutish, lepidote, 2–3 by 0.8 mm. *Umbels* 5–8-flowered. Perulae ovate, obtuse, glabrous except some scales near the top dorsally, up to 10 by 6 mm. Pedicels rather slender, lepidote, 0.7–1.2 cm. *Calyx* oblique, obscurely 5-lobed, *c.* 2.5 mm ø. *Corolla* pinkish red, tubular below, dilated upwards, *c.* 3.5 cm long in all, very densely lepidote outside, glabrous inside, tube curved, *c.* 4 mm ø at base, 7–10 mm below the lobes, the latter ± spreading, rounded, *c.* 8 mm ø. *Stamens* 10; filaments linear, sparsely pubescent below, glabrous upwards, *c.* 2.5 cm; anthers broad-oblong, 2.5 mm. *Disk* glabrous. *Ovary* densely lepidote and laxly patently short-hairy, *c.* 5 by 2 mm; style rather abrupt with the ovary, glabrous *c.* 2 cm.

Distr. *Malesia*: New Guinea (Mt Carstensz, along the Utakwa R.), between 2520 and 3050 m. Once collected. *Fl.* Jan.

19. Rhododendron ericoides LOW *ex* HOOK. *f.* in Hook. Ic. Pl. (1852) t. 887; WALP. Ann. 5 (1858) 446; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 198; GIBBS, J. Linn. Soc. Bot. 42 (1914) 104; MERR. En. Born. (1921) 461; SLEUM. Reinwardtia 5 (1960) 61; Blumea 12 (1963) 91; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 15. — **Fig. 8.**

var. **ericoides.**

Erect virgate shrub, (1–)2–3 m, reduced to a dwarfed habit and *c.* 15 cm height at its highest



Fig. 8. *Rhododendron ericoides* LOW *ex* HOOK. *f. var. ericoides*. Mt Kinabalu, *c.* 3800 m, N. Borneo (SLEUMER, 1963)

localities, occasionally epiphytic. Branchlets slender, densely set with wartlike leaf-cushions in the lower defoliate parts (no fine pubescence present, which generally is found in 25. *R. quadrasianum*). *Leaves* spirally arranged, very dense and ± imbricate in the upper part of the branchlets, ericoid, suberect, linear-lanceolate, the very apex with an obtuse glandular point, base attenuate into the petiole, coriaceous, glabrous above, laxly lepidote beneath (scales disk-shaped, entire, centre darker, thick, slightly impressed), margin crenulate by impressed scales, somewhat thickened and slightly or not revolute, 4–7(–10) by ± 1 mm, midrib very slightly depressed above, swollen underneath, nerves obsolete; petiole thick, 0.5 mm. *Flowers* solitary or in twos, rarely 3 in an umbel, nodding. Perulae ovate- to obovate-oblong, lepidote dorsally in the upper part, densely subvillous-fimbriate, especially near the apex, up to 4 by 1.5 mm, early caducous. Bracteoles linear-spathulate, long-ciliate upwards, *c.* 3 by 0.5 mm, early caducous. Pedicels rather slender, 5–8 mm, densely lepidote, epilose, ± hidden among the leaves for the lower half. *Calyx* slightly oblique, lepidote outside, glabrous inside, 5-partite, lobes erect, initially appressed to the corolla, spreading in later stages, narrowly subovate-triangular, obtuse, *c.* 2 mm long, 1–1.3 mm wide at the base. *Corolla* bright scarlet- or purplish red, tubular, not or slightly oblique and curved, (1–)1.5 cm long in all, subdensely pale greenish lepidote outside, the marginal part of the lobes excepted, glabrous inside, tube 0.8–1 cm long, *c.* 3 mm ø at the base, 4–5 mm at the throat, lobes broadly ovate to rounded, suberect or a little spreading, margin erose-denticulate, 2–3 mm ø. *Stamens* 10, ± equalling the corolla or slightly exserted, if the corolla lobes are more expanded; filaments filiform, glabrous; anthers *c.* 0.7 mm. *Disk* glabrous. *Ovary* conical, green, densely lepidote, *c.* 1.8 mm, gradually attenuate to the red style, the latter glabrous, finally exserted, up to 14 mm; stigma club-shaped. *Capsule* oblong-ovoid, often a little oblique and curved, 6–7 by 2.5–3 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. Shrub in primary mossy forest from 2440 m upwards, abundant, and a very common constituent of the Ericaceous (scrub)forest on exposed sunny places, also in crevices on the open granite core of Mt Kinabalu, running almost to the summit, reduced there to a spreading wind-clipped dwarf shrublet at *c.* 4000 m. *Fl. fr.* March-Nov.

var. **silvicolum** SLEUM. Reinwardtia 5 (1960) 62; Blumea 12 (1963) 91.

Differs from the typical plant (with which it has the large calyx lobes in common) by less densely arranged and wider *leaves*, 8–10 by 1.6–1.8(–2) mm. Bushy *c.* 1 m high undershrub. *Corolla* (pale) red.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. Forest and more open vegetation, 1525–3000 m. Possibly of hybrid origin.

20. Rhododendron nanophyton SLEUM. Reinwardtia 5 (1960) 62.

var. **nanophyton.**

Dwarf shrub. Branchlets erect, slender, tips ± papillose-puberulous, densely foliate, lower parts set with the scars and the thickish cushions of fallen leaves. *Leaves* scattered, lanceolate, apex short-attenuate, subacuminate, somewhat obtuse at the very top, base cuneate, coriaceous, laxly lepidote on the upper surface for a rather long time, finally glabrescent, persistently lepidote beneath (scales lax to subdense, round, marginal zone narrow, entire or a little wavy, centre dark red-brown, thick, distinctly impressed), not or slightly recurved on edge, crenulate by impressed scales, 4–6 by 1.5–2(–2.5) mm, midrib slightly impressed above, not much raised beneath, nerves obsolete; petiole rather slender, semiterete, *c.* 1 mm. *Flowers* solitary or in twos. Perulae ovate to narrow-ovate, acuminate, minutely pubescent and laxly lepidote in the upper part outside, ciliate, up to 5 by 2 mm. Bracteoles filiform, subspathulate at the end and densely ciliate, 4–5 mm. Pedicels very slender, densely lepidote, 5–6 mm. *Calyx* minute, disk-shaped, wavy and obscurely 5-lobed at the spreading limb, lepidote outside, glabrous inside. *Corolla* dark brick-red, tubular, somewhat oblique, ± straight, 1.3–1.4(–1.5) cm long in all, 2.5 mm ø at the base, *c.* 3.5 mm at the mouth, densely set with thickish scales outside, margin of the lobes excepted, glabrous inside, lobes slightly unequal, ovate to nearly rounded, irregularly crenulate (but not erose-denticulate) at the apex, *c.* 3 by 2 mm. *Stamens* 10, subequal, as long as or slightly longer than the corolla; filaments

linear, dilated towards the base, glabrous; anthers broadly oblong, 1.3–1.5 mm. *Disk* glabrous. *Ovary* conical-ovoid, 5-furrowed, densely lepidote, *c.* 2 by 1.2 mm, gradually tapering to the style, the latter thick-filiform, glabrous, 7–8 mm; stigma shortly club-shaped, rather small.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range: Rantemario), in open country at 3100–3300 m, once collected. *Fl.* June.

var. **petrophilum** SLEUM. Reinwardtia 5 (1960) 63.

Differs from the type variety by less distinctly papillose-puberulous branchlets, obovate-oblong *leaves* 2.5–4(–6) by 1.5–2(–2.5) mm, obtuse and mostly a little retuse at the apex and papillose-puberulous in the lower half, shortly but distinctly ciliate *calyx* lobes, minutely pubescent pedicels and subglobose-obovoid anthers 1 mm.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range), frequent on rocks just below the western edge of the plateau of bivouac Heinrich, at 3200–3250 m, once collected. *Fl.* June.

21. Rhododendron schizostigma SLEUM. Reinwardtia 5 (1960) 63.

Weak shrub, 0.3–1.5 m. Branchlets erect, slender, tips laxly lepidote, lower parts set with the scars and the thick leaf-cushions of the fallen leaves. *Leaves* scattered, dense together and subimbricate, ovate or elliptic-ovate or elliptic, apex shortly obtusely acuminate (terminal gland small), base subtruncate-rounded, or more rarely broadly cuneate, coriaceous, very laxly lepidote and early glabrescent above, laxly and persistently lepidote beneath (scales round or nearly so, margin entire or subentire, centre mostly rather small, not or faintly impressed), edge subcartilagineous and flat, crenulate by depressed scales, (5–)6–8(–12) by (3–)3.5–5(–8) mm, midrib minutely or not impressed above, slightly raised beneath, nerves obscure; petiole *c.* 1 mm. *Flowers* solitary or in twos. Perulae ovate-acuminate, membranous, glabrous, glossy, up to 1.3 by 0.8 cm. Bracteoles linear-subspathulate, glabrous, up to 1 cm. Pedicels stoutish, 10–14 mm at anthesis, densely covered with subsessile scales. *Calyx* minute, oblique, disk-shaped, wavy, lobes obsolete. *Corolla* tubular, right red, 2.6–2.9(–3.2) cm long in all, 3–4 mm ø at base, *c.* 6 mm below the lobes, very laxly lepidote below, glabrous upwards outside, glabrous inside, tube 2–2.2(–2.5) cm, lobes broad-elliptic, 6–7(–8) by 4–5(–6) mm, margin undulate. *Stamens* 10, unequal, *c.* 2.5 cm; filaments linear, glabrous, somewhat dilated towards the base, filiform upwards; anthers brown, broadly subobovate-elliptic, 1.5–1.7 by 1 mm. *Disk* glabrous, lobes thick and a little prominent. *Ovary* obliquely ovoid-conical, very densely lepidote, *c.* 4 by 2 mm, rather abrupt with the stoutish glabrous style (*c.* 1.5 cm at anthesis); stigma gradually thickened or turbinate, its numerous lobes irregularly club-shaped.

Distr. *Malesia*: New Guinea (Lake Habbema and Hubrecht Mts).

Ecol. In open vegetation, near Lake Habbema plentiful in heavy ground moss in thickets, or in shrubberies of peaty ridges, 3100–3450 m. *Fl.* Feb., Aug.

22. Rhododendron meliphagidum J. J. S. in Fedde, Rep. 30 (1932) 162; SLEUM. Reinwardtia 5 (1960) 64.

Shrub, up to 5 m. Branchlets terete, tips initially laxly set with sessile scales, finally glabrescent, smooth; internodes 1.5–6.7 cm. *Leaves* scattered, 8–11 together at the 2 or 3 upper nodes, obovate, apex rounded, shortly retuse, base cuneate into the petiole, coriaceous, laxly to subdensely lepidote on both faces initially (scales sessile, round, subentire, centre thick, impressed), ± glabrescent above with age (marginal zone of the scales then obliterated, the impressed centre remaining visible for a long time), less quickly or not glabrescent beneath, entire, edge distinctly but slightly revolute, 1.9–4.3 by 0.7–1.9 cm, midrib impressed above, strongly raised beneath especially in the lower 2/3, nerves 4–5 pairs, anastomosing, faintly impressed above, not rarely obsolete on both sides; petiole somewhat flattened, grooved above, lepidote, *c.* 2 mm. *Flowers* solitary. Outer perulae subulate, densely lepidote, inner ones ovate, acuminate, in part apiculate, puberulous and lepidote dorsally, up to 7 by 3 mm. Pedicels rather slender, laxly hairy (especially above the base) and lepidote, 8–10 mm. *Calyx* oblique, small, obtusely 5-lobed (1 mm), lepidote dorsally, margin rather long whitish ciliate. *Corolla* brownish orange or yellow, tubular, slightly oblique, *c.* 3 cm long in all, laxly lepidote outside, glabrous inside, tube *c.* 2.5 cm long, *c.* 4 mm ø at base, *c.* 6 mm below the lobes, the latter ovate, obtuse, erect, 5–6 by 4–5 mm, ciliolate. *Stamens* 10, 2.5–2.9 cm; filaments linear, flat, nearly 1 mm wide at the base, filiform upwards, glabrous; anthers suborbicular, *c.* 1 mm. *Disk* glabrous. *Ovary* oblong-conical, densely lepidote, *c.* 3 by 1.8 mm, gradually developing into a rather thick, nearly columnar (1 mm ø), glabrous style, *c.* 2.3 cm long at anthesis; stigma club-shaped.

Distr. *Malesia*: Moluccas: Buru, summit of Mt Togha, at 1800–2050 m, a very common shrub on open spots; Central Ceram, in primeval forest of Mt Murkele, at 2000–2500 m, abundant, on limestone. *Fl.* Feb., July.

23. Rhododendron vinkii SLEUM. Blumea 12 (1963) 91.

Epiphytic shrub. Branches numerous, divaricate; branchlets terete, 1.5–3 mm ø, densely covered at the ends with suborbicular, sessile or subsessile scales; internodes 2–4(–5) cm. *Leaves* in 3–5-merous pseudowhorls at the upper 2–3 nodes, oblong or obovate-oblong, apex broadly attenuate, obtuse, rarely slightly retuse, base cuneate-attenuate into the petiole, subcoriaceous, densely lepidote on both faces initially, glabrescent with age above, persistently lepidote beneath (scales roundish or almost so, thickish, impressed, distant mutually for 2 or 3 times their diameter), (3.5–)4–6(–7.5) by (1.3–)1.5–2(–2.5) cm, edge slightly revolute especially towards the base of the lamina,

midrib a little impressed above, as thick as the petiole and much prominent, gradually narrowed and less prominent distally below, nerves 6–8 irregular pairs, somewhat impressed above, obscure beneath, reticulation faintly impressed above, or almost inconspicuous at all; petiole subterete, grooved above, densely lepidote, (5–)6–8 by *c.* 1 mm. *Umbels* 2- or 3-flowered. Outer perulae ovate, inner ones obovate to spathulate, glabrous dorsally, caducously lepidote-fimbriate, thin, up to 1 cm. Bracteoles filiform. Pedicels slender, rather densely patent-puberulous and lepidote, 1.2–1.8 cm at anthesis, slightly elongate in later stages. *Calyx* obliquely patellar, indistinctly obtusely 5-lobed, *c.* 2.5 mm ø. *Corolla* subobliquely tubular, light red, 2.5 cm long in all, subdensely set with rather thickish subrotund scales outside, laxly hairy inside, tube erect, *c.* 2 cm long, 3–4 mm ø at base, *c.* 6 mm at the throat, lobes spathulate-obovate, *c.* 5 by 6–7 mm. *Stamens* 10, slightly exserted from the throat; filaments linear and shortly hairy below, glabrescent in the upper 1/4; anthers broad-oblong, hardly 2 mm. *Disk* densely erect-hairy. *Ovary* cylindric, rather abrupt with the style, *c.* 4 by 2 mm, yellowish tomentose, the hairs covering the scales; style rather thickish, 1.2–1.6 cm at anthesis, densely patent-hairy below, less so upwards, glabrous but for *c.* 2 mm below the capitate stigma.

Distr. *Malesia*: W. New Guinea (hinterland of Fak-Fak), 840 m, in primary *Agathis* forest on clayey soil. Once found. *Fl.* Feb.

24. Rhododendron ciliilobum SLEUM. Reinwardtia 5 (1960) 64; Blumea 12 (1963) 92.

Erect shrub. Branchlets rather short, terete, subdensely clad with rubiginous sessile or subsessile scales, not hairy at all. *Leaves* several together at the tips of the branchlets in a kind of pseudowhorl, obovate, apex very shortly retuse, rarely rounded, base cuneate, coriaceous, laxly lepidote above, though ± glabrescent with age and becoming a little rough, subdensely lepidote beneath (scales nearly round, sessile, marginal zone narrow and thin, subentire, centre rather large, thick and manifestly impressed), margin very shortly revolute basally, otherwise flat, (1.1–)1.3–1.8(–2) by (0.5–)0.6–0.8(–1) cm, midrib faintly sunk above, obtusely raised beneath, ± evanescent towards the top of the lamina, nerves obsolete above, hardly or not visible beneath; petiole terete, lepidote, subrugose, 2–3 mm. *Flowers* solitary or in twos. Perulae ovate to obovate-spathulate, apiculate, sericeous and lepidote in the upper dorsal part, densely white-fimbriate, up to 6 by 3 mm. Bracteoles filiform, hairy at the apex, up to 5 mm. Pedicels rather slender, densely to more laxly substipitate-lepidote, otherwise whether or not laxly short-hairy, 6–8 (–10) mm. *Calyx* minute, wavy and spreading, or reflexed at the narrow margin, lepidote and very shortly pubescent dorsally, *c.* 2 mm ø, lobes very short and obtuse. *Corolla* tubular, *c.* 2 cm long in all, *c.* 3 mm ø at the base, *c.* 5 mm below the lobes, laxly lepidote outside, glabrous inside, lobes ovate to suborbicular, 4 by 3–4 mm, erect initially, finally ± spreading, manifestly erose-denticulate and ciliate at the apex. *Stamens* 10, ± as long as the corolla at anthesis, or finally somewhat exserted; filaments filiform, glabrous; anthers 1.3 mm. *Disk* glabrous. *Ovary* subovoid-cylindric, *c.* 2.5 by 1.5 mm, very densely lepidote, gradually tapering to the style, the latter thick-filiform, glabrous, *c.* 1.7 cm; stigma club-shaped, irregularly lobed. *Capsule* *c.* 1.3 by 0.35 cm, obliquely subcylindric, deeply 5-grooved.

Distr. *Malesia*: W. New Guinea (Wissel Lakes region), in heath vegetation at *c.* 1755 m. Two collections. *Fl.* March, April.

A form without hairs at the calyx and corolla lobes is known from the Balim Valley, at 1600 m.

25. Rhododendron quadrasianum VIDAL, Rev. Pl. Vasc. Filip. (1886) 170; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 43; Philip. J. Sc. 1 (1906) Suppl. 111; *ibid.* 2 (1907) Bot. 292; *ibid.* 3 (1908) Bot. 382; ELM. Leafl. Philip. Bot. 3 (1911) 1106; MILLAIS, Rhodod. (1917) 233; MERR. En. Philip. 3 (1923) 244; MILLAIS, Rhodod. ser. 2 (1924) 218; COPEL. *f* Philip. J. Sc. 40 (1929) 139, t. 1; H. J. LAM, Blumea 5 (1945) 574; SLEUM. Reinwardtia 5 (1960) 64. — *R. retusum* (*non* BENN.) F.-VILL. Nov. App. (1883) 353.

See for further synonyms under the varieties.

KEY TO THE VARIETIES

1. Ovary exclusively lepidote, not hairy at all.
 2. Corolla lepidote and, at least laxly, pubescent outside.
  3. Corolla 20 (rarely up to 25) mm long, strictly tubular . . . **4.** *var.* **malindangense**
  3. Corolla 10–15(–16) mm long, slightly subcampanulate-dilated distally.
   4. Pedicels pubescent *and* ± densely lepidote at anthesis. Perulae dorsally lepidote and pubescent.
    5. Leaves rather broadly and shortly obovate, 15–20(–28) by (5–)6–8(–10) mm **2.** *var.* **davaoense**
    5. Leaves ± elongate-obovate, (10–)12–20 (–22) by 3–5 (rarely up to 6) mm **3.** *var.* **rosmarinifolium**
   4. Pedicels pubescent and but very sparsely or not lepidote at anthesis. Perulae outside glabrous or almost so.
    6. Leaves obovate, (11–)12–18(–20) by 4–7 (–8) mm . . . . **5.** *var.* **marivelesense**
    6. Leaves narrow-obovate, 8–10(–11) by 2–3 (–4) mm. . . . . **6.** *var.* **intermedium**
 2. Corolla mostly exclusively lepidote, rarely lepidote and also with some hairs at the base, or glabrous.
  7. Leaves (15–)17–30 by (7–)9–13 mm. (Pedicels pubescent *and* lepidote) **1.** *var.* **quadrasianum**
  7. Leaves 6–16(–20) by 2.5–6 mm.
   8. Leaves ± broadly obovate, (3–)4–5(–6) mm wide. Pedicels lepidote and laxly pubescent, sometimes exclusively lepidote **7.** *var.* **selebicum**

8. Leaves narrowly and ± elongately obovate, 2.5–4(–5) mm wide. Pedicels very laxly lepidote, nearly always epilose **8. *var.* cuneifolium**

1. Ovary lepidote and rather densely hairy to almost villous.

9. Leaves narrowly obovate, (5–)9–16 mm long.

10. Leaves 3–5 mm wide . . **9. *var.* villosum**

10. Leaves 1–1.5 mm wide. **10. *var.* angustissimum**

9. Leaves broadly obovate, (11–)16–22 by (5–)7–10 mm . . . . . **11. *var.* borneense**

1. *var.* quadrasianum. — *R. quadrasianum* VIDAL, Rev. Pl. Vasc. Filip. (1886) 170; COPEL. *f.* Philip. J. Sc. 40 (929) 140, t. 1, f. 1, 2 (*not typical*).

Shrub, 0.3–1(–3) m, occasionally treelet, erect and terrestrial, or rarely epiphytic. Branches greyish, the cork peeling off longitudinally. Branchlets terete, slender, brownish greyish, striate, younger parts generally ± densely patent-puberulous, tips moreover laxly to subdensely lepidote; internodes 0.5–8(–10) cm, the lower ones leafless. *Leaves* close together or in 4–8-merous pseudowhorls at the upper 2–3(–4) nodes, obovate, subsessile, apex broadly obtusely attenuate or mostly rounded, very slightly or not retuse, the terminal gland small and on the undersurface within the edge, base cuneate into the petiole, ± coriaceous, dark green and shining above, dilutely so beneath, laxly lepidote initially, gradually glabrescent with age above, pits of the scales remaining visible for a long time, subdensely lepidote beneath (scales rather small, round or nearly so, marginal zone narrow, entire to crenulate, centre thick, rusty-brown, ± distinctly impressed), not rarely provided with a fine puberulence in the lower part of the blade especially when young, margin ± revolute, (15–)17–30 by (7–)9–13 mm, midrib sunk above, prominent beneath especially in its lower half, nerves 2–4 pairs, curved-ascending and anastomosing, minutely depressed above, slightly raised beneath, not rarely ± inconspicuous, reticulation 0; petiole very short (blade is decurrent to nearly the base), up to 1.5 mm. *Flowers* solitary or in twos (sometimes 3, rarely 4 in an umbel). Flower buds ovoid, *c.* 10 by 6 mm. Outer perulae ovate to suborbicular, inner ones broadly obovate-spathulate, obtuse or minutely apiculate, lepidote and sericeous upwards dorsally, short-ciliate. Bracteoles filiform, glabrous, up to 6 mm. Pedicels rather slender, *c.* 10 (sometimes up to 15) mm, rather densely shortly patent-pubescent, laxly to subdensely lepidote. *Calyx* small, disk-shaped, 5-lobed, lepidote and ± hairy, lobes broad-ovate and obtuse, *c.* 0.5 mm. *Corolla* red, tubular in outline, slightly oblique, subcampanulate-dilated upwards, rather shortly 5-lobed, 12–14(–15) mm long in all, ± shining and subdensely lepidote, moreover with some scattered hairs at the very base (but not hairy all over the tube) outside, glabrous inside, tube *c.* 10 mm, 2.5–3 mm ø at the base, 4–5 mm at the throat, lobes somewhat irregular, broadly elliptic-obovate or suborbicular, 3–4 by 2.5–4 mm, finely subdenticulate-erose or entire at the apex. *Stamens* 10, as long as or slightly shorter than the corolla; filaments linear, glabrous; anthers subglobose, *c.* 1 mm. *Disk* glabrous. *Ovary* obliquely cylindrical, gradually attenuate into the style, *c.* 2 by 1.5 mm, 5-ribbed, densely lepidote; style glabrous, *c.* 8 mm; stigma subcapitate, irregularly lobed. *Capsule* obliquely cylindrical, densely rusty-lepidote, 1–1.2 (–1.5) by 0.25–0.35 cm. *Seeds c.* 2 mm including the narrow tail at both ends.

Distr. *Malesia*: Philippines (Luzon, Albay Prov.: Mayon Volcano).

Ecol. Rocky open slopes, 1330–2100 m, abundant. *Fl. fr.* May-June, Sept.

Vern. *Kutmú.*

Note. This is the "typical" form, *i.e.* the first one described of this rather variable species, collected again and again on Mayon Volcano, but not found elsewhere. Within the general aspect of *R. quadrasianum s. lat.*, this is a homogeneous, glabrescent, big-leaved form.

COPELAND *f.* stated that a special form of *R. quadrasianum* occurs on almost every mountain in the Philippines. I had to reduce his infraspecific taxa to a more reasonable number in order to avoid overlapping.

2. *var.* davaoense (COPEL. *f.*) SLEUM. Reinwardtia 5 (1960) 65. — *R. quadrasianum* VIDAL *f. davaoense* COPEL. *f.* Philip. J. Sc. 40 (1929) 143, t. 1, f. 9, 10. — *R. quadrasianum* VIDAL *f. negrosense* COPEL. *f. l.c.* 142, t. 1, f. 6.

Treelet or shrub, sometimes epiphytic. *Leaves* rather broadly and shortly obovate, 15–20(–28) by (5–)6–8(–10) mm. *Corolla* 10–15(–16) mm long in all, subcampanulate-dilated distally, lepidote and at least laxly pubescent outside. Pedicels pubescent and ± densely lepidote at anthesis. *Ovary* only lepidote.

Distr. *Malesia*: Philippines (Mindanao, Leyte, Negros, S. Luzon).

Ecol. Dense moss forest on summits, 1600–2440 m. *Fl. fr.* Jan.–Dec.

Vern. *Tongog*, Bag., *lasimancahoy*, Negros.

3. *var.* rosmarinifolium (VIDAL) COPEL. *f.* Philip. J. Sc. 40 (1929) 144, t. 1, f. 13–18; SLEUM. Reinwardtia 5 (1960) 65; Blumea 12 (1964) 92. — *R. rosmarinifolium* VIDAL, Rev. Pl. Vasc. Filip. (1886) 172; RENDLE, J. Bot. 34 (1896) 355; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 43; Philip. J. Sc. 2 (1907) Bot. 292; *ibid.* 3 (1908) Bot. 382; MILLAIS, Rhodod. (1917) 236; MERR. En. Philip. 3 (1923) 245; MILLAIS, Rhodod. ser. 2 (1924) 225. — *R. cuneifolium* (*non* STAPF) RENDLE, J. Bot. 34 (1896) 355; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 43. — *R. quadrasianum* VIDAL *var. intermedium* MERR. Philip. J. Sc. 3 (1908) Bot. 382, *p.p.*; En. Philip. 3 (1923) 244, *p.p.* — *R. quadrasianum* VIDAL *f. halconense* COPEL. *f.* Philip. J. Sc. 40 (1929) 141, t. 1, f. 5. — *R. quadrasianum* VIDAL *f. banahaoense* COPEL. *f. l.c.* 145, t. 1, f. 24. — *R. quadrasianum* VIDAL *f. pulogense* COPEL. *f. l.c.* 144, t. 1, f. 19–23, 28; H. J. LAM, Blumea 5 (1945) 575, *p.p.*

Shrub, (0.5–)1–2 m, rarely treelet up to 6 m. *Leaves* ± elongate-obovate, (10–)12–20(–22) by 3–5 (rarely up to 6) mm. *Corolla* 10–15(–16) mm long in all, subcampanulate-dilated distally, red to orange, lepidote and at least laxly pubescent outside. Pedicels pubescent and ± densely lepidote at anthesis. *Ovary* only lepidote.

Distr. *Malesia*: Philippines (Mindoro, Biliran, Luzon).

Ecol. Mossy (oak-)forest, also in secondary growth and open places, locally common, 1300–2400 m. *Fl. fr.* Jan.-Dec.

Vern. *Bikbiki, sisisip*, Ig.

4. *var.* malindangense (MERR.) COPEL. *f.* Philip. J. Sc. 40 (1929) 142, t. 1, f. 7, 8; SLEUM. Reinwardtia 5 (1960) 66. — *R. malindangense* MERR. Philip. J. Sc. 3 (1908) Bot. 256, 381; MILLAIS, Rhodod. (1917) 206; MERR. En. Philip. 3 (1923) 244; MILLAIS, Rhodod. ser. 2 (1924) 183.

Shrub, 2 m, or treelet up to 7 m, sometimes epiphytic. *Leaves* oblong-obovate, (15–)20–25(–30) by (5–)6–8(–10, rarely up to 13) mm; petiole 2–3 mm. *Corolla* strictly cylindric, red, 20(–25) mm long in all, 4–5 mm ø, laxly pubescent and lepidote outside, lobes 5 by 3–4 mm. Anthers 1 mm. Pedicels rather densely pubescent and laxly lepidote. *Ovary* only lepidote.

Distr. *Malesia*: Philippines (Mindanao, Camiguin).

Ecol. Mossy forest, 1000–1600 m. *Fl. fr.* March-Sept.

Vern. *Malágos*, Bag., *mogá*, Sub., *tagum-tagúm*, Mbo.

5. *var.* marivelesense (COPEL. *f.*) SLEUM. Reinwardtia 5 (1960) 66. — *R. quadrasianum* VIDAL *f. marivelesense* COPEL. *f.* Philip. J. Sc. 40 (1929) 141, t. 1, f. 3, 4, 25–27.

Mostly small tree. *Leaves* (rather broadly) obovate, (11–)12–18(–20) by 4–7(–8) mm. *Corolla c.* 15 mm long in all, tubular, pubescent and lepidote outside. Pedicels pubescent, practically not lepidote. *Ovary* only lepidote.

Distr. *Malesia*: Philippines (Luzon, Mindoro).

Ecol. Mossy forest, 1200–2500 m. *Fl. fr.* March-Nov.

6. *var.* intermedium MERR. Philip. J. Sc. 3 (1908) Bot. 382, *s. str.*; En. Philip. 3 (1923) 244; COPEL. *f.* Philip. J. Sc. 40 (1929) 143, t. 1, f. 11, 12, 29; SLEUM. Reinwardtia 5 (1960) 66.

Small tree or shrub. *Leaves* narrow-obovate, 8–10(–11) by 2–3(–4) mm. *Corolla* tubular below, subcampanulate distally, *c.* 10 cm long in all, pubescent and lepidote outside. Pedicels pubescent, practically elepidote. *Ovary* exclusively lepidote.

Distr. *Malesia*: Philippines (Luzon).

Ecol. Open exposed ridges, 2000–2400 m.

Vern. *Kutmu*, Ig., *tongog*, Bag.

7. *var.* selebicum J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 443; Bot. Jahrb. 68 (1937) 199; SLEUM. Reinwardtia 5 (1960) 67. — *R. quadrasianum* VIDAL *f. monodii* H. J. LAM, Blumea 5 (1945) 576.

Shrub or treelet up to 4 m. *Leaves* ± broadly obovate, 6–14 by (3–)4–5(–6) mm. *Corolla* lepidote, but epilose outside, (10–)12–15 mm long in all, red or orange, sometimes tube yellow, limb orange. Pedicels laxly hairy and laxly to subdensely lepidote, sometimes exclusively lepidote. *Ovary* exclusively lepidote.

Distr. *Malesia*: Central and SE. Celebes.

Ecol. Light forest or open places, 2335–3000 m. *Fl.* June-Nov.

8. *var.* cuneifolium (STAPF) COPEL. *f.* Philip. J. Sc. 40 (1929) 145; SLEUM. Reinwardtia 5 (1960) 67; Blumea 12 (1963) 92; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 6 — *R. cuneifolium* STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 198, t. 15, f.B, 3; GIBBS, J. Linn. Soc. Bot. 42 (1914) 104; MILLAIS, Rhodod. (1917) 150; MERR. En. Born. (1921) 461, *p.p.*; MILLAIS, Rhodod. ser. 2 (1924) 121. — *R. quadrasianum* VIDAL *f. pulogense* (*non* COPEL. *f.*) H. J. LAM, Blumea 5 (1945) 575, *p.p.*

Terrestrial, or sometimes epiphytic shrub or treelet. *Leaves* ± elongate, rather narrow-obovate, 6–16 by 2.5–4(–5) mm. Pedicels laxly lepidote, nearly always epilose. *Corolla* glabrous or nearly so, red, pink, (pale) brick- or salmon-red, 10–15 (–20) mm long in all. *Ovary* only lepidote.

Distr. *Malesia*: North Borneo (Mt Kinabalu) and SW. Central Celebes (once found near Rantepao, N of Makale).

Ecol. On Mt Kinabalu common undershrub in mossy forest clearings, or in ridge or summit scrub forest, (1525–)1650–2865 m, in Central Celebes in grass and fern wilderness at 1200 m. *Fl.* Jan.-Dec.

9. *var.* villosum J. J. S. [*ex* MERR. En. Born. (1921) 463, *nom. nud.*] Bull. Jard. Bot. Btzg III, 13 (1935) 444; H. J. LAM, Blumea 5 (1945) 576, *incl. f. lutea* H. J. LAM *et f. rubra* H. J. LAM, *l.c.*; SLEUM. Reinwardtia 5 (1960) 67; Blumea 11 (1961) 114; *ibid.* 12 (1963) 92. — *R. cuneifolium* (*non* STAPF) RIDL. J. Str. Br. R. As. Soc. *n.* 63 (1912) 61. — *R. cuneifolium* STAPF *var. subspathulatum* (*non* RIDL.) MERR. Sarawak Mus. J. 3 (1928) 541.

Shrub, apparently epiphytic in general. *Leaves* narrow-obovate, (5–)9–16 by 3–5 mm. *Corolla* pubescent (sometimes rather sparingly so) and lepidote, red or yellow, *c.* 15 mm long in all. Pedicels lepidote and pubescent. *Ovary* lepidote and rather densely pilose to nearly villous.

Distr. *Malesia*: Borneo.

Ecol. Both in open mossy forest (rather common on Mt Dulit and Mt Kinabalu) and in low scrubby "kerangas" vegetation on bare sandstone rocks (as on summit of Mt Tanggoi), and in elfin woodland on rugged hill crest (Mt Pagon, 1675 m), (820–)1350–1680 (sometimes up to 1900) m. *Fl.* Jan.-Dec.

10. *var.* angustissimum SLEUM. Blumea 12 (1963) 92. — *R. ericoides* (*non* LOW *ex* HOOK. *f.*) BURTT,

Proc. R. Soc., B, 161 (1964) 83, *in text*. Epiphytic shrublet; branchlets short-pubescent. *Leaves* narrow-oblong-obovate, densely arranged especially towards the top of the young shoots, *c.* 10 by 1–1.5 mm. Pedicels slender, *c.* 5 mm, hairy. *Calyx* lobes very short, ciliate, tube hairy. *Corolla* tubular, slightly dilated distally, red, densely covered with roundish scales, sparsely so by longish white hairs, *c.* 10 by 3–4 mm. *Stamens* exserted; anthers 0.5 mm. *Ovary* subvillous.

Distr. *Malesia*: Borneo (Sarawak: Mt Mulu), in submontane forest, *c.* 1300 m. *Fl.* June.

11. *var.* borneense J. J. S. [*ex* MERR. En. Born. (1921) 462, *nom. nud.*] Bull. Jard. Bot. Btzg III, 13 (1935) 444; SLEUM. Reinwardtia 5 (1960) 67; Blumea 12 (1963) 92.

Shrub, probably epiphytic in general. *Leaves* ± broad-obovate, (11–)16–22 by (5–)7–10 mm. *Corolla* red, hairy and lepidote outside, *c.* 15 mm long in all. Pedicels hairy and laxly lepidote. *Ovary* densely pubescent and lepidote.

Distr. *Malesia*: Borneo.

Ecol. In primary forest, common on Mt Kemul, 1800 m. *Fl.* Oct.

2. *Subsection Siphonovireya*

SLEUM. Reinwardtia 5 (1960) 68. — *Rhododendron sect. Hadranthe* SCHLTR, Bot. Jahrb. 55 (1918) 157, *p.p.* — **Fig. 9-10.**

Scales disk-shaped, entire or nearly so (subcrenate), their marginal zone narrower and thinner than the mostly thick centre. *Corolla* salver-shaped, tube elongate and ± narrow, straight or slightly curved, lobes equalling 1/4 or less of the total length of the corolla, spreading ± horizontally.

Distr. *Malesia:* limited to New Guinea. Fig. 16.

KEY TO THE SPECIES

1. Leaves distinctly prominent-reticulate underneath. . . . . **26. R. habbemae**
1. Leaves obscurely or not reticulate underneath.
2. Style lepidote *and* patent-hairy in the lower third.
3. Ovary exclusively lepidote . . . . . **27. R. cinchoniflorum**
3. Ovary lepidote *and* hairy.
4. Corolla tube 2–2.5 cm; lobes much reflexed. Style widely exserted . . . . . **28. R. protandrum**
4. Corolla tube *c.* 3 cm; lobes erecto-patent. Style included . . . . . **29. R. inundatum**
2. Style lepidote to various degree, not hairy at all.
5. Corolla tube strictly cylindric, or but slightly dilated in the upper part.
6. Capsule *c.* 10 by 0.5–0.6 cm. Petiole (9–)11–16(–22) mm. Corolla tube 7–8(–8.5) cm **30. R. agathodaemonis**
6. Capsule (2.5–)3–4(–5) by 0.4 cm. Petiole (3–)5–8 (rarely up to 12) mm. Corolla tube 4–5.5 (rarely up to 7) cm . . . . . **31. R. herzogii**
5. Corolla tube gradually dilated from the base upwards. . . . . **32. R. incommodum**

26. Rhododendron habbemae KOORD. Nova Guinea 8 (1912) 877 ('*habbemai*'); J. J. S. *ibid.* 12 (1914) 142; *ibid.* 12 (1917) 510; SLEUM. Reinwardtia 5 (1960) 68. — *R. bodenii* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 94.

Shrub. Branchlets smooth, tips exclusively laxly lepidote. *Leaves* in 4–9 cm spaced, 3–5-merous pseudowhorls, obovate or obovate-oblong or obovate-elliptic, apex broadly attenuate, mostly ± obtuse, often apiculate by a small protruding gland, base broadly cuneate to truncate-rounded or subcordate, coriaceous, rigid, shining and ± olivaceous above, dull and paler beneath, laxly to subdensely covered with small, ± rounded scales, which are ± immersed on both faces in fully mature leaves, 3.5–6 by 1.5–3 cm, midrib strongly impressed above, much raised beneath, nerves 6–8(–10) pairs, rather straight, inarching near the edge, very slightly impressed above, prominent beneath, reticulation rather inconspicuous or very slightly impressed above, dense and manifestly raised beneath; petiole grooved above, 4–7 by *c.* 1.5 mm. *Umbels* 5–8-flowered. Perulae ovate to obovate, outer ones ± acuminate, inner ones obtuse, ± lepidote outside, glabrous inside, up to 1.5 cm. Bracteoles filiform to linear-spathulate, glabrous, 1–1.5 cm. Pedicels rather slender, ±densely lepidote, (0.6–) 0.9–1.5 cm. *Calyx* small, shortly and rather irregularly 5-dentate. *Corolla* salver-shaped, white, tube narrow-cylindric, straight or slightly curved, its base only somewhat dilated (5–6 mm) and 5-pouched, rather densely covered with small rounded scales outside as are the lobes, glabrous inside, (3.3–)4–5(–5.5) cm, lobes obovate, obtuse, 1–1.4 by 0.6–1 cm. *Stamens* 10, unequal; filaments linear, laxly to very laxly hairy, 3.5–4 cm; anthers oblong, 3 by 1 mm. *Disk* glabrous or almost so. *Ovary* subcylindric, 5-ribbed, very densely lepidote, 6–7 by 1.5 mm; style slender, 2.7–3.5 cm, mostly somewhat exserted from the throat, clad with short spreading hairs and scales at the base, exclusively hairy above, the upper part glabrous; stigma turbinate.

Distr. *Malesia*: New Guinea (Main Range from Mt Carstensz to the Hellwig Mts and Mt Goliath).

Ecol. Both in forest on wet mossy ground and on humus- and moss-covered exposed rocks, 2000–3450 m. *Fl.* Jan.-Dec.

27. Rhododendron cinchoniflorum SLEUM. Reinwardtia 5 (1960) 68. — **Fig. 9.**

Shrub. Branchlets rather slender, terete, tips lepidote; internodes 2–8 cm. *Leaves* in 4–6-merous pseudowhorls at the end of the upper internodes, ovate-elliptic or mostly elliptic, apex shortly ± obtusely acuminate, not rarely apiculate by a small gland, base subtruncate-rounded to slightly cordate, coriaceous, subdensely and ± cadu-

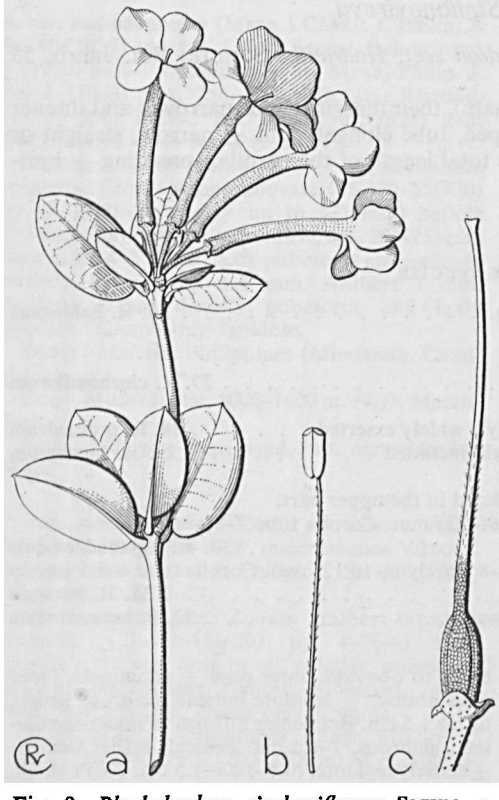

Fig. 9. *Rhododendron cinchoniflorum* SLEUM. *a.* Habit, × ⅔, *b.* stamen, × 2, *c.* ovary and style, × 2 (*a–c* EYMA 5264).

cously lepidote above, densely and persistently so beneath (scales nearly round, ± wavy at the margin, very distinctly impressed, the pits becoming blackish with age), (1.6–)2–2.5(–3) by 1–1.6 cm, midrib impressed above, strongly prominent beneath, nerves 3–4 pairs, very slightly impressed above in fully mature leaves, somewhat prominent in younger ones, generally not well visible, especially beneath, reticulation 0; petiole lepidote, 1.5–3 by 1–1.5 mm. *Umbels* 4–6(–7)-flowered. Outer perulae ovate-acute, inner ones obovate, lepidote dorsally along the middle line, up to 1 by 0.7 cm. Bracteoles linear, *c.* 6 by 1 mm. Pedicels rather slender, densely rufous-lepidote, 5–8 mm. *Calyx* disk-like, *c.* 2.5 mm ø, limb spreading or reflexed at anthesis, lepidote outside, glabrous inside, margin undulate and shortly 5-lobed. *Corolla* salver-shaped, colour not known (probably white), tube nearly straight, somewhat 5-saccate at the very base, very densely lepidote outside, glabrous inside, 2.5–3 cm by *c.* 2.5 mm, lobes ± spreading horizontally, obovate-elliptic, 1–1.2 by 0.8–0.9 cm, laxly lepidote outside, glabrous inside. *Stamens* 10, unequal, not or slightly exserted from the throat; filaments filiform, laxly hairy; anthers broadly oblong, 2–2.5 mm. *Disk* low, ± densely white-hairy. *Ovary* cylindric-conical, densely exclusively lepidote, *c.* 4 by 2 mm, abruptly narrowed to the style, slightly 5-ribbed; style *c.* 2.3 cm, lepidote and shortly patent-hairy in the lower third, gradually glabrescent upwards; stigma shortly turbinate, minutely crenulate.

Distr. *Malesia*: W. New Guinea (near the Wissel Lakes), 2400 m. Once found. *Fl.* Oct.

28. Rhododendron protandrum SLEUM. Blumea 11 (1961) 114.

Shrub *c.* 2.5 m, divaricately branched. Branchlets rather slender, juvenile parts densely lepidote and *c.* 2 mm ø; internodes (2–)3–6(–8) cm. *Leaves* in 4–5-merous pseudowhorls at the upper 2 or 3 nodes, elliptic, apex ± broadly subacuminate, or sometimes obtusely apiculate, base broadly attenuate or subcuneate, coriaceous, subdensely lepidote initially, glabrescent above with age, ± persistently lepidote beneath (scales small, roundish, marginal zone narrow, centre thick, yellowish, slightly impressed), very narrowly marginate, 3–5 by (1.6–)2–3 cm, midrib narrowly immersed above, as thick as the petiole and much prominent in the lower part beneath, nerves 4(–6) spreading, rather straight pairs, faintly impressed above, very slightly raised beneath, or not rarely ± obsolete on both faces, no reticulation; petiole grooved above, 4–6 by *c.* 1 mm. *Umbels* 5–8(–10)-flowered. Perulae membranous, glabrous dorsally, glandular fimbriate apically, outer ones ovate, apiculate or obtuse, inner ones obovate-oblong to oblong, up to 1 by 0.8 cm. Bracteoles subspathulate-linear, glabrous, up to 8 by 1 mm. Pedicels slender, 5–7(–10) mm, subdensely lepidote. *Calyx* subobliquely patellar, *c.* 2.5 mm ø, shortly and irregularly 5-lobed. *Corolla* tubular, ± horizontally expanded at the lobes, pure white or greenish white, or pale pink at the tube and white at the lobes, densely lepidote outside, set with short retrorse hairs in the lower third, glabrous for the rest inside, tube straight or slightly curved, *c.* 2.5 cm, 2–2.5 mm ø except the slightly dilated very base, lobes subspathulate-oblong, 5–6 by *c.* 3 mm, which become ± reflexed in full anthesis. *Stamens* 10, much exserted from the corolla tube early at the anthesis (when the style is still included in the corolla tube), erect, ± recurved with the upper part of the filaments towards the end of the anthesis (when the style becomes much exserted); filaments almost filiform, white, laxly or more densely hairy in the lower 1/4; anthers

oblong, base obtuse, 1.8 by 0.5 mm. *Disk* slightly prominent, laxly erect-hairy at the upper margin only. *Ovary* cylindric, *c.* 5 by 1.5 mm, subdensely subappressedly short-hairy and lepidote, tapering to the slender style, the latter lepidote to almost the top and laxly hairy in the lowest 10 mm; stigma subcapitate, very shortly 5-lobed. Submature *capsule* narrow-fusiform, reddish, laxly lepidote and hairy, 2.5–3 cm by 2.5–3 mm, rather deeply 5-furrowed lengthwise.

Distr. *Malesia*: New Guinea (Sibil R. Valley).

Ecol. In shrub vegetation on poor, impervious, white clay, 1260 m, common. *Fl.* June; *fr.* Aug.

29. Rhododendron inundatum SLEUM. Blumea 12 (1963) 92.

Terrestrial shrub, *c.* 1 m; branchlets reddish, striate, slightly pruinose when dry, variously obtusely compressed, laxly and ± caducously lepidote; the 2 ultimate internodes 6–12 cm by 3–4 mm. *Leaves* erecto-patent, in 4–5-merous pseudowhorls at the upper 3 nodes, elliptic to elliptic-obovate, apex very broadly attenuate or mostly rounded, sometimes apiculate, base broadly cuneate to the petiole, coriaceous, green above, yellowish green below, early glabrescent above, still subdensely lepidote with age (scales small, roundish, distant from each other for about their diameter, marginal zone thin, narrow, centre small, much impressed), slightly revolute in dry specimens, 3.5–5.5 by (1.5–)2–3(–3.3) cm, midrib narrowly immersed above, as thick as the petiole at the base, nerves 6–7 pairs, with some additional less conspicuous ones between, rather straight, obscurely anastomosing before the edge, slightly impressed above, a little prominent or indistinct below, no reticulation; petiole 6–9 by 1–1.5 mm. *Umbels* ± 4-flowered. Outer perulae ovate-acuminate, submucronulate by a protracted apex, densely set with thickish scales and very short hairlets at base and the middle outside, otherwise glabrous, inner ones ± spathulate, thinner, edge minutely lacerate, up to 1 by 0.6 cm. Bracteoles linear, sparsely lepidote, not hairy, *c.* 1.2 cm. Pedicels pinkish, ± densely lepidote, epilose, 1–1.2 cm by *c.* 0.5 mm. *Calyx* a little oblique, patellar, obscurely lobed, *c.* 2.5 mm ø. *Corolla* tubular below, somewhat expanded at the lobes, white, 4–4.3 cm long in all, subdensely lepidote except the marginal parts of the lobes outside, laxly hairy at the tube inside, tube rather straight, ± 3 cm, base 2.5–3 mm ø, gradually widened to 5 mm at the throat, lobes erecto-patent, obovate-spathulate, *c.* 1 by 0.7–0.9 cm. *Stamens* 10, reaching halfway the corolla lobes; filaments narrow-linear and densely patently white-hairy in the lower 3/4, filiform and glabrous upwards; anthers oblong, base obtuse, 2 mm. *Disk* hardly prominent, glabrous. *Ovary* subcylindric, densely lepidote and laxly patently white-hairy, 4–5 by *c.* 1.5 mm, continuous with the style, the latter rather slender, as long as the corolla tube, densely lepidote and laxly patently hairy in the lower, exclusively densely lepidote in the upper half; stigma subcapitate.

Distr. *Malesia*: New Guinea (Balim R. Valley near Wiligimaan), once found.

Ecol. Temporarily inundated grassplain on peaty soil, at *c.* 1650 m, locally common. *Fl.* June.

Vern. *Tumuk*, Dani.

30. Rhododendron agathodaemonis J. J. S. in Fedde, Rep. 12 (1913) 209; Nova Guinea 12 (1914) 142, t. 37 A; *ibid.* 12 (1917) 510; SLEUM. Reinwardtia 5 (1960) 69. — *R. hellwigii* (*non* WARB.) KOORD. Nova Guinea 8 (1912) 878, t. 153.

Shrub or small, compact tree, 1.2–6 m. Branchlets terete, tips laxly to densely rusty-lepidote. *Leaves* in 7–20 cm spaced, 4–5-merous pseudowhorls, elliptic to obovate-elliptic, apex broad-acuminate to obtuse, sometimes apiculate by a small gland or a little retuse, base broadly attenuate into the petiole or mostly rounded-obtuse, coriaceous, rather stiff, entire, somewhat revolute towards the base, sparsely to subdensely minutely lepidote on both surfaces especially beneath (scales round, entire or shallowly undulate at the marginal zone, centre ± impressed), (3.5–)5–7(–7.5) by (2.5–)3.5–4.8 cm, midrib slightly impressed above, distinctly raised though somewhat flattened beneath, nerves 6–8(–10) pairs, rather straight, anastomosing with each other and the primary veins near the edge, very slightly impressed above, a little raised or inconspicuous beneath, reticulation obscure; petiole somewhat flattened, sparsely lepidote, (9–)11–16(–22) by 1.5–2 mm, grooved above. *Umbels* showy, (6–)8–10(–12)-flowered. Perulae ovate to obovate, lepidote dorsally, *c.* 1.5 by 1 cm. Bracteoles filiform below, linear-spathulate upwards, laxly lepidote, *c.* 12 mm long, 1 mm wide apically. Pedicels rather stoutish, 6–15(–18) mm, ± densely lepidote. *Calyx* very small, annular, irregularly denticulate. *Corolla* salver-shaped, with a scent of carnations, pure white or somewhat rose tinged at the tube, the latter slightly curved, cylindric at least below, sometimes somewhat dilated in the upper half, 7–8(–8.5) cm long, *c.* 3 mm ø at the base, 4–6.5 mm in the middle and the upper half, sparsely to subdensely lepidote outside, laxly hairy and not rarely sparingly lepidote in the lower half inside, lobes rounded to obovate, spreading in a right angle, 1–1.5 by 0.8–1.2 cm, laxly lepidote or mostly glabrous outside, glabrous inside, *Stamens* 10, slightly or not exserted from the throat; filaments very slender, subdensely (rarely more laxly) set with spreading hairs in the lower half, glabrous above; anthers orange, oblong, thecae apiculate at base, 3–4 by 0.8 mm. *Disk* glabrous. *Ovary* elongate-conical, densely lepidote, 7–10 by 2 mm; style slender, slightly exserted, rather densely to laxly lepidote almost to the top, epilose; stigma short-turbinate, crenulate. *Capsule* red-brown, cylindric, attenuate at both ends, obtusely 5-angled, *c.* 10 by 0.5–0.6 cm.

Distr. *Malesia*: New Guinea (Mts Hubrecht and Wichmann on the southern, and near Habbema Lake on the northern side of the Orange Mts).

Ecol. Moss forest, in damp ground or swampy open places, 3050–3450 m. *Fl.* Feb., Aug., Nov.

31. Rhododendron herzogii WARB. Bot. Jahrb. 16 (1892) 15, 25; K. SCH. & LAUT. Fl. Schutzgeb. (1901) 487; SCHLTR, Bot. Jahrb. 55 (1918) 160, f. 6; SLEUM. Reinwardtia 5 (1960) 69; Blumea 11 (1961) 115; *ibid.* 12 (1963) 93; Jahrb. Rhodod. Ges. Bremen (1963) f. 13, 18. — *R. carringtoniae* (*non* F. v. M.) LANE-POOLE, For. Res. Papua (1925) 130; WHITE & FRANCIS, Proc. R. Soc. Queensl. 39 (1928) 68; STONOR, Rhodod. Yearbook 6 (1951) 49, f. 50. — *R. agathodaemonis* (*non* J. J. S. 1913) J. J. S. Nova Guinea 18 (1936) 99. — **Fig. 10.**

Erect shrub, (0.5–)1–2 m. Branchlets terete, subdensely lepidote at the ultimate internodes (3–13 cm), glabrescent and pruinose below. *Leaves* in 4–6-merous pseudowhorls at the upper nodes,

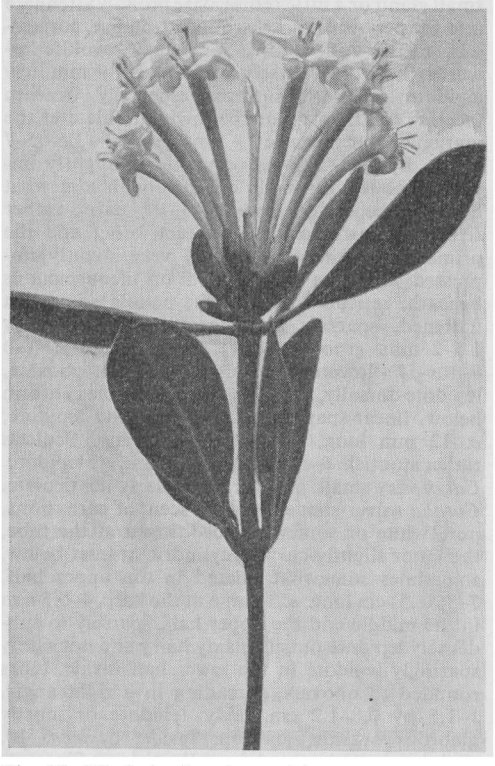

Fig. 10. *Rhododendron herzogii* WARB. Edie Creek near Wau, E. New Guinea, 1850 m (SLEUMER 4129) (SLEUMER, 1961).

elliptic or obovate-elliptic, sometimes nearly obovate or elliptic-oblong, apex broadly ± obtusely acuminate, sometimes rather blunt, base broadly cuneate to almost rounded, coriaceous, dark to medium green above, paler to yellowish green beneath, slightly revolute towards the base, subdensely lepidote when young, though early glabrescent above, rather densely and ± persistently impressed-lepidote beneath (scales roundish, pale yellow, their marginal zone narrow and shallowly irregularly crenate), (2.5–)4–6(–9) by (1.5–)2–4(–5) cm, midrib slightly grooved above, robust and prominent beneath, nerves (6–)8–10 (rarely up to 12) pairs, slightly curved, ± parallel to each other, rather obscurely anastomosing, faintly impressed above, raised beneath, reticulation obscure; petiole semiterete, grooved above, lepidote, (3–)5–8 (rarely up to 12) by 1.5–2 mm. *Umbels* 5–10-flowered. Flower buds obovoid-oblong, *c.* 2 by 1 cm, almost whitish green when fresh. Perulae ovate to subobovate, thin, densely lepidote dorsally except the glabrous marginal part, scales almost transparent-silvery in fresh specimens, up to 1.5 by 1 cm. Bracteoles narrow-linear, up to 3 cm. Pedicels rather stoutish, densely lepidote, (4–)6–8 mm. *Calyx* very small, oblique, disk-shaped, subentire. *Corolla* salver-shaped, pure white, or slightly pinkish at the tube externally, fragrant, tube straight or very slightly curved, 4–5.5 (rarely up to 7) cm long, *c.* 2.5 mm ø at base and middle, dilated upwards to *c.* 3.5 mm, densely lepidote outside, rather densely hairy and sparingly or not lepidote in the lower 2/3 of the inside, lobes spreading, orbicular to elliptic-obovate, 8–9 by 5–6 mm, ± lepidote outside, glabrous inside. *Stamens* 10, somewhat exserted at least in part beyond the recurved corolla lobes; filaments white, very slender, ± densely and patently hairy in the lower ⅔ only; anthers orange, oblong, 3–3.5(–4) by 0.8 mm. *Disk* very laxly hairy or glabrous. *Ovary* narrowly cylindric, very densely lepidote, 6–7 by 1.5 mm, rather abruptly tapering to the style, the latter mostly somewhat exserted from the throat, densely lepidote below, less so upwards, sometimes glabrous distally; stigma green, short-obconical. *Capsule* reddish, cylindric, rather straight, lepidote, (2.5–)3–4(–5) by 0.4–0.5 cm.

Distr. *Malesia*: New Guinea (Main Range from the Wissel Lakes to the Owen Stanley Range, and on Mt Saruwaged).

Ecol. Terrestrial, more rarely epiphytic, on earthen cliff faces, landslides, steep eroded banks or slopes, also in mountain forest or heath-scrub, on infertile sandy or clayey soil, not rarely found in (fern) regrowth, as coloniser in sluiced areas or in gullies of old garden land, (1530–)1600–2500 m. *Fl. fr.* Jan.-Dec.

Vern. *Lon, rohn*, Enga, *kibimuma*, Chimbu: Masul, *wumbambegon*, Wahgi: Minj, *numbamb*, Hagen: Togoba, *ronggehpa*, Mairi: Watabung.

32. Rhododendron incommodum SLEUM. Reinwardtia 5 (1960) 70; Blumea 11 (1961) 115; *ibid.* 12 (1963) 93.

Shrub, *c.* 1 m. Branchlets rather slender, subterete, lepidote only at the ultimate internodes (0.5–6 cm). *Leaves* in 3–4-merous pseudowhorls at the upper nodes, elliptic-oblong or mostly elliptic, apex broadly obtusely acuminate, base cuneately attenuate to the petiole, coriaceous, laxly lepidote initially, finally glabrescent above, subdensely and ± persistently lepidote beneath (scales small, roundish, entire or nearly so, yellowish, ± impressed), slightly revolute towards the base, 5–7.5 by 2.5–4 cm, midrib a little impress-

ed above, robust and very prominent in the lower part, gradually less so upwards and fading distally beneath, nerves 4–6 pairs in an acute angle with the midrib, obscurely anastomosing, slightly impressed above, respectively raised beneath, reticulation obscure; petiole subterete, rugose, 4–20 by *c.* 1.5 mm. *Umbels* ± 8-flowered. Bracteoles filiform, very laxly lepidote. Pedicels rather slender, subdensely covered with pale yellow scales, *c.* 10 by 0.5 mm. *Calyx* subobliquely disk-shaped, wavy, very shortly 5-lobed, *c.* 2.5 mm ø. *Corolla* tubular, 5–5.5 cm long in all, red, tube straight or slightly curved, 3.5–4 cm, gradually dilated from *c.* 3 mm ø at the base to *c.* 1 cm at the throat, laxly to subdensely clad with small yellowish scales outside, very laxly hairy and sparingly lepidote inside, lobes obovate or oblong-obovate, ± spreading, very laxly lepidote outside, glabrous inside, 1–1.5 by 0.5–0.7 cm. *Stamens* 10, well exserted from the throat; filaments filiform, laxly pubescent especially in their lower part, and glabrous above, or glabrous at all; anthers obovate-oblong, 2–3 by 1 mm, base obtuse. *Disk* glabrous. *Ovary* elongate-conical, very densely lepidote, *c.* 5 by 1.7 mm, gradually tapering to the style, which is laxly lepidote to the top and attains 5 cm; stigma shortly turbinate, rather small.

Distr. *Malesia*: New Guinea (Ogeramnang in the Sattelberg-Saruwaged area, and Purosa in the Okapa area, Eastern Highlands).

Ecol. Locally common, high epiphyte in mixed rain-forest, 1830–1950 m. *Fl.* Sept., Dec.

3. *Subsection Phaeovireya*

SLEUM. Bot. Jahrb. 74 (1949) 539; Reinwardtia 5 (1960) 71. — *Rhododendron sect. Schistanthe* SCHLTR, Bot. Jahrb. 55 (1917) 140, *p.p.* — *Rhododendron sect. Zygomorphanthe* SCHLTR, *ibid.* 55 (1918) 145, *p.p.* — *Rhododendron sect. Hadranthe* SCHLTR, *l.c.* 157, *p.p.* — **Fig. 11—15, 31.**

Scales ± dendroid, each on top of a distinct and ± persistent epidermal tubercle, thus both surfaces or at least the undersurface of the leaves densely tubercled and scabrid or rough to the touch in later glabrescent stages; marginal zone usually wide, deeply, often narrowly incised (then becoming similar to a stellate hair). *Corolla* various, mostly shortly tubular and ± zygomorphous, rarely elongate and funnel- or salver-shaped.

Distr. *Malesia:* Central Celebes and New Guinea. Fig. 16.

KEY TO THE SPECIES

1. Ovary exclusively and densely stellate-lepidote, *i.e.* no simple hairs present except possibly at the very apex of the ovary and on the style.
2. Style up to 2 mm. (Leaves 0.8–1.6 by 0.4–0.7 cm, very much revolute).
3. Anthers dehiscent by anticous pores. Style columnar, 1.5–1.6 mm.
4. Leaves spirally arranged, equidistant. Corolla *c.* 1.3 cm long in all, lobes 4–5 mm ø. . . **33. R. eymae**
4. Leaves in distant pseudowhorls. Corolla (1.5)–1.7–2.2 cm long in all, lobes 7–9 mm ø. **34. R. revolutum**
3. Anthers dehiscent by posticous pores. Style obconical, 1 mm. Leaves in pseudowhorls. **35. R. extrorsum**
2. Style at least 5 mm.
5. Style thick, *c.* 2 mm ø. Ovary 4–5 mm ø. Leaves large, (7–)10–16 by (3.5–)6–10 cm.
6. Corolla deep blood red, 6.5–7(–8) cm. Style 3–3.5(–4) cm . . . . . **36. R. hellwigii**
6. Corolla white or cream, may be with a rose tinge, or pink with a reddish throat, (11–)11.5–12.5 cm. Style 5.5–6.5 cm . . . . . **37. R. superbum**
5. Style slender, up to 1 mm ø. Ovary up to 2.5 mm ø. Leaves small or mostly medium-sized.
7. Leaves linear, lanceolate or ovate-lanceolate, 0.3–0.9 (–1.3, very rarely up to 1.6) cm wide.
8. Corolla glabrous outside .. . . . . **38. R. prainianum**
8. Corolla lepidote and/or hairy outside.
9. Corolla lepidote *and* hairy outside . . . . . **39. R. stelligerum**
9. Corolla lepidote *or* hairy outside.
10. Corolla exclusively lepidote outside.
11. Pedicels up to 0.5 cm. Style 0.6 cm. . . . . **40. R. neriifolium**
11. Pedicels (0.7–)1–1.3 cm. Style 1.7–3 cm.
12. Leaves linear, strongly revolute, (3–)3.5–5.5 cm by 2–3(–4) mm . . . **41. R. hooglandii**
12. Leaves lanceolate to ovate-lanceolate, slightly revolute, 3–7 by (0.3–)0.6–1(–1.3, very rarely up to 1.6) cm . . . . . **42. R. rarum**
10. Corolla exclusively whitish hairy outside. . . . . **43. R. delicatulum**
7. Leaves of various shape besides linear or lanceolate, 1 cm wide only in the narrowest leaves in the same specimen, and at least in part, or mostly all of them much wider.
13. Style exclusively laxly ± patently short-hairy at least at the base, not lepidote at all.

14. Filaments glabrous or practically so. . . . . **47. R. dielsianum *var.* stylotrichum**
14. Filaments hairy to various degree.
15. Corolla quite glabrous outside from the beginning. . . . . **44. R. bryophilum**
15. Corolla laxly to subdensely lepidote outside at least initially, may be glabrescent in later stages.
16. Corolla 3.8–4.5 cm long in all. Anthers 3 mm. . . . . **45. R. tuberculiferum**
16. Corolla 2.6–3 cm long in all. Anthers 2 mm. . . . . **46. R. asperrimum**
13. Style bearing no (or practically no) hairs, otherwise whether or not stellate-lepidote.
17. Style stellate-lepidote only at the very base, or quite glabrous.
18. Corolla sparsely to subdensely lepidote outside.
19. Filaments glabrous or practically so. . . . . **47. R. dielsianum *var.* dielsianum**
19. Filaments laxly papillose-hairy. . . . . **46. R. asperrimum**
18. Corolla completely glabrous outside.
20. Corolla about halfway 5-lobed, *c.* 2.5 cm . . . . . **48. R. stolleanum**
20. Corolla 5-lobed to 1/3, 3.5–3.8 cm . . . . . **49. R. psilanthum**
17. Style stellate-lepidote at least in the lower third.
21. Filaments densely hairy below. Disk ± densely hairy . . . . . **.50. R. phaeochitum**
21. Filaments very sparsely hairy or glabrous. Disk glabrous.
22. Leaves coriaceous, rather stiff, very densely stellate-lepidote ('tomentose') initially (scales persistent a rather long time), ± distinctly revolute at the margin. . **51. R. beyerinckianum**
22. Leaves subcoriaceous, less densely stellate-lepidote initially (scales ± fugacious), but slightly or not revolute at the margin.
23. Leaves ovate or oblong-ovate . . . . . **52. R. leptanthum**
23. Leaves (broadly) elliptic to oblong-elliptic, rarely obovate-elliptic . . . **53. R. warianum**

1. Ovary all over densely set with simple hairs, or distinctly hairy *and* lepidote to various degree.
24. Corolla (8–)9–14(–16) cm long in all.
25. Style glabrous except for some hairs and/or scales at the very base.
26. Ovary subcylindric, densely covered with ± stiff hairs, the hairs completely hiding the scales. Corolla glabrous outside . . . . . **54. R. gardenia**
26. Ovary ± bottle-shaped, densely covered equally with hairs and scales mixed on the lower (seed-bearing), and exclusively lepidote in the upper (constricted) part and the very base of the style. Corolla laxly lepidote outside . . . . . **55. R. thaumasianthum**
25. Style lepidote and/or hairy at least in the lower half.
27. Style predominantly hairy, and laxly stellate-lepidote in about the lower half, gradually more lepidote and less hairy above for about 1/4 of the total length, exclusively stellate-lepidote for some mm above, and glabrous in the uppermost part. Flowers 6–7-merous.
28. Anthers (8–)10–11(–16) mm . . . . . **56. R. konori**
28. Anthers 6(–7) mm . . . . . **57. R. phaeopeplum**
27. Style densely stellate-lepidote and epilose in the lower ⅔, glabrous above. Flowers 5-merous. Anthers 6 mm . . . . . **58. R. opulentum**
24. Corolla up to 7 cm long in all.
29. Leaves sessile or subsessile (petioles rarely up to 4 mm).
30. Style glabrous except for some spreading hairs at the base or in the lower 1/4. Ovary predominantly lepidote, the hairs scattered between the scales.
31. Corolla 3.8–4.5 cm; anthers 3 mm . . . . . **45. R. tuberculiferum**
31. Corolla 2.6–3 cm; anthers 2 mm . . . . . **46. R. asperrimum**
30. Style hairy *and* lepidote at least halfway. Ovary predominantly hairy, the tomentum ± covering the scales.
32. Corolla 2.5–2.8 cm. Leaves 1.6–4 by 1.2–1.7 cm.
33. Leaves ovate, base slightly cordate. Umbels 3-flowered. Corolla outside laxly lepidote, and sometimes very sparsely hairy too, inside laxly hairy . . . . . **59. R. spondylophyllum**
33. Leaves elliptic, base ± rounded. Flowers solitary. Corolla outside sparsely hairy, inside glabrous. **60. R. melantherum**
32. Corolla generally at least 4 cm long. Leaves (3–)3.5–7.5 by (1.6–)2.4–4.5 cm.
34. Leaves ovate or elliptic or suborbicular, sometimes obovate-elliptic. (Corolla 4–4.5 cm).
35. Corolla broadly tubular, ± zygomorphic; lobes ± erecto-patent, 1–1.2(–1.5) by 0.8–1 cm. **61. R. cyatheicolum**
35. Corolla funnel-shaped, ± regular; lobes widely spreading, 1.5–1.9 cm ø . . **62. R. asperum**
34. Leaves oblong-elliptic. (Corolla (4.5–)5–5.5 cm). . . . . **63. R. rhodochroum**
29. Leaves distinctly petioled.
36. Corolla 5-lobed ± halfway, 2–2.3 cm long . . . . . **64. R. gilliardii**
36. Corolla 5–7-lobed up to ⅓ of its total length.
37. Leaves deeply impressed-reticulate above, sharply prominently so beneath, *i.e.* distinctly bullate.
38. Leaves (8–)10–18(–22) by 4.5–12(–13) cm. . . . . **65. R. bullifolium**
38. Leaves 5–8 by 3–5 cm . . . . . **66. R. solitarium**

37. Leaves whether or not slightly impressed-reticulate above, resp. prominently so, *i.e.* not properly bullate.
39. Corolla ± densely and ± persistently lepidote outside.
40. Corolla 2.5–3 cm long.
41. Leaves ovate- or subovate-oblong, coriaceous. . . . . **67. R. schoddei**
41. Leaves elliptic- to obovate-oblong, subcoriaceous. . . . . **68. R. phaeochristum**
40. Corolla 4–6 cm long.
42. Leaves oblong, base truncate or slightly cordate. Umbels 4–8(–10)-flowered. **69. R. haematophthalmum**
42. Leaves broad-elliptic to ovate-elliptic, base broad-attenuate to almost rounded. Umbels 2–3-flowered . . . . . **70. R. phaeops**
39. Corolla but laxly and more caducously lepidote, or glabrous outside.
43. Anthers *c.* 2.5 mm. Corolla (3–)3.5(–4) cm. . . . . **71. R. truncicolum**
43. Anthers 3.5–5 mm. Corolla (4–)5–7 cm.
44. Style with a short though distinct purely lepidote zone (as found in 56. *R. konori*) above the lower zone, where hairs and scales are found together or the hairs are predominant. **57. R. phaeopeplum**
44. Style without such an upper exclusively lepidote zone.
45. Corolla white or pink, narrowly funnel-shaped, regular; tube straight or almost so.
46. Corolla 5-merous. Leaves broad-elliptic, more rarely oblong-elliptic or almost rounded. **72. R. rappardii**
46. Corolla 6–7-merous. Leaves oblong or elliptic-oblong . . . . . **73. R. dianthosmum**
45. Corolla red, tubular, ± zygomorphous; tube rather straight below, slightly curved and gradually dilated upwards . . . . . **74. R. rubellum**

33. Rhododendron eymae SLEUM. Reinwardtia 5 (1960) 74.

Dwarf shrub, 10–25 cm. Branchlets divaricate, terete, tips densely covered with rufous squamular scales, otherwise scabrid and dark coloured; internodes 0.5–1.5 cm. *Leaves* scattered and equidistant along the upper internodes, ovate or nearly oblong ovate, apex short-acuminate, acutish, base subtruncate rounded, very coriaceous, rigid, revolute to or nearly to the midrib, very young ones stellate lepidote on both faces, mature ones glabrescent above, though ± persistently lepidote beneath (scales squamular, the margin deeply stellate-lacerate, subsessile, the minute centre deepened, each scale on top of a persistent epidermal elevation), scabrid, 0.8–1.2 by 0.4–0.7 cm when extended, only 2–3 mm wide in the revolute state, midrib obscure above, a little prominent beneath, nerves obsolete; petiole lepidote, thick, 0.5–1.5 mm. *Flowers* solitary or mostly in twos, rarely in threes. Perulae ovate-acuminate, lepidote at the apex dorsally, glabrous otherwise, up to 1 by 0.6 cm. Bracteoles filiform, glabrous, up to 8 mm. Pedicels densely rufous-squamular-lepidote, (0.7–)1–1.2 cm by *c.* 1 mm at anthesis. *Calyx* small, densely lepidote, irregularly 5-dentate, teeth broad-triangular, subacute, 1 mm, or one or the other of them elongate to 3 mm. *Corolla* tubular below, dilated distally, rather fleshy, sulfureous, *c.* 1.3 cm long in all, tube subcylindric, 8–9 mm long, 3–4 mm ø at the base, 5–6 mm at apex, very densely rufous-stellate-lepidote outside, glabrous inside, lobes suberect or a little spreading, subspathulate to orbicular, 4–5 mm ø, densely lepidote outside, the margin excepted, glabrous inside. *Stamens* 10, unequal, only partly a little exceeding the corolla tube; filaments filiform, slightly dilated above the base, glabrous; anthers broad-oblong, dehiscent by anticous pores, *c.* 1.5 by 1 mm. *Disk* low, glabrous. *Ovary* ovoid-conical, very densely stellate-lepidote, 3–4 by *c.* 2.5 mm, rather abrupt with the style, the latter thick-columnar, glabrous, *c.* 1.6 mm long, stigma subcapitate, very shortly 5-lobed. *Capsule* ovoid, shortly contracted distally, 8–9 by *c.* 5 mm, densely rufous-stellate-lepidote; style persistent, *c.* 1.5 mm; valves not twisted; calyx a little accrescent; fruit-pedicel 1.5–1.8 cm.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range: Mt Rantemario), 3100–3300 m. Once collected. *Fl. fr.* June.

34. Rhododendron revolutum SLEUM. Reinwardtia 5 (1960) 74.

Low shrub, 10–40 cm. Branches mostly much divided; branchlets terete, *c.* 1.5 mm ø, tips densely stellate-lepidote and scabrid; internodes 1–3(–4) cm. *Leaves* in 4–6-merous pseudowhorls at the upper 2–3 nodes, ± narrowly ovate, apex short-acuminate, subacute, base truncate-rounded, coriaceous, very stiff, mostly revolute to the midrib, densely rufous-brown-lepidote on both faces initially (scales irregularly and ± deeply stellate-incised, the minute centre extended downwards into a stem-like foot, each scale on top of a thickish persistant epidermal tubercle), early glabrescent and scabrid above, lepidote for a long time beneath, 1–1.4 by 0.4–0.7 cm when extended, only ± 4 mm wide when revolute, midrib very slightly impressed above, obscure beneath as are the nerves; petiole thick, lepidote, 0.5–1 mm. *Flowers* solitary or in twos. Outer perulae ovate-subulate, ± lepidote dorsally, inner ones narrowly ovate-acuminate, ciliate and set with caducous marginal scales, glabrous otherwise, up to 1 by 0.5 cm. Bracteoles filiform, laxly long-hairy and lepidote, *c.* 1 cm. Pedicels very densely rufous-stellate-lepidote, 1.2-2 cm at anthesis, nearly 1 mm ø. *Calyx* subobliquely disk-shaped, densely

rufous-stellate-lepidote, 3–4 mm ø, lobes obtuse, *c.* 1 mm. *Corolla* tubular-infundibuliform, bright pink, (1.5)–1.7–2.2 cm, tube 0.9–1.4 cm, base rounded and 3–4 mm ø, gradually dilated upwards to 5–6 mm, densely stellate-lepidote outside, glabrous inside, lobes subspathulate-orbicular, wrinkled, 7–9 mm ø, laxly lepidote outside from the base to the middle, otherwise glabrous. *Stamens* 10, unequal, hardly exserted from the throat; filaments linear, slightly dilated above the base, glabrous; anthers oblong elliptic, *c.* 1.3 mm, dehiscent by anticous pores. *Disk* low, glabrous. *Ovary* ovoid-conical, densely stellate-lepidote, apex obtuse or abrupt with the style, *c.* 5 by 3 mm. Style columnar, glabrous, *c.* 1.5 by 0.4–0.5 mm; stigma thick-obconical, slightly 5-lobed. *Capsule* ovoid-ellipsoid, densely stellate-lepidote, *c.* 8 by 4 mm, crowned by a 2.5 mm long style; stigma manifestly 5-lobed; fruit-pedicel *c.* 2 cm.

Distr. *Malesia*: W. New Guinea (Lake Habbema), once found.

Ecol. Restricted to crevices and sandy niches on sterile limestone slopes, 3225 m. *Fl.* Aug.

35. Rhododendron extrorsum J. J. S. Nova Guinea 18 (1936) 95, t. 19, 2; H. J. LAM, Nat. Tijd. N. I. 89 (1929) 97, f. 54 (phot.); SLEUM. Reinwardtia 5 (1960) 75.

Lax shrub, 0.3–1.2 m, with irregular, often tortuous branches covered with grey bark. Branchlets dichotomously ramose, terete, densely rusty-scurfy-lepidote at the tips, glabrescent and scabrous below, blackish when dry; internodes 0.8–2.3(–4) cm. *Leaves* 4–5 per pseudowhorl at the upper 2–3 nodes, with some much reduced ones scattered along the internodes, normal ones ovate, apex short-acuminate, subacute, base rounded-obtuse, coriaceous, stiff, dull light green above, light greenish yellow beneath, strongly revolute, often so to the midrib, very densely stellate-lepidote on both faces initially (scales ± deeply irregularly lacerate in the marginal zone, not rarely incised to the minute centre, each scale shortly dendroid and on top of a distinct epidermal permanent elevation), rather early glabrescent above, less or later so beneath, finally scabrid, 1–1.6 by 0.4–0.7 cm when expanded, only 0.3–0.5 cm wide in the revolute state, midrib slightly grooved above, somewhat prominent beneath, nerves obscure; petiole stout, lepidote, 2–3 mm. *Flowers* solitary or in twos. Perulae ovate, acuminate, ciliolate, scaly along the dorsal middle line, glabrous otherwise, up to 1.5 by 0.5 cm. Bracteoles linear to linear-subspathulate, glabrous, up to 1 cm long. Pedicels densely rufous-lepidote, *c.* 5 mm by *c.* 1 mm. *Calyx* oblique, disk-shaped, very shortly obtusely 5-lobed, densely lepidote, *c.* 2.5 mm ø. *Corolla* very light lemon-yellow, nearly white, broadly funnel-shaped, 5-lobed halfway or slightly more, *c.* 1.9 cm long in all, tube wide, gradually dilated from 3–4 mm ø at base to 8–9 mm at the throat, subdensely covered with brown scales outside, glabrous inside, lobes somewhat spreading, wavy, obliquely suborbicular, *c.* 1.2 cm ø, glabrous except for some scales at the very base outside. *Stamens* 10, slightly unequal, 7–8 mm; filaments linear, slightly dilated above the base, pale green, glabrous; anthers red-brown, oblong, dehiscing by distinctly backward pores, *c.* 1.5 mm. *Disk* obsolete. *Ovary* ovoid-conical, obtuse, *c.* 4 by 3 mm, densely stellate-lepidote; style abrupt with the ovary, very shortly obconical, hardly 1 mm, glabrous; stigma convex, slightly lobed. *Capsule* ovoid, densely rusty-stellate-lepidote, *c.* 1.2 by 0.6 cm, pedicel 8 by 1 mm.

Distr. *Malesia*: W. New Guinea (Mt Doorman).

Ecol. Open slope, also in the saddle between the summits, scattered though common, 3500 m. *Fl.* Oct.

36. Rhododendron hellwigii WARB. Bot. Jahrb. 16 (1892) 15, 26; K. SCH. & LAUT. Fl. Schutzgeb. (1901) 487; SCHLTR, Bot. Jahrb. 55 (1918) 157; DIELS, *ibid.* 62 (1929) 487; SLEUM. Reinwardtia 5 (1960) 76.

Shrub or small tree, terrestrial or apparently usually epiphytic. Branchlets 4–6 mm ø, terete, glabrous except the somewhat flattened or angular and ± densely rufous-stellate-lepidote tips; internodes 2–8(–15) cm. *Leaves* in 3–5-merous pseudowhorls at the upper 1–2 nodes, or 2 or 3 scattered but near together at the nodes, ovate to ovate-elliptic, sometimes suborbicular, very coriaceous and firm, apex broadly attenuate and obtuse to rounded, base rounded, sometimes slightly cordate, greyish brownish above when dry, brownish beneath, rusty-stellate-lepidote on both faces initially (scales small, irregularly incised, sessile or very shortly stalked, each on top of a minute epidermal tubercle which remains visible for a long time beneath), early glabrescent above with age, rather smooth or often somewhat rough to the touch, more persistently lepidote beneath, edge not revolute, 8–13(–16) by 5–8.5(–10.5) cm, midrib grooved above in the lower half, robust, rather flat, distinctly prominent to nearly the top, nerves 8–10 pairs, rather irregular, the lowest 2 pairs from near the base of the blade, all ± straight below, curved-anastomosing to the edge, slightly prominent on both faces, veins rather coarse, much less visible, veinlets obscure; petiole robust, a little flattened, grooved above, ± densely lepidote, (1–)1.2–1.6 (rarely up to 2.5) cm by 3–4 mm. *Umbels* 2–3-flowered. Flower buds ovoid, 3–3.5 by 2.5–3 cm. Outer perulae ovate to suborbicular, inner ones broad-spathulate, obtuse or very shortly apiculate, densely covered with short, stoutish, nearly bullate hairs on both faces, glabrescent, remaining scabrous, not ciliate, up to 4 by 3.5 cm. Bracteoles linear to subspathulate, hairy or almost hirsute below, glabrous distally, *c.* 2–3.5 cm by 1–4 mm. Pedicels very stout, densely dark rufous-lepidote, 0.6–1(–1.3) cm by 2–2.5 mm. *Calyx* rim-like, very shortly obtusely 5–6-lobed, *c.* 6 mm ø. *Corolla* broadly funnel-shaped, dark blood red, rather fleshy, 6.5–7 (sometimes up to 8) cm in all, tube slightly dilated upwards and moderately curved, (4–)4.5(–5) cm long, 1–1.3 cm ø at base, 1.7–2 cm at apex, glabrous outside, densely set with short ± retrorse

hairs inside in the lower half, lobes 6–7, somewhat expanded, broadly spathulate or obovate, (2.5–)3–3.5 by 2.5–3(–3.5) cm. *Stamens* 12–14, unequal, slightly exserted from the throat; filaments linear (1 mm), clad with retrorse or patent hairs in their lower ⅔, glabrous and filiform distally; anthers linear-oblong, 7–8 by 1.5 mm, base of each theca shortly obtusely bilobed. *Disk* glabrous, blackish when dry. *Ovary* subovoid-cylindric, *c.* 10 by 4–5 mm, densely covered with small flattened scales, ± abruptly attenuate to the curved style, the latter thick, glabrous, sometimes shining, 3–3.5(–4) cm by *c.* 2 mm; stigma shortly thick-capitate, obscurely 5–6-lobed.

Distr. *Malesia*: E. New Guinea (Finisterre and Saruwaged Mts).

Ecol. Terrestrial on steep slopes among grasses at 1675–2100 m, mostly epiphytic in mountain or mossy forest, 1065–2440 m (also reported up to 4000 m, which seems to be less reliable). *Fl.* Jan.-May, Sept., Oct.

37. Rhododendron superbum SLEUM. Reinwardtia 5 (1960) 76; Blumea 11 (1961) 115; *ibid.* 12 (1963) 95; *ibid.* 12 (1964) 339; Jahrb. Rhodod. Ges. Bremen (1963) f. 19, *non* Hort. *ex* LAVALLEE, 1877, *nom. nud.* — *R. devrieseanum vel aff.* STONOR, Rhodod. Yearbook 6 (1951) 50, f. 48.

Stiff shrub, (0.5–)1.5–2(–6) m. Branchlets terete, (5–)6–7 mm ø, tips striate and somewhat flattened in dry specimens, densely fugaciously rusty-stellate-lepidote, older parts glabrescent, ± scabrid; internodes 5–10 cm. *Leaves* in 4-merous pseudowhorls or scattered and ± close together at the upper nodes, broad- or ovate-, sometimes subobovate-elliptic, very coriaceous, stiff, erect, apex broad-attenuate and very shortly acuminate or obtuse, base subtruncate-rounded or slightly cordate, ± dark green above, slightly paler beneath, dull young ones densely covered on both faces with a golden tomentum of rather small scales (scales irregularly stellate-lacerate at the marginal zone, each on top of a distinct persistent epidermal tubercle), early glabrescent above, tardily so beneath, finally very rough on both surfaces, flat, (8–)10—12 by (4.5–)6–8 cm, midrib sulcate above in the lower part, less so apically, stout and ± flattish beneath, *c.* 4 mm wide at the base, gradually narrower apically, nerves *c.* 8 pairs, 2 lowest nearly from the base of the blade, upper ones patently from the midrib, all rather straight below, curved before the edge and anastomosing, a little prominent on both faces, veins still less conspicuous, somewhat impressed above in fully mature leaves, slightly raised beneath, no proper reticulation visible; petioles flattened, grooved above, 1.5–2 cm by 2.5–4 mm. *Umbels* 3–5-flowered. Perulae ovate, subcoriaceous, reddish carmine, densely set with coarse thick hairs and rough to the touch outside, up to 5 by 3 cm. Bracteoles linear to linear-subspathulate, laxly hairy, up to 5 by 0.5 cm. Pedicels robust, densely rusty-stellate-lepidote, (0.8–)1.2–2.4 cm by 2–2.5 mm. *Calyx* oblique, cup-shaped, lepidote dorsally, 7–9 mm ø, lobes obtusely deltoid, manifestly shortly fimbriate, 1.3–2 mm, sometimes much larger and petaloid. *Corolla* funnel- or widely trumpet-shaped, fleshy or waxy in texture, white to cream or very light yellow, sometimes faintly flushed with pink, and shades to deep pink towards the tube, or pink with reddish throat, outside of tube sometimes ± uniformly pink, scented, (11–)11.5–12.5 cm long in all, 9–10(–12) cm across the limb in dry, 13–14 cm long in fresh specimens, tube gradually dilated from the base upwards, 6.5–7.5 cm, *c.* 1 cm ø at base, 2–2.5 cm at apex, laxly lepidote or mostly glabrous outside, covered with white, ± retrorse and rather dense hairs in the lower half inside, glabrous otherwise, lobes 6–7, ± spreading, broadly obovate or spathulate, 4.5–5 by 3–3.5 cm, glabrous. *Stamens* 12 or 14, slightly longer than the corolla tube, unequal; filaments light green, linear, *c.* 1 mm wide at the base, very densely ± patently hairy below, less so or even glabrous and narrower in the upper ½ to ¾; anthers linear-oblong, white, 8–9 by *c.* 1.5 mm, thecae minutely lobulate at the base. *Disk c.* 1 mm high, glabrous. *Ovary* thickly conical-cylindric, densely clad with copper-coloured, stellate scales, *c.* 11 by 4 mm, not rarely abruptly narrowed to the red or green style, the latter completely glabrous, 5.5–6.5 cm by *c.* 2 mm; stigma capitate, 7–8 mm across in fresh specimens, obscurely 6–7-lobed. *Capsule* cylindric, shortly narrowed at both ends, widest above the middle, *c.* 5 by *c.* 1.3 cm. *Seeds* 7–8 mm including tails.

Distr. *Malesia*: New Guinea (Southern, Western, and Eastern Highlands: Mt Giluwe, Mt Sugarloaf, Yaki Valley, Minj-Nona Divide, Mt Hagen, Bismarck Mts, Marafunga above Goroka; Mt Saruwaged area).

Ecol. Generally epiphytic on the upper branches of large trees, apparently with preference just below the true moss forest level; terrestrial on Mt Michael and Mt Giluwe, in low shrub and on edge of cloud forest, (1525–)2300–3050 m. in Uinba (Minj-Nona Divide) even in fallow native gardens at 1970 m. *Fl. fr.* April-Sept.

Vern. *Marugump*, Enga, *wamp-wamp*, Mendi, *kukump*, Minj.

Note. STONOR described this as growing commonly, but individually, its huge, lily-like flowers making glowing spots of colour among the greens of the innumerable other epiphytes. The flower has an exquisite scent, reminiscent of Carnations or the Regale Lily; he thinks, that this and other high-epiphytic *Rhododendrons* with a delicious scent like *R. agathodaemonis* "are pollinated by the Lory parrots, some of which live in the moss-forests, and the more so as we know parrots to be among the few birds with a sense of smell".

38. Rhododendron prainianum KOORD. Nova Guinea 8 (1909) 187; SLEUM. Reinwardtia 5 (1960) 78.

Epiphytic or terrestrial shrub, up to 2 m. Branchlets terete, slender, *c.* 1.5 mm ø, few-branched, tips very densely covered with rubiginose, stellate scales, glabrescent below; internodes 2–6

cm. *Leaves* in 3–4-merous pseudowhorls, linear-lanceolate or linear, subsessile, straight or subfalcate, apex gradually attenuate, subacute, base shortly cuneate, subcoriaceous, initially lepidote on both faces (scales stellate-incised at the marginal zone to various degree, dendroid, each scale on top of a minute epidermal persistent tubercle), early glabrescent and scabrid above, tardily so beneath, edge very slightly or not revolute, 5–10 by (0.3–)0.4–0.7 cm, midrib strongly impressed above, prominent beneath, nerves ± obscure; petiole slender, densely lepidote, 2(–3) mm. *Flowers* solitary or mostly in twos. Perulae ovate, rostrate-acuminate, stellate-lepidote outside mainly at the apex, up to 15 by 6 mm. Bracteoles linear, laxly lepidote, 1–1.5 cm. Pedicels very slender, densely lepidote, 9–11 mm. *Calyx* cup-shaped, *c.* 2 mm ø, glabrescent outside, with obscure teeth. *Corolla* tubular, slightly zygomorphic, membranous, lilac, glabrous in- and outside, 2.5–2.7 cm long in all, tube cylindric, straight or slightly curved, 1.5–1.8 cm long, *c.* 3 mm ø at base, not more than 4 mm at apex, lobes spreading, obovate-spathulate to suborbicular, 6–8 by 5–7 mm. *Stamens* 10, 2.5–2.8 cm; filaments linear below, filiform distally, glabrous; anthers broad-oblong, 1.5 by 1 mm. *Disk* finely short-pubescent at the upper margin. *Ovary* elongate-conical, very densely rufous-stellate-lepidote, *c.* 3–4 by 1 mm, gradually tapering to the slender style (1.5–2 cm), which is lepidote in the lower ½ to ⅓, bearing sometimes several short hairs in the middle (practically epilose), glabrous apically; stigma short-obconical.

Distr. *Malesia*: New Guinea (Hellwig Mts; Orion Mts: Sibil R. Valley).

Ecol. On poor clayey soil, at 900–1300 m. *Fl.* May-Aug.

39. Rhododendron stelligerum SLEUM. Blumea 11 (1961) 115.

Shrub, 1–1.5 m, with sparse erect, much branched twigs. Branchlets slender, tips very densely covered with rusty stellate scales, older parts glabrescent, ashy; internodes (1.5–)3–7 cm by 1.5–2 mm. *Leaves* in 4–5-merous pseudowhorls at the upper (2–3) nodes, sublinear-lanceolate, attenuate at both ends, apex subacute, coriaceous, initially very densely clothed with rusty stellate scales, glabrescent and remaining rough to the touch above with age, more persistently lepidote beneath (scales partly covering each other, each on top of a minute, persistent epidermal tubercle, marginal zone rather wide, deeply and irregularly stellate-incised or -lacerate, ends of the laciniae filiform, centre rather large, dark chestnut brown, tapering downwards into a kind of short stem or foot), much revolute at the edge, (2–)2.5–4.5 cm long, (0.3–)0.4–0.8 cm wide in the revolute state, midrib hardly indicated above, obtuse and much prominent beneath, nerves inconspicuous; petiole very densely lepidote, 4–6 by *c.* 1 mm. *Flowers* 2 or 3 per umbel, rarely solitary. Flower buds ovoid-oblong, *c.* 1 cm; outer perulae broadly subulate, more inner ones ovate, subabruptly narrowed into an acumen of 2–3 mm, slightly keeled and lepidote in the upper part dorsally, innermost ones ovate-oblong, obtuse, ± glabrous dorsally, all densely lepidote-fimbriate, up to 1 by 0.5 cm. Bracteoles filiform, laxly caducously lepidote, up to 1 cm. Pedicels entirely covered with almost golden stellate scales, 1.2–1.6 cm by 0.7–1 mm. *Calyx* disk-shaped, suboblique, shortly 5-lobed (or one or two lobe(s) sometimes elongated into a narrow lacinia up to 8 mm), *c.* 2.5 mm ø, densely lepidote dorsally. *Corolla* tubular below, gradually subcampanulate-dilated upwards, not rarely somewhat curved, markedly zygomorphous, deep pink when fresh, magenta in dry specimens, subdensely set with golden stellate scales and ± crisp, white hairs outside at the tube and the base of the lobes, glabrous for the rest, 3.5–4 cm long in all, tube (2–)2.5–3.2 cm long, 5–6 mm ø at base, 7–9 mm at throat, lobes erecto-patent, broadly spathulate or obovate, 0.7–1(–1.2) by 0.6–0.8 cm. *Stamens* 10, unequal, ± long exserted from the tube, the longest attaining half the corolla lobes; filaments linear, 1 mm wide below, 0.5 mm wide in the upper part, quite glabrous; anthers obovate-oblong, 2–2.5 by 1.5 mm. *Disk* slightly prominent, glabrous. *Ovary* subcylindric, *c.* 5 by 2.5 mm, very densely clothed with deeply stellate-incised golden scales, but no hairs, gradually narrowed into the style, which is covered with dense or more laxly arranged scales and hairs to the lower ¾, glabrous for the rest; stigma thick-turbinate, shortly 5-lobed. *Capsule* subcylindric, slightly curved, densely stellate-lepidote, not hairy at all, 2–2.5 by 0.4 cm, splitting into 5 twisted and subreflexed valves. *Seeds* very narrow, almost filiform, 4 mm, long-tailed at both ends.

Distr. *Malesia*: New Guinea (Star Mts: on Mt Antares), once collected.

Ecol. In semi-alpine shrub-vegetation, 3000 m. *Fl.* July.

40. Rhododendron neriifolium SCHLTR, Bot. Jahrb. 55 (1918) 149; SLEUM. Reinwardtia 5 (1960) 78.

"Epiphytic shrub. Branchlets elongate, flaccid, terete, laxly foliate, densely stellate-lepidote. *Leaves* opposite, linear-lanceolate or nearly linear, apex acute, base nearly rounded, lepidote on both faces initially, glabrescent above, entire, 3.5–7 by 0.5–0.9 cm; petiole 2–3 mm. *Flowers* solitary. Perulae and bracteoles not known. Pedicels densely stellate-lepidote, up to 5 mm. *Calyx* disk-shaped, densely stellate-lepidote, very shortly 5-lobed, 2.5–3 mm ø. *Corolla* tubular, bright pink-red to purplish, zygomorphous and slightly curved, rather densely stellate-lepidote outside, glabrous inside, 2.7–3.3 cm, lobed to the upper 1/5, lobes suborbicular, erecto-patent. *Stamens* 10, very slender, up to 2.5 cm; filaments filiform, laxly hairy; anthers oval, *c.* 2 mm. *Ovary* oblongoid, densely stellate-lepidote, *c.* 6 mm. Style subulate, laxly hairy, 6 mm; stigma capitate, 6-gibbous.

Distr. *Malesia*: New Guinea (Schrader Mts), in mountain forest at *c.* 2070 m. *Fl.* May-June.

Note. Neither type material preserved nor recollected; description after the original diagnosis.

41. Rhododendron hooglandii SLEUM. Reinwardtia 5 (1960) 75; Blumea 12 (1964) 339. — **Fig. 31 b—c.**

Straggling, much branched shrub, 0.7–1.8 m, also epiphytic. Branchlets densely set with stalked scales, warty and rough to the touch at the ultimate 1–2 internodes, early covered with greyish or whitish cork below; internodes 2–6(–8) cm. *Leaves* in 4–6-merous pseudowhorls at the upper 1–2(–3) nodes, linear, apex subobtuse, base narrowed to the petiole, coriaceous, densely covered on both faces with yellowish stalked, deeply stellate-incised scales which go early, leaving the stalks, thus making the surface of the lamina scabrous, revolute to near the midrib, (3–)3.5–5.5 cm by 2–3 (–4) mm, midrib faintly impressed above, as thick as the petiole and somewhat prominent beneath, nerves not visible; petiole stoutish, densely stalked-lepidote, (4–)5–8 mm. *Umbels* (1–)2-flowered. Outer perulae subulate, inner ones ovate-subacuminate, almost blunt, lepidote along the dorsal middle line, glabrous otherwise, lepidote-fimbriate, 3–7 by 1–4 mm. Bracteoles filiform, minute. Pedicels rather robust, densely and exclusively clothed with yellowish stalked scales, *c.* 1 cm. *Calyx* obliquely patellar, very obtusely and shortly 5-lobed, densely set with nearly sessile scales, *c.* 3 mm ø. *Corolla* tubular, somewhat curved and zygomorphous, pinkish red, 2.8–3 cm long in all, densely covered outside with substipitate or sessile, subentire to variously dented scales, glabrous inside, tube 2–2.3 cm, *c.* 5 mm ø at base, hardly dilated upwards, lobes broadly obovate, 5–8 mm ø. *Stamens* 10, as long as or slightly longer than the corolla; filaments linear, glabrous; anthers subquadrate-oblong, 1.5 by 1 mm. *Disk* glabrous. *Ovary* nearly conical, gradually tapering to the style, very densely lepidote, not hairy at all, *c.* 5 by 2 mm. Style red, rather slender, with some scales at the very base, glabrous for the rest, *c.* 2 mm; stigma subcapitate, greenish yellow, 5-lobed. *Capsule c.* 1.8 cm.

Distr. *Malesia*: New Guinea (Eastern Highlands: Goroka Subdistr., Kerigomna; Western Highlands: Upper Minj R. Valley, Minj-Nona Divide).

Ecol. Forest grassland edge or alpine thickets, not common, 3000–3410 m. *Fl.* July.

42. Rhododendron rarum SCHLTR, Bot. Jahrb. 55 (1918) 150; SLEUM. Reinwardtia 5 (1960) 78; Jahrb. Rhodod. Ges. Bremen (1963) f. 17; Blumea 12 (1963) 97; *ibid.* 12 (1964) 339. — **Fig. 11.**

Epiphytic slender shrub, up to 1 m high, much branched. Branchlets terete, 1–2 mm ø, laxly leaved, tips densely rusty-squamular-lepidote, older parts glabrescent, somewhat scabrid and early covered with greyish cork; internodes (1.5–)3–10 cm. *Leaves* opposite or mostly in 3–5-merous pseudowhorls at the upper 3–4 nodes, often different in size in the same whorl, with some much reduced leaflets between them, in general larger in the lower whorls, lanceolate to ovate-lanceolate, apex gradually long-acuminate, subacute, base very broadly attenuate or mostly ± rounded, subcoriaceous, rather thin, deep green above, pale green below with brown sparse scales, densely lepidote initially on both faces (scales ± deeply stellate-incised, ± dendroid, each scale on top of a minute epidermal persistent tubercle), rather early glabrescent above, persistent for some time beneath, finally also glabrescent there, a little rough to the touch on both sides in later stages, slightly revolute at the margin especially towards the base, 3–7 by (0.3–)0.6–1(–1.3, rarely in part in the lowest ones up to 1.6) cm, always widest in the lower third, midrib faintly impressed above, prominent beneath, nerves obscure; petiole slender, densely lepidote, (1–)2–3 mm. *Flowers* solitary or in twos, sometimes in 3–4-flowered umbels. Flower buds ovoid, acute. Outer perulae spreading, subuliform, inner ones ovate, rather abruptly subulate-acuminate, ciliate, all densely but ± fugaciously squamular-stellate-lepidote outside, glabrous inside, up to 1 by 0.6 cm. Bracteoles linear to filiform, ± glabrous, up to 1 cm. Pedicels slender, densely stellate-lepidote, (0.7–)1–1.3 cm. *Calyx* small, disk-like, *c.* 2 mm ø, not or very shortly obtusely lobed, lepidote dorsally. *Corolla* (deep) pink, crimson to scarlet or blood red, tubular in the lower ⅔, expanded at the limb, rather manifestly zygomorphous, (2.3–)2.5–3.5(–3.8) cm in all, tube slightly curved, (1.8–)2–2.5(–2.7) cm long, 3–4 mm ø at base, gradually widened to 6–8 mm at apex, ± densely stellate-lepidote and epilose outside, glabrous or very laxly hairy inside, lobes broad-obovate to suborbicular, (6–)7–9 by 6–8 (–9) mm. *Stamens* 10, unequal, well exserted from the throat, in part as long as the corolla; filaments narrow-linear, glabrous below, very laxly hairy in the middle, glabrous distally; anthers oblong, *c.* 2 by 1 mm. *Disk* glabrous or very minutely pubescent at the upper margin. *Ovary* subcylindric, densely stellate-lepidote, *c.* 6 by 2–2.5 mm, gradually tapering to the style, the latter stoutish, generally lepidote in the lower ⅓ and exclusively laxly patent-hairy above to or almost to the top, rarely ± glabrescent, ± equalling the corolla in length not before the latter is developed; stigma clavate-capitate, obscurely 5-lobed. *Capsule* narrow-oblong, 3–4 by 0.4–0.5 cm, valves twisted. *Seeds c.* 4 mm including the tails.

Distr. *Malesia*: New Guinea (Western and Eastern Highlands: Mt Hagen, Nondugl; Bismarck Mts).

Ecol. Low epiphytic on tree trunks or rotten stumps in mountain forest, also in light moss-forest, 1585–3350 m, plentiful locally. *Fl.* April-Nov.

Vern. *Sezupezup*, Enga, Kepilam, *wambuberi*, Enga, Poio, *remono kire*, Kaugel.

43. Rhododendron delicatulum SLEUM. Reinwardtia 5 (1960) 78.

***var.* delicatulum.**

Epiphytic shrub, 30–50 cm. Branchlets very slender, 1–2 mm ø, terete, laxly foliate, tips densely stellate-lepidote, glabrescent below; internodes 3–6 cm. *Leaves* in 3–4-merous pseudowhorls at the upper nodes, linear-lanceolate, apex gradu-



Fig. 11. *Rhododendron rarum* SCHLTR. Marafunga near Goroka, 2400 m, E. New Guinea (SLEUMER 4137) (SLEUMER, 1961).

ally acuminate and somewhat curved, subacute, base broadly attenuate into the petiole to nearly rounded, subcoriaceous, the very young ones rather densely covered on both faces with deeply stellate-incised, sessile or shortly dendroid scales, these on top of persisting epidermal tubercles, early glabrescent and rough to the touch above, tardily so beneath, slightly revolute at the margin, (3–)4–6.5 by 0.4–0.7 cm, mostly widest below the middle, midrib sunk above, prominent beneath, nerves obsolete; petiole lepidote, *c.* 2 by 0.5–0.7 mm. *Umbels* ± 3-flowered. Outer perulae subulate, inner ones ovate, with a subulate acumen for the ultimate 3–10 mm, rather densely stellate-lepidote dorsally, ± glabrous internally, fimbriate, up to 2 by 0.6 cm. Bracteoles linear-subspathulate, very laxly hairy, up to 1.5 cm by 1 mm. Pedicels slender, densely rufous-stellate-lepidote, *c.* 1.2 cm. *Calyx* small, oblique, annular, membranaceous, obscurely lobed, stellate-lepidote dorsally, shortly fimbriate, *c.* 2 mm ø. *Corolla* tubular below, widened at the limb, somewhat zygomorphous,

pink, *c.* 2.7 cm long in all, tube 1.5–1.8 cm long, *c.* 3 mm ø at base, *c.* 6 mm at apex, equally subdensely shortly whitish hairy (but not lepidote) outside, ± laxly hairy inside, lobes 5, suberect-patent, broadly obovate-spathulate or suborbicular, 5–7 by 5–6 mm. *Stamens* 10, almost equalling the corolla in length; filaments filiform, very laxly hairy below, glabrous distally; anthers broad-oblong, 1.3 by *c.* 0.8 mm. *Disk* very shortly yellowish hairy at the upper margin, glabrous below. *Ovary* conical-cylindric, densely dark rusty-stellate-lepidote, 5 by 1.8 mm, gradually tapering to the style, which is rather slender, as long as the corolla and covered with spreading yellowish hairs to the top; stigma subcapitate.

Distr. *Malesia*: W. New Guinea (Bernhard Camp, Idenburg R.), in mossy forest at 1800 m. Once collected. *Fl.* Jan.

var. **lanceolatoides** SLEUM. Blumea 11 (1961) 116.

Leaves wider, ovate-lanceolate, (2.5)–3.5–5 by 0.7–1.2 cm.

Distr. *Malesia*: W. New Guinea (Star Mts), on peaty soil at 1500 m. Once collected. *Fl.* July.

44. Rhododendron bryophilum SLEUM. Reinwardtia 5 (1960) 79; Blumea 12 (1963) 97.

Shrub, epiphytic in high trees. Branchlets slender, 1–2 mm ø, terete, laxly leaved, tips brown, densely covered with caducous star-shaped scales, older parts glabrescent and verruculose; internodes 2–6(–8) cm. *Leaves* opposite or in 3–4-merous pseudowhorls at the upper 3 or 4 nodes, oblong, apex short-attenuate, subobtuse, base broadly attenuate or mostly subtruncate-rounded, thinly coriaceous, subdensely lepidote on both faces initially (scales minute, deeply stellate-incised and subdendroid, early caducous, each on top of a persistent epidermal tubercle), rather early glabrescent and subdensely tuberculate or scabrid, slightly or not revolute at the margin, 4–5.5 by (1–)1.3–2.2 cm, widest in the middle, midrib lepidote for a long time, very slightly sunk above, prominent beneath, nerves 4–5(–6) pairs, curved-anastomosing, faintly visible on both faces; petiole flattened, 2(–3) by *c.* 1 mm, lepidote. *Umbels* ± 3-flowered. Perulae ovate to obovate-spathulate, apiculate or obtuse, membranous, glabrous, minutely fimbriate, up to 8 by 6 mm. Bracteoles filiform, subglabrous, up to 1 cm. Pedicels very slender, densely minutely stellate-lepidote, epilose, 10–12 by 0.4 mm. *Calyx* suboblique, small, obscurely 5-lobed, stellate-lepidote outside, *c.* 2 mm ø. *Corolla* tubular, distinctly zygomorphous, pale salmon, thin, 3.5–4 cm long, quite glabrous outside, laxly hairy at the tube inside, tube cylindric, curved, (1.8–)2.2–2.8 cm, 4–5 mm ø at base, widened to 7 mm at the throat, lobes spathulate, 10–12 by *c.* 7 mm. *Stamens* 10, nearly equalling the corolla in length; filaments narrow-linear, glabrous immediately above the base, laxly hairy upwards, but again glabrous distally; anthers oblong, 1.8–2 by 1 mm. *Disk* very shortly hairy at the upper margin, glabrous elsewhere. *Ovary* elongate-ovoid, densely and exclusively stellate-lepidote, *c.* 4 by 1.5 mm, gradually attenuate to the style, the latter relatively thick, laxly covered with short, subpatent hairs to nearly the top, *c.* 1.8 cm; stigma shortly club-shaped.

Distr. *Malesia*: N. New Guinea (Cycloop Mts), in forest, 1065–1830 m. *Fl.* March-June.

45. Rhododendron tuberculiferum J. J. S. Med. Rijksherb. 25 (1915) 4; Nova Guinea 12 (1917) 504; *ibid.* 12 (1918) t. 199 a, 203 b–f; SLEUM. Reinwardtia 5 (1960) 80.

Shrub, 1–1.5 m. Branchlets terete, 2–3 mm ø, tips clad with dendroid stellate scales, older parts glabrescent and densely verruculose; internodes 1.8–11 cm. *Leaves* 5–7 crowded towards the upper 2–3 nodes, or in pseudowhorls, ovate to ovate-elliptic or oblong-elliptic, rarely lanceolate, coriaceous, stiff, ± erecto-patent, apex obtusely acuminate or obtuse, sometimes apiculate, base rounded-obtuse to slightly cordate, subsessile, densely rufous-lepidote on both faces when very young (scales ± stellate, subsessile or subdendroid, each on top of a minute epidermal permanent tubercle), early glabrescent especially above, manifestly verruculose and rough to the touch on both faces, slightly to strongly recurved at the margin, (1.7–)2–4.8 by (0.9–)1.2–2.1 cm, midrib sunk above, prominent beneath, nerves obscure; petiole densely lepidote or early verruculose, 1–4 by 1.5–2 mm. *Umbels* 2–5(–6)-flowered. Outer perulae triangular, subulate-acuminate at the apex, inner ones ovate-acuminate to spathulate and shortly apiculate or obtuse, glabrous on both sides, subdenticulate, up to 1.8 by 0.6 cm. Bracteoles linear, glabrous, up to 2 cm by *c.* 1 mm. Pedicels rather slender, densely lepidote, 1.5–2.5 (sometimes up to 3.2) cm. *Calyx* disk-shaped, oblique, lepidote dorsally, very shortly obtusely 5-lobed, *c.* 4 mm ø. *Corolla* ± zygomorphous, tubular below, funnel-shaped towards the limb, red, 3.8–4.5 cm, ± densely lepidote outside, margin of the lobes excepted, laxly hairy to the lower ⅔ of the tube inside, glabrous for the rest, tube cylindric, 2.5–3.2 cm, slightly curved, 4–6 mm ø at base, widened to ± 8 mm at apex, lobes 5 (rarely 6) suborbicular, retuse, 9–12 mm ø. *Stamens* 10 (rarely 12), subequal, 2.8–3.5 cm; filaments linear, rather laxly hairy below, less so upwards, glabrous distally; anthers oblong, base obtuse, *c.* 3 by 1 mm. *Disk* minutely pubescent, or practically glabrous. *Ovary* elongate-conical, very densely lepidote, with some hairs between the scales in the upper part respectively at the base of the rather abrupt style, *c.* 7 by 2.5 mm. Style patently hairy at base, otherwise glabrous, *c.* 1.7 cm; stigma capitate.

Distr. *Malesia*: W. New Guinea (Wichmann and Hubrecht Mts), in open places at 3000–3100 m. *Fl.* Feb.

46. Rhododendron asperrimum SLEUM. Blumea 12 (1963) 97.

Epiphytic, sometimes scandent, divaricately branched shrub. Branchlets rather slender; internodes 3–5(–7) cm by *c.* 2 mm. *Leaves* in 3–4-merous pseudowhorls at the upper 2–3 nodes,

subsessile, ovate, apex very broadly attenuate to rounded, base a little cordate, coriaceous, covered by a tomentum of rufous dendroid stellate scales as are the branchlets and petioles initially (scales stellate-incised or -lacerate to almost the centre, the latter small, protracted downwards into a short stipe, each on top of an epidermal marked elevation), early glabrescent with age above, more tardily so beneath, rough to the touch by the persistent epidermal warts, which are paler than the blade, (2–)2.5–4(–4.5) by (1.5–)2–2.8(–3.2) cm, midrib impressed above, prominent beneath, nerves subinconspicuous on both sides, no reticulation; petiole 2 by 1.5 mm. *Umbels* (3–)4–6-flowered. Perulae thin, ovate to spathulate, laxly caducously lepidote or finally glabrous, up to 1.5 by 0.7 cm. Bracteoles linear to filiform, glabrous, *c.* 1 cm. Pedicels rather slender, very densely stellate-lepidote, not hairy, 1.1–1.5 cm. *Calyx* obliquely patellar, shortly or hardly 5-lobed, densely lepidote dorsally, 2–3 mm ø. *Corolla* tubular, zygomorphous towards the limb, pink to purplish, 2.6–3 cm long in all, initially densely, later more laxly lepidote or finally ± glabrescent outside, laxly papillose-hairy at the tube inside, tube curved, *c.* 2 cm long, 4–5 mm ø, slightly dilated towards the throat, lobes unequal, erecto-patent, obovate-spathulate, *c.* 1 by 0.6 cm. *Stamens* 10, subequalling the corolla in length; filaments linear, laxly papillose-hairy in the lower half, glabrous above; anthers obovate-elliptic, base obtuse, 2 by 1.3 mm. *Disk* glabrous below, hairy at the upper margin. *Ovary* subcylindric, *c.* 4 by 1.5 mm, densely set with rufous stellate scales and more laxly with paler hairs, rather abrupt with the style, the latter lepidote and hairy at the very base, and exclusively laxly patently hairy in the lower $^1/_4$ (rarely glabrous even there), glabrous for the rest; stigma subcapitate.

Distr. *Malesia*: NW. New Guinea (Wandammen Peninsula: Wondiwoi Mts).

Ecol. Primary forest, 800–1800 m. *Fl.* March.

47. Rhododendron dielsianum SCHLTR, Bot. Jahrb. 55 (1918) 150; SLEUM. Reinwardtia 5 (1960) 80; Blumea 12 (1963) 97. — *R. laureola* SCHLTR, Bot. Jahrb. 55 (1918) 151.

***var.* dielsianum.**

Epiphytic or terrestrial shrub, 0.3–0.9(–1.5) m, much branched. Branchlets erecto-patent, terete, 1.5–3 mm ø, tips densely rusty-stellate-lepidote, or almost -tomentose, older parts glabrescent, rather smooth, brownish; internodes 1.5–8 cm. *Leaves* opposite or mostly in 3–4-merous pseudo-whorls at the upper 2–3 nodes, elliptic-oblong or oblong, apex short-acuminate, apiculate, subacute, base broadly attenuate into the petiole, or rarely subrotundate, subcoriaceous, densely stellate-lepidote on both faces initially (scales rather small, deeply stellate, sessile or shortly dendroid and on top of rather low persistent epidermal elevations), early glabrescent above, tardily beneath especially near or on the midrib, finally glabrescent and a little rough to the touch on both faces, margin not or slightly revolute, 3–5.5 by (0.8–)1.2–2 (sometimes up to 2.7) cm, midrib somewhat sunk above, prominent beneath, nerves *c.* 6 pairs, very faintly impressed above, raised beneath, mostly subinconspicuous on both faces; petiole rather slender, (2–)3–5 mm. *Flowers* solitary or in twos, sometimes in 3(–5)-flowered umbels. Outer perulae subulate, inner ones ovate-subulate to ovate-apiculate, caducously stellate-lepidote in the upper half, short-fimbriate, up to 1.5 by 0.6 cm. Bracteoles filiform, subglabrous, up to *c.* 1 cm. Pedicels slender, densely rusty-stellate-lepidote, 1–1.3 cm at anthesis. *Calyx* slightly or not oblique, disk-shaped, densely stellate-lepidote dorsally, *c.* 2.5 mm ø, very shortly obtusely 5-lobed. *Corolla* tubular to about $^4/_5$ of its total length, slightly curved and zygomorphous, sparsely lepidote outside, glabrous or sparsely pubescent inside, (pale) pink, (2.5–)3–3.5 cm, tube 2–2.5 cm long, slightly saccate and 4–5 mm ø at the base, dilated to 8–10 mm at apex, lobes broad-spathulate to suborbicular, somewhat expanded, *c.* 6–8 by 5–7 mm. *Stamens* 10, unequal, the longest nearly equalling the corolla; filaments linear to filiform, glabrous or very slightly hairy; anthers *c.* 2 by 1 mm. *Disk* rather prominent, glabrous. *Ovary* subcylindric, densely stellate-lepidote, 5–6 by 1.5 mm, gradually tapering to the slender style, which is glabrous or lepidote at the very base only, and slightly exceeds the throat; stigma subcapitate, slightly 5-gibbous.

Distr. *Malesia*: E. New Guinea (Upper Sepik R. region; Kani, Finisterre and Saruwaged Mts; Kuno area: Tagan R.; once found in the SE. part near Ueli).

Ecol. Epiphyte on tall trees in ravines and wooded slopes, in dense shade, terrestrial in secondary grassland, 1200–1940 m. *Fl.* May-Sept.

Vern. *Raubiu*, Ueli.

***var.* stylotrichum** SLEUM. Reinwardtia 5 (1960) 80; Blumea 11 (1961) 116.

Slender erect shrub, 1.5–3 m. *Corolla* pink. Differs from *var. dielsianum* by the style which is laxly set with short spreading hairs in its lower half.

Distr. *Malesia*: New Guinea (Eastern Highlands: Upper Dunantina Valley and the road between Kami and Lufa).

Ecol. Hillside secondary grasslands, at 1700–1920 m, locally common. *Fl.* Aug.

Vern. *Hakessa, hongkempa, sosomepari*, Asaro: Kefamo, *gagin*, Chimbu: Masul.

48. Rhododendron stolleanum SCHLTR, Bot. Jahrb. 55 (1917) 143; SLEUM. Reinwardtia 5 (1960) 80.

"Epiphytic, much branched shrub, *c.* 1 m. Branches and branchlets erecto-patent, terete, lepidote-tomentellous initially. *Leaves* opposite, lanceolate to lanceolate-ligulate, apex acute or obtuse, base broadly cuneate or rounded, coriaceous, sparsely brown-lepidote above, covered beneath with a brown lepidote tomentum initially, 4–8 by 1.2–3.2 cm; petiole 3–4 mm. *Umbels* 2–4-flowered. Pedicels slender, densely lepidote-

tomentellous, 1.3–1.5 cm. *Calyx* patelliform, very shortly and bluntly 5-lobed, *c.* 3 mm ø. *Corolla* tubular, 5-lobed ± halfway, *c.* 2.5 cm long in all, glabrous outside, minutely puberulous inside, lilac, lobes obliquely obovate-oval, obtuse, glabrous on both faces. *Stamens* 10, *c.* 2 cm long; filaments filiform, sparsely puberulous or almost glabrous; anthers oblong, *c.* 1.5 mm. *Ovary* narrow-oblong, very densely and shortly stellate-lepidote-tomentellous, *c.* 8 mm including the subulate glabrous style; stigma obliquely capitate, 5-gibbous."

Distr. *Malesia*: E. New Guinea (Upper Sepik R. region: camp 'Felsspitze', *c.* 141° 30'–4° 10'), in low mountain forest.

Note. As the holotype specimen is lost and no isotype is preserved, the above given description is a translation of the original, rather incomplete one. The position of *R. stolleanum* both in and within *subsect. Phaeovireya* thus remains somewhat doubtful; yet most of the characters given are those of *R. dielsianum.*

49. Rhododendron psilanthum SLEUM. Reinwardtia 5 (1960) 81.

Shrub. Branchlets slender, *c.* 2 mm ø, terete, tips densely rusty-stellate-lepidote, early glabrescent and smooth elsewhere; internodes *c.* 6.5 cm. *Leaves* opposite or in 3-merous pseudowhorls, elliptic or oblong-elliptic, apex shortly subacutely acuminate, apiculate, base attenuate into the petiole, subcoriaceous, stellate-lepidote on both faces initially (scales minute, deeply incised, dendroid, on top of minute epidermal tubercles), early glabrescent above, tardily so beneath, but finally glabrous and somewhat rough on both faces, edge slightly revolute, 3.5–4.5 by 1.3–2(–2.2) cm, midrib a little impressed above, raised beneath, nerves inconspicuous; petiole densely lepidote, 5–6 by *c.* 1 mm. *Umbels* 3-flowered. Pedicels slender, very densely stellate-lepidote, 1.2–1.5 cm by *c.* 0.5 mm. *Calyx* minute, oblique, in form of a short cup, subentire, *c.* 2 mm ø. *Corolla* tubular below, dilated at the limb, slightly zygomorphous, red, completely glabrous in- and outside, 3.5–3.8 cm in all, tube *c.* 2.5 cm, at the base 5-gibbous and 4–5 mm ø, widened to *c.* 8 mm at apex, lobes expanded, broadly obovate-spathulate, 1–1.2 by 0.8–1 cm. *Stamens* 10, slightly unequal, *c.* 3 cm; filaments narrow-linear, glabrous; anthers obovate-oblong, *c.* 2.2 by 1 mm, very shortly biappendiculate at the base. *Disk* prominent, glabrous. *Ovary* subovoid-cylindric, *c.* 4 by 2 mm, very densely stellate-lepidote, rather abruptly attenuate into the style, the latter 2.5 cm in length, stellate-lepidote at the very base, otherwise entirely glabrous; stigma subcapitate.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range, Pintealón, spur of Mt Pokapindjang), on the ridge at 2400–2600 m. Once found. *Fl.* June.

50. Rhododendron phaeochitum F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 23; SLEUM. Reinwardtia 5 (1960) 83; Blumea 12 (1964) 339.

Epiphytic shrub, *c.* 1 m high, branches stout, 5–6 mm ø. Branchlets slender, about 2 mm ø, densely dark rufous-stellate-lepidote at the upper 1 or 2 internodes, glabrescent and densely verruculose or scabrid below; internodes (2–)3–8 cm. *Leaves* opposite or 3(–4) in a pseudowhorl or crowded near the upper nodes, elliptic or mostly obovate-elliptic, apex ± rounded-obtuse, apiculate, base broadly cuneate into the petiole or rounded, coriaceous, rather stiff, initially covered with a close dark rufous tomentum of stellular scales on both faces (scales very small, deeply incised, subsessile, each on top of a minute epidermal tubercle), early glabrous and somewhat lustrous, finally smooth above, lepidote for a long time beneath, ultimately glabrescent there but remaining manifestly verruculose and rough to the touch, entire, edge slightly revolute, 4–6.5 (rarely up to 14) by 2.5–4 (rarely up to 7) cm, midrib slightly impressed above, rather stout and prominent beneath, nerves 5–6(–7) pairs, straight below only, irregularly curved-ascending and anastomosing in the upper part, faintly prominent in young, a little sunk above in fully mature leaves, prominent beneath, reticulation rather dense and conspicuous, visible on both sides; petiole densely stellate-lepidote, 5–8 by 1–1.5 mm. *Umbels* 2–4 (–5)-flowered. Perulae membranous, ovate to obovate-spathulate, ± obtuse, glabrous, caducously fimbriate, up to 1.5 by 0.8 cm. Bracteoles linear-spathulate, subglabrous, up to 1.5 cm by 1 mm. Pedicels densely stellate-lepidote (seemingly stellate-hairy), 1.4–2.5 cm by 1 mm. *Calyx* reduced to an almost annular membrane, irregularly dentate, stellate-lepidote dorsally, fimbriate, *c.* 3 mm ø. *Corolla* tubular below, expanded at the limb, ± zygomorphic, pink to deep red, subdensely stellate-lepidote outside both on the tube and the base and mediane of the lobes, laxly hairy in the lower half of the tube inside, 3.5–4.5(–5) cm in all, tube slightly curved, 2–2.5(–3) cm long, 4–5 mm ø at base, widened to *c.* 8 mm at apex, lobes broad-obovate to suborbicular, (8–)10–15 by 8–12 mm. *Stamens* 10, slightly unequal, mostly a little exserted from the corolla; filaments linear and densely pubescent below, filiform and glabrous distally; anthers oblong, 2.5–3 by 1 mm. *Disk* ± densely white-hairy at the upper margin. *Ovary* cylindric, densely and exclusively rusty-stellate-lepidote, 5–7 by 2–3 mm, tapering to the stoutish style, which is nearly as long as the stamens and equally rusty-stellate-lepidote and may be very laxly hairy at least in its lower half, often to nearly the top, glabrous otherwise; stigma broadly obconical-capitate.

Distr. *Malesia*: E. New Guinea (Western and Eastern Highlands: Nondugl, Chimbu Divide, Goroka region; originally from Mt Musgrave in Central Distr.).

Ecol. Epiphytic, or terrestrial on ridges (also limestone ridges), 2135–2560 m. *Fl.* April-Dec.

Vern. *Tegwa*, Chimbu.

51. Rhododendron beyerinckianum KOORD. Nova Guinea 8 (1912) 876, t. 150; J. J. S. *ibid.* 12 (1914) 137; *ibid.* 12 (1917) 504, *incl. var. longipetiolatum*

J. J. S. *l.c.*; *ibid.* 18 (1936) 94; SLEUM. Reinwardtia 5 (1960) 81; Blumea 11 (1961) 116; *ibid.* 12 (1963) 98. — *R. dasylepis* SCHLTR, Bot. Jahrb. 55 (1918) 153, f. 4; STONOR, Rhodod. Yearbook 6 (1951) 50, f. 53. — *R. schultzei* SCHLTR, Bot. Jahrb. 55 (1918) 154. — *R. saavedranum* DIELS, *ibid.* 62 (1929) 486. — *R. chrysopeplon* SLEUM. *ibid.* 74 (1949) 540.

Slender terrestrial or epiphytic, occasionally scandent shrub or treelet, 0.5–2.5 (rarely up to 4) m, loosely branched, erect. Branchlets stoutish to rather slender, often only 1.5 mm ø at apex, densely to very densely covered with rusty stellate scales in form of a detersile tomentum, which goes early in the older parts, these brownish and scabrid by numerous fine tubercles; internodes 1.5–8 (sometimes up to 15) cm. *Leaves* opposite or mostly in 3–5(–7)-merous pseudowhorls, often rather variable in shape and size in the same whorl, lanceolate-oblong to oblong or obovate-oblong to elliptic, sometimes ovate or broad-elliptic, subobovate or suborbicular, apex broadly gradually attenuate, apiculate, subacute or mostly obtuse, base broad-attenuate into the petiole or rounded, coriaceous or at least rather stiff, erecto-patent, very densely rufous-lepidote ('tomentose') on both faces initially (scales irregularly stellate-lacerate up to the centre, dendroid, easily removable, each on top of a minute epidermal persistent tubercle), early glabrescent and somewhat shining and scabrid above, tardily so beneath, though finally glabrescent and scabrid here too, ± dark olivaceous green above, paler and more brownish beneath, margin mostly strongly revolute and more densely and/or more persistently stellate-lepidote than the intervenium beneath, generally (3–)4–6 by (1–)1.5–3.5 cm, occasionally up to 10 by 5 cm in the lower leaves, midrib slightly impressed above, robust and much prominent beneath, nerves (4–)5–6(–7) pairs, rather straight below, curved-anastomosing before the edge, very slightly impressed above respectively raised beneath, often inconspicuous or completely covered by the tomentum beneath, reticulation dense, visibly prominent on both faces in fully mature leaves, occasionally ± impressed above; petiole densely stellate-lepidote, (3–)5–11 (sometimes up to 20) by *c.* 2 mm. *Umbels* 2–4(–5)-flowered. Outer perulae subulate, completely covered with rusty stellate scales, inner ones ovate-acuminate, apiculate, lepidote at the dorsal upper part only, fimbriate, up to 1 by 0.5–0.7 cm. Bracteoles linear and glabrous or caducously lepidote below, subspathulate and laxly hairy apically, up to 1 cm. Pedicels densely and exclusively rusty-stellate-lepidote, at anthesis 1–1.5 cm by 0.7–1 mm, up to 2.2 cm in fruit. *Calyx* patellar, densely stellate-lepidote, shallowly obtusely 5-lobed, 3(–4) mm ø. *Corolla* tubular basally, widening distally, somewhat zygomorphous, mostly pink to deep purplish pink or dark red, sometimes pale pink or cream, rarely greenish or white, densely covered with ± caducous golden-brown stellate scales on the tube and the lower part of the lobes outside, completely glabrous inside, (2.5–)3–3.5 cm in all when dry (up to 4.5 cm when fresh!), tube straight or slightly curved, (1.5–)2–2.5 cm long, 4–6(–7) mm ø at base, somewhat dilated towards the mouth, lobes erecto-patent, suborbicular, 7–10(–12) by 6–9(–11) mm. *Stamens* 10, unequal, mostly not quite equalling the corolla in length, sometimes finally exserted; filaments linear, ± reddish, glabrous or rarely laxly hairy; anthers obovate-oblong, 2–2.5 by 1.2 mm, brown to dark red. *Disk* low, glabrous, *i.e.* epilose as far as not covered with stellate scales initially. *Ovary* elongate-conical or -subobovoid, densely stellate-lepidote, 6–8 by 2.5–3 mm, rather abruptly tapering to the stoutish style, the latter as long as the stamens and exclusively stellate-lepidote to the top at anthesis, but accrescent and glabrescent from the top backwards in later stages; stigma broad-obconical, slightly 5-lobed. *Capsule* thick-fusiform, often a little wider in the upper half, densely rusty-lepidote, 2–4 cm by 5–6 mm, crowned by the style remains. *Seeds* very narrow, tailed at both ends, 3–4 mm.

Distr. *Malesia*: New Guinea (Main Range from the Wissel Lakes to Mt Victoria, also in the Nassau and Bismarck Mts, and on and around Mt Saruwaged).

Ecol. Epiphytic both in mossy forest and on fern trees in grassland, terrestrial in more open mossy *Nothofagus-Podocarpus-Pandanus* forest and along banks of creeks in open alpine grassland, or on edges of *Equisetum-Carex* bog, locally common as undergrowth in openings or native rest clearings within the stunted moss forest or on (may be old) landslides, occasionally a small shrub growing on exposed cliff face, 1500–3615 m, reported from Mt Saruwaged between 3600 and 4000 m. Said to grow also on limestone. *Fl. fr.* Jan.-Dec.

Vern. *Kibimume*, Chimbu: Masul, *djilimp*, *wumbemp*, Wahgi: Minj, *wambu*, Hagen: Togoba, *kwonem*, Chimbu: Goromagua, *oganga*, Hagen: Wankl, *kume*, *tikoro*, Mendi, *rohn*, Enga.

Note. *R. beyerinckianum* is conceived here in a broad sense, comprising forms with larger leaves and apparently longer capsules (3–4 cm) in the mossy forest zone, and such with smaller and narrower leaves, respectively shorter capsules (2–2.5 cm) from open country above 2800 m, and forms which differ much in the colour of the corolla, ranging from pure white over light yellow and pink to (the normal) dark red, of which the paler colours generally are found in specimens with larger leaves, apparently growing at lower altitude and/or in shadowy places. The species recently has come into cultivation, *i.e.* the smaller leaved and dark red flowering form from the Western and Eastern Highlands.

Nearest to *R. phaeochitum* of which the fruit is not yet known, and possibly to be united with that species in the future.

52. Rhododendron leptanthum F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 24, *in obs.*; SLEUM. Reinwardtia 5 (1960) 83; Blumea 11 (1961) 116; *ibid.* 12 (1963) 98; Jahrb. Rhodod. Ges. Bremen (1963) f. 9, 10, *non* HAYATA, 1915. — Fig. 12.

Small, rather straggling shrub, 0.5–2(–3) m,

terrestrial or epiphytic, with thick roots and pendulous branches. Branchlets rather slender, *c.* 1.5 mm at the densely red-brown stellate-lepidote tips, glabrescent and a little scabrid in older parts; internodes 2–12 cm. *Leaves* opposite or mostly in 3–4-merous pseudowhorls, ovate or oblong-ovate, apex gradually ± shortly acuminate, subacute, base ± rounded, subcoriaceous, firm, equally subdensely lepidote on both faces (scales small, deeply stellate-lacerate and short-dendroid, each on top of minute paler, often nearly white tubercles beneath, the latter less distinct on the upper surface), early glabrescent above, ultimately so beneath, margin but slightly or not revolute, (2–)3–6.5(–7) by (1.3–)1.5–3(–3.2) cm, midrib impressed above, prominent beneath, nerves in 5–7 pairs, rather straight, anastomosing near the edge, slightly impressed above, somewhat raised beneath, veins laxly reticulate, mostly rather distinctly raised beneath, finer reticulation of the veinlets visible above, inconspicuous beneath; petiole 2–4 (–5) mm, densely lepidote. *Umbels* 2–3(–5)-flowered. Perulae membranous, ovate-acuminate, outer smaller ones ± densely lepidote, inner larger ones glabrous, fimbriate, up to 1.2 by 0.6 cm. Bracteoles linear-spathulate, ± glabrous, up to 1.5 cm by 2 mm. Pedicels rather slender, densely stellate-lepidote, 0.7–1.3 cm by 0.5–0.8 mm. *Calyx* in form of a low cup, *c.* 2.5 mm ø, very shortly obtusely 5-dentate. *Corolla* tubular, slightly zygomorphous, deep pink to salmon or carmine, (2–)2.5–3(–3.4) cm long in all, laxly to subdensely stellate-lepidote outside except a wide marginal part of the lobes, glabrous inside, tube slightly curved, 1.5–2 cm, (3–)4–5 mm ø at base, widened to 7–8 mm at apex, lobes broad-spathulate to suborbicular, (5–)7–10(–12) by 6–9(–12) mm. *Stamens* 10, subequalling the corolla in length, slightly unequal; filaments red when fresh, narrow-linear, glabrous or with some scattered hairs; anthers *c.* 1.6 by 1 mm. *Disk* glabrous. *Ovary* elongate-conical, densely rufous-stellate-lepidote, 3–5 by 1.5–2 mm, gradually tapering to the style, the latter stellate-lepidote to or almost to the top,

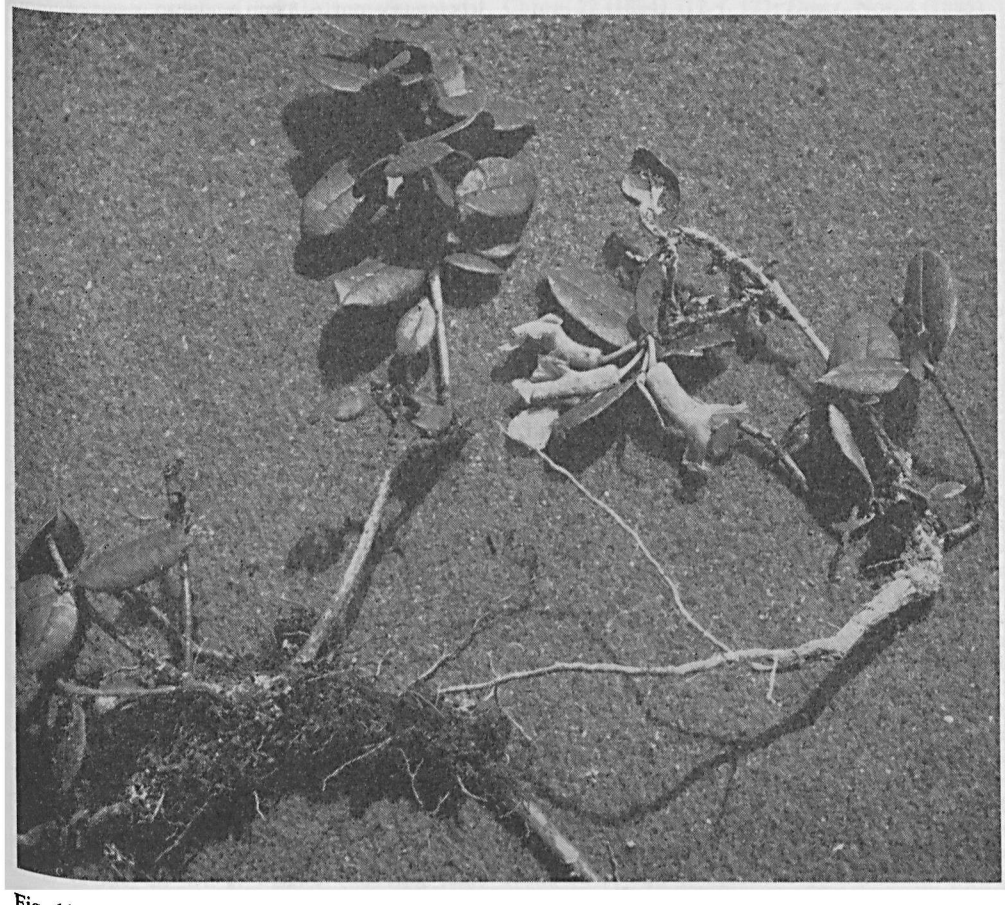

Fig. 12. *Rhododendron leptanthum* F. v. M. Epiphytic shrublet, showing thick roots, Edie Creek near Wau, E. New Guinea, 1850 m (SLEUMER 4127) (SLEUMER, 1961).

±as long as the stamens; stigma broadly obconical capitate. Submature *capsule* fusiform, curved, *c.* 4 cm by 3 mm, densely stellate-lepidote, on fruit-pedicel 1.5–2 cm.

Distr. *Malesia*: E. New Guinea (Morobe to Milne Bay Distr.).

Ecol. Terrestrial on rocks or dry exposed cliff face, or in opening of *Castanopsis* forest, epiphyte on big branches of high trees or fallen trunks in mossy forest on *Nothofagus*, sometimes gregarious, 1370–2250 m. *Fl.* Jan.-Oct.

Vern. *Zavi*, Gerebi: Movoi.

53. Rhododendron warianum SCHLTR, Bot. Jahrb. 55 (1918) 151; LANE-POOLE, For. Res. Papua (1925) 130; WHITE & FRANCIS, Proc. R. Soc. Queensl. 39 (1928) 68; SLEUM. Reinwardtia 5 (1960) 83.

Small epiphytic or terrestrial shrub, creeping on the ground, occasionally erect and up to 5 m, with lax, spreading branches. Branchlets slender, terete, the upper 1–2 internodes densely rusty-stellate-lepidote, early glabrescent and rather smooth elsewhere; internodes 1–10 cm. *Leaves* opposite or mostly in 3–4-merous pseudowhorls, elliptic or oblong-elliptic, sometimes broad-elliptic or rarely subobovate-elliptic, apex broadly attenuate, acute to nearly rounded, base ± rounded, subcoriaceous, though mostly rather firm, lepidote initially on both faces (scales deeply and irregularly stellate-incised, subsessile or short-dendroid, each on top of a minute epidermal tubercle), early glabrescent above, rather tardily so beneath, rather smooth then as the remaining tubercles are not much conspicuous, faintly or not recurved at margin, (2.5–)3–5(–7) by (1.3–)1.5–3(–4.4) cm, midrib impressed above, prominent beneath, nerves 5–7 pairs, very slightly impressed above and raised beneath, often ± inconspicuous, as are the veins and veinlets; petiole densely stellate-lepidote, mostly rather flattened, 2–5 by *c.* 1 mm. *Flowers* solitary, or in 2–3(–6)-flowered umbels. Outer perulae narrowly to broadly ovate-acuminate, ± densely stellate-lepidote outside, inner ones obovate-spathulate and ± glabrous, fimbriate, up to 1.5 by 0.6 cm. Bracteoles linear-subspathulate, glabrous, up to 1.2 cm. Pedicels rather slender, densely rusty-stellate-lepidote, (1–)1.2–1.5 cm by *c.* 0.5 mm. *Calyx* small, very shortly cup-shaped and obtusely 5-lobed, *c.* 3 mm ø. *Corolla* tubular basally, dilated at the limb, ± distinctly zygomorphous, waxy white with pinkish flush or pale pink to rose, 3–3.5(–4) cm in all, laxly stellate-lepidote outside, glabrous inside, tube curved, 2–2.5 cm long, *c.* 4 mm ø at base, dilated to *c.* 6 mm at throat, lobes broad-spathulate to sub-orbicular, 9–12 by 7–9(–11) mm. *Stamens* 10, unequal, as long as or slightly longer than the tube; filaments red, narrow-linear, glabrous or very laxly hairy; anthers broad-oblong, *c.* 1.5(–2) by 0.8 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely stellate-lepidote, 5–6 by 1.5 mm, gradually attenuate to the style, the latter slender, *c.* 1.5 cm, stellate-lepidote at anthesis at least in the lower half, often to 4/5 of the total length, glabrescent distally; stigma short-obconical.

Distr. *Malesia*: E. New Guinea (Morobe to Milne Bay Distr.).

Ecol. Epiphyte in *Nothofagus* forest, also terrestrial on limestone precipices or in moss forest rest clearings and heath-like vegetation, 1065–2600 m, locally common. *Fl.* Jan.-Dec.

Vern. *Rohn*, Enga: Kepilam.

54. Rhododendron gardenia SCHLTR, Bot. Jahrb. 55 (1918) 158; SLEUM. Reinwardtia 5 (1960) 83.

Epiphytic or terrestrial shrub, 1–2.5 m. Branchlets terete, stout, 6–8 mm ø, glabrous and pruinose in the older parts, fugaciously rusty-stellate-lepidote at the tips; internodes 15–20 cm. *Leaves* opposite or ± in 3(4–)-merous pseudowhorls at the upper 2 nodes, patent, elliptic or oblong-elliptic, rarely subobovate-elliptic, apex shortly obtusely acuminate, not rarely rounded or a little retuse, base broad-attenuate into the petiole to rounded, very coriaceous, stiff, subdensely lepidote initially on both faces (scales minute, ± deeply stellate-lacerate and ± manifestly dendroid, each on top of a paler minute epidermal elevation), early glabrescent and rough to the touch by the persistent tubercles on both sides, especially beneath, slightly or not revolute at the narrowly cartilagineous margin, 8–15 by 5.5–9 cm, midrib robust in the lower half of the blade, and ± impressed above, very prominent beneath, flattish and wrinkled in dry specimens, nerves 8–10 pairs, ± straight below, curved and indistinctly anastomosing before the edge, very slightly prominent on both faces or somewhat sunk above, often becoming inconspicuous towards the edge, no proper reticulation visible; petiole lepidote initially, 2–3 (–4) cm by 2.5–4 mm. *Umbels* 3–4-flowered. Bracteoles linear, laxly hispid-hairy, up to 2.5 cm by 2 mm. Pedicels stout, cylindric, densely covered with rufous sessile scales, moreover laxly hispid-hairy in the upper part and more densely so immediately below and at the calyx, 1–1.5(–2) cm by 2–2.5 mm. *Calyx* oblique, cup-shaped, lepidote and hirsute outside, ± glabrous inside, 8–10 mm ø, irregularly obtusely 5–8-lobed, lobes ciliate, 2–3 mm. *Corolla* funnel-shaped, snow-white or suffused with pink especially at the tube, rather fleshy, fragant, 10–11 cm long and across the limb, tube straight, *c.* 5 cm long, 8–10 mm ø at base, gradually dilated to 1.5–2.5 cm at apex, glabrous outside, ± densely clothed with retrorse whitish hairs in its lower half to 3/4 inside, lobes 5–8, spreading, broadly obovate-cuneate, 5–6 by 3–4(–5) cm, glabrous. *Stamens* 10–16, slightly unequal, *c.* 7 cm long at full anthesis; filaments linear and densely patent-hispid-villous below, glabrous and filiform distally; anthers linear-oblong, 10–12 by 1.5 mm, base obtuse. *Disk* prominent, very densely hairy. *Ovary* oblongoid-cylindrical, densely covered with subappressed, yellowish, ± stiff hairs, which cover completely the numerous scales, *c.* 1.3 cm by 5 mm, rather abruptly attenuate to the robust style, which is glabrous except some hairs at the very base, *c.* 6 cm by 1.5 mm; stigma large, subcapitate,

obtusely 5–8-gibbous, *c.* 4 mm ø.

Distr. *Malesia*: New Guinea (Sepik R. region and Bele R. Valley 25 km NE. of Lake Habbema).

Ecol. High epiphyte in forest, but also a terrestrial shrub in sandy openings in mossy forest on crest of mountain ridge, 1400–2300 m. *Fl.* June-July, Oct.-Nov.

55. Rhododendron thaumasianthum SLEUM. Blumea 12 (1963) 98. — *R. magnificum* SLEUM. Reinwardtia 5 (1960) 84, *non* F. K. WARD, 1935.

Shrub, apparently epiphytic. Branchlets flattened at the ultimate internodes (10 cm), densely covered with fugacious rusty-stellate scales, glabrescent. *Leaves* laxly scattered in the upper half of the upper internode, the highest 2 leaves opposite or 3 in a pseudowhorl, elliptic or subovate-elliptic, thick-coriaceous and rigid, apex nearly rounded, base subtruncate-rounded, very young ones lepidote on both sides (scales small, stellate-lacerate, dendroid, each on top of a distinct epidermal tubercle), early glabrescent above, tardily so beneath, at full maturity very densely set with pale tubercles, and correspondingly very rugose or scabrid on both surfaces, edge ± manifestly revolute, 8–13 by (4–)5–7 cm, midrib as thick as the petiole below, gradually narrower towards the apex of the lamina, slightly impressed above, prominent beneath, nerves *c.* 8 pairs, rather straight and markedly raised below, ± evanescent upwards on both sides, no proper reticulation; petiole a little flattened, grooved above, 2–2.5 cm by 3–4 mm, densely lepidote respectively finally verruculose. *Umbels* 3–5-flowered. Outer perulae ovate, obtuse, scabrid by numerous ± bullate, stiff, short hairs in- and outside, *c.* 2 by 1–1.5 cm, middle ones obovate, 2.5–4 by 2–3 cm and equally rough, innermost ones spathulate, clad with longer, stiff and ± appressed hairs at the base dorsally, minutely tubercled upwards, 4–7 by 2.5–3 cm. Bracteoles linear-spathulate, *c.* 5 cm long, *c.* 2 mm wide at the apex, subdensely hispidulous. Pedicels densely rusty-stellate-lepidote, not hairy at all, (6–)10–15 by 2–2.5 mm. *Calyx* annular, membranous, very short, wavy, obscurely lobed, lepidote outside, glabrous inside, lobes very laxly and shortly whitish ciliate. *Corolla* funnel-shaped, fleshy, colour not known (white or pinkish?), laxly stellate-lepidote at the tube outside, rather densely clad with retrorse hairs in the lower half of the tube inside, *c.* 9 cm long in all, tube rather straight, *c.* 5 cm long, *c.* 0.8 cm ø at base, dilated to *c.* 1.5 cm at apex, lobes 7, obovate-spathulate, *c.* 4 by 2–2.5 cm. *Stamens* 14, 7–8 cm long; filaments linear and densely ± patently subvillous below, more laxly hairy upwards, glabrous distally; anthers linear-oblong, 10–11 by 1.5 mm, base obtuse. *Disk* densely white-hairy. *Ovary* cylindric and densely hairy and lepidote below, constricted upwards in form of a bottle-neck and exclusively lepidote there, *c.* 2 mm long, *c.* 5 mm ø below, 2.5 mm ø in the upper part. Style seemingly abrupt with the ovary due to the thick lepidote "tomentum" at its very base, but really gradually continuing the ovary, completely glabrous above the base, blackish when dry, *c.* 6.5 cm;. stigma thick-capitate, 7-lobulate.

Distr. *Malesia*: New Guinea (Wissel Lakes), once found.

Note. Similar to *R. konori*, but style completely glabrous.

56. Rhododendron konori BECC. Malesia 1 (1878) 200; SLEUM. Reinwardtia 5 (1960) 85; Blumea 11 (1961) 116; *ibid.* 12 (1963) 98; Jahrb. Rhodod. Ges. Bremen (1963) f. 14, 38. — *R. toverenae* F. v. M. Vict. Nat. 1 (1884) 101, *reimpr.* Gard. Chron. 22 (1884) 712, f. 127; Descr. Not. 4 (1885) 12; STEIN, Jahresber. Schles. Ges. Vaterl. Cult. f.d. Jahr 1885 (1886) 412; SLEUM. Reinwardtia 5 (1960) 119; Blumea 11 (1961) 117. — *R. devrieseanum* KOORD. Nova Guinea 8 (1909) 185; *ibid.* 8 (1912) 876, t. 151; J. J. S. *ibid.* 12 (1914) 141 ('*devriesianum*'); GIBBS, Arfak (1917) 170; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 478. — *R. devrieseanum ssp. astrapiae* FOERSTER in Fedde, Rep. 13 (1914) 224. — *R. astrapiae* FOERSTER *ex* SCHLTR, Bot. Jahrb. 55 (1918) 160. — **Fig. 13, 14.**

Shrub, (0.5–)1–2(–4) m, or treelet, 2–4(–6) m, stems mostly few, 2.5–8 cm ø, terrestrial or epiphytic. Branches few, suberect, up to 4 cm across. Branchlets robust, terete, 3–9 mm ø, the upper 1 or 2 internodes caducously stellate-lepidote, lower parts glabrescent, somewhat rough to the touch, finally smooth, often pruinose in dry specimens; internodes 6–20 cm, sometimes with several, much reduced scattered early caducous leaflets. *Leaves* scattered in the upper third of the upper 1 or 2(–3) internodes, rather close together, sometimes crowded into 3–5-merous pseudowhorls, elliptic or oblong-elliptic, more rarely oblong or ovate-oblong, apex shortly subacuminate-attenuate, rather blunt, often rounded, base broadly attenuate to rounded, more rarely subcordate, coriaceous and stiff, dark green above, yellowish green beneath, densely covered with a rufous detersile tomentum on both faces when young (scales deeply stellate-lacerate, ± dendroid, each on top of a paler permanent epidermal tubercle), ± glabrescent at maturity on both sides, the midrib excepted, which remains lepidote for a long time, ± rough or even scabrid to the touch on both sides, margin slightly or not revolute, (7–)10–18(–21) by (4–)5–8(–9, sometimes up to 12) cm, midrib as stout as the petiole at base, rather flat or even slightly impressed in its middle above, strongly prominent in the lower half beneath, nerves (7–)8–10(–12) pairs, rather straight and marked below, curved and less visible towards the edge, ± anastomosing, slightly impressed above in fully mature leaves, somewhat raised beneath, often rather obscure on both faces, reticulation ± inconspicuous; petiole ± semiterete, densely lepidote, rough in later stages, (1–)1.5–3(–3.5) cm by (2–)3–4(–5) mm. *Umbels* (3–)5–8(–12)-flowered. Flower buds ovoid, 5–8(–11) by 3–4(–5)cm. Outer perulae ovate, inner ones oblong-ovate to obovate-spathulate, ± scabrid outside by minute stiff bullate hairs or their remaining warty bases, up to 7.5 by 3 cm, often

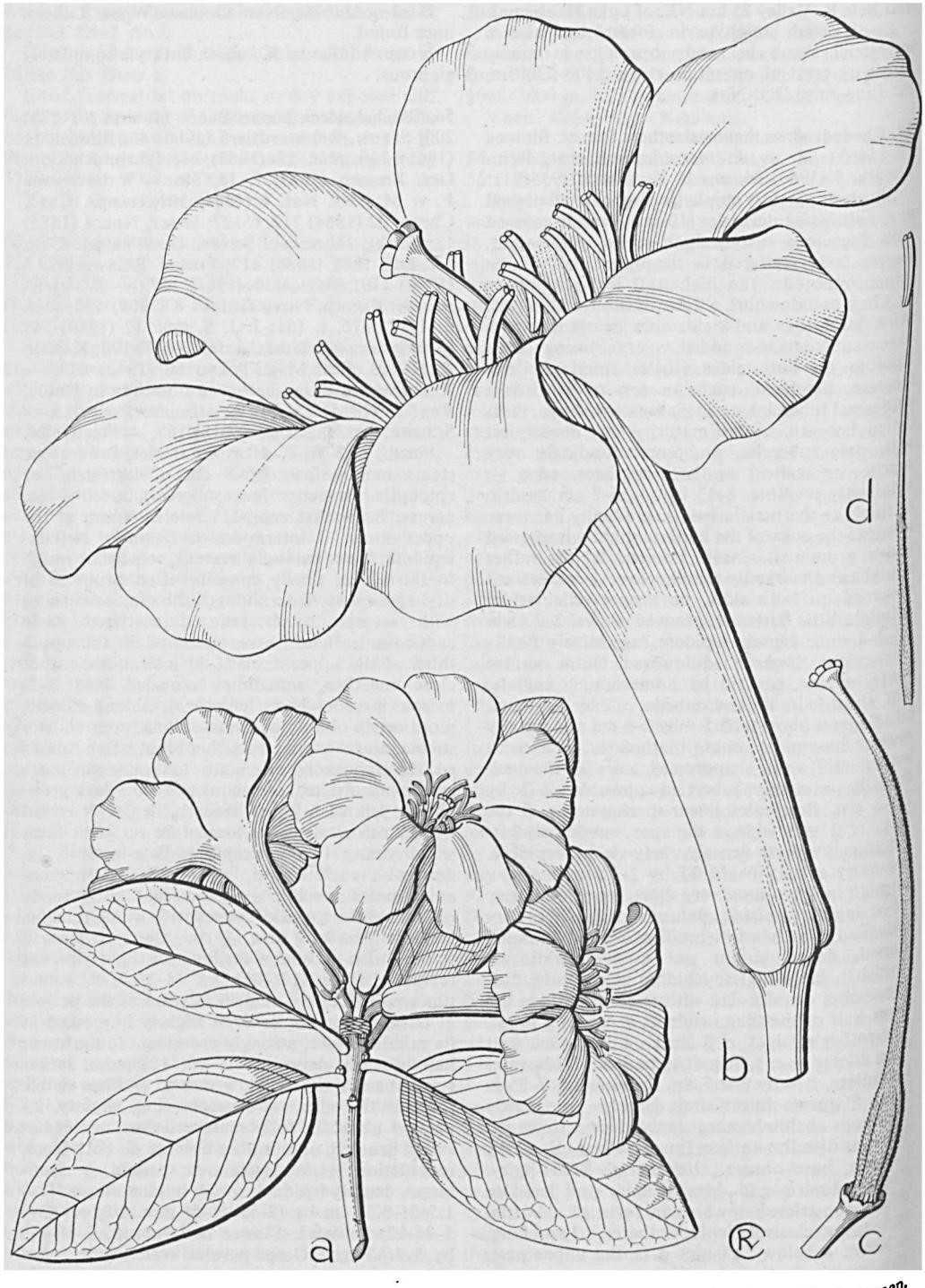

Fig. 13. *Rhododendron konori* BECC. *a.* Habit, × ⅓, *b.* flower, × 1, *c.* ovary and style, × ⅔, *d.* stamen, × ⅔ (*a–d* CRUTTWELL 1010 and a drawing made by him from a fresh specimen).

of a dull carmine colour outside, sometimes more pinkish. Bracteoles linear-spathulate, often lacerate distally, subdensely hairy, white, up to 5 cm by 1–2(–4) mm. Pedicels densely rufous-stellate-lepidote, and whether or not hairy below the calyx, (4–)6–15 by 2.3(–4) mm. *Calyx* rather manifestly oblique, patelliform, shortly (1–2 mm) irregularly and obtusely (6–)7-lobed or- dented, one or the other lobe sometimes up to 1.5 cm, stellate-lepidote dorsally and often set with some stiff hairs, whitish ciliate or fimbriate, 6–9(–10) mm across. *Corolla* tubular below, funnelform-expanded towards the lobes, fleshy, pure white, often pinkish in later stages especially distally, or sometimes pale to rather deep pink from the beginning, or pinkish only at the sinuses to the lobes, with a sweet fragrance of carnations especially at night, (8–)9–14(–16) cm long in all when dry, 12–16(–17, rarely up to 19) cm long when fresh, variable in length probably due to growing going on during anthesis, provided with some sparse stellate scales at the tube, or completely glabrous outside, ± densely covered with whitish retrorse hairs in the lower half of the tube inside, tube cylindric, or sometimes slightly 7-angled, (6–)7–8 (–11) cm long, 0.6–1(–1.5) cm ø at base, widened to (1–)1.5–2 cm at apex, lobes 6 or 7, spreading, obovate-spathulate to suborbicular, often sinuous distally, (3.5–)4–5(–7) by (2.2–)2.5–4(–5) cm in dry, 5–8 by 4–6 cm in fresh specimens. *Stamens* 12 or 14, unequal, mostly exserted for 1–2 cm from the tube; filaments densely hairy and linear below, glabrous and almost filiform in the upper third; anthers orange or yellowish, linear-oblong, (8–)10–11(–13, rarely up to 16) by *c.* 1.5 mm. *Disk* densely white-hairy. *Ovary* subcylindric, somewhat attenuate towards the base, densely clad with yellowish, stiff, ± forward directed hairs which cover numerous scales, 10–15 by 4–5(–7) mm, rather abruptly attenuate to the thick style, the latter white to reddish, 4–6(–8.5) cm first, accrescent rapidly during and still after anthesis, attaining almost the length of the corolla in later stages, ± densely hairy and laxly stellate-lepidote in the lower half, gradually more lepidote and less hairy in the following ¼, finally exclusively, ± caducously lepidote for some mm, glabrous in the distal $^1/_5$ to ¼ part. Stigma yellow, capitate, shortly 6- or 7-lobed, 5–7 mm ø. *Capsule* ± fusiform, 6–9(–12) by 1.2–1.5(–1.8) cm, widest a little below the middle, gradually attenuate to the apex, rough by the remaining hairs and numerous minute tubercles, topped by the persistent style, which attains (4.5–)5.5–9 (sometimes even 15) cm, the stigma lobes up to 2 by 1 mm then. Fruit-pedicel 2–3 cm by 3–4 mm. Capsule finally splitting from the top in form of ligneous, irregularly twisted walls, of which the outer part has gone before. *Seeds* narrow-fusiform, flattened, 6–8(–10) mm including the tails at both ends, *c.* 0.03 mm wide.

Distr. *Malesia*: New Guinea (Tamrau, Nettoti and Arfak Mts in the Vogelkop Peninsula, from Mt Genofa near Kaimana, Wissel Lakes area, Hellwig and Star Mts, Upper Sepik R. region, Western and Eastern Highlands and on and around Mt Saruwaged, in the SE. known as far as the Maneau Range) and Fergusson I.

Ecol. Epiphytic in montane forest, terrestrial as substage in *Nothofagus* and *Castanopsis-Quercus* forest and forest edge of clearings, in open fern regrowth (there found often with smaller flowers and fruits), on burned open summits, also on peat bogs, swamps or marsh, generally on poor clayey soil or humus, 750-2400(–2500) m. *Fl.* Jan.-Dec.

Vern. *Soksaikokohugwe*, Arfak, *tetjai*, Hattam, *wagadei*, *waradé*, Kapauku, *wennieran*, Arguni, *wayam*, Maneau Ra.

Note. *R. konori* has been recently introduced into horticulture from various places in New Guinea, especially from the Arfak Mts, where it grows in abundance around the Anggi Lakes. It apparently hybridizes there locally with 62. *R. asperum*, which is often found on the same places. Such hybrids have smaller, 6- or 7-merous corollas and more ovate and more shortly petioled leaves than are found in typical *R. konori*. It is possible that most or all forms of *R. konori* in the Arfak Mts with such smaller corollas and smaller fruits are due to introgression of *R. asperum*, though the leaves may be typical *R. konori*. In one place with abundant *R. konori* and 248. *R. laetum*, I found a fruiting specimen which was apparently intermediate in leaves (apex more pointed, midrib red: *laetum* characters), in the epidermal tubercles of the leaves (less prominent than in *R. konori*) and in the fruit (shorter, and more densely hairy than in *R. konori*).

57. Rhododendron phaeopeplum SLEUM. Reinwardtia 5 (1960) 92; Blumea 12 (1963) 99; Jahrb. Rhodod. Ges. Bremen (1963) f. 40.

Terrestrial shrub. Branchlets terete, 3–5 mm ø, densely rusty-stellate-lepidote at the upper internodes, glabrescent otherwise and densely papillate-verruculose, rather smooth to the touch, often pruinose in dry specimens; internodes 3–10 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 1–2 nodes, elliptic or ovate-elliptic, apex broad-attenuate, obtuse to nearly rounded, apiculate at the very top, base generally obtuse or rounded, not rarely slightly cordate, thick-coriaceous, very stiff, erecto-patent, very young ones densely rusty- or brown-lepidote (scales irregularly stellate-lacerate, nearly squamular, the segments ending in something like a hair, each subsessile on top of an epidermal tubercle, which persists for a long time beneath), mature ones olivaceous, dull, ± glabrescent, often rather smooth above, rusty-brown and covered with a thick detersile tomentum of star-shaped scales (no proper hairs!) beneath, finally glabrescent also there and very densely tubercled and scabrid, distinctly revolute at the margin in dry specimens, 4–7(–10) by (2–)2.5–4.5 (–5) cm, midrib ± flat, dilated and a little raised in the lower part, very slightly impressed in the middle, evanescent towards the top of the lamina above, very stout below as a continuation of the petiole, gradually decreasing upwards beneath,



Fig. 14. *Rhododendron konori* BECC. Mt Sensenemés, 2550 m, Anggi Gigi Lake, Arfak Mts, NW. New Guinea (SLEUMER, 1962).

nerves 8–10 pairs, lower ones irregular, upper ones rather straight, ± raised above, nearly inconspicuous beneath in fully mature leaves, reticulation absent; petiole somewhat flattened above, lepidote, (5–)8–12(–20) by 1.5–3 mm. *Umbels* 4–6-flowered. Perulae rigidly membranaceous, outer ones ovate, ± obtuse, laxly lepidote dorsally and puberulous below, *c.* 2 by 1.5 cm, inner ones oblong-spathulate, ± densely shortly subsericeous-hirsutulous on both faces, ciliate, up to 4 by 1.5 cm. Bracteoles linear to linear-spathulate, very laxly pubescent, up to 4 cm by 1–3 mm. Pedicels very densely rusty-stellate-lepidote, whether or not with some hairs immediately below the calyx, 1.2–2.3 cm by 1.5–2 mm at anthesis. *Calyx* oblique, disk-shaped, 4–5 mm ø, wavy and shortly obtusely 5–6-lobed, ciliate. *Corolla* narrowly funnel-shaped, scented, white or pinkish, 6–7 (rarely up to 8) cm long in dry, (7–)8–9 cm in fresh specimens, tube very laxly stellate-lepidote or entirely glabrous outside, densely set with longish, retrorse hairs in the lower ¾ inside, ± straight, 4–4.5 cm long, 5–8 mm ø at base, *c.* 1.5 cm at throat, lobes 6 or 7, spreading, broadly obovate-spathulate, (2–)3.5(–4.5) by 1.8–2.3(–3) cm. *Stamens* 12 or 14, unequal, ± equalling the tube; filaments linear, densely patently yellowish hairy below, more laxly so and slender upwards, glabrous and filiform at the top; anthers oblong, 6(–7) by 1 mm, base obtuse. *Disk* low, laxly to densely pubescent. *Ovary* nearly fusiform, gradually attenuate to the style, *c.* 10 by 3.5 mm, very densely clothed with yellowish, forward directed, stiff hairs, which ± cover the scales. Style ± as long as the stamens, thick and longitudinally 12- or 14-ribbed below as is the ovary, densely hairy and lepidote there (the scales well visible), upwards almost exclusively clad with dark rusty or brown stellate scales and a few or practically no hairs for *c.* 2 mm, more slender and quite glabrous for about 10 mm below the thick-capitate, 6–7-gibbous stigma. *Capsule* fusiform, densely hairy and lepidote, (4–)5–6 by 1 cm, crowned by the 4–5 cm long style.

Distr. *Malesia*: New Guinea (Wissel Lakes region and Arfak Mts, above the Warjori R.).

Ecol. Heathland and open, fern-covered crest within the *Nothofagus-Castanopsis* forest, 1300 m.

Note. *R. phaeopeplum* is something like a small edition of *R. konori*, and possibly in the Wissel Lakes region a hybrid of *R. konori* with a related species of the same subsection with smaller flowers, may be 72. *R. rappardii*. Above the Warjori R., part of the specimens I found matched the type from the Wissel Lakes almost completely, but others had petioles up to 2 cm long, larger and usually less cordate leaves, and less densely hairy perulae. All specimens had 6- or mostly 7-merous, pure white flowers. Quite a number of natural, ± intermediate hybrids with the 5-merous, orange-red flowered 255. *R. zoelleri*, which is abundant on the same place, showed pale pink, 5- *and* 6-merous corollas on the same specimen, longer, more acuminate, thinner, ± glossy leaves, on which the epidermal tubercles are much less distinct than in the species of *subsect. Phaeovireya* in general, and longer, more slender pedicels. A few specimens of *R. zoelleri*, typical besides white corollas with yellowish hue all over or at least at the tube, found in the same place, are probably due to a slight introgression of *R. phaeopeplum*. Up to now, such "white" *R. zoelleri* had not yet been found despite the fact that it is one of the widespread and much collected species in New Guinea.

58. Rhododendron opulentum SLEUM. Reinwardtia 5 (1960) 85.

Epiphytic shrub, 1 m. Branchlets subterete, tips densely rufous-stellate-lepidote, older parts glabrescent and scabrid by minute tubercles; internodes 10–20 cm. *Leaves* laxly alternate in the upper half of the apical internodes, oblong-elliptic or broad-oblong, coriaceous, apex short-acuminate, subacute or subobtuse, base very broadly attenuate to rounded, the very young ones ± densely rufous-lepidote above and beneath (scales minute, deeply stellate-incised, short-dendroid, each on top of a minute pale epidermal tubercle, the proper scale going early), mature ones glabrescent except the midrib, densely minutely tubercled and very rough to the touch, margin but slightly wavy or revolute, 6–10 by 3–4 cm, midrib rather stout, flattened, a little raised and sunk in the lower part above, well prominent beneath, nerves *c.* 10 pairs, rather dense together, irregular, ± straight below, anastomosing near the edge, slightly prominent on both surfaces, veins laxly prominent-reticulate, finer reticulation of the veinlets rather obscure; petiole ± flattened, *c.* 1 cm by *c.* 2.5 mm, densely lepidote, rough in later stages. *Umbels* 7–8-flowered. Middle and inner perulae spathulate, densely whitish subsericeous-hirsute in- and outside, up to 4.5 by 2 cm. Bracteoles linear, very densely subappressedly whitish hairy, up to 3 cm by 2 mm. Pedicels densely appressed-hairy and laxly fugaciously stellate-lepidote, 8–10 by *c.* 1.5 mm. *Calyx* very oblique, annular, obscurely 5–6-lobed or -dentate, densely hairy and lepidote dorsally, *c.* 4 mm ø. *Corolla* elongate-tubular below, expanded at the 5 lobes, fragrant, pink at the tube, shading to white at the lobes, 9–10 cm long in all, 4–5 cm ø at the limb, glabrous outside, rather densely clothed with longish retrorse hairs at the tube up to almost the throat inside, tube cylindric, 6–7 cm long, 4–5 mm ø at base, gradually dilated to *c.* 8 mm at apex, lobes broadly obovate to suborbicular, 2.5–3 by 1.8–2.5 cm, glabrous. *Stamens* 10, exceeding the tube for *c.* 1 cm; filaments linear and densely set with retrorse hairs below, more laxly hairy upwards, filiform and glabrous in the ultimate ¼; anthers elongate-oblong, base obtuse, *c.* 6 by 1.2 mm. *Disk* white-hirsute. *Ovary* elongate-cylindric, very densely stellate-lepidote and ± laxly short-hairy (the hairs ± hidden by the scales), 10–12 by *c.* 2.5 mm, gradually attenuate to the style, the latter 5–6 cm long, rather thick below, very densely stellate-lepidote and epilose to the lower 3–4 cm, more slender and completely glabrous for the rest; stigma large, capitate, manifestly 5-gibbous.

Distr. *Malesia*: W. New Guinea (Bernhard Camp, Idenburg R.), once found as a frequent epiphyte on large trees in mossy forest at 1800 m. *Fl.* Jan.

59. Rhododendron spondylophyllum F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 23; SLEUM. Reinwardtia 5 (1960) 86.

Shrublet. Branchlets slender, 1–1.5 mm ø, tips densely lepidote, elsewhere densely finely verrucose and scabrid; internodes 3–6 cm. *Leaves* in 3–4-merous pseudowhorls at the upper 1–2 nodes, ovate, apex shortly obtusely acuminate, base slightly cordate, ± sessile, coriaceous and stiff at maturity, glabrous and densely verruculose above, densely lepidote for a long time beneath at least near the midrib (scales coarsely and irregularly incised at the margin, dendroid, each on top of a small permanent lighter tubercle), finally glabrescent and very rough beneath too, margin subrevolute, (1.6–)2–3 by 1.2–1.7 cm, midrib manifestly grooved above, prominent beneath, nerves ± obscure; petiole 0.5–1 by 1 mm. *Umbels* 3-flowered. Pedicels densely set with dark brown, short-dendroid, star-shaped, squamular scales, 6–8 by 0.7 mm. *Calyx* reduced to a narrow membrane, lepidote and very laxly hairy dorsally, obscurely 5-lobed, *c.* 2.5 mm ø. *Corolla* cylindric below, expanded at the limb, somewhat zygomorphous, 2.5–2.8 cm in all, colour not known (probably pink or red), tube 1.8–2 cm long, laxly lepidote and sometimes very sparsely hairy outside, laxly ± retrorsely hairy in the lower ⅔ inside, *c.* 4 mm ø at base, *c.* 6 mm at throat, lobes broadly spathulate to suborbicular, lepidote outside in the lower half, glabrous otherwise, ± 8 mm ø. *Stamens* 10, nearly as long as the corolla; filaments linear, laxly patent-hairy in the lower half; anthers broad-oblong, 2 by 1 mm. *Disk* almost glabrous. *Ovary* conical, yellowish tomentose (hairs covering the scales), *c.* 4 by 2 mm, gradually attenuate to the rather slender style, which is densely yellowish hairy (with sparse scales) in its lower ⅔ to ¾, glabrous distally, and up to 1.2 cm long; stigma rather small, turbinate.

Distr. *Malesia*: New Guinea (Mt Knutsford, Owen Stanley Range), once found.

60. Rhododendron melantherum SCHLTR, Bot. Jahrb. 55 (1918) 152; SLEUM. Reinwardtia 5 (1960) 86.

"Epiphytic shrublet, *c.* 50 cm, much branched. Branchlets erecto-patent, densely foliate, terete, densely rufous-lepidote in the young parts; internodes short. *Leaves* opposite, elliptic, subsessile, apex obtusely acuminate, base cuneate, ± laxly rufous-stellate-lepidote beneath, glabrescent above, 2.4–4 by 1.2–1.7 cm; petiole rufous-lepidote, 2–4 mm. *Flowers* solitary. Pedicels slender, densely rufous-lepidote, *c.* 1.5 cm. *Calyx* rufous-lepidote, very shortly 5-lobed, *c.* 2.5 mm ø. *Corolla* tubular, manifestly zygomorphous, dark blood red, slightly curved and dilated to *c.* 1 cm ø at apex, sparsely puberulous outside, glabrous inside, 2.7 cm long in all, lobes obovate-suborbicular, truncate-obtuse, *c.* 7 mm ø. *Stamens* 10, *c.* 2.3 cm; filaments filiform, sparsely hairy; anthers oblong, blackish red, 2.5 mm. *Ovary* oblongoid, slightly 5-grooved lengthwise, densely rufous-tomentellous. Style filiform, shortly finely hairy, almost attaining the stamens in length; stigma capitate, 5-gibbous."

Distr. *Malesia*: New Guinea (Schrader Mts), once found in mountain forest at *c.* 2070 m. *Fl.* June.

Note. No type material preserved; description after the original diagnosis.

61. Rhododendron cyatheicolum SLEUM. Reinwardtia 5 (1960) 86.

Epiphytic shrub, 30–40 cm; branches rigid. Branchlets terete, 2–5 mm ø, tips stellate-lepidote, older parts glabrescent and densely verruculose; internodes 3–8 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 2 nodes, ovate, subsessile, apex broadly attenuate, obtuse, base rounded or subcordate, coriaceous, rigid, the very young ones very densely rufous-stellate-lepidote (scales rather small, subsessile or short-dendroid, very early caducous), yellowish beneath, scabrid by numerous minute whitish tubercles beneath, less so or rather smooth above, edge ± manifestly revolute, 3–4.2 by 2–2.5 cm, midrib slightly sunk above, prominent beneath, more stoutish towards the base; nerves *c.* 6 pairs, rather inconspicuous above, somewhat raised beneath, reticulation not visible; petiole 1–2 by *c.* 2 mm. *Umbels* 4–5-flowered. Perulae membranous, outer ones ovate, apiculate, with a prominent dorsal rib, lepidote at the apex outside, glabrous otherwise, fimbriate, inner ones ovate-oblong to obovate or truncate-spathulate, glabrous, up to 1.5 by 0.8 cm. Bracteoles narrow-linear below, subspathulate at the apex, up to 1.5 by 0.1 cm, laxly hairy. Pedicels densely stellate-lepidote, not hairy at all, 1.5–2 cm by 0.8 mm. *Calyx* disk-shaped, very shortly obtusely 5-lobed, wavy, lepidote and laxly hairy dorsally, ciliate, 4–5 mm ø. *Corolla* broad-tubular, somewhat zygomorphous, pink, 4–4.5 cm, minutely stellate-lepidote and with some hairs here and there outside, the margin of the lobes excepted, laxly subpatently hairy at the tube inside, tube a little curved, *c.* 3 cm long, 5–6 mm ø at base, dilated to 10 mm at apex, lobes obovate, erect-spreading, 1–1.2(–1.3) by 0.8–1 cm. *Stamens* 10, ± as long as the corolla; filaments linear below, rather densely hairy in the lower third, glabrescent and filiform distally; anthers subobovate-oblong, 3 by 1 mm, base very shortly biappendiculate. *Disk* glabrous. *Ovary* ovoid-conical, densely yellowish hairy (hairs ± strigose, directed forward, ± covering the scales), 5–6 by 3–4 mm, rather abruptly attenuate to the style, the latter thickish, densely hairy and laxly lepidote below, upwards more laxly hairy and lepidote, the ultimate glabrous 6–8 mm excepted, as long as or a little longer than the corolla; stigma capitate.

Distr. *Malesia*: New Guinea (Wharton Range, Murray Pass), once collected; common epiphyte on grassland tree-ferns, at 2840 m. *Fl.* June-Sept.

62. Rhododendron asperum J. J. S. Nova Guinea 12 (1914) 137, t. 34; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 478; SLEUM. Reinwardtia 5 (1960) 87; Blumea 12 (1963) 99; Jahrb. Rhodod. Ges. Bremen (1963) f. 36. — **Fig. 15.**

Terrestrial shrub, 0.5–1(–2) m. Branchlets stoutish, tips flattened or obtusangular, densely stellate-lepidote, terete in the lower parts, 2–4 mm ø, densely verruculose and rough to the touch; internodes 3–10 cm. *Leaves* in dense 5–10-merous pseudowhorls at the upper 2–3 nodes, ovate or elliptic or suborbicular, sometimes obovate-elliptic, subsessile, apex obtusely or mostly rounded, base

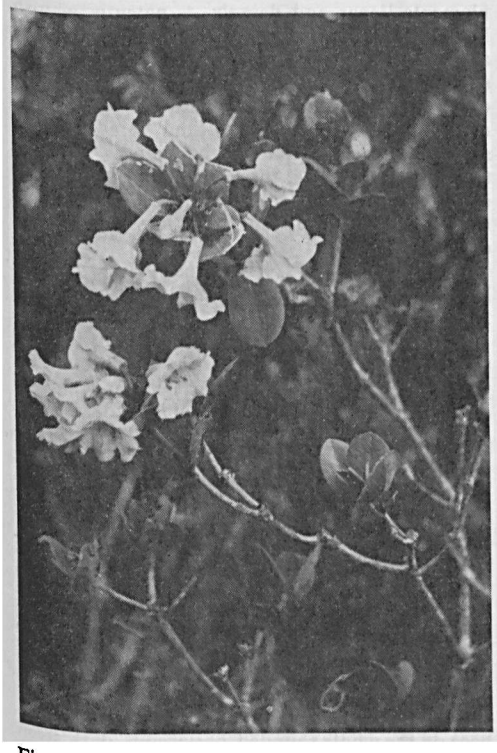

Fig. 15. *Rhododendron asperum* J. J. S. Mt Sensenemés, 2500 m, Anggi Gigi Lake, Arfak Mts, NW. New Guinea (SLEUMER & VINK 4303) (SLEUMER, 1962).

broadly rounded or mostly shortly cordate, coriaceous, rigid, greyish green to dark green above, rusty below, densely stellate-lepidote on both faces initially (scales small, deeply incised, each subsessile on top of a small persistent elevated light point), early glabrescent above, later so beneath, scabrid by numerous minute tubercles on both faces especially beneath, edge manifestly recurved in dry specimens, (2–)3–5.5(–7) by (1.5–)2–4.5(–5.5) cm, midrib a little sunk above, strongly obtusely prominent in its lower half beneath, gradually less so towards the apex of the blade, nerves in 5–9 pairs, spreading irregularly, faintly anastomosing before the edge, very slightly impressed in fully mature leaves above, somewhat prominent beneath, veins ± inconspicuous; petioles somewhat flattened, 1–2.5 by 1–2 mm. *Umbels* 5–9-flowered. Perulae membranous, outer ones smaller, ovate to suborbicular, shortly subulate-acuminate, ± lepidote and puberulous dorsally at the apex, inner ones larger, obovate to spathulate, ± glabrous, up to 2 by 1 cm. Bracteoles linear, laxly hairy or nearly glabrous, up to 2 cm by 1 mm. Pedicels red, densely stellate-lepidote, (1.5–)2–3 cm by *c.* 1 mm. *Calyx* ± oblique, in form of a flat cup, densely lepidote outside, very shortly obtusely 5-lobed, *c.* 4 mm ø. *Corolla* funnel-shaped, ± regular, white or pink (sometimes deeply pink, or tube of a more intense colour than the lobes), scented, (3.5–)4–4.5 cm long and wide at the limb, laxly lepidote outside at the tube and the base of the lobes, ± sparsely hairy inside at the tube, glabrous otherwise, tube (2–)2.3–2.8 cm, *c.* 4 mm ø at base, gradually widened to 1 cm at apex, lobes much spreading, suborbicular, 1.5–1.9 cm ø. *Stamens* 10, somewhat exserted from the throat; filaments linear, ± laxly hairy in the lower ½ to ⅔, glabrous above; anthers oblong, (2.5–)3–4 by 1 mm. *Disk* low, hirtellous at the upper margin only. *Ovary* cylindric-conical, densely covered with whitish ± spreading hairs and stellate scales (these ± hidden between and below the hairs), gradually attenuate to the style, which is rather slender, clad with spreading hairs and some scales in the lower ½ to ⅔, glabrous apically, 2–2.3 cm long; stigma capitate. *Capsule* subcylindric, densely rusty stellate-lepidote and hairy, 1.5–1.8 by 0.6–0.8 cm.

Distr. *Malesia*: New Guinea (Arfak Mts).

Ecol. In heath formation on ridge, edge of degradated *Nothofagus* forest, or burnt open summit, on poor clayey soil, granite and quartzite, 2150–2750 m. *Fl.* Jan., April, July.

Note. Forms local hybrids with 248. *R. laetum*, characterized by glossy, shortly acuminate leaves with less distinct epidermal tubercles, perulae densely hairy dorsally and *c.* 2.5 cm long, pedicels lepidote *and* pubescent, anthers *c.* 4 mm long, ovary densely hairy; corolla in all shades from pale greenish yellow to pink salmon (then often with yellow or greenish hue in the lower part of the tube).

63. Rhododendron rhodochroum SLEUM. Reinwardtia 5 (1960) 87.

Shrub. Branchlets 5–7 mm ø, terete, obtusangular at the upper internodes, tips apparently very early glabrescent, very densely verruculose and rough; internodes 4–13 cm. *Leaves* scattered and dense together in the upper third of the upper 3–4 internodes, or in 3–5-merous pseudowhorls, oblong-elliptic, apex broadly attenuate and obtuse, sometimes apiculate, base slightly cordate, coriaceous, rigid, rufous-stellate-lepidote on both faces when very young (scales minute, subsessile, each on top of a paler permanent epidermal tubercle), early glabrescent above, more tardily so beneath, finally glabrescent there too and

very rough to the touch on both sides, ± revolute at the margin in dry specimens, (3–)4–7.5 by 1.6–3.5 cm, midrib somewhat impressed in its lower, ± flat in its distal part above, continuing the stout petiole beneath and thus very prominent below, less so apically, nerves 8–10 pairs, spreading, faintly raised on both sides, ± evanescent towards the edge, often inconspicuous beneath as are the veins; petiole 2–4 by 1.5–2.5 mm. *Umbels* 3–8-flowered. Perulae membranous, ovate-oblong to obovate, ± obtuse, outer ones ± lepidote dorsally, inner ones glabrous, up to 1.5 by 0.8 cm. Bracteoles linear, glabrous, up to 1.5 cm. Pedicels densely rufous-stellate-lepidote, *c.* 2 cm by *c.* 1 mm. *Calyx* disk-shaped, ± reflexed, densely lepidote dorsally, lobes subobtuse, 1–1.5 mm, not ciliate. *Corolla* tubular, somewhat curved and zygomorphic, pink, subdensely stellate-lepidote at the tube and the lower part of the lobes outside, laxly hairy at the tube inside, (4.5–)5–5.5 cm in all, tube 3.3–4 cm long, 5–6 mm ø at base, 9–10 mm at apex, lobes erecto-patent, broadly obovate, 1–1.5 by 1–1.3 cm. *Stamens* 10, unequal, *c.* 1 cm exserted from the tube; filaments linear below, subdensely hairy at the base, laxly so in the middle, glabrous and filiform distally; anthers obovate-oblong, obtuse at the base, 3–3.5 by 1.3 mm. *Disk* glabrous below, hairy at the upper margin. *Ovary* ovoid-conical, densely hairy and stellate-lepidote, 6–8 by *c.* 3 mm, rather abrupt with the style, the latter densely patently hairy and laxly lepidote in the lower half, glabrous upwards, as long as the stamens or slightly exceeding them; stigma thick, oblique, capitate, distinctly 5-gibbous.

Distr. *Malesia*: W. New Guinea (Lake Habbema), at 3225 m, common in more open mossy thickets on peat ridges, associated with *R. haematophthalmum*. *Fl.* Aug.

64. Rhododendron gilliardii SLEUM. Reinwardtia 5 (1960) 88.

Shrub; epiphytic or terrestrial? Branchlets terete, slender, 2 mm ø, nodose, tips densely rufous-stellate-lepidote, very early glabrescent elsewhere, early covered with greyish bark; internodes 1.5–2.5 cm. *Leaves* opposite or in 3-merous pseudowhorls at the upper node, broad-elliptic, apex almost rounded, apiculate, base very broadly attenuate or rounded, subcoriaceous, immature ones densely rufous-lepidote on both faces (scales ± deeply and irregularly incised at the marginal zone, each sessile on top of an epidermal tubercle), mature ones glabrescent, rather smooth and shining above, lepidote for a long time, finally glabrescent and somewhat rough by the permanent tubercles beneath, the very edge slightly revolute, 3–5 by 2–3.3 cm, midrib a little sunk above, prominent beneath especially in the lower part, nerves *c.* 8 pairs, ± patent and parallel to each other, curved-anastomosing before the edge, minutely impressed above, slightly raised beneath, veins not much conspicuous, or only beneath so in the glabrescent parts of the lamina; petiole lepidote, 5–6 by *c.* 1 mm. *Umbels* 4–6-flowered. Perulae and bracteoles not known. Pedicels very densely stellate-lepidote, 2–2.8 cm by *c.* 0.5 mm at anthesis. *Calyx* minute, disk-shaped, obtusely shortly 5-lobed, *c.* 2.5 mm ø. *Corolla* (colour not known, possibly white or yellowish) tubular in the lower, 5-lobed and expanded in the upper half, 2–2.3 cm in all, densely rufous-stellate-lepidote at the tube and the base of the lobes outside, laxly set with retrorse hairs at the tube inside, glabrous otherwise, tube *c.* 1 cm long, 5-pouched and *c.* 5 mm ø at base, somewhat contracted above, but again 5–6 mm ø at apex, lobes obovate-spathulate, sometimes a little retuse, 1–1.3 by 0.7–0.8 cm. *Stamens* 10, nearly as long as corolla; filaments linear and densely ± patently whitish hairy below, more slender and glabrous apically; anthers obovate-oblong, *c.* 2 mm. *Disk* very shortly pubescent at the upper margin, glabrous otherwise. *Ovary* elongate-conical, *c.* 4 by 2 mm, densely subappressed-hairy and lepidote (the scales well visible among the hairs), gradually tapering to the style, the latter rather slender, ± densely patent-hairy and less densely lepidote to the lower ⅔, glabrous for the rest; stigma broad-capitate.

Distr. *Malesia*: E. New Guinea (Western Highlands: Mt Hagen), once found near timber line, 2285–3655 m. *Fl.* July.

Note. Remembers *R. macgregoriae* in the size and the form of leaves and flowers, but is completely distinct by the peculiar stellular scales on distinct tubercles, which are typical for *subsect. Phaeovireya*.

65. Rhododendron bullifolium SLEUM. Blumea 12 (1963) 93.

Erect, few-stemmed shrub, 3–4 m, or treelet, 4–6 m, trunk 2–3 m by 5 cm. Branchlets terete, 3–10 mm ø, covered with a rather persistent, though detersile tomentum of rufous stellate scales; internodes 6–20(–26) cm. *Leaves* in (4–)6-merous pseudowhorls at the upper 2 or 3 nodes, elliptic or mostly ovate-elliptic, more rarely broad-elliptic or ovate, slightly inequilateral, apex very shortly subacuminate, obtusate or rounded, base on the whole rounded, coriaceous, dark green and glossy above, paler and dull beneath, young ones completely covered with a thick tomentum of stellate rufous scales, mature ones glabrescent early above, less quickly so beneath especially along midrib and nerves (scales ± dendroid, marginal zone ± deeply incised or lacerate, the small centre deepened or prolonged downwards into a kind of foot), (8–)10–18(–22) by 4.5–12 (–13) cm, bullate both in the fresh and dry state, margin flat, midrib as thick as the petiole below, and hardly prominent in the lower, ± impressed in the upper part above, nerves irregular, 10–14 pairs, curved anastomosing before the edge, much impressed above, prominent beneath as are the veins, veinlets more distinct and reticulate towards the leaf margin; petiole densely stellate-lepidote initially, 2.5–5 cm by 2.5–3.5 mm. Immature buds *c.* 2 by 2 cm, each containing 10–12 *flowers*; perulae ovate, outer ones subacuminate,

inner ones obtuse, substrigose-sericeous, on both faces and lepidote dorsally. Immature *corolla* densely lepidote at the tube outside, glabrous at the lobes. Fruit-pedicel densely lepidote, *c.* 2.5 cm by 1.5 mm. Young *fruit* 2.5 cm long, fusiform, densely set with scales and pale stoutish hairs, as is the style, of which only the lower part (for *c.* 3 cm) is known. Twisted valves of the mature fruit (3–)4–5.5 cm.

Distr. *Malesia*: New Guinea (Arfak Mts, Mt Sarumot, Anggi Gigi Lake), once found.

Ecol. Undershrub or -tree in transitional zone of *Castanopsis* to *Nothofagus* forest, at 2050–2100 m. *Fr.* Jan.

66. Rhododendron solitarium SLEUM. Blumea 12 (1963) 94.

Erect, terrestrial shrub, sprawling, one- or few-stemmed, 1–1.5 m, branches few and short; branchlets and young shoots covered with a rusty tomentum of stellate scales, which is ± detersile and disappears rather early; internodes 4–7 cm. *Leaves* in 4–6-merous pseudowhorls at the upper 3(–4) nodes, oblong-elliptic or ± broadly elliptic, sometimes subobovate-elliptic, apex ± rounded, not rarely slightly retuse, base broad-attenuate to rounded, dark green and glossy above, yellowish green below, mature ones glabrescent above, remaining lepidote for a certain time below especially at midrib and nerves (scales ± dendroid, marginal zone stellate-incised to various degree, the small centre deepened and protracted downwards into a short foot, the latter on top of an epidermal tubercle), 5–8 by 3–5 cm, bullate, midrib as wide as the petiole and hardly prominent in the lower, gradually narrower and ± impressed in the upper part above, on the undersurface thick as the petiole at the base, gradually narrower and less prominent distally, nerves in 7–9 pairs, irregular and not rarely deeply forked, ± transverse and straight from the midrib, becoming curved upwards, anastomosing quite a distance before the edge dissolving into a coarse network of veins, all nerves and veins deeply impressed above, ± sharply prominent beneath, veinlets much less conspicuous; petiole densely lepidote initially, (0.8–)1–1.5 cm by 1.5–2.5 mm. *Umbels* 4–6-flowered. Bracteoles linear to subspathulate, caducously lepidote-fimbriate, 1–1.5 cm by 1–2 mm. Pedicels densely rufous-lepidote, *c.* 1.5 cm by 1 mm at anthesis. *Calyx* obliquely patellar, *c.* 3 mm ø, lobes sometimes elongate. *Corolla* tubular below, widely funnelform-expanded at the lobes, white, densely stellate-lepidote outside, the marginal part of the lobes excepted, densely set with retrorse hairs at the tube inside, 5–5.5 cm long in all, tube slightly curved, *c.* 4 cm long, *c.* 4 mm ø at base, *c.* 7 mm at apex, lobes obovate-spathulate, *c.* 1.5 by 1–1.5 cm. *Stamens* 10, *c.* 5 mm exserted from the throat; filaments linear, laxly hairy in the lower ¾, glabrous above; anthers oblong, base obtuse, 3–3.5 mm. *Disk* glabrous below, tomentose upwards. *Ovary* subcylindric, *c.* 10 by 2.5 mm, densely set with yellowish hairs and scales; style continuous with the ovary, densely to more laxly hairy and lepidote in the lower ¾ part only, slightly exceeding the corolla tube.

Distr. *Malesia*: E. New Guinea (Morobe Distr.: Edie Creek and Merri Creek; common on Mt Kaindi).

Ecol. Growing solitary in eroded gold workings, on rather open, *Vaccinium*- and grass-covered slopes, at *c.* 1850 m. *Fl.* June.

67. Rhododendron schoddei SLEUM. Blumea 12 (1963) 95.

Terrestrial shrub, *c.* 2 m. Branchlets rather slender, divaricate, densely set with sessile rusty scales at the upper internode only; internodes 2–4.5 cm. *Leaves* in 3–4-merous pseudowhorls at the upper 1–2 nodes, ovate- or subovate-oblong, apex gradually or shortly attenuate, tip bluntish, base ± rounded, young ones subdensely lepidote on both faces, mature ones coriaceous, glabrescent and shining above, paler and more longer remaining lepidote below (scales rusty, subdendroid, marginal zone stellate-dented or -lacerate to various degree, centre small, often a little deepened and prolonged downwards into a short foot, on top of a low epidermal tubercle), subrevolute, (3–)3.5–5(–6) by 1.5–2.3 cm, midrib narrowly impressed above, stout in the lower part, gradually decreasing and finally ± evanescent distally below, nerves 6–8 pairs ± right from the midrib, curved-anastomosing towards the edge, slightly impressed above, hardly prominent or obscure beneath, no reticulation; petiole reddish, subdensely lepidote, 1.5–2 cm by *c.* 1 mm. *Umbels* (2–)3-flowered. Perulae ovate-acuminate, appressedly lepidote dorsally. *Calyx* obliquely patellar, lepidote dorsally, shortly 5-lobed, *c.* 3 mm ø. *Corolla* deep pink, broadly tubular below, expanded at the lobes, subdensely to densely lepidote at the tube outside, laxly hairy there inside, *c.* 2.5 cm long in all, tube straight, 1.8–2 cm, 4–5 mm ø at base, 6–7 mm at apex, lobes obovate-spathulate, shortly retuse, 6–8 mm ø. *Stamens* 10, subequalling the corolla; filaments linear and laxly hairy below, more filiform and glabrous distally; anthers oblong, each theca with a short basal apiculus, *c.* 2.5 mm. *Disk* prominent and glabrous except the upper hairy margin. *Ovary* subconical-cylindric, *c.* 5 by 2.5 mm, slightly 5-angular, densely lepidote and short-hairy, more densely and longer hairy at the angles, continuous with the style, the latter rather slender, hairy in the ⅓–½ lower part, glabrous for the rest; stigma rather thickish.

Distr. *Malesia*: New Guinea (Western Highlands: Lagaip Valley).

Ecol. On limestone ridge in heath-like vegetation at *c.* 2600 m. *Fl.* Aug.

68. Rhododendron phaeochristum SLEUM. Blumea 12 (1963) 95; Jahrb. Rhodod. Ges. Bremen (1963) 27, *in text.*

Terrestrial shrub, (1–)2–3(–4) m; branches erect, deeply divided; branchlets slender, tips covered with a rusty tomentum of stellate scales; internodes (2–)3–6(–10, rarely up to 18) cm. *Leaves* in (3–)4–5(–6)-merous pseudowhorls at the

upper 2–3 nodes, elliptic- to obovate-oblong, apex obtusely attenuate or subacuminate, base ± cuneate into the petiole, subcoriaceous, dark green and shining above, yellowish green below, young ones clad with a rather detersile rusty tomentum of star-shaped scales initially, early glabrescent with age above, less so below especially at midrib and nerves (scales dendroid, marginal zone deeply stellate-incised or -lacerate, cupular-depressed towards the minute centre, the latter prolonged downwards into a very slender stem, which rests on a distinct epidermal tubercle), slightly revolute at the very edge, (3–)4–7(–9) by 2–3(–4) cm, midrib narrowly impressed above, thick-prominent in the lower, decreasingly so in the upper part below, nerves 6–8(–9) pairs, rather irregular, curved-anastomosing before the edge, very slightly impressed or not rarely obscure above, hardly prominent beneath; petiole densely lepidote initially, 8–12(–15) by 1.5–2 mm. *Umbels* 2–3(–4)-flowered. Floral buds subglobose, 1–1.5 cm ø, perulae thin, outer ones ovate, densely stellate-lepidote at the dorsal midline, caducously lepidote-fimbriate, *c.* 1 cm, inner ones subspathulate, ± glabrous dorsally, up to 1.2 cm. Bracteoles subspathulate-linear, glabrous, *c.* 1 cm by 1–1.5 mm. Pedicels rather slender, densely stellate-lepidote, *c.* 1 cm at anthesis. *Calyx* obliquely patellar, minutely 5-lobed, lepidote dorsally, *c.* 2.5 mm across. *Corolla* curved-tubular, expanded at the lobes, zygomorphous, pale to more deeply carmine, 2.5–3 cm long in all in dry, 3.5–4 cm in fresh specimens, thin-fleshy, glossy and densely set with golden scales outside, laxly hairy at the tube inside, tube 1.5–2 cm long, *c.* 3 mm ø at base, 5 mm at throat, lobes subspathulate-obovate, *c.* 1 cm ø. *Stamens* 10, attaining ± half the corolla lobes; filaments linear, densely to more laxly hairy in the lower ¾ part, glabrous above; anthers obovate-oblong, dark purple to almost blackish when fresh, base obtuse, 2 by 1 mm. *Disk* prominent, hairy only at its upper margin. *Ovary* subcylindric, 5 by 2.5 mm, densely set with rusty stellate scales and paler, ± appressed hairs, tapering to the style, the latter *c.* 1.2 cm, base slightly hairy, glabrous for the rest; stigma subclavate. *Fruit* fusiform, densely lepidote and hairy, 2(–2.5) cm by 4–5 mm.

Distr. *Malesia*: W. New Guinea (Vogelkop Peninsula: Tamrau, Nettoti and Arfak Mts).

Ecol. In understorey of *Nothofagus* forest, 1800–2250 m, often sterile. *Fl.* Jan.

Vern. *Tschotschai*, Manikiong, *aruwo*, Hattam.

Note. A natural hybrid of *R. phaeochristum* with apparently 268. *R. culminicolum var. angiense* was found once in the Arfak Mts near Lake Anggi Gita, 1900 m; in the general appearance, in the star-shaped scales and in flowers it shows the characters of the first, and in the wider, more obovate and blunt leaves (which show a less dense tomentum of stellate scales and no trace of epidermal tubercles) the characters of the latter. On Mt Gwamongga near Lake Anggi Gigi at 2550 m a sterile plant has been collected, very similar in leaf-characters to *R. phaeochristum*, but tubercles much less distinct than normally found in this species, probably also due to an ingression of a species of *ser. Javanica*.

69. Rhododendron haematophthalmum SLEUM. Reinwardtia 5 (1960) 89.

Erect rigid shrub, 1.5–2.5 m high. Branchlets terete, upper internodes 2–8 cm by 2–3 mm, lower ones 3–7 mm ø, stellate-lepidote at the innovations, otherwise very early glabrescent, and very rugose by innumerable minute tubercles. *Leaves* mostly scattered, close together at the upper node, more rarely along the internode, or in a 3–5-merous pseudowhorl, ± oblong, apex short-acuminate, apiculate or obtuse, base truncate-rounded, not rarely slightly cordate, very coriaceous, rigid, erecto-patent, densely clad with minute, stellate, short-dendroid scales (each on top of a paler epidermal tubercle) when very young, early glabrescent and very densely scabrid by the persistent tubercles on both faces, margin ± revolute, 5–9 by 2–3.5 cm, midrib as thick as the petiole below, ± flattened and but slightly prominent in its lower, ± sunk in its upper part above, nerves 7–10 pairs, irregular, spreading, rather straight, indistinctly anastomosing, ± inconspicuous above, slightly raised or ± evanescent beneath; petiole subterete, rugose, 7–17 by 2–3 mm. *Umbels* 4–8(–10)-flowered. Perulae ovate to obovate or spathulate, obtuse, membranous, glabrous, up to 2 by 1 cm. Bracteoles linear, apex subspathulate, glabrous, up to *c.* 2 cm by 1 mm. Pedicels very densely rusty-stellate-lepidote, epilose, (1.5–)2–3.5 cm by 1 mm at anthesis. *Calyx* oblique, disk-shaped, irregularly 5-dentate, densely lepidote dorsally, epilose, *c.* 4 mm ø, lobes short, obtuse, not ciliate, or may be 1–2 lobes elongate-deltoid, acute, up to 3 mm. *Corolla* manifestly zygomorphous, tubular below, dilated at the limb, red, densely rufous-stellate-lepidote outside, the margin of the lobes excepted, very shortly hairy at the tube inside, (4–)4.5–5.5 cm long in all, tube ± curved, 2.5–3.5 cm, 5–6 mm ø at base, widened to *c.* 10 mm at apex, lobes irregularly broad-obovate or suborbiculate, 1.5–2 by 0.9–1.5 cm. *Stamens* 10, unequal, nearly as long as the corolla; filaments linear, laxly ± patently hairy below, glabrous distally; anthers forming a purple centre in the throat of the corolla, broad-oblong to obovate-oblong, 3.5–4 by 1.3–1.5 mm. *Disk* glabrous. *Ovary* cylindric, subabruptly attenuate to the style, densely shortly patent-hairy and lepidote (the scales well visible among the hairs), 5–6 by *c.* 3 mm. Style rather stout, ± equalling the stamens, subdensely to laxly patently hispid-pubescent in the lower half, with some scales between the hairs, otherwise glabrous; stigma thick-capitate, manifestly 5-gibbous.

Distr. *Malesia*: W. New Guinea (Lake Habbema).

Ecol. Common on edges of mossy thickets, frequent in shrubberies of peaty ridges or peaty treeless area in forest or in mossy thickets, 3000–3225 m. *Fl.* Aug., Oct.

70. Rhododendron phaeops SLEUM. Reinwardtia 5 (1960) 90.

Epiphytic shrub, 1 m. Branchlets terete, 2–3 mm ø, tips stellate-lepidote, otherwise densely minutely verrucose and rough to the touch, early covered with cork; internodes 3–6 cm. *Leaves* in 3–4-merous pseudowhorls at the upper 2 or 3 nodes, broad-elliptic or ovate-elliptic, apex shortly attenuate, obtuse, base very broadly attenuate to nearly rounded, coriaceous, rigid, stellate-lepidote initially on both faces (scales small, dendroid, on top of persistent epidermal tubercles, caducous), early glabrescent and scabrid by numerous tubercles on both faces especially beneath, edge but shortly revolute, 5–8 by 3–5 cm, midrib as thick as the petiole, somewhat prominent and grooved along the midline in its lower ⅔, impressed for the rest above, nerves 6–8 pairs, irregular, rather straight below, obscurely curved-anastomosing before the edge, very slightly immersed above, prominent beneath, veins lax, faintly sunk above, raised or ± obsolete beneath; petiole grooved above, densely lepidote, 1–1.5 cm by *c.* 2 mm. *Umbels* 2–3-flowered. Pedicels densely rusty-stellate-lepidote, 1.5–2 cm by *c.* 1 mm. *Calyx* disk-shaped, densely lepidote, epilose, 5–6 mm ø, with 5 distinct irregular elongate-triangular subacute teeth, these white-ciliate, spreading, 2–4 mm. *Corolla* zygomorphous, tubular below, gradually widened upwards, red, 5.5–6 cm long in all, densely rusty-stellate-lepidote outside the margin of the lobes excepted, subdensely clothed with slender, whitish, rather longish retrorse hairs at the entire tube inside, tube curved, 6 mm ø at base, *c.* 15 mm at throat, lobes broad-spathulate to suborbicular, 1.5–2 cm ø, glabrous inside, *Stamens* 10, unequal; filaments linear, wider and ± densely patent-pilose below, narrower and glabrescent to glabrous above, 4.5–5.5 cm; anthers brown when fresh, broad-oblong, 5–5.5 by nearly 2 mm. *Disk* glabrous. *Ovary* obconical-cylindric, densely clad with subappressed, yellowish, stiff hairs which cover the scales, *c.* 7 by 3 mm, ± abrupt with the style, the latter rather stout, densely hairy and laxly lepidote below, more laxly patent-hairy and more densely lepidote upwards, glabrous at the upper 5 mm below the capitate stigma.

Distr. *Malesia*: W. New Guinea (Bernhard Camp, Idenburg R., *c.* 139°–3° 30′), once found, in mossy forest at 2150 m. *Fl.* Feb.

71. Rhododendron truncicolum SLEUM. Reinwardtia 5 (1960) 91.

Small shrub, epiphytic on tree trunks. Branchlets slender, 1.5–2.5 mm ø, caducously lepidote at the tips, otherwise minutely verrucose, covered with grey cork in the older parts; internodes 2–4 cm. *Leaves* in 3–4-merous pseudowhorls at the upper nodes, elliptic, apex broad-attenuate, subapiculate, base broad-attenuate to rounded, subcoriaceous, mature ones glabrescent or with remains of former scales, otherwise with minute elevated points above, lepidote for a long time beneath along the midrib (scales stellate, subsessile on top of pale persistent epidermal tubercles), otherwise glabrescent and somewhat rough to the touch, quite flat, (2.5–)3–4 by 1.4–2.4 cm, midrib flat or slightly sunk above, prominent beneath especially towards the base of the blade, much more slender than the petiole, nerves *c.* 6 pairs, irregular, rather straight below, anastomosing with each other and the veins before the edge, the latter forming a lax network which is equally raised on both faces, veinlets rather inconspicuous; petiole a little flattened, grooved above, densely lepidote, 4–6 by 1–1.3 mm. *Umbels* 3-flowered. Perulae membranous, ovate to obovate, apiculate, papillose or glabrous dorsally, up to 1.5 by 0.6 cm. Bracteoles filiform, very laxly hairy or glabrous, up to 1.5 cm. Pedicels densely rusty-stellate-lepidote, epilose, 1–1.3 cm by *c.* 0.6 mm. *Calyx* disk-shaped, hardly lobed, *c.* 2.5 mm ø, densely lepidote and sparsely pubescent dorsally, sparsely ciliate. *Corolla* zygomorphous, tubular, rosy-pink, (3–)3.5–4 cm long in all, laxly stellate-lepidote outside at the tube and the base of the lobes, laxly hairy inside at the tube, glabrous elsewhere, tube slightly curved, 2–2.5 cm long, 4–5 mm ø at base, 8–10 mm below the lobes, these broadly obovate-spathulate, 1–1.5 by 0.8–1 cm, irregularly wavy and crenulate. *Stamens* 10, unequal, attaining ± half the length of the corolla lobes; filaments linear, laxly patent-hairy below, glabrous in the upper third; anthers broad-oblong, 2.5 by 1 mm, thecae very shortly apiculate at the base. *Disk* glabrous below, pubescent at the upper margin. *Ovary* cylindric, densely lepidote and laxly pubescent, *c.* 4 by 1.8 mm, rather abrupt with the style, the latter slender, slightly exceeding the tube, laxly patently hispidulous and densely lepidote in the lower third, glabrous for the rest; stigma thickly turbinate-capitate.

Distr. *Malesia*: New Guinea (Mt Dayman/Mt Maneao, Milne Bay Distr.), once found in forest at *c.* 2135 m. *Fl.* June.

72. Rhododendron rappardii SLEUM. Reinwardtia 5 (1960) 93; Blumea 12 (1963) 99.

Terrestrial shrub, 1.2–2.5 m. Branchlets terete, upper internodes 4–10 cm by 2 mm, subdensely caducously rusty-stellate-lepidote initially, glabrescent, covered with numerous minute pustules and rather scabrid to the touch, pruinose at the older parts (3–5 mm ø), which are smooth respectively early covered by an ashy cork. *Leaves* in 3–5-merous pseudowhorls at the upper 3 or 4 nodes, broad-elliptic, more rarely oblong-elliptic or nearly rounded, apex broad-attenuate, obtuse or rounded, base very broadly attenuate or mostly rounded, rather thinly coriaceous, though firm, fugaciously rusty-or brown-lepidote on both faces initially (scales rather small, irregularly stellate-lacerate, ± dendroid, each on a minute epidermal tubercle), very early glabrescent and ± smooth above, finally glabrate also beneath, but permanently rugulose by numerous minute tubercles, entire, the edge slightly or not revolute, (3.5–)4–7(–7.5) by (2.5–)3–5 cm, midrib dilated and grooved in the basal, becoming very narrow and ± impressed in the upper part above, thick

and obtusely prominent beneath, nerves 5–6(–8) pairs, at an acute angle, rather straight below, less conspicuous towards the edge, minutely impressed in fully mature leaves above, not or but little raised beneath, veins ± indistinct; petiole subterete, lepidote, 6–12(–15) by *c.* 2 mm. *Umbels* 5–8-flowered. Outer perulae ovate, obtuse, lepidote in the middle outside, otherwise papillate-puberulous, 1–1.5 by 0.7–1 cm, inner ones oblong to spathulate, densely and longer subsericeous-pubescent on both sides, up to 3 by 1.5 cm. Bracteoles linear, ± laxly hairy, up to 2.5 cm by *c.* 1 mm. Pedicels stoutish, densely rusty-stellate-lepidote, subdensely or laxly hairy at least below the calyx, (5–)8–12 by nearly 1 mm at anthesis. *Calyx* oblique, disk-shaped, rather small, lepidote and pubescent dorsally, ciliate, very shortly 5-lobed, 2–3 mm ø. *Corolla* narrow funnel-shaped, regular, white or pink, very sparsely stellate-lepidote or mostly glabrous outside, ± densely clad with ± longish retrorse hairs at the tube inside, 4–5 (rarely up to 5.5) cm long in all, tube ± straight, gradually widened towards the mouth, 3–4 mm ø at base, 6–8 mm at the throat, lobes 5, irregular, obovate spathulate, 1.2–1.5(–1.8) by (0.6–)0.8–1.2 cm. *Stamens* 10, ± attaining halfway the corolla lobes; filaments linear and almost villous below, rather abruptly glabrescent upwards, glabrous and filiform distally; anthers elongate-oblong, 3.5–4 by 1 mm, base minutely biappendiculate. *Disk* low, ± pubescent. *Ovary* cylindric, gradually attenuate to the style, 6–8 by 2.5–3 mm, densely clad with appressed, yellow, stiff hairs which cover the scales. Style nearly as long as the stamens, rather thick below, ± densely patent-hairy and ± laxly lepidote to the lower ¾ (less densely hairy distally), more slender and glabrous for the rest; stigma capitate.

Distr. *Malesia*: W. New Guinea (Wissel Lake region).

Ecol. In primary or mostly in secondary forest, on ± steep slopes, 1750–1850(–2300) m, on peaty or clayey soil or stony clay, derived from limestone or sandstone, locally common. *Fl.* Jan., March, May, Oct.

Vern. *Wajadé*, *waradé*, *waradei*, Kapauku.

73. Rhododendron dianthosmum SLEUM. Blumea 12 (1963) 100; Jahrb. Rhodod. Ges. Bremen (1963) 10, *in text*.

Epiphytic, much branched shrub, 0.5–2 m; branchlets rather slender, densely lepidote, early glabrescent and pruinose; internodes (4–)6–16 cm. *Leaves* in 3(–4)-merous pseudowhorls at the upper 2 or 3 nodes, oblong or elliptic-oblong, apex shortly subacuminate-attenuate, bluntish, base broadly attenuate to rounded, coriaceous, young ones densely rufous-stellate-lepidote, mature ones glabrescent, on both faces set with numerous epidermal tubercles and rough to the touch (scales dendroid, marginal zone incised to or almost to the small centre, the latter deepened or prolonged into a short foot), (7–)9–14 by 3–5.5 cm, edge a little recurved, midrib not much prominent in the lower, gradually flattish in the upper part above, as thick as the petiole in the basal, gradually decreasing in the upper part below, nerves 8–10 (–12) pairs, irregular, ± inarched before the edge, slightly prominent on both faces, veins laxly reticulate, not much conspicuous; petiole densely lepidote initially, 1–1.5 cm by 2–2.5 mm. *Umbels* 4–6-flowered. Perulae a sordid red, outer ones ovate, more inner ones elliptic-ovate and apiculate, innermost ones broadly spathulate, lepidote and/or appressed-hairy to various degree, 1–3.5 by 1–1.5 cm. Bracteoles linear, glabrous, *c.* 2 cm by 1–2 mm. Pedicels exclusively and very densely rusty-stellate-lepidote, 1–1.5 cm by *c.* 1.5 mm. *Calyx* obliquely patellar, *c.* 3 mm across. *Corolla* tubular below, ± horizontally spreading at the lobes, 6–7-merous, pure white, with a scent of carnation, glabrous outside, short-hairy at the tube inside, 5–6 (when fresh *c.* 7) cm long in all, tube 2.5–3.5 (when fresh 3–4) cm, 6–7-pouched at the base and *c.* 6 (when fresh *c.* 10) mm ø, lobes spathulate, 3 or 4 of them generally smaller than the others, 2–2.5 (when fresh 3–3.5) by 1–2 cm. *Stamens* exserted from the throat for *c.* 1 cm; filaments linear, densely or more laxly hairy in the lower ¾, glabrous distally; anthers elongate-oblong, base obtuse 3.5–4 by almost 1 mm. *Disk* glabrous below, tomentose at the upper margin. *Ovary* subcylindric, 8–10 by 2–3 mm, covered by a tomentum of whitish to yellowish, forward-directed hairs, which cover the scales; style continuous, rather slender, *c.* 3 cm, densely or more distally laxly hairy in the lower ¾, glabrous for the rest, no scales visible; stigma capitate, 2.5–3 mm across.

Distr. *Malesia*: N. New Guinea (Cycloop Mts).

Ecol. In primary forest, 800–1400 m, descending along ravines to *c.* 500 m. *Fl.* May-July.

74. Rhododendron rubellum SLEUM. Reinwardtia 5 (1960) 94. — *R. phaeochitum* (*non* F. v. M.) WRIGHT, Kew Bull. (1899) 104.

Erect branching tree, up to 5 m. Branchlets terete, 2–3 mm ø, densely stellate-lepidote at the upper 1 or 2 internodes, glabrescent and early covered with ashy cork below; internodes 3–8 cm. *Leaves* in 4–5-merous pseudowhorls at the upper 1 or 2 nodes, elliptic-oblong or oblong, apex short-acuminate, apiculate, base broadly cuneate or rarely rounded, coriaceous, immature ones densely rusty- or brown-lepidote (scales rather large, very narrowly stellate-incised in form of stellate hairs, dendroid, each on top of an epidermal tubercle), early glabrescent and rough by the persistent tubercles above, clothed for a long time beneath with a nearly woolly tomentum formed by the scales which when gone leave the under-surface too tubercled and scabrid, dark green and dull above, paler beneath, slightly or not revolute at the margin, 4–8.5(–9.5) by 2.5–3.5(–4.5) cm, midrib flat or minutely impressed above, as stout as the petiole and very prominent in the lower, gradually less prominent distally beneath, nerves 6–8 pairs, starting at an acute angle, rather straight below, curved and anastomosing before the edge, forming a lax network with the veins,

nerves slightly impressed above, raised beneath, veins hardly sunk above, raised beneath, no proper reticulation; petiole grooved above, densely lepidote, 1–1.7 cm by 1.5–2 mm. *Umbels* 6–8-flowered. Outer perulae ovate, subobtuse, inner ones spathulate, both densely subsericeous-hirtellous on both sides, up to 1.8 by 1 cm. Bracteoles linear to very narrowly spathulate, ± densely hirsutulous, up to 1.3 cm by 3 mm. Pedicels densely rusty-stellate-lepidote, otherwise not hairy or only so immediately below the calyx, 0.8–1.5 by 1 mm. *Calyx* ± deeply 5-dentate, rather densely pubescent and lepidote dorsally, lobes irregularly triangular, subacute, long-fimbriate, 1.5–2 mm. *Corolla* tubular, ± zygomorphous, bright red, (4.5–)5–6 cm at full anthesis, very laxly lepidote or glabrous at the tube outside, laxly set with retrorse hairs at the tube inside, tube rather straight below, slightly curved and gradually dilated upwards, *c.* 4 cm long, *c.* 4 mm ø at base, *c.* 8 mm at throat, lobes erecto-patent, irregular, obovate-spathulate, sometimes nearly orbicular, 1.2–1.6(–2) by 1–1.5(–1.7) cm. *Stamens* 10, slightly shorter than the corolla, unequal; filaments linear and ± densely patent-hairy below, gradually less so above, completely glabrous at the ultimate 6–10 mm; anthers elongate-oblong, base obtuse, *c.* 4.5 by 1 mm. *Disk* glabrous at least in the lower part. *Ovary* elongate-cylindric, gradually tapering to the style, very densely hairy in the lowest 1 mm (which may be the upper margin of the disk), densely rufous-lepidote and hairy on the proper ovary (scales more numerous than the hairs, and thus well visible), 8–10 by 2.5–3 mm. Style as long as or a little longer than the tube, laxly pubescent and very sparsely lepidote in the lower ⅓ to ⅔, glabrous for the rest; stigma thickly turbinate-subcapitate. *Capsule* 3–3.5 by *c.* 0.6 cm, densely rufous-hirsute and lepidote. *Seeds* filiform, 3–4 mm, with a very narrow tail on both ends.

Distr. *Malesia*: E. New Guinea (Wharton and Owen Stanley Ranges).

Ecol. In forests, said to be common at the Murray Pass (Wharton Range) at 2840 m. *Fl.* June-Sept.

4. Subsection Malayovireya

SLEUM. Blumea Suppl. 4 (1958) 48; Reinwardtia 5 (1960) 95. — *Rhododendron ser. Malayanum* COPEL. *f.* Am. Midl. Nat. 30 (1943) 605, *in text, nom. nud.* — **Fig. 17—18.**

Scales sessile, flat, slightly impressed, generally of two different sizes (*i.e.* very many smaller, and fewer much larger ones, irregularly mixed), all very dense, touching or partly overlapping each other, the centre very dark (sooty to blackish brown) and large in relation to the paler marginal zone, the latter irregularly several-lobed or -incised up to the centre (the broad lobes again, but more shortly lobed) and becoming silvery in later stages.

Distr. S. Siam, *Malesia* (excluding Lesser Sunda Is. and New Guinea). Fig. 16.

Note. Scales of the same type, but less distinctly inequal and spaced for their greater, partly overlapping each other for their smaller number, point to hybrids with species of other subsections, *viz Pseudovireya*, *Solenovireya*, and *Euvireya*. The influence of the *Malayovireya* parent is easily recognized by the dark chestnut colour of the scales, chiefly of their centre, whilst the influence of the other parent generally results in reducing the size of and increasing the distance between the scales. Species with such ± intermediate type of scales are kept in *subsect. Malayovireya*. Species as 181. *R. pyrrhophorum* and 179. *R. ripleyi var. cryptogonium* show the *Malayovireya*-influence to a minor degree and are placed in *subsect. Euvireya*. See also the note under *subsect. Albovireya*.

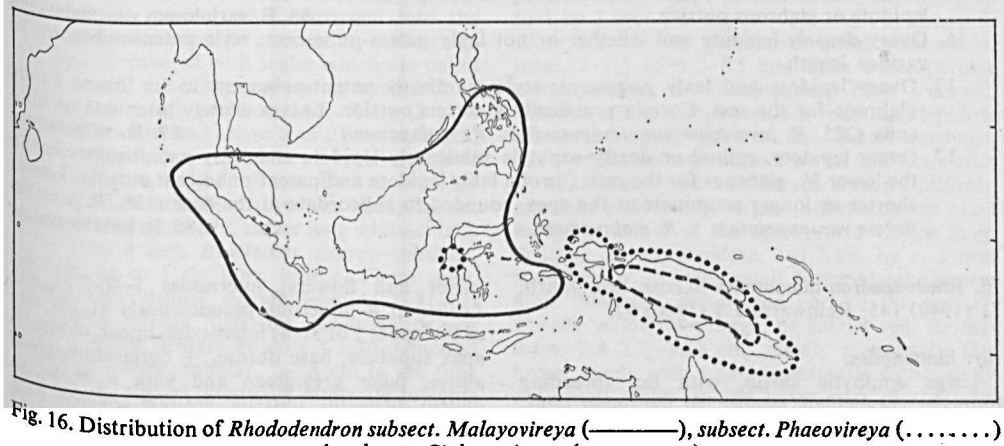

Fig. 16. Distribution of *Rhododendron subsect. Malayovireya* (————), *subsect. Phaeovireya* (.....) and *subsect. Siphonovireya* (– – – – – –).

KEY TO THE SPECIES

1. Scales very dense, all or most of them touching, respectively partly covering each other, very different in size, *i.e.* many smaller ones mixed with few other ones of almost double their size.
2. Leaves linear to lanceolate-linear, up to 10 cm by 4 mm.
3. Inflorescences 4–6-flowered. Corolla ± campanulate, 1.2–1.4 cm; lobes 8–10 by 7–9 mm. **75. R. himantodes**
3. Inflorescences 1–3(very rarely –4)-flowered. Corolla ± tubular, 2–2.4 cm; lobes 5–6(–7) by 3–4(–5)mm. . . . . **76. R. vinicolor**
2. Leaves of various shape, at least 6 mm wide.
4. Leaves sessile or nearly so (petiole up to 4 by 3 mm), base rounded to subcordate-auriculate. (Filaments pubescent at the base).
5. Corolla glabrous or rarely very sparsely lepidote in the lower part of the tube outside, 2.4–2.7 (–3.2) cm. Pedicels shorter than the corolla. . . . . **77. R. durionifolium**
5. Corolla ± densely lepidote outside at least at the tube, *c.* 2 cm. Pedicels as long as or mostly longer than the corolla . . . . . **78. R. fallacinum**
4. Leaves manifestly petioled, base mostly cuneate to rounded, very rarely subcordate.
6. Inflorescences exclusively terminal.
7. Filaments glabrous.
8. Style thick, rather short, as long as or shorter than the proper ovary, hardly half as long as the corolla . . . . . **79. R. apoanum**
8. Style slender, ± twice as long as the proper ovary, ± as long as the corolla. **80. R. malayanum *var.* malayanum**
7. Filaments ± densely short-pubescent in the lower ½ or ⅓.
9. Corolla besides some scales laxly short-pubescent outside . . **80. R. malayanum *var.* pubens**
9. Corolla besides some scales not hairy outside.
10. Corolla 4–4.5 cm . . . . . **81. R. nortoniae**
10. Corolla up to 3.2 cm.
11. Leaves ± distinctly bullate. Pedicels lepidote, not hairy.
12. Leaves ovate or elliptic-ovate, sometimes ovate-lanceolate, base mostly rounded, or rarely attenuate. Corolla short-pubescent inside in the lower half of the tube . . **82. R. acuminatum**
12. Leaves elliptic-lanceolate, base acute or obtuse. Corolla similar but glabrous at the insertions of the filaments . . . . . **83. R. fortunans**
11. Leaves not bullate. Pedicels finely patent-hairy under and between the scales. **80. R. malayanum *var.* pilosifilum**
6. Inflorescences both terminal and axillary. . . . . **80. R. malayanum**
1. Scales all or for their greater number spaced from each other, much less different in size. Presumably hybrids with species of other subsections.
13. Leaves linear-lanceolate, (2.8–)3–4(–5) cm by (3–)4–5 (rarely up to 8) mm . . **84. R. lineare**
13. Leafshape otherwise, (4.5–)6–12(–16) by (2–)2.5–4(–5.5) cm.
14. Filaments glabrous.
15. Leaves oblong-obovate, apex rounded or slightly retuse . . . . . **85. R. obscurum**
15. Leaves lanceolate to elliptic-lanceolate, rarely elliptic, gradually attenuate towards the subacute apex . . . . . **86. R. variolosum *var.* variolosum**
14. Filaments rather densely patent-pubescent at least in the lower third.
16. Ovary and base of the style exclusively lepidote; style glabrous for the rest. Corolla very laxly lepidote or glabrous outside. . . . . **86. R. variolosum *var.* andersonii**
16. Ovary densely lepidote and whether or not laxly patent-pubescent; style patent-pubescent to various length.
17. Ovary lepidote and laxly pubescent; style manifestly patent-pubescent to its lowest 2 mm, glabrous for the rest. Corolla practically glabrous outside. Leaves acutely attenuate at both ends (225. *R. javanicum var. teysmannii* × *R. malayanum*) . . . . . **87. R. wilhelminae**
17. Ovary lepidote, epilose or nearly so; style subdensely lepidote and laxly patent-pubescent in the lower ⅔, glabrous for the rest. Corolla laxly lepidote and patent-pubescent outside. Leaves shorter or longer acuminate at the apex, rounded to subcordate at the base (136. *R. jasminiflorum var. punctatum* × *R. malayanum*) . . . . . **88. R. hybridogenum**

75. Rhododendron himantodes SLEUM. Bot. Jahrb. 71 (1940) 145; Reinwardtia 5 (1960) 97.

***var.* himantodes.**

Large epiphytic shrub, with lax spreading branches; branchlets slender, at the upper internodes very densely covered with scales of the *R. malayanum* type, which are also found on leaves and flowers; internodes 1–4(–5.5) cm. *Leaves* in 4–5-merous pseudowhorls at the end of the upper 2 or 3(–4) internodes, linear, elongate, apex subacute, base obtuse, ± coriaceous, green above, paler grey-green and with a brownish midrib beneath, initially entirely covered with scales which disappear above with age, but remain beneath, margin strongly revolute to nearly the

top, 5–9(–10) cm by 2–4 mm, midrib deeply impressed, very prominent beneath, nerves obscure; petiole densely lepidote, stoutish, 2–3 mm. *Flowers* 4–6 per umbel. Perulae ovate to obovate-spathulate, the upper dorsal part and/or the mediane lepidote, ciliolate, up to 10 by 6 mm. Bracteoles narrow-linear, glabrous or laxly lepidote, up to 8 mm. Pedicels slender, densely lepidote, 1.5–2 cm at anthesis. *Calyx* minute, oblique, obsoletely 5-lobulate or -denticulate, densely lepidote. *Corolla* campanulate to infundibuliform-campanulate, deeply 5-lobed, 1.2–1.4 cm in all, snow-white with brown dots, membranous, tube broadly tubular-campanulate, 3–6 mm long, at the base with 5 small pouches *c.* 2.5 mm ø, rather densely lepidote outside, ± densely hairy inside, lobes obovate-spathulate, ± spreading, glabrous outside in the upper part as well as inside, lepidote at the base outside, 8–10 by 7–9 mm. *Stamens* 10; filaments linear, 4–5 mm, white-hairy especially at the very base; anthers *c.* 2.5 by 0.3 mm. *Disk* glabrous. *Ovary* conical, entirely covered by scales, 4–5 by 2 mm, gradually tapering to the glabrous style, the latter slightly curved, *c.* 4 mm; stigma capitate. *Capsule* narrow-oblong, lepidote, *c.* 1.5 cm. *Seeds* 7–8 mm including the tail-like appendages.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy forest, crest of ridge, 1525–2135 m. *Fl.* Feb.-Oct.

var. **lavandulifolium** SLEUM. Reinwardtia 5 (1960) 97.

Leaves 3–4.5 cm by *c.* 2 mm. *Flowers* only seen in bud, very light yellow.

Distr. *Malesia*: E. Borneo (Mt Kemul), epiphyte in mountain forest, 1800 m. *Fl.* Oct.

76. Rhododendron vinicolor SLEUM. Reinwardtia 5 (1960) 98.

Epiphytic shrub. Branchlets elongate, terete, slender, completely covered with scales of the *R. malayanum* type as they occur also on the inflorescences and the leaves. *Leaves* rather laxly scattered along the branchlets, more densely so distally, linear or narrow-lanceolate, apex gradually attenuate, obtuse, base narrowed into the petiole, subcoriaceous or coriaceous, still at age very densely covered with scales which are pallid on the upper, red-brown on the undersurface of the leaves, strongly revolute, 3–6(–7) by (2–)3–4 mm, midrib impressed above over its entire length, very prominent beneath, nerves obsolete; petiole densely lepidote, 2–3 by 0.5 mm. *Umbels* 1–3(very rarely –4)-flowered. Perulae ovate, subapiculate, densely lepidote dorsally, rather long white-ciliate, up to 5 by 3 mm. Bracteoles narrow-subulate, glabrous, up to 1 cm long, base *c.* 1 mm wide. Pedicels very slender, densely lepidote, 6–8(–12) mm. *Calyx* minute, disk-like, shallowly or not lobed, ± wavy, densely lepidote. *Corolla* wine-red or reddish purple, tubular, 2–2.4 cm in all, tube cylindric, ± curved, gradually attenuate towards the slightly 5-saccate base, 2–2.5 mm ø at base, *c.* 4 mm at throat, laxly and ± caducously lepidote outside, glabrous inside, lobes somewhat spreading, obovate, lepidote on the dorsal midline, glabrous elsewhere, 5–6(–7) by 3–4(–5) mm. *Stamens* 10, 1.7–1.9 cm; filaments narrow-linear, filiform distally, slightly unequal, glabrous; anthers broadly obovate, *c.* 1.5 mm. *Disk* glabrous. *Ovary* obconical-cylindric, densely lepidote, *c.* 4 by 1.5 mm, gradually passing into the style, the latter slender, lepidote in the lower third or only at the base, (8–)10–12 mm; stigma shortly club-shaped and obscurely lobed.

Distr. *Malesia*: Sumatra (Atjeh: Mt Lembuh region; Tapanuli: near Sidikalang).

Ecol. In flat forest ridges with cold solfatara fields and on narrow ericoid ridge, 1100–1500 m. *Fl.* Feb.-March.

77. Rhododendron durionifolium BECC. Malesia 1 (1878) 202; RIDL. J. Str. Br. R. As. Soc. *n.* 63 (1912) 61; MERR. En. Born. (1921) 461; SLEUM. Reinwardtia 5 (1960) 98; Blumea 11 (1961) 116; *ibid.* 12 (1963) 100. — *R. mjöbergii* MERR. Sarawak Mus. J. 3 (1928) 542.

Treelet or shrub, terrestrial or mostly epiphytic. Branchlets terete, stout, entirely covered in the younger parts with initially chestnut to dark golden squamular scales of the *R. malayanum* type, as they are found also in the inflorescences and the leaves; internodes 3–16 cm by (2–)3–4 mm. *Leaves* 3–4(–5) in each of the spaced pseudowhorls, or only 2–4 not properly whorled in the apical part of the upper internode, sessile or nearly so, lanceolate to ovate-lanceolate, apex ± long-acuminate to short-caudate, base rounded or mostly subcordate-auriculate, coriaceous, showing very thin silvery dots or small pits above, entirely and persistently covered with red-brown scales beneath, margin repand-denticulate to nearly entire, slightly revolute, (8–)11–15 (–17) by (2–)2.5–4(–6.5) cm, midrib distinctly impressed above, very stout and prominent beneath, nerves 6–9 pairs, rather straight and spreading below, ± curved and anastomosing towards the edge, slightly impressed above in mature leaves only, ± indistinct beneath, veins laxly reticulate and mostly minutely impressed above only; petiole densely lepidote, up to 4 by 3 mm, but mostly very short or almost 0. *Flowers* 8–10(–14) per umbel; floral buds ovoid, large, 2–2.5 by 1.2–1.5 cm, their outer perulae ovate, obtuse to subapiculate, base truncate, subcoriaceous, subpuberulous outside, lepidote along the upper part of the dorsal mediane, finely whitish ciliate, up to 2 by 1.2 cm, inner ones ± spathulate and smaller. Bracteoles filiform, papillose-pubescent, often subspathulate and barbulate-ciliate at the apex, up to 1.5 cm long. Pedicels densely lepidote, 1–1.5 cm by *c.* 1 mm at anthesis. *Calyx* very small, formed by the uppermost thickened cup-shaped part of the pedicel. *Corolla* yellow to orange, or scarlet red, funnelform, 2.4–2.7(–3.2) cm, mostly completely glabrous, rarely with a few (apparently rather early caducous) scales on the lower part of the tube outside, glabrous or slightly pubescent at the base of the tube inside, tube ± straight,



Fig. 17. *Rhododendron fallacinum* SLEUM. *a.* Habit, × ⅔, *b.* flower, × 1, *c.* ovary and style, × 2, *d.* stigma, × 5, *e.* stamen, × 3, *f.* fruit, × ⅘, *g.* seed, × 10, *h–k.* subsequent outer to inner perulae, × ⅘ (*a* and *f–g* GRISWOLD 122, *b–e* DARNTON 585, *h–k* CLEMENS 27106, 27800, 32714).

1.2–1.5 cm long, *c.* 3 mm ø at the slightly 5-pouched base, *c.* 4–5 mm at throat, lobes ± spreading, obovate to nearly rounded, ± as long as the corolla tube, 8–11 mm wide. *Stamens* 10, slightly unequal, *c.* 2 cm; filaments linear, flattened and rather densely whitish hairy in the lower part, filiform and glabrous distally; anthers oblong, *c.* 3.5 by 0.5–0.8 mm, not rarely somewhat curved. *Disk* glabrous. *Ovary* elongate-conical, 5–6(–8) by 1.5 mm, densely lepidote, gradually tapering to the style which is rather stout and lepidote in the lower half, 7–8(–10) mm; stigma capitate at anthesis, slightly 5-lobed, lobes accrescent into separate club-shaped spreading parts afterwards. *Capsule* cylindric, often somewhat curved, 2.5–3.5(–4.5) cm by 3–4 mm, densely lepidote, slightly 5-ribbed. *Seeds* 4–5 mm including the filiform tails; fruit-pedicel 1–1.5 mm ø, up to 2.5 cm long.

Distr. *Malesia*: Borneo (Sarawak, Central and SE. Borneo).

Ecol. Generally in moss forest, also found in low scrubby vegetation on bare sandstone rocks of B. Tanggoi summit, apparently but locally common, 800-2400 m. *Fl.* May, Aug.-Nov.

78. Rhododendron fallacinum SLEUM. Reinwardtia 5 (1960) 99; Blumea 12 (1963) 100; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f.7 & 8. — *R. durionifolium* (*non* BECC.) STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 197. — **Fig. 17.**

Treelet or shrub, sometimes a tree, generally terrestrial, more rarely epiphytic, up to 6 m. Branchlets terete, robust, densely covered with the dark brown scales of the *R. malayanum* type which equally are found in the inflorescences and on the leaves; internodes 2–9 (sometimes up to 30) cm. *Leaves* 3–4(–6) per pseudowhorl at the upper nodes, sessile or subsessile, ovate-oblong or subovate-lanceolate, apex shortly to rather long acuminate or subcaudate, subacute, base mostly slightly cordate-auriculate, (7–)10–16 by (2–)2.5–6(–7) cm; petiole up to 3 by 3 mm. *Inflorescences* 10–30-flowered. Outer perulae ovate, inner ones obovate-spathulate, ± caducously lepidote in the upper part of the mediane outside, otherwise papillate-puberulous, densely whitish ciliate, up to 2 by 1 cm. Bracteoles filiform and papillous below, spathulate and subvillous-ciliate above, up to 1.5 cm. Pedicels rather stoutish, mostly 2–3(–4) cm already at anthesis, rarely a little shorter then, densely lepidote. *Calyx* disk-like, minute, obsoletely lobed, *c.* 2 mm ø. *Corolla* funnel-shaped, light red, rose-purplish or red-orange, deep orange pink with a deep pink centre, also bright red, rarely dark red or pale scarlet, scentless, *c.* 2 cm long, subdensely brownish lepidote at the tube and the lower part of the lobes outside, otherwise completely glabrous, tube straight, 7–10 by *c.* 3 mm ø at the slightly 5-saccate base, lobes obovate-spathulate to almost rounded, slightly emarginate, 1–1.6 by 0.8–1.1 (–1.3) cm. *Stamens* 10, ± unequal, *c.* 1.8 cm; filaments linear, slightly dilated towards the base and rather densely and ± patently hairy there, filiform and glabrescent upwards; anthers elongate-oblong, *c.* 3 by 0.3 mm. *Disk* glabrous. *Ovary* elongate-conical, densely lepidote, 6–7 by 1.5 mm, gradually extending into the glabrous style (*c.* 10 mm); stigma shortly turbinate-subcapitate, shortly 5-lobed initially, ultimately 5-clubbed. *Capsule* golden brown or purple, cylindric, not rarely a little curved, 2.5–3 cm by *c.* 3 mm; fruit-pedicel rather slender, 2.5–3.5(–4) cm.

Distr. *Malesia*: Borneo (North Borneo: Mt Kinabalu; Mt Trus Madi).

Ecol. In mossy forest in damp shaded places, but also on ridge crests or open exposed places, among ferns and scrub rather frequent, 1220–2600 m. *Fl. fr.* Jan.-Dec.

Note. Sterile specimens hardly distinguishable from those of *R. durionifolium* BECC.

79. Rhododendron apoanum STEIN, Gartenflora 34 (1885) 194, t. 1196; Jahresber. Schles. Ges. Vaterl. Cult. f. d. Jahr 1885 (1886) 414–416; VIDAL, Rev. Pl. Vasc. Filip. (1886) 172; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 43; Philip. J. Sc. 3 (1908) Bot. 380; ELM. Leafl. Philip. Bot. 3 (1911) 1107; MILLAIS, Rhodod. (1917) 115; MERR. En. Philip. 3 (1923) 243; MILLAIS, Rhodod. ser. 2 (1924) 83; COPEL. *f.* Philip. J. Sc. 40 (1929) 146; SLEUM. Reinwardtia 5 (1960) 99; Blumea 11 (1961) 116. — *Rhododendron sp.* VIDAL, Sinopsis Atl. (1883) 30, t. 60, f.E. — *R. jasminiflorum* (*non* HOOK.) F.-VILL. Nov. App. (1883) 353.

Lax erect shrub, rarely subscandent, mostly epiphytic, *c.* 1 m, stems usually several from the same root, profusely branched above the middle, the suberect twigs greyish brown. Branchlets terete, the upper internodes (2–7 cm) densely covered with dark rusty scales of the *R. malayanum* type, which are also found on inflorescences and leaves. *Leaves* close together towards the end of the upper internodes in a 3–5-merous pseudowhorl, lanceolate to elliptic-lanceolate, sometimes rather obovate-lanceolate or oblong, variable in shape and size, apex gradually or subabruptly acuminate, subacute or obtuse, base broadly to narrowly attenuate into the petiole, ± coriaceous, dull green above, initially densely lepidote on both faces, glabrescent only above with age, small pits remaining visible for a long time, entire to feebly dentate towards the apex, shortly revolute at the edge especially towards the base, (5–)6–11 by (1.5–)2–4 cm, midrib slightly impressed above, very prominent beneath in the lower part of the lamina, nerves 6–7 pairs, irregularly spreading, upper ones rather straight, all anastomosing, very slightly depressed above in fully mature leaves, somewhat raised or almost faintly visible beneath, reticulation 0; petiole semiterete, lepidote (0.9–) 1–1.5 cm by 2–3 mm, grooved above, *Flowers* 6–15 per umbel. Perulae ovate, obtuse, outer ones densely lepidote in the dorsal mediane outside, inner ones progressively larger and less lepidote, all finely greyish sericeous the margin excepted, densely white-ciliate, up to 1 by 0.8 cm. Bracteoles filiform, short-hairy, apex slightly spathulate and barbate, up to 1 cm. Pedicels rather stoutish,

densely lepidote, 7–11 mm. *Calyx c.* 2 mm ø, shortly 5-lobed, all over lepidote. *Corolla* tubular 1.6–2 cm, purple to blood red, sometimes shiny bright red and a bit waxy, very laxly lepidote outside at least at the sinuses of the lobes, tube straight, 1.1–1.5 cm long, 2–3 mm ø at the slightly 5-pouched base, lobes subpatent, broadly obovate to nearly rounded, 5–7 by 4–6 mm. *Stamens* 10, about ⅔ as long as the corolla; filaments linear, flat, glabrous; anthers broad-oblong, *c.* 1.7 mm. *Disk* glabrous. *Ovary* subovoid-conical, 4–5 by 2 mm, densely lepidote; style as long as or shorter than the ovary, rather thick, lepidote at the base, glabrous in the upper half; stigma thick-capitate. *Capsule* fusiform, 2–2.2 by *c.* 3 mm. *Seeds c.* 2 mm including the filiform appendages.

Distr. *Malesia*: Philippines (Mindanao: Mt Apo and other higher peaks).

Ecol. Moss forest on peaks and ridges, 1380–2930 m, apparently not rare on Mt Apo. *Fl.* March, May-Oct.

Vern. *Kalumping-busau, malagos, malagos-tabusa*, Bag., *saring-singon*, Mbo.

80. Rhododendron malayanum JACK, Mal. Misc. 2 (1822) 17, *reimpr.* HOOK. Bot. Misc. 1 (1834) 369; DC. Prod. 7 (1839) 725; PLANCH. Fl. Serres 5 (1849) 477–480 h; MIQ. Fl. Ind. Bat. 2 (1859) 1059; Suppl. 1 (1860) 251; HOOK. Bot. Mag. (1873) t. 6045; BECC. Malesia 1 (1878) 205; CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 462; HENSLOW, J. R. Hort. Soc. 13 (1891) 262, f. 42 (*fol.*), 43g (*fl.*); RIDL. J. Str. Br. R. As. Soc. *n.* 23 (1891) 145; *ibid. n.* 39 (1903) 15; K. & G. J. As. Soc. Beng. 74, ii (1905) 78; RIDL. J. Linn. Soc. Bot. 38 (1908) 313, *reimpr.* J. Fed. Mal. St. Mus. 2 (1908) 120; *ibid.* 4 (1909) 44; KOORD.-SCHUM. Syst. Verz. (1912) fam. 233, p. 106; KOORD. Exk. Fl. Java 3 (1912) 6; RIDL. J. Fed. Mal. St. Mus. 5 (1914) 39; J. J. S. in K. & V. Bijdr. 13 (1914) 103; RIDL. J. Fed. Mal. St. Mus. 6 (1915) 157; MILLAIS, Rhodod. (1917) 206; MERR. En. Born. (1921) 462; BURK. & HOLTT. Gard. Bull. S. S. 3 (1923) 57; RIDL. Fl. Mal. Pen. 2 (1923) 219; J. Mal. Br. R. As. Soc. 87 (1923) 75; BURK. & HENDERS. Gard. Bull. S.S. 3 (1925) 390; SP. MOORE, J. Bot. 63 (1925) Suppl. 57; HOCHR. Candollea 2 (1925) 492; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256; J. Fed. Mal. St. Mus. 13 (1927) 5; J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 122; BURK. Dict. (1935) 1903; SYMINGTON, J. Mal. Br. R. As. Soc. 14 (1936) 355; J. J. S. Bot. Jahrb. 68 (1937) 201; HUTCH. in Craib, Fl. Siam. En. 2 (1938) 317; STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 387; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 3; HENDERS. Mal. Nat. J. 6 (1950) 262; MERR. J. Arn. Arb. 33 (1952) 243; SLEUM. Blumea Suppl. 4 (1958) 48; Reinwardtia 5 (1960) 100; Blumea 11 (1961) 117; STEEN. Endeavour 21 (1962) 189, t. 3; SLEUM. Blumea 12 (1963) 101; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 2. — *R. tubiflorum* R(EINWARDT) in Bl. Cat. Gew. Pl. Btzg (1823) 72, *nom.nud.*; DC. Prod. 7 (1839) 725; HASSK. Cat. Hort. Bog. (1844) 162; MORITZI, Syst. Verz. (1846) 42; PLANCH. Fl. Serres 5 (1849) 477–480 h; ZOLL. Syst. Verz. 2 (1854) 137; MIQ. Fl. Ind. Bat. 2 (1859) 1059; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 44, t. II A; BL. Fl. Jav. Pl. inéd. (1863–83) t. 5. — *Vireya tubiflora* BL. Bijdr. (1826) 855; DON, Gen. Syst. 3 (1834) 848. — *Azalea tubiflora* BL. *ex* DC. Prod. 7 (1839) 725 *in syn.* — *R. fuscum* BL. Pl. Jav. Pl. inéd. (1863–83) t. 7 C, f.1, *cf.* STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 388. — *Azalea malayana* (JACK) O. KTZE, Rev. Gen. Pl. 2 (1891) 387.

KEY TO VARIETIES AND FORMS

1. Inflorescences exclusively terminal.
 2. Filaments glabrous. . . **1.** *var.* **malayanum**
 2. Filaments ± densely short-pubescent in basal ⅓–½.
  3. Corolla besides some scales laxly short-pubescent outside . . . . . **2.** *var.* **pubens**
  3. Corolla besides some scales glabrous. **3.** *var* **pilosifilum**
1. Inflorescences both terminal and axillary.
 4. Filaments glabrous.
  5. Leaves oblong-lanceolate, ± acute at apex and base . . . **5a.** *var.* **axillare** *f.* **axillare**
  5. Leaves elliptic or ovate.
   6. Leaves broadly elliptic, apex shortly obtusely attenuate, base ± truncate. **5b.** *var.* **axillare** *f.* **latifolium**
   6. Leaves ovate, apex shortly obtusely acuminate, base rounded **5c.** *var.* **axillare** *f.* **ovatum**
 4. Filaments ± densely short-pubescent in the lower ⅓–½ . . . . . **4.** *var.* **infrapilosum**

1. *var.* **malayanum.**

Erect, straggling shrub, not rarely crooked, terrestrial or frequently epiphytic, sometimes treelet up to 5 m. Branchlets terete, slender, tips as all parts of the plant very densely covered with flat, ± roundish scales of two different sizes, very manifest to the naked eye; scales very close, touching or partly overlapping each other, the marginal zone thin, brownish, becoming ± silvery with age, ± irregularly and mostly deeply crenate or lobed or cleft, the centre dark chestnut-brown to sooty, large in relation to the marginal zone, leaving a small dark pit when the scale has gone; internodes 2–10 cm. *Leaves* subopposite or in a 3–6-merous pseudowhorl at the end of the upper 1–3 internodes, ± ascending, oblong- to lanceolate-elliptic, sometimes lanceolate or oblanceolate, variable in shape and size, always attenuate at both ends, apex mostly gradually short-acuminate, the very apex obtuse by a small gland, base acutely attenuate into the petiole, coriaceous, dark green and shining above, rubiginose to copper-coloured beneath, entirely covered with scales on both faces initially, glabrescent above with age, persistently lepidote beneath, entire or indistinctly repand-denticulate in the upper half, not rarely slightly revolute especially towards the base, (4–)5–10(–15) by (1–)1.5–3(–4) cm, midrib somewhat depressed above, bold and prominent beneath in the lower part, gradually less so distally, nerves in (5–)6–8 pairs, ± irregular, mostly rather

straight, anastomosing before the edge, a little sunk in mature leaves, not rarely rather obscure above, slightly or not raised beneath, reticulation mostly not visible; petiole stout, grooved above, ± semiterete, densely lepidote, (1–)1.2–1.8(–2.2) cm. *Umbels* exclusively terminal, (3–)4–8-flowered; flowers pendulous. Perulae ovate-triangular or ovate to spathulate, densely lepidote dorsally in their middle, otherwise glabrous or finely sericeous, densely whitish ciliate, 0.3–0.8(–1) by 0.2–0.4 (–0.6) cm. Bracteoles filiform, slightly dilated at the apex and barbate there, otherwise glabrous, up to 1.5 cm. Pedicels rather slender, ± densely pubescent to nearly short-velutinous, the hairs mostly completely covered by the scales, 6–9(–15) mm. *Calyx* ± oblique, small, 5-dentate or -lobed, densely lepidote, lobes ± obtuse, sometimes up to 1 mm. *Corolla* tubular in general, somewhat dilated towards the lobes which are ± spreading in full anthesis, waxy and glossy, bright red to scarlet-crimson or purplish, rarely salmon-red or rose-pink, sometimes yellowish at the tube, subdensely or mostly sparsely lepidote outside, at least at the sinuses of the lobes, glabrous inside, (1.5)–1.7–2.2 (–2.4, rarely up to 2.8) cm, tube ± straight or slightly curved, somewhat laterally compressed, slightly 5-saccate and 3(–4) mm ø at base, 4–5 mm at throat, lobes broadly obovate to nearly rounded, 5–7 by *c.* 4 mm. *Stamens* 10, unequal, as long as or slightly longer than the corolla tube; filaments linear, nearly filiform above, glabrous, ± papillose; anthers broad-oblong, 1.2–1.6 mm. *Disk* glabrous where not covered with scales. *Ovary* oblong-conical, densely lepidote, 4–5 by 1.5–2 mm, tapering to the style, the latter slender, equalling or mostly slightly surpassing the stamens in length, or slightly exserted from the throat of the corolla, 1–1.5(–2) cm, mostly lepidote in the lower ¼ to ⅓, rarely so to ½, or glabrous except the very base; stigma shortly club-shaped. *Capsule* subcylindric, 2.2–2.6(–2.8) by 3(–4) mm. *Seeds* very narrow, 5 mm including the tails.

Distr. S. Siam, in *Malesia*: Sumatra, Malay Peninsula, W. Java, Borneo, Celebes.

Ecol. Usually epiphytic in primary and secondary rain-forest from (550–)1000–2400 (in Celebes and Sumatra up to 3000) m, but also terrestrial on peaty soil, stony or sandy ground, quartzite cliffs, hard sandstone ridges or exposed rocks or crests, on slopes or margins of craters, where subalpine scrub vegetation dominates, in mossy heath forest on Mt Kinabalu, not rarely common locally. *Fl.* Jan.-Dec.

Vern. *Api-api, kaju si lattom hunik*, M, Tapanuli, *bungai rorung*, Iban.

Note. The flowers of *R. malayanum* are apparently constantly somewhat larger in Celebes, compared with those of the other islands, attaining the largest size given above.

2. *var.* pubens SLEUM. Reinwardtia 5 (1960) 102. — *R. malayanum*; J. J. S. in Fedde, Rep. 30 (1932) 164, *p.p.*

Corolla distinctly short-pubescent in- and outside, 3 cm. Filaments pubescent below. *Leaves* 8–12 by 2.5–5 cm. *Inflorescences* terminal.

Distr. *Malesia*: Moluccas (W. Ceram: Ora Mts), 1000 m, rare on steep limestone ridge, once found. *Fl.* May.

3. *var.* pilosifilum SLEUM. Reinwardtia 5 (1960) 102; Blumea 11 (1961) 117. — *R. malayanum*; J. J. S. in Fedde, Rep. 30 (1932) 164, *p.p.*

Pedicels finely patent-hairy. *Corolla* rose, glabrous. Filaments laxly to subdensely hairy in the lower half. *Inflorescences* terminal.

Distr. *Malesia*: Moluccas (Central Ceram and Buru), 1075–1700 m, on peat moor respectively light summit forest on limestone, and in N. Borneo on Mt Kinabalu rare among bracken, scrub and grasses at *c.* 2440 m. *Fl.* Dec., Feb., March.

4. *var.* infrapilosum SLEUM. Reinwardtia 5 (1960) 103; Blumea 12 (1963) 101.

Leaves subovate- or subelliptic-lanceolate, not rarely obtuse to subcordate at the base, 9–17 by 3–4.5 cm. Filaments laxly to subdensely hairy in the lower ⅓–½. *Inflorescences* both terminal and axillary.

Distr. *Malesia*: Borneo (Sarawak and Central Borneo at Sarawak border), 1700–1830 m. *Fl.* Oct.-Dec.

5a. *var.* axillare J. J. S. Ic. Bog. 4 (1919) 74, note, *f.* **axillare**; SLEUM. Reinwardtia 5 (1960) 103; Blumea 11 (1961) 117.

Inflorescences both terminal and axillary on the same specimen. *Leaves* oblong-lanceolate, 12–20 by 4–6 cm.

Distr. *Malesia*: Borneo; here and there, possibly together with the typical variety. Such forms with both terminal and axillary inflorescences are limited to Borneo.

5b. *var.* axillare J. J. S. ***f.* latifolium** SLEUM. Reinwardtia 5 (1960) 103.

Leaves (broadly) elliptic, apex shortly obtusely attenuate, base ± truncate-obtuse, 9–14 by (4–) 5–7.5 cm. *Inflorescences* both terminal and axillary.

Distr. *Malesia*: Borneo (Sarawak and SE. Borneo). *Fl.* Oct.

5c. *var.* axillare J. J. S. ***f.* ovatum** SLEUM. Reinwardtia 5 (1960) 103.

Leaves ovate, base rounded, 9–15 by 5–8 cm. *Inflorescences* both terminal and axillary.

Distr. *Malesia*: Borneo (Sarawak, Brunei and Central Borneo).

Ecol. In Brunei found gregarious as a terrestrial plant in extreme heath ('*kerangas*') forest at low level (*c.* 260 m), in heath forest at 550 m, and in mossy forest ('elfin woodland') at 1525 m, always on deep peat between hard sandstone boulders on sharp narrow ridges. *Fl.* April.

Vern. *Bungai rorung*, Iban, Brunei.

81. Rhododendron nortoniae MERR. Philip. J. Sc. 1 (1906) Suppl. 220; *ibid.* 3 (1908) Bot. 380;

ELM. Leafl. Philip. Bot. 3 (1911) 1107; MILLAIS, Rhodod. (1917) 218; MERR. En. Philip. 3 (1923) 244; MILLAIS, Rhodod, ser. 2 (1924) 195; COPEL. *f.* Philip. J. Sc. 40 (1929) 149, t. 2, f. 2–4; SLEUM. Reinwardtia 5 (1960) 103. — *R. catanduanense* MERR. in Copel. *f.* Philip. J. Sc. 40 (1929) 149, t. 2, f. 5–6.

Epiphytic shrub. Branches terete, brown; branchlets (as inflorescences and leaves) densely covered with dark brown scales of the type observed in *R. malayanum*. *Leaves* in pseudowhorls at the upper nodes, lanceolate to oblong-lanceolate or narrow-elliptic, acuminate to the rather slender long apex, attenuate to the acute base, coriaceous, glabrous and shining above, densely lepidote beneath, very similar to those of *R. malayanum* and *R. apoanum*, with slightly recurved margin, (5–)8–15 by 1.5–3.5 cm, midrib impressed above, prominent beneath, nerves 5–6 distant pairs, ascending, slightly impressed above and raised beneath, reticulation obscure; petiole stoutish, densely lepidote, *c.* 1 cm. *Umbels* ± 12-flowered. Perulae ovate to oblong-ovate, subacute, glabrous dorsally, ciliate, 1–1.7 cm. Bracteoles filiform. Pedicels rather slender, patent-puberulous, not lepidote (seen only in fruit--stage), 1–1.5(–2) cm. *Calyx* disk-like, *c.* 3 mm ø, obscurely and obtusely lobed, lobes short-ciliate. *Corolla* tubular, crimson or scarlet, 4–4.5 cm, glabrous outside, pubescent inside along the 5 main nerves, tube cylindric, *c.* 3.5 cm, scarcely widened distally, slightly curved, 6–7 mm ø, lobes broad-obovate to nearly rounded, 8–10 by 6–8 mm. *Stamens* 10, slightly unequal, as long as the corolla or slightly exserted; filaments filiform, densely brownish pubescent in the lower third; anthers oblong, 3.5 mm (in the Negros specimen only 2 mm). *Disk* glabrous. *Ovary* narrow-oblong, densely lepidote; style elongated, filiform, densely lepidote in the lower half only, nearly as long as the corolla; stigma turbinate. *Capsule* cylindric, slightly curved, densely rusty-lepidote, (4–)5–8 by *c.* 3 mm. *Seeds* 4–5 mm long including the filiform tails.

Distr. *Malesia*: Philippines (Mindanao: near Lake Lanao, 800 m; Catanduanes: Mt Mariguidon, 270 m; S. Negros: Cuernos Mts).

Vern. *Malágos*, Catand.

Note. There are slight differences between the 3 specimens from the above mentioned localities in size of leaves, anthers, and capsules.

82. Rhododendron acuminatum HOOK. *f.* in Hook. Ic. Pl. (1852) t. 886; WALP. Ann. 5 (1858) 446; BECC. Malesia 1 (1878) 207, *p.p.*; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 197; GIBBS, J. Linn. Soc. Bot. 42 (1914) 104; MERR. En. Born. (1921) 460; SLEUM. Reinwardtia 5 (1960) 104; Blumea 12 (1963) 101; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 13. — **Fig. 18.**

Small tree or shrub, *c.* 3, rarely up to 6 m. Branches few, robust. Branchlets short, much divaricate, upper parts subterete to obtusely angular especially towards the end of each internode; upper internodes 3–7 cm, densely dark



Fig. 18. *Rhododendron acuminatum* HOOK. *f.* Mt Kinabalu, 2600 m, N. Borneo (SLEUMER 4691) (SLEUMER, 1963).

lepidote at the ends, more silvery so below. *Leaves* 3–5(–6) close together at the upper nodes or condensed in pseudowhorls, ovate or elliptic-ovate, sometimes ovate-lanceolate, apex rather short-acuminate, ± obtuse, base mostly rounded, sometimes very broadly attenuate, stiff coriaceous, dark green and glossy above, densely scaly on both faces initially, glabrescent above (pits of the gone scales remaining visible), permanently covered beneath with scales of the type found in *R. malayanum*, edge not or slightly revolute, 6–10 (–12) by 2.5–5(–6) cm, midrib strongly impressed above, very thick and rigid beneath, continuing the petiole and gradually narrower apically, nerves 6–8 pairs, spreading, straight or slightly curved to the edge, distinctly anastomosing, ± deeply depressed above, ± strongly prominent beneath, veins laxly reticulate and ± manifestly impressed above, not or slightly raised beneath, the whole lamina thus rather coarsely ± bullate at least in the dry state; petiole subterete, grooved above, densely lepidote, (1–)1.2–2 cm by 2–3 mm. *Flowers* (7–)10–15 per umbel. Flower buds ovoid, *c.* 2.5–1.5 cm. Perulae ovate, truncate at the base, obtuse at the apex, greenish, all over covered with a very fine brownish or greyish puberulence outside, moreover lepidote outside along the mediane and/or at the apex, but glabrous at the thin margin, up to 2 by 1.3 cm. Bracteoles linear to filiform, subspathulate-dilated at the top, patent-puberulent, up to 1.5 cm. Pedicels rather stoutish, densely scaly, puberulent among the scales, 8–12 mm in flower. *Calyx* cup-shaped, shallowly 5-lobed, *c.* 2.5 mm ø, densely lepidote. *Corolla* tubular-subinfundibuliform, red, scarlet or purple to deep pinkish orange, 2.5–2.8 cm, subdensely to sparsely and caducously brownish lepidote, finally ± glabrescent outside, shortly subdensely pubescent at the lower half of the tube inside, tube 1.5–1.7(–2) cm, rather straight, cylindric, *c.* 4 mm ø at the slightly 5-pouched base, somewhat widened to the mouth, lobes subpatent,

obovate to almost rounded, (6–)8–10 by 5–8 mm. *Stamens* 10, unequal, *c.* 2 cm; filaments linear, flattened to nearly the top, rather densely whitish patent-hairy in the lower third; anthers broad-oblong, 2.5–2.8 by 1 mm, no basal appendages. *Disk* glabrous. *Ovary* cylindrical, *c.* 5 by 2 mm, densely squamular-lepidote, gradually tapering to the rather stoutish style, which is lepidote in its lower half; stigma thick, turbinate, with several lobes. *Capsule* cylindric, short-attenuate at both ends, densely lepidote, 3–3.5 cm by 4–5 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy forest and scrub forest, on ridge top, 1830–3350 m, not rare. *Fl.* Jan.–Dec.

83. Rhododendron fortunans J. J. S. Bull. Jard. Bot. Btzg III, 1 (1920) 401, t. 49; SLEUM. Reinwardtia 5 (1960) 104; Blumea 12 (1963) 101.

Shrub. Branchlets stoutish, subangular, upper parts (as inflorescences and leaves) densely squamular brown-lepidote as in *R. malayanum*; internodes 2–7 cm. *Leaves* 3–5 crowded near the end of the upper node, ± set in a pseudowhorl, sometimes subopposite, elliptic-lanceolate, apex rather long subcaudate-acuminate, subacute, base acutely attenuate into the petiole or rarely obtuse, coriaceous, dark olivaceous to brownish when dry above, dark rubiginose beneath, lepidote on both faces initially, glabrescent above with age (dark pits of the fallen scales left), completely covered with dark brown scales beneath, edge slightly revolute especially to the base, (6.5–)7–13 by 2.3–4 cm, midrib very stout beneath, gradually decreasing apically, nerves 5–10 pairs, ± patent and partly rather straight, manifestly anastomosing, very impressed above and prominent beneath, veins laxly reticulate, lamina ± markedly bullate; petiole somewhat flattened, grooved above, densely lepidote, 5–10(–12) by 2–3 mm. *Umbels* 10–13-flowered. Flower buds ovoid, large, perulae ovate to obovate-spathulate, outer ones all over pubescent, lepidote in the upper part, inner ones lepidote only, up to 2.4 by 1.2 cm. Bracteoles linear below, spathulate towards the apex, ciliolate, up to 1.6 cm. Pedicels rather stoutish, densely lepidote, 1.5–2 cm. *Calyx* suboblique, small, cup-shaped, shortly obtusely 5-lobed, lepidote. *Corolla* white, widely funnel-shaped, *c.* 1.5 cm long in all, *c.* 2 cm ø at limb, 5-lobed, tube 3–4 mm long, very densely brownish lepidote at the tube and the lower half of the lobes outside, densely pubescent at the tube inside except the spots where the filaments are inserted, glabrous at the lobes inside, lobes suborbicular, 9–12 mm ø. *Stamens* 10, *c.* 9 mm; filaments linear, glabrous at the very base, short-villous above, more laxly pubescent upwards to the top; anthers elongate, *c.* 3 mm, thecae divergent below, each bearing a basal conical obtuse lobe or appendice. *Disk* glabrous. *Ovary* conical, 2.5 by 1.7 mm, densely lepidote, gradually attenuate into a rather thick glabrous style (2.5 mm); stigma thick, turbinate. *Capsule* short-cylindric, *c.* 2.3 by *c.* 0.3 cm; fruit-pedicel *c.* 2 cm.

Distr. *Malesia*: Central Borneo (top of B. Radja in the Schwaner Mts), *c.* 2000 m, said to be common there. *Fl.* Oct., Dec.

Vern. *Daun tali, kaju tari*, Daj.

84. Rhododendron lineare MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 108; En. Born. (1921) 462; SLEUM. Reinwardtia 5 (1960) 104; Blumea 11 (1961) 117.

Epiphytic or terrestrial shrub, up to 2 m. Branchlets slender, terete, irregular; internodes 1.5–6 cm, the upper 2–4 ones densely lepidote. *Leaves* in 3–5-merous pseudowhorls, mostly present only at the end of the uppermost 2 nodes, linear to linear-lanceolate, gradually attenuate towards the obtuse apex, base very broadly attenuate, or mostly subtruncate-rounded, coriaceous, glabrous and shining above in the mature state, densely lepidote beneath (scales in general of the type which is found in *R. malayanum*, but much less distinctly of two different sizes, although larger ones are present, the majority are small spaced ones with relatively few ones partly overlapping), margin somewhat cartilagineous, wavy, mostly revolute in dry state, (2.8–)3–4(–5) cm by (3–)4–5 (very rarely up to 8) mm, midrib strongly impressed on the upper surface, sharply prominent beneath, nerves obscure; petiole rather thick, densely lepidote, *c.* 2 mm. *Umbels* 2–3 (rarely up to 4)-flowered. Flower buds elongate-ovate, subacute, outer perulae narrow ovate, inner ones obovate-oblong to subspathulate, all short-acuminnate, densely lepidote dorsally in their upper part, densely whitish ciliate towards the apex, up to 1.5 cm by 7 mm. Bracteoles narrow linear, barbate-ciliate at the top, up to 1.2 cm. Pedicels rather stoutish, covered with squamular scales which are easily detached, 8–10 mm. *Calyx* very small, oblique, disk-shaped, *c.* 2 mm ø, obscurely lobed, densely lepidote. *Corolla* infundibuliform, *i.e.* tubular below, campanulate above, bright (primrose) yellow with reddish brown external spots (scales!), *c.* 2 cm, densely lepidote at the tube, laxly so on the lower half of the lobes outside, glabrous inside, tube straight, cylindrical, 7–8 mm, *c.* 3 mm ø at the slightly saccate base, lobes spreading, oblong-obovate, apex rounded, 10–12 by 6–7 mm. *Stamens* 10, slightly unequal, nearly as long as the corolla; filaments filiform above, dilated towards the base, rather densely whitish patent-hairy in the lowest 3 mm; anthers narrow-oblong, *c.* 3 mm by 0.5 mm, thecae somewhat pointed at the base. *Disk* rather thick, glabrous. *Ovary* subcylindric, *c.* 4 by 1.5 mm, densely lepidote, gradually tapering to a rather thickish style, which is almost as long as the corolla and lepidote in its lower half; stigma rather thick-obconical, distinctly 5-lobed. *Capsule* cylindric, densely lepidote, 1–1.2 cm by *c.* 2.5 mm.

Distr. *Malesia*: Borneo (Sarawak; Brunei).

Ecol. Moss forest, epiphytic or on moss covered ground, 360–1230 m. *Fl.* June-Oct.

85. Rhododendron obscurum SLEUM. Reinwardtia 5 (1960) 104.

Shrub, *c.* 3 m. Branchlets subdensely minutely rufous lepidote; ultimate internodes *c.* 3 cm by

2 mm. *Leaves* in 3–4-merous pseudowhorls at the upper 2 or 3 nodes, oblong-obovate, apex rounded or mostly slightly retuse, base ± broadly cuneate, coriaceous, lepidote initially on both faces, at full maturity ± glabrescent above, subdensely and persistently lepidote beneath (scales minute, the thin marginal zone variously dented, the centre but little impressed, rather large and of the chestnut-brown colour typical for those of *R. malayanum*), flat, 4.5–7.5 by (2–)2.3–3 cm, midrib narrow and immersed above, as thick as the petiole beneath at the base and much prominent, gradually less so apically, nerves 7–9 pairs, suberect below, curved anastomosing towards the edge, minutely impressed above, somewhat raised or nearly invisible beneath, no reticulation; petiole a little flattened, grooved above, densely lepidote, 6–8 by *c.* 2 mm. *Umbels* ± 3 flowered. Flower bud scales ovate-acuminate, subsericeous-puberulous on both sides, white-ciliate, *c.* 7 by 4 mm. Pedicels rather slender, laxly lepidote, 1.4–1.8 cm. *Calyx* oblique, disk-shaped, very shortly or not lobed, lepidote dorsally, *c.* 2.5 mm ø. *Corolla* tubular, slightly curved, gradually widened to the mouth, pink, 2.6–3 cm long in all, laxly lepidote outside, glabrous inside, tube *c.* 2 cm, at the base 3–4, at the apex *c.* 6 mm ø, lobes obovate, suberect, 0.7–1 by 0.4–0.5 cm. *Stamens* 10, unequal, the longer ones nearly as long as the corolla; filaments linear, glabrous; anthers oblong-obovate, *c.* 1.5 by 0.7 mm. *Disk* glabrous. *Ovary* elongate-conical, densely lepidote, *c.* 4 by 1.5 mm, gradually tapering to the slender, somewhat exserted style; stigma subcapitate. *Capsule c.* 1 cm.

Distr. *Malesia*: Malay Peninsula (Pahang: top of Mt Benom), 2105 m, once found. *Fl.* May.

Note. Apparently a natural hybrid of *R. malayanum* with a species of *subsect. Pseudovireya* (13. *R. perakense*, 16. *R. scortechinii*, or 10. *R. spathulatum*).

86. Rhododendron variolosum BECC. Malesia 1 (1878) 206; MERR. En.Born. (1921) 463; Sarawak Mus. J. 3 (1928) 543; SLEUM. Reinwardtia 5 (1960) 105; Blumea 12 (1963) 101.

var. **variolosum.**

Terrestrial or epiphytic shrub, 0.5–0.8 m, or treelet up to 1.6 m; branchlets subterete, rather stout; internodes 2–12 cm, upper ones densely squamular-lepidote, lower ones glabrous, minutely tubercled. *Leaves* scattered, rather close together in the upper part of the upper nodes, lanceolate to elliptic-lanceolate, rarely elliptic, gradually attenuate towards the apex and base, apex subacute, the very base mostly obtuse before running into the petiole, coriaceous, glabrous and shining above in mature state, some scattered scales excepted (fallen scales leaving no distinct pits), densely covered beneath with scales (these in general of the type found in *R. malayanum*, but the larger ones sparse and less different in size than in *R. malayanum*, rather small and largely spaced initially, but some touching or overlapping, all distinctly impressed), narrowly revolute, (7–)8–12(–16) by (2–)2.5–4 (–5.5) cm, midrib deeply depressed above, strongly raised beneath, nerves 10(–12) pairs, rather straight, curved-anastomosing before the edge, all slightly impressed above, prominent beneath as are the reticulate veins; petiole flattened, grooved above, densely lepidote, (1–)1.5–2.5 cm by 2–3 mm. *Umbels* terminal and axillary (the latter apparently not well developed), 5–8(–12)-flowered. Flower buds oblong-ellipsoid, acuminate, perulae ovate-oblong to subspathulate, outer ones acutely acuminate, lepidote upwards dorsally, up to 1.5 by 0.7 cm. Bracteoles filiform, glabrous, up to 1 cm. Pedicels nodding, slender, densely lepidote, 1–1.5 (–2) cm. *Calyx* disk-shaped, rather oblique, wavy, obscurely lobed, densely lepidote, *c.* 3 mm ø. *Corolla* pink, or scarlet with yellow tube, infundibuliform, 2.5–2.8(–3) cm, very laxly lepidote or glabrous outside, entirely glabrous inside, tube cylindric, ± straight, saccate at the base, 1.2–1.5 cm, 3–4 mm ø at the base, 6 mm at throat, lobes obovate-spathulate, rounded-obtuse, spreading, 1.1–1.3(–1.5) by 0.6–0.8 cm. *Stamens* 10, unequal, 1.7–2 cm; filaments linear, glabrous; anthers almost rectangular, *c.* 2 by 0.7 mm. *Disk* glabrous. *Ovary* elongate-conical, densely lepidote, *c.* 5 by 1.5 mm, deeply 5-ribbed, gradually tapering to a rather thick style as long as the stamens and lepidote in its lower ⅔, glabrous elsewhere; stigma short-turbinate or subcapitate, shortly 5-lobed.

Distr. *Malesia*: Borneo (Sarawak: Mt Pueh, *c.* 1500 m; N. Borneo: on crest of Mt Trus Madi, *c.* 2600 m).

var. **andersonii** (RIDL.) SLEUM. Reinwardtia 5 (1960) 105; Blumea 11 (1961) 117; *ibid.* 12 (1963) 101. — *R. andersonii* RIDL. Kew Bull. (1914) 207; MERR. En. Born. (1921) 460.

Filaments rather densely patent-hairy in the lower third. *Corolla* sometimes pubescent inside at the tube, of a pink to deep red colour, often with yellow corolla tube or base.

Distr. *Malesia*: Borneo (Sarawak, Central Borneo, and Mt Kinabalu in North Borneo).

Ecol. In open exposed crest of spur, among bracken, scrub and grasses, rare on Mt Kinabalu, where it grows from 2345 to 2440 m, and almost certainly a natural hybrid of *R. malayanum* with a yellow-flowered species of *ser. Javanica.*

Vern. *Bunga klangin*, Iban.

87. Rhododendron wilhelminae HOCHR. Candollea 2 (1925) 493; SLEUM. Reinwardtia 5 (1960) 106.

Shrub, *c.* 2 m. Branchlets somewhat flattened at the ends, lepidote; internodes 5–8 cm. *Leaves* in 4–5-merous pseudowhorls at the upper 1 or 2 nodes (one leaf mostly inserted a little below the node), broadly lanceolate, apex subacutely acuminate, base cuneate, coriaceous, lepidote on both faces initially, ± glabrescent and shining with age, persistently lepidote beneath (scales rather flaky, dense but spaced 1–3 times their own diameter, light brown marginal zone rather narrow, irregularly dented or lobed, centre relatively large, dark chestnut-brown as in *R. mala-*

yanum), edge slightly recurved especially towards the base of the lamina, 8–10 by 2.6–3.7 cm, midrib slightly impressed above, much prominent beneath, nerves 8–9(–10) pairs, slightly raised beneath only, reticulation obsolete; petiole ± flattened, lepidote, 8–15 by *c.* 2 mm. *Umbels* ± 4-flowered. Flower buds elongate-ovoid, *c.* 1.7 by 0.5 cm. Perulae oblong-ovate, subobtuse, glabrous in- and externally, white-ciliate towards the apex, up to 1.5 by 0.7 cm. Bracteoles linear. Pedicels rather stoutish, ± densely lepidote and finely patent-pubescent, 1.2–1.6 cm. *Calyx* oblique, very shortly subacutely lobed, or occasionally one lobe elongated up to 2 mm. *Corolla* tubular-funnelform, *c.* 3.5 cm long in all, *c.* 2.5 cm ø at the limb, carmine, practically glabrous outside, tube *c.* 1.8 cm, base somewhat pouched and 4–5 mm ø, widened to *c.* 6 mm at throat, lobes obovate-spathulate, *c.* 1.5 by 1 cm. *Stamens* 10, very unequal, the longest *c.* 2.6 cm; filaments linear below, somewhat broadened above the base, ± densely patently hairy in the lower third, narrower and glabrous towards the top; anthers elongate-obovate, *c.* 2.5 by 0.5 mm, containing pollen. *Disk* hairy on the upper margin, glabrous below. *Ovary* subcylindric, densely lepidote and laxly finely patent-pubescent, *c.* 4 by 1.5 mm; style continuous, subdensely patent-pubescent for *c.* 2 mm at the base, glabrous for the rest, *c.* 2.2 cm; stigma distinctly 5-lobed.

Distr. *Malesia*: W. Java (Mt Salak), *c.* 1350 m, once found in shrubbery near the crater, very rare. *Fl.* Oct.

Note. The characters of *R. wilhelminae* show a combination of those of 225. *R. javanicum var. teysmannii* and *R. malayanum*, which both are found on Mt Salak, and suggest a natural hybrid of these species.

A garden-hybrid "Monarch" (of the formula *jasminiflorum* > *javanicum* × *longiflorum* × *broo-keanum*) has been crossed with *R. malayanum*; the flower of this hybrid, figured by HENSLOW, J. R. Hort. Soc. 13 (1891) 276, f. 44 n, reminds much of that of *R. wilhelminae*.

88. **Rhododendron hybridogenum** SLEUM. Reinwardtia 5 (1960) 106.

Shrub. Branchlets rather slender, densely lepidote; internodes 4–7.5 cm by *c.* 2 mm. *Leaves* in 4-merous pseudowhorls at the upper 2 nodes, subovate-elliptic, apex shorter or longer subacutely acuminate, base rounded or mostly slightly cordate, coriaceous, rather densely set with small scales or their relics above at maturity, very densely and persistently lepidote beneath (scales rather small, often contiguous, narrow marginal zone dented or lobed to various degree, centre slightly impressed, relatively large and of the chestnut or russet-brown colour found in *R. malayanum*), slightly revolute towards the base, 4.5–6 by (2–)2.5–2.9 cm, midrib much dilated at the base only, further up abruptly narrowed and slightly impressed above, as thick as the petiole at the base, gradually narrower and less prominent distally beneath, nerves (6–)8–10 pairs, slightly curved, inarching near the edge, faintly depressed above, slightly raised beneath, no reticulation; petiole densely lepidote, somewhat flattened, 4–6 by *c.* 2 mm. *Umbels* ± 8-flowered. Perulae ovate-acuminate, apiculate, subsericeous dorsally, lepidote towards the top, obscurely ciliolate, up to 8 by 6 mm. Bracteoles linear, subglabrous, 5 mm. Pedicels subdensely lepidote, more laxly short-patent-pubescent, 1–2 cm by 0.5 mm at anthesis. *Calyx* obliquely disk-shaped, indistinctly lobed, *c.* 3 mm ø. *Corolla* tubular, said to be yellowish, *c.* 3 cm long in all, outside laxly lepidote and especially in the lower half laxly patent-pubescent, inside finely hairy, tube but a little widened upwards, *c.* 2 by 0.3 cm, lobes obovate-spathulate, ± expanded, *c.* 1 by 0.5–0.6 cm. *Stamens* 10, unequal, *c.* 2.5 cm; filaments linear, densely hairy below, less so towards the middle, narrower and glabrous above; anthers obovate-oblong, *c.* 1.5 by 0.7 mm. *Disk* somewhat prominent, hairy at the upper margin, glabrous otherwise. *Ovary* elongate-ovoid, continuous with the style, very densely lepidote, with a hair here and there between the scales, *c.* 5 by 2 mm; style slender, *c.* 2.8 cm, subdensely lepidote and laxly patent-pubescent to the lower ⅔, glabrous for the rest; stigma subcapitate, distinctly 5-lobed.

Distr. *Malesia*: Malay Peninsula (Pahang: Cameron Highlands). Once found. *Fl.* Oct.

Note. *R. hybridogenum* most certainly is a natural hybrid of *R. malayanum* and 136. *R. jasminiflorum var. punctatum*, and exactly intermediate between these species, which (both terrestrial) are not rare in the Cameron Highlands.

5. *Subsection Albovireya*

SLEUM. Reinwardtia 5 (1960) 107. — *Rhododendron sect. Zygomorphante* SCHLTR, Bot. Jahrb. 55 (1918) 145. *p.p.* — **Fig. 20—21.**

Scales very dense, in general rather large, touching or slightly overlapping each other, forming a coherent layer on the undersurface of (sub)mature leaves, which is persistent for a rather long time. *Corolla* of various shape.

Distr. *Malesia*: Sumatra, Java, Celebes, Philippines (Luzon), New Guinea. Fig. 19.

Note. It is not clear whether the *Albovireya* group is a natural entity, and deserves as such the rank of a subsection, or that it should be merged as a series into *subsect. Euvireya*. Presumable hybrids of *R. malayanum* with species of *subsect. Euvireya* show a similar dark red to copper coloured layer of very dense, partly overlapping scales on the undersurface of the leaves. Possibly such apparently rare species

as *R. lampongum* and *R. cernuum* are of hybrid origin, less probably *R. album* and *R. aequabile*. As the area of *R. malayanum* does not extend farther than Ceram and Buru in the East, the New Guinean species of *subsect. Albovireya* cannot be hybrids; they form a rather coherent group with those of Celebes within the subsection.

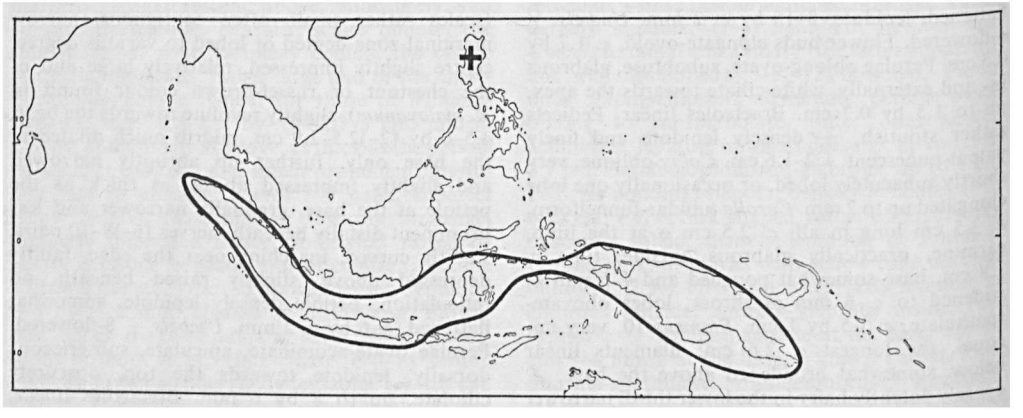

Fig. 19. Distribution of *Rhododendron subsect. Albovireya.*

KEY TO THE SPECIES

1. Ovary densely exclusively lepidote.
 2. Corolla ± campanulate. (Leaves 4.5–12.5 by 1.3-5 cm; petiole 0.9–3.5 cm).
  3. Leaves lanceolate to narrow-elliptic; nerves and veins distinctly raised above. Filaments rather longish and patently hairy in the lower third . . . . . **89. R. album**
  3. Leaves elliptic; nerves and veins slightly impressed above. Filaments glabrous . . **90. R. aequabile**
 2. Corolla ± tubular.
  4. Petiole 1.5–2 cm . . . . . **91. R. proliferum**
  4. Petiole 0–6 (rarely up to 8) mm.
   5. Leaves subcoriaceous to coriaceous (nerves mostly visible on both faces or at least on the upper- or undersurface). Style ± as long as or shorter than the ovary.
    6. Leaves ± long cuneate-attenuate to a distinct petiole. . . . . **92. R. zollingeri**
    6. Leaves broadly attenuate or mostly subtruncate or obtuse, sometimes rounded at the base, petiole (very) short to 0.
     7. Corolla (1.3–)1.5–1.6 cm, but slightly oblique, lobes equal. Ovary obovoid-obconical. Capsule *c.* 6 mm ø. . . . . **93. R. lagunculicarpum**
     7. Corolla 1–1.2 (rarely up to 1.3) cm, more distinctly oblique, lobes unequal. Ovary ovoid-conical. Capsule 4–5 mm ø.
      8. Perulae lepidote and shortly subsericeous-pubescent dorsally, manifestly ciliate. **94. R. yelliotii**
      8. Perulae caducously lepidote along the dorsal median, or quite glabrous and ± lustrous, fimbriate, no proper hairs present at all. More densely lepidote forms of 183. *R. inconspicuum* (*subsect. Euvireya ser. Buxifolia*).
   5. Leaves ± rigidly coriaceous (nerves ± obscure). Style longer than the ovary.
    9. Leaves elliptic or mostly subovate- or oblong-, rarely ovate-elliptic, (1.5)–1.8–2.7(–3.7) by (0.6–)0.8–1.4(–1.6) cm, base ± subtruncate-rounded; petiole distinct, subterete. (2–)3–6(–8) by 1.5–2 mm . . . . . **95. R. correoides**
    9. Leaves oblong to narrowly obovate-oblong, 1.8–2.4 (rarely up to 3) by (0.4–)0.6–0.8(–1) cm, base cuneate into the very short, much flattened petiole (up to 2 by 1–1.5 mm), or almost sessile. **96. R. comptum *var.* comptum**

1. Ovary lepidote *and* ± densely and patently hairy.
 10. Corolla campanulate or funnelform-campanulate, yellow, lobes ± as long as the tube.
  11. Leaves ovate-lanceolate to oblong-elliptic, 2–4(–4.5) cm wide. Corolla funnelform-campanulate, 1.8–2 cm. . . . . **97. R. lampongum**
  11. Leaves lanceolate, 1–1.5 (rarely up to 1.7) cm wide. Corolla broad-campanulate, 1–1.2 cm. **98. R. cernuum**
 10. Corolla tubular or funnelform-tubular, pink to scarlet, lobes (mostly much) shorter than the tube.
  12. Leaves coriaceous with well visible, either prominent or impressed lateral nerves.
   13. Leaves (4.5–)6–9 by (3–)3.5–5(–5.5) cm. Corolla 3.3–3.8 cm long in all . . **99. R. pudorinum**

13. Leaves 1.5–4 by 1–2.6 cm.
14. Corolla 2.3–2.5(–2.6) cm long in all, laxly to subdensely lepidote outside . . **100. R. arenicolum**
14. Corolla (2.8–)3–3.2 cm long in all, glabrous outside. . . . . **101. R. giulianettii**
12. Leaves thicker and more rigid, the nerves faint or not visible.
15. Leaves oblong to obovate-oblong. . . . . **97. R. comptum *var.* trichodes**
15. Leaves elliptic or more rarely oblong or subovate-elliptic . . . . . **102. R. versteegii**

89. Rhododendron album BL. Cat. Hort. Btzg (1823) 72; DC. Prod. 7 (1839) 721; PLANCH. Fl. Serres 5 (1849) 477–480 h; HOOK. Bot. Mag. (1857) t. 4972; PLANCH. Belg. Hort. 8 (1858) 70, f. 20; MIQ. Fl. Ind. Bat. 2 (1859) 1058; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 43; BL. Fl. Jav. Pl. inéd. (1863–83) t. 3; KOORD. Exk. Fl. Java 3 (1912) 4; J. J. S. in K. & V. Bijdr. 13 (1914) 101; KOORD. Fl. Tjib. 3 (1918) 3; STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 387; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 4; SLEUM. Reinwardtia 5 (1960) 108; STEEN. Endeavour 21 (1962) 189, t. 7, *non* HOFFMANNSEGG, 1824, *nec* BUCH.-HAM. *ex* D. DON, 1825. — *Vireya alba* (BL.) BL. Bijdr. (1826) 855; G. DON, Gen. Syst. 3 (1834) 848.

Epiphytic shrub, up to 1 m. Branchlets stoutish, densely covered with brown-golden scales at the upper 3–4 internodes, the latter 4–8 (rarely up to 13) cm long, ultimate ones subangular and striate lengthwise in dry specimens, lower ones terete. *Leaves* in 4–5-merous pseudowhorls at the upper 3–4 nodes, lanceolate to narrow-elliptic, acuminate and subacute at the apex and base, coriaceous, rather stiff, sparsely lepidote initially, becoming entirely glabrous in mature state and slightly shining above, dull brown beneath and densely rufous- or rubiginose-lepidote (scales rather small, flat, very dense, touching or slightly overlapping each other, forming a ± continuous layer for a rather long time, the marginal zone wide in relation to the small darker centre, ± deeply and irregularly crenate to moderately incised, finally caducous, the centre depressed, remaining pits small, rather close to each other), entire, the edge markedly revolute in dry specimens, 5–12.5 by 1.3–3(–3.5) cm, midrib manifestly impressed the entire length above, robust and prominent beneath, nerves 7–10 pairs, irregular, ± spreading, rather straight below, anastomosing towards the edge, slightly though manifestly raised above, obscure beneath; petiole stout, grooved above, very densely lepidote, 1.2–3(–3.5) cm. *Umbels* 7–12-flowered. Flower buds subglobose, abruptly contracted into a long beak (5 mm). Perulae ovate-triangular, apex subulate-acuminate, lepidote dorsally, up to 1.4 by 0.5 cm. Bracteoles linear, lepidote, up to 1 cm. Pedicels rather slender, 1–2(–2.3) cm, densely lepidote. *Calyx* disk-shaped, lepidote dorsally, lobes broadly ovate, obtuse, appressed to the corolla, 1–1.5 mm. *Corolla* campanulate, cream or pale yellow, rarely yellowish pinkish, 1.2–1.5 cm (*c.* 2 cm when fresh) in all, 3–4 mm ø at base, *c.* 1.5 cm at limb, laxly golden-lepidote outside, glabrous inside except for the lowest 2 mm which are laxly pubescent, lobes transverse-oval to suborbicular, 7–8 by 9–10 mm. *Stamens* 10, *c.* 1.1 cm; filaments linear, patent-hairy in the lower third, glabrous above; anthers broad-oblong, *c.* 1.8 mm. *Disk* glabrous. *Ovary* conical, exclusively and densely lepidote, *c.* 3 by 1.5 mm, tapering to the style, the latter rather thick, 6–7 mm, lepidote in the lower half, glabrous for the rest; stigma thick, annular, deeply 5-lobed. *Capsule* fusiform, 2 cm by 4 mm, densely lepidote, on fruit-pedicel 2–2.3 cm. *Seeds* 5–6 mm including the tails.

Distr. *Malesia*: W. Java (Mts Salak, Gedeh, and vicinity), reported from Central Java (Kedu: Dieng, leg. JUNGHUHN), but not recollected there.

Ecol. Mountain forest, 1200–1700 m, not rare locally. *Fl.* Sept.-Jan.

Vern. *Tjantigi koneng*, J.

90. Rhododendron aequabile J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 451; SLEUM. Reinwardtia 5 (1960) 109. — *R. album* (*non* BL.) RIDL. J. Fed. Mal. St. Mus. 8 (1917) 58.

Much branched tree or large shrub, 1.5–4 m. Branchlets stout, terete, densely dark rufous-lepidote at the upper 2 longitudinally striate internodes; internodes 3.5–16 cm. *Leaves* in 6–9-merous pseudowhorls at the ultimate 2 or 3 nodes, elliptic, apex shortly acuminate or apiculate, subacute to rather obtuse, base ± long-attenuate into the petiole, stiff-coriaceous, glabrous at maturity above, very densely dark rufous-lepidote all over the undersurface (scales very similar to those of *R. album*), entire, the edge ± revolute in dry specimens, 4.5–10(–11) by (1.7–)2.5–5 cm, midrib depressed over its entire length, strongly convex-prominent beneath, nerves 6–10 pairs, irregularly spreading, rather straight below, anastomosing towards the edge, slightly but distinctly depressed above, a little or not raised beneath, veins rather indistinct, faintly impressed above; petiole grooved on both sides, densely lepidote, 0.9–2.8 cm by 1.8–3 mm. *Umbels* 6–12-flowered. Outer perulae ovate-acuminate, abruptly subulate in the upper half, ± lepidote outside especially at the acumen, up to 2.2 cm by 1 cm, inner ones linear-spathulate, apex erose, glabrous, up to 1.5 cm by 3 mm. Bracteoles filiform, up to 1 cm. Pedicels thickened at apex, curved, densely lepidote, epilose, 1–1.5 cm by 1 mm. *Calyx* rather small, oblique, disk-shaped, angular, 3–4 mm ø, margin indistinctly lobed, wavy, densely lepidote dorsally. *Corolla* tubular below, widened distally, *i.e.* campanulate in outline, brick red to carmine, laxly to subdensely lepidote at the tube and the lower part of the lobes outside, glabrous inside, 1.7–2(–2.5) cm long in all, tube 1–1.2 cm, 4–5 mm ø at base,

8–10(–15) mm at throat; lobes obovate-orbicular, slightly retuse, repand or wavy at the apex, 6–9(–11) by 5–9(–11) mm. *Stamens* 10; filaments linear, glabrous, 1–1.3 cm; anthers broad-oblong, 2–2.2 by 1 mm. *Disk* glabrous. *Ovary* conical-ovoid, densely lepidote, epilose, *c.* 4 by 3.5 mm, abruptly attenuate to the style, the latter rather thick, glabrous, 8–10 mm; stigma very thick, broad-conical or subcapitate, 2 mm ø, 5-lobulate. *Capsule* elongate-ellipsoid, (1.4–)1.6–2(–2.2) cm by 6–7 mm, slightly 5-ribbed, densely lepidote, on fruit-pedicel 1–1.7 cm by 1–1.5 mm. *Seeds* 4 mm including the tails.

Distr. *Malesia*: Sumatra (Westcoast to Benkulen: Mts Singgalang, Kerintji, and Pesagi).

Ecol. Dense (subalpine) forest, also in *Vaccinium* forest, (1220–)2300–2870 m. *Fl.* Jan.-June, *fr.* May-June.

91. Rhododendron proliferum SLEUM. Blumea 12 (1963) 101.

Erect, terrestrial, few-branched shrub, 1.5–2 m. Branchlets purplish, obtusangular, tips very densely and rather persistently lepidote; innovations not rarely with numerous basal, long-persistent thin perulae, as are found in the flower buds, due to a median foliar prolification of the inflorescence; internodes (3–)6–10 cm by 4–6 mm. *Leaves* in (8–)10–12-merous pseudowhorls at the upper 2 or 3 nodes, erect, a little spreading (uppermost whorl ± concealing the inflorescence or infructescence), subspathulate-obovate or obovate-oblong, apex broadly attenuate to almost rounded, base cuneate to and somewhat decurrent along the petiole, young ones covered by scales on both faces, mature ones coriaceous, firm, glabrous above, very densely and subpersistently lepidote beneath (scales subequal, partly covering each other, brown to reddish brown and shining, marginal zone thin, rather wide, irregularly substellate-angular, -lobed or -dented, centre small, impressed, leaving dark pits when the scale is gone), entire, slightly convex in dry specimens, (6–)7–10.5 by (2–)2.5–4.5(–5) cm, midrib rather narrowly impressed above, as thick as the petiole and obtusely prominent beneath, nerves 7–9 pairs, lower ones in an acute, upper ones in a wide angle from the midrib, obscurely inarching before the edge, faintly immersed above, a little prominent or obscure beneath, no reticulation; petiole dorsally compressed and grooved, very densely lepidote, 1.5–2 cm by *c.* 3 mm. *Umbels* (4–)6–10-flowered (to conclude from the young infructescences known); perulae numerous, thin, purplish, persistent for a long time, outer ones elongate-deltoid to ovate-acuminate and lepidote dorsally, inner ones elongate-oblong to -spathulate, up to 4 by 2 cm. Pedicels densely lepidote, 2.5–3.2 cm by *c.* 1 mm in fruit. *Calyx* but slightly oblique, patellar, shortly 5-lobed, *c.* 5 mm across. *Corolla* (only known in withered state on the young fruit) tubular below, expanded at the lobes, apparently slightly zygomorphous and red when fresh, *c.* 3 cm long in all, lepidote at the base of the tube outside, otherwise glabrous, tube *c.* 2 cm by 4–5 mm, lobes obovate, *c.* 5 mm ø. *Stamens* 10; filaments linear (1 mm) below, narrower upwards, glabrous, *c.* 2.7 cm; anthers subobovate-elliptic, base obtuse, *c.* 3.5 by 1.5 mm. *Disk* prominent, glabrous. *Ovary* in a developed state (or young fruit) very densely set with rubiginous stellate scales, tapering to the style, which is lepidote at the base, glabrous for the rest, 2–2.5 cm; stigma subpeltate, 2–2.5 mm ø. *Fruit* thick-fusiform, with 5 thick ribs, densely lepidote, finally 2–2.5 cm by 6–8 mm.

Distr. *Malesia*: W. New Guinea (Arfak Mts: on Mt Gwamongga, Anggi Giqi Lake), once collected.

Ecol. Dense submossy forest, on steep slope below summit, 2550 m, apparently rare. *Fr.* Jan.

92. Rhododendron zollingeri J. J. S. Ic. Bog. 4 (1910) 73, t. 322; KOORD. Exk. Fl. Java 3 (1912) 6; BACK. Bull. Jard. Bot. Btzg II, 12 (1913) 28 ('*zollingerianum*'); J. J. S. in K. & V. Bijdr. 13 (1914) 108; MILLAIS, Rhodod. (1917) 265; J. J. S. Bull. Jard. Bot. Btzg III, 4 (1922) 240, *incl. var. latifolium* J. J. S.; HOCHR. Candollea 2 (1925) 492; MALM in Fedde, Rep. 34 (1934) 284; J. J. S. Bot. Jahrb. 68 (1937) 200; H. J. LAM, Blumea 5 (1945) 577; AMSH. in Back. Bekn. Fl. Java (em. ed) 7 (1948) fam. 162, p. 3; SLEUM. Reinwardtia 5 (1960) 109; STEEN. Endeavour 21 (1962) 189, t. 5. — *R. tubiflorum* (*non* BL.) MOR. Syst. Verz. (1846) 42. — *R. album* (*non* BL.) ZOLL. Syst. Verz. 2 (1854) 137. — *R. malayanum* (*non* JACK) KOORD. Junghuhn Gedenkb. (1910) 185. — Fig. 20.

Much-branched, erect treelet or shrub, (0.2–)1–4 m. Branchlets rather slender, terete, rather densely reddish lepidote at the upper 1–2, glabrescent at the lower internodes, the latter (1.5–)2.5–6(–8, rarely up to 10) cm, finally greyish corticate. *Leaves* in (4–)5–6-merous pseudowhorls or at least close together at the upper 2–3 nodes, not rarely an odd leaf much lower inserted than the others, lanceolate to obovate- or elliptic-lanceolate, apex shortly acuminate, subacute or sometimes rather obtuse, not rarely minutely glandular-apiculate, base ± narrowly attenuate into the petiole, ± coriaceous, initially lepidote on both faces, glabrescent or glabrous above at maturity (scales leaving small pits), densely lepidote beneath (scales rather small, dense to very dense, similar to those of *R. album*, but paler and a little smaller, marginal zone finally disappearing, remaining pits minute and dense), somewhat revolute at the edge, (3–)3.5–5.5(–7) by (1–)1.2–1.6(–2.2, very rarely up to 3) cm, midrib impressed above, prominent beneath, reddish there in fresh specimens, nerves 5–6(–7) pairs, lower ones steeply ascending, upper ones more spreading, curved, indistinctly anastomosing, faintly impressed above, minutely but mostly well visibly raised beneath, veins obscure on both sides; petiole semiterete, grooved above, lepidote, 2.5–5 by 1–1.5 mm. *Inflorescence* terminal (if also axillary ones are present, these reduced). *Umbels* (3–)5–6(–8)-flowered. Perulae ovate to obovate, obtuse, thin, lepidote dorsally towards the apex,

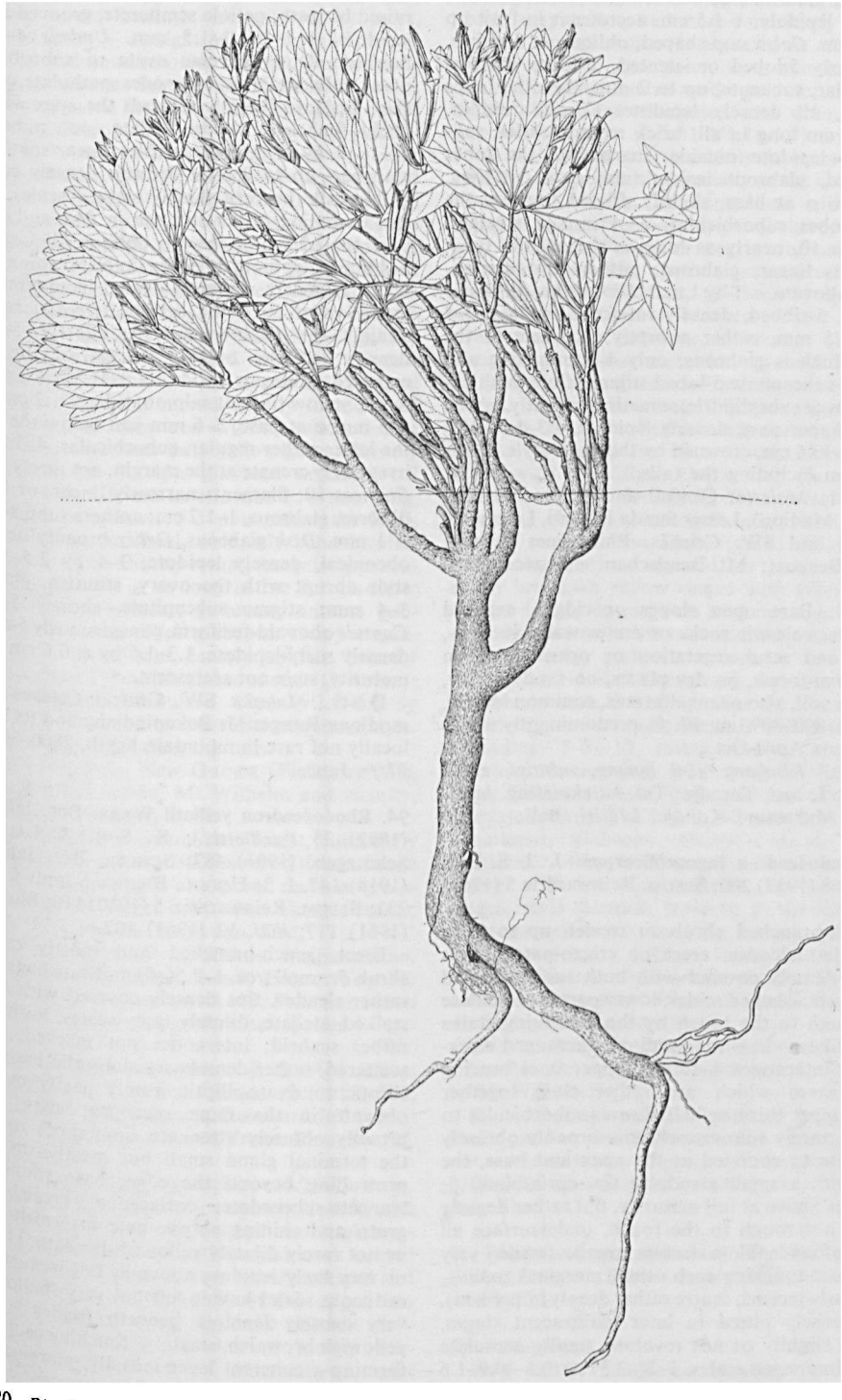

Fig. 20. *Rhododendron zollingeri* J. J. S., × ½. In debris of solfatara up to the indicated line, Jang plateau, Welirang summit, 2950 m, E. Java (VAN STEENIS 10968).

glabrous otherwise, up to 8 by 4 mm. Bracteoles filiform, glabrous, up to 6 mm. Pedicels slender, densely lepidote, 1–1.5 cm, accrescent in fruit up to 2.2 cm. *Calyx* cup-shaped, oblique, *c.* 3 mm ø, irregularly 5-lobed or -dented, 2 lobes narrow-triangular, subacute, up to 2 mm, the other ones smaller, all densely lepidote. *Corolla* tubular, 1.4–1.5 cm long in all, brick red to scarlet, subdensely lepidote outside, margin of the lobes excluded, glabrous inside, tube *c.* 1 cm long, 3–4 mm ø at base, slightly dilated towards the limb, lobes suborbicular, *c.* 4 mm ø, straight. *Stamens* 10, nearly as long as the corolla tube; filaments linear, glabrous; anthers broadly obtusely obovate, *c.* 1 by 1 mm. *Disk* glabrous. *Ovary* conical, 5-ribbed, densely rufescent-lepidote, 3–4 by 2–2.5 mm, rather abruptly attenuate to the style which is glabrous, only 4–5 mm long and bears a subcapitate 5-lobed stigma. *Capsule* thick-fusiform or subcylindric, sometimes slightly curved in the upper part, densely lepidote, 1.3–1.5(–1.8) by (0.5–)0.6 cm, crowned by the short style. *Seeds* *c.* 3 mm including the tails.

Distr. *Malesia*: Central and E. Java (Kedu, Besuki, Madiun), Lesser Sunda Is (Bali, Lombok), Central and SW. Celebes, Philippines (Luzon, Prov. Benguet: Mt Bandschan, not recollected there).

Ecol. Bare open slopes or ridges, exposed summits, volcanic rocks or crater walls, in fern-, grass- and scrub-vegetation or open forest, in *Casuarina* forest, on dry places, on sandy, stony, or ashy soil, also near solfataras, common locally, (1200–)1800–3090 m. *Fl. fr.* predominantly in the dry season April-Oct.

Vern. *Kĕmbang gĕni lanang, mĕntigi, rang-kapĕlĕt*, J, *tasi*, Toradja: Tai, *kajukalèlèng, lassa-lassa*, Makassar: Kondje, *kĕnjĕri*, Bali.

93. Rhododendron lagunculicarpum J. J. S. Bot. Jahrb. 68 (1937) 200; SLEUM. Reinwardtia 5 (1960) 110.

Much-branched shrub or treelet, up to 2 m. Branchlets slender, erect or erecto-patent, tips rather densely covered with both subsessile and stalked star-shaped scales, lower parts verruculose and rough to the touch by the remaining stalks or rib-like and ± longitudinally arranged emergences; internodes 4–11 cm, upper ones bearing 7–12 leaves which are rather close together in the upper third or half. *Leaves* suborbicular to elliptic, rarely subovate-elliptic, broadly obtusely attenuate to rounded at the apex and base, the apex with a small glandular tip, coriaceous, ± glabrous above at full maturity, but rather densely pitted, not rough to the touch, undersurface all over rufous-lepidote (scales small, sessile, very dense and touching each other, marginal zone ± irregularly incised, centre rather deeply impressed), very densely pitted in later glabrescent stages, margin slightly or not revolute, finally crenulate by the impressed scales, 1–2(–2.5) by (0.6–)0.9–1.6 cm, midrib slightly sunken above, somewhat raised beneath, not rarely becoming indistinct distally, nerves 4(–6) pairs, irregularly spreading and curved-ascending, anastomosing, slightly depressed above as are some of the veins, faintly raised beneath; petiole semiterete, grooved above, lepidote, 1–2 by 1–1.5 mm. *Umbels* 4–5(–8)-flowered. Outer perulae ovate to suborbicular-ovate, subacuminate, inner ones spathulate, obtuse, thin, lepidote dorsally towards the apex which is finely fimbriate or denticulate, not pubescent, up to 8 by 5 mm. Bracteoles linear-spathulate, glabrous, up to 8 mm. Pedicels densely covered with sessile or very shortly stalked scales, 1–1.3 cm, becoming rather stoutish in fruit and accrescent to 2.2 cm. *Calyx* ± oblique, disk-shaped, 3–4 mm ø, lepidote dorsally, limb spreading, wavy and irregularly minutely dented (sometimes one teeth longer than the others). *Corolla* tubular, straight or slightly curved, shortly 5-lobed, densely lepidote outside margin of the lobes excepted, glabrous inside, (1.3–)1.5–1.6 cm long in all, yellow to light salmon, tube 1–1.2 cm long, 4–5 mm ø at base, 5–6 mm just below the lobes, the latter rather regular, suborbicular, 4–5 mm ø, irregularly crenate at the margin, not rarely retuse. *Stamens* 10; filaments narrowly linear, or almost filiform, glabrous, 1–1.2 cm; anthers suborbicular, *c.* 1 mm. *Disk* glabrous. *Ovary* broadly obovoid-obconical, densely lepidote, 3–4 by 2.5–3 mm; style abrupt with the ovary, stoutish, glabrous, 3–4 mm; stigma subcapitate, shortly 5-lobed. *Capsule* obovoid-fusiform, conspicuously 5-ribbed, densely rusty-lepidote, 1.3–1.5 by *c.* 0.6 cm at full maturity, style not accrescent.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range: Mt Pokapindjang and its spurs), locally not rare in mountain heath, 2800–3000 m. *Fl. fr.* June.

94. Rhododendron yelliotii WARB. Bot. Jahrb. 16 (1892) 25 (*'yelliottii'*); K. SCH. & LAUT. Fl. Schutzgeb. (1901) 487; SCHLTR, Bot. Jahrb. 55 (1918) 147, f. 3; HOOGL. Blumea Suppl. 4 (1958) 233; SLEUM. Reinwardtia 5 (1960) 110; Blumea 11 (1961) 117; *ibid.* 12 (1963) 102.

Erect, much-branched and mostly compact shrub or small tree, 1–2.5(–5) m. Branchlets terete, rather slender, tips densely covered with shortly stalked, stellate, dilutely rusty scales, lower parts rather scabrid; internodes not marked. *Leaves* scattered, rather densely set along the branchlets, elliptic to ovate-elliptic, rarely partly ovate or obovate in the same specimen, apex mostly broadly obtusely attenuate, sometimes rounded, the terminal gland small but mostly somewhat protruding beyond the edge, base rounded or truncate-subcordate, coriaceous, greyish dark green and shining above, pale brownish silvery or not rarely dilutely yellowish beneath, glabrous or very laxly lepidote above at full maturity, the caducous scales having left but very shallow pits, very densely lepidote beneath (scales ± light yellowish brownish, small, ± touching each other, forming a coherent layer initially, marginal zone lobed or incised to various degree, centre small, rather deeply depressed), distinctly minutely crenate at the margin by impressed scales, mostly

somewhat revolute, 1.1–2.5(–3) by 0.6–1.5(–2) cm, midrib slightly impressed above, manifestly obtusely raised beneath, nerves 4–6(–8) pairs, rather regular, ± straight below, curved towards the edge and anastomosing distally, very slightly impressed above, faintly raised beneath, veins obscure; petiole a little flattened, minutely grooved above, lepidote, 1–2(–3) by *c.* 1 mm. *Umbels* 3–5-flowered. Outer perulae ovate, subacute, inner ones spathulate, obtuse, all lepidote dorsally and shortly subsericeous-pubescent, finely though well visibly ciliate, up to 8 by 5 mm. Bracteoles linear-subspathulate, glabrous or barbate apically up to 8 mm. Pedicel slender, 0.8–1.3 cm in anthesis, to 1.8 cm in fruit, densely covered with subsessile scales. *Calyx* disk-shaped, ± oblique, 2.5–3.5 mm ø, very densely lepidote outside, irregularly obtusely 5-lobed or -dented. *Corolla* tubular, widened towards the limb, ± zygomorphous and not rarely somewhat curved, mostly (blood-) red or pale red or deep red within, yellow-brown externally, sometimes pale yellow-green, densely yellowish scaly outside, glabrous inside, 1–1.2 (rarely up to 1.3) cm in all, tube *c.* 8 mm long, 2.5–3 mm ø at base, 4–5 mm below the limb, lobes suberect, unequal, obliquely suborbicular, *c.* 3 mm ø, often shortly retuse, irregularly crenulate. *Stamens* 10, ± as long as the corolla tube; filaments narrow-linear, glabrous; anthers subglobose, *c.* 1 mm. *Disk* glabrous. *Ovary* ovoid-conical, *c.* 5 by 2.5 mm, densely lepidote, broadly attenuate into a stoutish glabrous style (3–4 mm); stigma capitate, 5-lobulate. *Capsule* 1.2–1.5 by 0.4–0.5 cm, crowned by the relatively short style. *Seeds* *c.* 4 mm including the tails.

Distr. *Malesia*: New Guinea (Finisterre Mts, Mt Saruwaged region, Mt Wilhelm and vicinity, Owen Stanley Range).

Ecol. Epiphytic in mountain forest, but mostly terrestrial in (*Podocarpus-Libocedrus*-)forest fringe growth, on steep slopes or exposed rocks or grassland above the forest line, often along streams, (1300–)1800–3680 m. *Fl. fr.* Jan.-Dec.

Vern. *Kutengaigai*, Chimbu: Waimambuno, *wubamp*, Minj: Kamang, *kitsch*, Hagen: Togoba.

Note. For differences with 183. *R. inconspicuum* (*subsect. Euvireya*) see under that species.

95. Rhododendron correoides J. J. S. Med. Rijksherb. 25 (1915) 2; Nova Guinea 12 (1917) 500; *ibid.* 12 (1918) t. 195; SLEUM. Reinwardtia 5 (1960) 110. — *R. coniferum* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 97.

Shrub with erect branches, (0.25–)1–4 m. Branchlets obtusangular, tips densely clothed with subsessile or very shortly stalked scales, glabrescent and early covered with greyish cork below; internodes (1–)2–8 cm. *Leaves* either scattered and approximate in the upper ⅔ of the upper two internodes, or crowded in more distinct 5–7-merous pseudowhorls, elliptic or mostly subobovate or oblong-, rarely ovate-elliptic, apex broadly obtusely attenuate, sometimes rounded, apiculate by a small terminal gland, base very broadly attenuate to subtruncate-rounded, firmly coriaceous, densely lepidote initially on both faces, glabrescent in later stages and hardly pitted above, very densely and more persistently lepidote beneath (scales similar to those in *R. album*, but slightly smaller and paler, flat, marginal zone finally dissolute, centre moderately sunk, leaving dense pits), edge thickened and crenulate by impressed scales, (1.5–)1.8–2.7(–3.7) by (0.6–)0.8–1.4(–1.6) cm, midrib slightly depressed above, bluntly raised beneath especially in the lower part, evanescent distally, or sometimes entirely inconspicuous, nerves 3–4(–6) pairs, curved-ascending, faintly impressed or nearly obscure above, indistinct beneath; petiole subterete, slightly grooved above, lepidote, (2–)3–6(–8) by 1.5(–2) mm. *Umbels* (2–)3–5-flowered. Outer perulae ovate-acuminate, subacute, inner ones oblong to obovate-spathulate, membranous and lustrous, laxly lepidote on the dorsal midline or keel, up to 2 by 1 cm. Bracteoles linear-subspathulate, glabrous, 1–1.5 cm. Pedicels very densely lepidote, epilose, 1–1.5(–2) cm by *c.* 1 mm, forming an angle with the calyx. *Calyx* very shortly cup-shaped, oblique, densely lepidote dorsally, 2.5–3 mm ø, ± obscurely lobed. *Corolla* tubular below, dilated towards the limb, (dark) yellow with orange base, or orange-red, or reddish brown, rarely brownish yellow tinged with green, (1.5–)1.8–2.6 (rarely up to 3) cm long in all, subdensely or laxly lepidote at the tube and the middle of the lobes outside, glabrous otherwise and inside, tube (1–)1.2–1.8(–2.2) cm long, 3–4 mm ø at the subsaccate base, 5–6 mm across the throat, lobes broad-elliptic or suborbicular, suberect or ± spreading, 5–8(–10, rarely up to 11) mm ø. *Stamens* 10, unequal, ± as long as the corolla tube; filaments linear, glabrous; anthers broadly obovate-oblong, 2–2.5 by 1.3–2 mm. *Disk* slightly prominent, glabrous. *Ovary* conical, densely lepidote, *c.* 4 by 2.5–3 mm (at the base), rather abrupt with the style initially, less so in later stages; style stoutish, lepidote at the very base, glabrous otherwise, as long as the corolla or finely exserted; stigma thick, subturbinate-capitate, 5-lobed. *Capsule* subcylindric, apex long-attenuate, base short-attenuate, *c.* 1.5 by 0.4 cm, on fruit-pedicel up to 3.5 cm.

Distr. *Malesia*: New Guinea (Main Range from Mt Carstens, Hubrecht and Orange Mts to Mt Wilhelmina).

Ecol. Subalpine forest, marginal forest shrubberies and in open vegetation, also on ridge crests, not rarely on mossy or peaty soil, locally common, 3100–3800 (possibly up to 4300) m. *Fl. fr.* Feb., Aug.-Dec.

96. Rhododendron comptum C. H. WRIGHT, Kew Bull. (1899) 103; SLEUM. Reinwardtia 5 (1960) 111. — **Fig. 21.**

var. **comptum.**

Low shrub. Branchlets slender, firm, obtusangular and longitudinally striate, densely covered with sessile scales initially, glabrescent and smooth with age; internodes 2–6(–8) cm. *Leaves* alternate,

scattered over the whole length or at least the upper half of the upper 1–2 internodes, oblong to (narrowly) obovate-oblong, coriaceous, stiff, apex shortly attenuate, subapiculate, or sometimes nearly rounded, base cuneate into the very short petiole, densely lepidote on both faces initially, glabrescent and ± shining above with age, undersurface more persistently lepidote (scales of the type found in *R. album*, very dense, touching each other, flat, thin, rather small, rufescent initially, becoming silvery with age, centre moderately

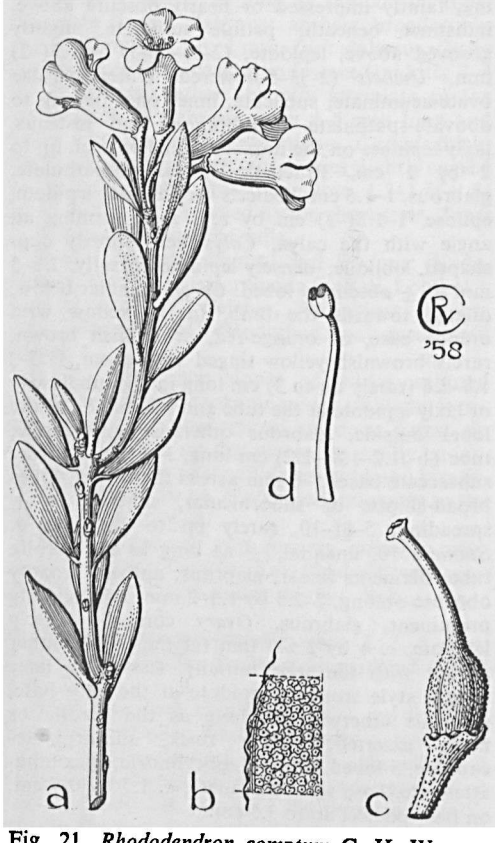

Fig. 21. *Rhododendron comptum* C. H. WRIGHT *var. comptum*. *a*. Branchlet with flowers, × ⅔, *b*. undersurface of leaf, × 6, *c*. ovary and style, × 2, *d*. stamen, × 2 (*a—d* MACGREGOR anno 1889).

impressed), tardily glabrescent, densely pitted then, 1.8–2.4 (rarely up to 3) by (0.4–)0.6–0.8(–1) cm, edge densely crenulate by impressed scales, not revolute, midrib a little sunk above, but slightly and obtusely raised beneath, ± obscure apically, nerves obscure; petiole much flattened, 0–2 by *c.* 1.5 mm, grooved dorsally, lepidote. *Umbels* 3–4-flowered. Outer perulae ovate-oblong, subacuminate, inner ones oblong to oblong-obovate, lepidote at a broad midline dorsally, glabrous for the rest, up to 2 by 1 cm. Bracteoles linear, glabrous, *c.* 1.5 cm. Pedicels very densely lepidote, epilose, 1.2–1.8 cm by 1–1.5 mm. *Calyx* shortly cup-shaped, oblique, forming an angle with the pedicel, *c.* 3.5 mm ø, densely lepidote outside, obsoletely and bluntly lobed, but one lobe may be more distinct sometimes. *Corolla* tubular below, campanulate distally, 2–2.4 cm long in all, presumably red, laxly lepidote outside, glabrous inside, tube 1.2–1.5 cm long, *c.* 4 mm ø at base, *c.* 5 mm at the mouth, lobes suborbicular, ± spreading, 7–9 mm ø. *Stamens* 10, ± as long as the corolla tube; filaments linear, glabrous; anthers obovate to suborbicular, *c.* 1.3 mm ø. *Disk* glabrous. *Ovary* very densely lepidote, conical, 4–5 mm long, *c.* 3 mm ø at base, tapering to or subabrupt with the style, the latter ± as long as the corolla, stoutish, lepidote, in its lower ¼–⅓, glabrous for the rest; stigma large, capitate, 5-lobed.

Distr. *Malesia*: New Guinea (Owen Stanley Range: Mts Scratchley and Victoria), 3050–3960 m.

var. **trichodes** SLEUM. Reinwardtia 5 (1960) 111.

Ovary densely lepidote and patently hairy, otherwise not different from *var. comptum*.

Distr. *Malesia*: E. New Guinea (Mt Albert Edward), twice found on exposed, rocky bluffs in open grassland, 3680 m. *Fl.* May-July.

97. Rhododendron lamponguum MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 251, 585 (*descr.*); SLEUM. Reinwardtia 5 (1960) 111. — *Azalea lamponga* (MIQ.) O. KTZE, Rev. Gen. Pl. 2 (1891) 387.

Shrub. Branchlets rather robust, terete, tips densely fuscous-lepidote, glabrescent below; internodes (1–)3–11 cm. *Leaves* in 5–6-merous pseudowhorls at the upper 2 nodes, ovate-lanceolate to oblong-elliptic, apex shortly to subcaudate-acuminate, subacute, base attenuate to the petiole, coriaceous, stiff, dark green above, brownish greenish underneath, practically glabrous above at maturity, dark fuscous- or rubiginose-lepidote beneath (scales exactly of the same type as in *R. album*, very dense, leaving small pits), (4–)5–9.5 by 2–4 (–4.5) cm, margin ± revolute in dry specimens, midrib strongly impressed above, very prominent beneath, nerves *c.* 8 pairs, irregular, ± spreading, straight below, anastomosing towards the edge, slightly sunk above in quite mature leaves, minutely or not raised beneath, veins ± perceptible above only; petiole subterete, grooved above, densely lepidote, 1–2.5 cm by 1.5–3 mm. *Umbels* 5–6-flowered; flower buds ovate-apiculate as in *R. album*. Outer perulae ovate, abruptly and rather longish apiculate or subulate, inner ones oblong-spathulate, obtuse, all lepidote dorsally, up to 1.6 by 0.6 cm. Bracteoles linear, laxly lepidote, up to 1.5 cm. Pedicels stoutish, ± densely rufous-lepidote and laxly short-hairy, 1–1.5 cm. *Calyx* small, obtusely shortly 5-lobed, densely lepidote, *c.* 4 mm ø. *Corolla* campanulate from a basal tube, 1.8–2 cm long in all, yellow, laxly lepidote on the tube and near the sinuses to the lobes, base of the tube 3–4 mm ø and somewhat pouched, lobes broadly obovate-spathulate, spreading, 7–9 by 6–8 mm. *Stamens* 10; filaments linear, patently

long-hairy in the lower third, glabrous elsewhere, 1.4–1.6 cm; anthers broadly oblong, 2 by 1 mm. *Disk* glabrous at the base, densely whitish hairy upwards. *Ovary* obovoid-cylindric, i.e. attenuate at the base, *c.* 4 by 2 mm, densely lepidote and patently hairy, gradually narrowed to the style, the latter nearly as long as the corolla, slender, lepidote and patently hairy in the lower, conspicuously hairy in the middle, glabrous in the upper third; stigma subcapitate, indistinctly lobed. Submature *capsule* obovoid-fusiform, long-attenuate to the base, broadest in the upper third, *c.* 1.8 by 0.3 cm, subdensely lepidote and patently hairy, pedicel *c.* 1.5 cm.

Distr. *Malesia*: Sumatra (Padang Highlands: Mt Gombak; Lampongs: Mt Radja Bassa), in low forest, 1370–2330 m. *Fl.* Nov.

98. Rhododendron cernuum SLEUM. Reinwardtia 5 (1960) 111.

Shrub, 1 m. Branchlets divaricate, nodose, tips rufescent-lepidote; internodes 1.5–8 cm. *Leaves* in ± 4-merous pseudowhorls at the upper 1 or 2 nodes, lanceolate, shortly or long acuminate-attenuate at both ends, coriaceous, glabrescent above with age, the remaining scales flat and not impressed, densely and ± persistently lepidote beneath (scales similar to those of *R. album*, centre sunk), edge slightly revolute in dry specimens, (4–)5–9 by 1–1.5 (rarely up to 1.7) cm, midrib impressed above, rather thick-prominent beneath, nerves 6–8 pairs, straight and ± spreading, whether or not minutely depressed above, obscure beneath; petiole subterete, lepidote, (6–)10–15 by *c.* 1.5 mm. *Umbels* ± 5-flowered. Outer perulae ovate to subrotundate, abruptly subulate-attenuate at the apex, densely lepidote dorsally, inner ones ovate to subspathulate, obtuse, up to 8 by 5 mm. Bracteoles filiform, laxly lepidote, up to 6 mm. Pedicels slender, nodding, densely lepidote, 1–1.5 cm. *Calyx* suboblique, almost cup-shaped, *c.* 2.5 mm ø, margin spreading or reflexed, irregularly shortly and obtusely 5-lobed. *Corolla* broadly campanulate, yellow, 1–1.2 cm long in all, 2–3 mm ø at base, *c.* 10 mm at limb, subdensely lepidote outside margin of the lobes excepted, glabrous inside, lobes broad-obovate, 5–6 by 4–5 mm, shortly retuse or irregularly crenate distally. *Stamens* 10, nearly as long as the corolla; filaments linear, long patently hairy in the lower third, glabrous above; anthers 1.7 mm. *Disk* prominent, very shortly hairy at the upper margin, glabrous below. *Ovary* ovoid-conical, densely patently hairy and lepidote, *c.* 2.5 by 1.7 mm; style rather abrupt, lepidote at the very base, glabrous otherwise, 4–5 mm; stigma rather large, subcapitate, 5-lobulate.

Distr. *Malesia*: S. Sumatra (Benkulen: Mt Belirang and Mt Kaba).

Ecol. On Mt Belirang on dry sulphur-stone slope, 1500 m, rare, *Fl.* July-Aug.

99. Rhododendron pudorinum SLEUM. Reinwardtia 5 (1960) 112.

Treelet, 4 m. Branchlets robust, 5–7 mm ø, obtusangular in the new, densely rufous-lepidote shoots, subterete, early glabrescent and greyish corticate in the older parts; internodes 12 cm long or more. *Leaves* laxly scattered along the upper 1 or 2 internodes, broad-elliptic, sometimes nearly rounded or obovate-elliptic, apex shortly (0.5 cm) acuminate or apiculate, not rarely blunt, base broadly cuneate to the petiole, or more rarely subtruncate-rounded, coriaceous, glabrous and impressed-punctulate above at full age in dry specimens, very densely copper-coloured or rubiginose-lepidote beneath (scales rather small, of the type in *R. album*), entire or obscurely crenulate, edge slightly revolute, (4.5–)6–9 by (3–)3.5–5(–5.5) cm, midrib thick and somewhat prominent at the base, gradually flattened and finally grooved distally above, rather flat and but slightly raised beneath, nerves *c.* 8 pairs, rather steeply ascending, slightly prominent (but a little depressed in the middle) above, slightly raised beneath, veins laxly reticulate, nearly obscure above, more visible beneath; petiole flattened and grooved dorsally, initially lepidote, (0.8–)1.5(–2) cm by 2–3(–4) mm. *Umbels* 8–15-flowered; terminal flower buds (*i.e.* the normal ones) broad-ovoid, *c.* 2 by 1.5 cm, lateral ones in the axils of the upper leaves much reduced in size. Outer perulae suborbicular, inner ones broadly spathulate, obtuse, sericeous on both sides margin excepted, moreover lepidote dorsally, up to 1.3 cm. Bracteoles linear-spathulate, *c.* 1 cm by 2 mm, densely long-hairy. Pedicels densely lepidote, epilose, 2–2.5 cm by *c.* 0.8 mm. *Calyx* disk-shaped, thick-membranous, *c.* 4 mm ø, wavy and indistinctly lobulate at the margin, densely lepidote dorsally, almost fimbriate by the scales which project beyond the margin. *Corolla* elongate-funnelform, pink, 3.3–3.8 cm long in all, laxly to very laxly lepidote outside at the tube and the middle of the lobes, glabrous inside, tube 2.2–2.5 cm, straight, *c.* 4 mm ø at base, 6–7 mm at the mouth, lobes broadly obovate to nearly rounded, not rarely slightly retuse, 1.1–1.4 by 1–1.2 cm. *Stamens* 10, somewhat longer than the corolla tube, unequal; filaments linear below, filiform distally, quite glabrous; anthers broadly subobovate-oblong, 2.5 mm. *Disk* thick, blackish when dry, glabrous. *Ovary* obconical, *c.* 5 mm long, 3 mm ø in the upper part, slightly less below, very densely clothed with subpatent, short yellowish hairs and scales (the latter covered by the hairs), shortly contracted into the style, the latter hairy and lepidote at the very base, glabrous otherwise, stoutish, *c.* 2 cm long at anthesis; stigma shortly turbinate-capitate, but faintly lobed. *Capsule* subcylindric, apex acuminate, base somewhat attenuate, slightly thicker in the upper third, densely hairy and lepidote, 2.5–3 cm by *c.* 6 mm; style *c.* 2.5 cm; fruit-pedicel 2.5–4 cm, glabrescent.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range: Mt Pokapindjang and its spur to Tinábang).

Ecol. In low forest, 2500–3000 m. *Fl.* June.

100. Rhododendron arenicolum SLEUM. Reinwardtia 5 (1960) 113.

Shrub. Branchlets slender, terete, tips more densely lepidote than lower parts; internodes 3–8 cm. *Leaves* scattered in the upper half of the upper 1–2 internodes, elliptic, rarely subovate-elliptic, apex very shortly acuminate or nearly apiculate, with a blunt terminal gland, base subtruncate to rounded, coriaceous, glabrous and somewhat rugose above with full age, very densely reddish brown-lepidote beneath at least initially (scales similar to those in *R. album* and forming the same coherent layer, centre but slightly impressed), finally glabrescent beneath too, densely pitted then, margin not or but very slightly revolute, minutely crenulate, (2–)2.5–4 by 1.5–2.6 cm, midrib flat above, slightly prominent beneath, nerves 5–7 pairs, lower 2–3 pairs from or from somewhat above the base, the other higher from the midrib, all straight below, curved distally and obscurely anastomosing, faintly sunk above, a little raised beneath, veins subobscure; petiole lepidote, 3–4 by *c.* 1.5 mm, flattened dorsally. *Umbels* 7–9-flowered; flower buds broadly ovoid, *c.* 1.5 by 1 cm. Outer perulae ovate, inner ones subspathulate, blunt, whitish sericeous and lepidote along the dorsal midline, up to 1.5 by 1 cm. Bracteoles filiform below, up to 2 mm subspathulate-dilated distally, pubescent, up to 1 cm. Pedicels densely rusty-lepidote, epilose, 1.5–2.7 cm by 0.5 mm. *Calyx* disk-shaped, *c.* 3.5 mm ø, densely lepidote dorsally, margin wavy and patent, indistinctly bluntly 5-lobed. *Corolla* tubular below, dilated towards the limb, pink, 2.3–2.5(–2.6) cm long in all, laxly to subdensely lepidote outside at the tube and the middle of the lobes, tube 1.2–1.5 cm, a little pouched and 3–4 mm ø at base, 6–7 mm below the lobes, the latter broadly obovate or nearly rounded, retuse or irregularly crenulate, spreading, 8–11 mm. *Stamens* 10, slightly exceeding the corolla tube in length; filaments filiform, glabrous or with some sparse hairs; anthers oblong, 1.2 by 0.8 mm. *Disk* glabrous. *Ovary* thick-conical, 4–5 by 2–2.5 mm, very densely lepidote and densely shortly patently hairy; style abrupt with the ovary, rather thick, glabrous, 5–6 mm; stigma large, almost turbinate, manifestly 5-lobed.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range).

Ecol. On open sandy ridges, 2600–3000 m. *Fl.* June.

101. Rhododendron giulianettii LAUT. in K. Sch. & Laut. Nachtr. (1905) 338; SLEUM. Reinwardtia 5 (1960) 114. — *R. papuanum* (*non* BECC.) C. H. WRIGHT, Kew Bull. (1899) 104.

Small shrub. Branchlets rather slender, ± densely covered with shortly stalked scales in the younger, scabrous verruculose in the lower parts. *Leaves* scattered, mostly at the upper third of the upper internodes (2–8 cm), elliptic to ovate-elliptic, sometimes nearly rounded, apex broadly attenuate, obtuse to rounded, not apiculate, base ± rounded, abruptly contracted into the petiole, which is somewhat winged by the decurrent blade in its upper half, coriaceous, densely lepidote on both faces initially, early glabrescent above, the rather flat scales leaving but small and shallow pits on the upper surface, very densely rusty-lepidote beneath (scales rather small, of the type as in *R. album*, but some of the scales not rarely darker in colour, the undersurface thus becoming ±spotted), margin slightly revolute, (1.5–)1.7–2.8 by 1–1.8 cm, midrib a little impressed above, faintly raised beneath, nerves 4–5 pairs, lower ones steeply curved upwards, upper ones more spreading, all rather irregular, indistinctly anastomosing, slightly depressed above, obscure below; petiole flattened, grooved above, lepidote, *c.* 3 by 1–2 mm. *Umbels* ± 4-flowered. Perulae ovate, obtuse, outer ones lepidote dorsally, inner ones larger, glabrous, not hairy or sericeous at all, up to 1 by 0.7 cm. Bracteoles filiform, glabrous, up to 1 cm. Pedicels stoutish, densely rufous-squamular-lepidote, 1–1.4 cm. *Calyx* ± obliquely disk-shaped, 3–4 mm ø, margin wavy and obscurely dented, densely lepidote dorsally. *Corolla* tubular below, dilated at the lobes, apparently red, completely glabrous in- and outside, (2.8–)3–3.2 cm long in all, tube cylindric, straight, slightly dilated upwards, (1.8–)2–2.2 cm, 4–5 mm ø at base, 6–7 mm at the mouth, lobes nearly rounded, ± spreading, *c.* 1 cm ø, mostly somewhat retuse. *Stamens* 10, unequal, 2.5–3 cm; filaments linear, dilated below (1 mm), nearly filiform distally, glabrous; anthers 2.6–3 by 1 mm. *Disk* conspicuous, glabrous. *Ovary* conical, 5 by 2.5 mm, densely shortly patently hairy and lepidote, rather gradually attenuate to the style, the latter stoutish, glabrous the lepidote base excepted, *c.* 2.4 cm; stigma broad-conical, lobes inconspicuous.

Distr. *Malesia*: E. New Guinea (Owen Stanley Range: Mt Scratchley), 3050–3960 m. Once found.

102. Rhododendron versteegii J. J. S. Med. Rijksherb. 25 (1915) 2; Nova Guinea 12 (1917) 501; *ibid.* 12 (1918) t. 196; SLEUM. Reinwardtia 5 (1960) 114; Blumea 11 (1961) 117.

Erect shrub, 0.2–0.35 (sometimes up to 1) m, sparsely branched. Branchlets stoutish, terete, densely covered with sessile scales, early glabrescent and smooth then; internodes 2–8(–12) cm. *Leaves* scattered, ± dense but distant from each other in the upper ½–⅔ of the upper internode, obovate or elliptic-obovate, elliptic or more rarely oblong- or subovate-elliptic, apex broadly attenuate and bluntish or rounded, base subtruncate-rounded, or broadly attenuate, thick-coriaceous, flat or but slightly convex, very densely lepidote on both faces initially, tardily glabrescent above, lepidote for a longer time beneath (scales small, very dense, of the type of *R. album*, first rusty, then silvery, marginal zone finally dissoluted, centre leaving shallow pits), marginate, manifestly densely crenulate by impressed scales, (1–)1.5–3(–4) by (0.6–)0.8–1.4(–2) cm, midrib narrowly grooved above, thick and obtusely prominent in the lower, gradually obscure towards the upper part of the lamina beneath, nerves 3–4

pairs, faintly impressed above, or mostly ± inconspicuous on both faces; petiole ± flattened, grooved above, lepidote, 2–3(–4) by 1–2 mm. *Umbels* (2–)3–5-flowered. Outer perulae ovate-oblong, subacuminate or obtuse, inner ones oblong to oblong-spathulate, membranous, lepidote on a broad dorsal midline, glabrous otherwise, up to 1.9 by 0.8 cm. Bracteoles linear to linear-subspathulate, glabrous, up to 1.6 cm. Pedicels erect, forming an angle with the calyx (the flower nodding), very densely rusty-lepidote, epilose, 0.9–2 cm by 0.8 mm. *Calyx* very oblique, disk-shaped, densely lepidote, 4–5 mm ø, margin wavy, obtusely 5-lobed, one or the other lobe sometimes elongate. *Corolla* tubular below, widened towards the limb, (2.5–)3–3.5 cm long in all, laxly to subdensely lepidote outside at the tube and the dorsal midline of the lobes, glabrous inside, tube (1.8–)2–2.2 cm, somewhat angular, red, 4–5 mm ø at the slightly pouched base, 6–8 mm at the mouth, lobes red, yellow, or partly yellow and partly red (tinged red outside), obovate to suborbicular, somewhat spreading, (1–)1.2–1.4 by 1–1.3 cm. *Stamens* 10, unequal, the longest nearly as long as the corolla; filaments linear, glabrous; anthers obovate-oblong, *c.* 2.5 by 1 mm. *Disk* prominent, glabrous. *Ovary* shortly conical, very densely lepidote and hairy (the spreading hairs covering ± the scales), 5–6 by 2.5–3 mm, rather abrupt with the style initially, less so in later stages; style slender, ± as long as the corolla, densely lepidote and laxly to sparsely hairy in the lower $^1/_3$ to $^2/_5$, glabrous for the rest; stigma capitate, distinctly 5-lobed. *Capsule* oblong-conical, 5-ribbed, densely lepidote and hairy, (1.3–)1.5–2 by 0.5–0.6 cm, broadest below the middle, pedicel 2–3 cm by 1–1.5 mm.

Distr. *Malesia*: W. New Guinea (Quarles Valley to Mt Wilhelmina and Habbema Lake).

Ecol. Grassy edges of *Podocarpus* forest, alpine grassland or boggy slopes, scattered through open mossy thickets of exposed ridges, 3200–3950 m, sporadic, but locally common, in wet shallow sandy or peaty soil. *Fl.* Feb., Sept.

6. *Subsection Solenovireya*

COPEL. *f.* Philip. J. Sc. 40 (1929) 136, 158; SLEUM. Bot. Jahrb. 74 (1949) 537, *p.p.*; Reinwardtia 5 (1960) 114. — *Rhododendron sect. Hadranthe* SCHLTR, Bot. Jahrb. 55 (1918) 157, *p.p.* — Fig. 23–25.

Scales star-shaped to various degree, mostly flat, rarely subdendroid, rarely each on top of a low, hardly permanent epidermal tubercle, ± equal in size, distant from each other. *Corolla* tubular, salver-shaped, tube straight or slightly curved, long and narrow, lobes relatively short (at most 1/4 as long as the total corolla), spreading ± horizontally.

Distr. *Malesia* (excluding Java and Lesser Sunda Is). Fig. 22.

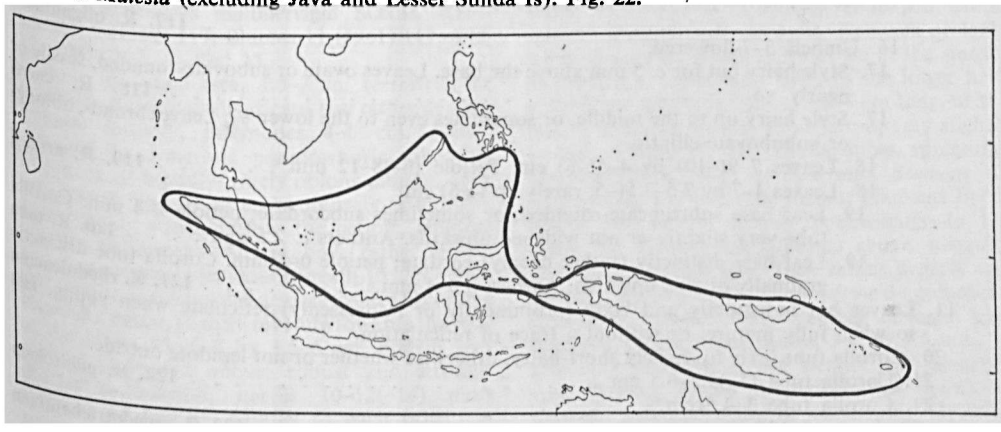

Fig. 22. Distribution of *Rhododendron subsect. Solenovireya.*

KEY TO THE SPECIES

1. Ovary densely and exclusively (or at least seemingly so) lepidote.
2. Style lepidote or glabrous.
3. Style glabrous. Leaves 3.5–6 cm wide.
4. Leaves ± broadly elliptic or obovate-, rarely oblong-elliptic; nerves 10–12(–14) pairs, rather close to each other. Perulae lepidote in the upper part dorsally, not hairy at all . . **103. R. multinervium**
4. Leaves oblong-elliptic; nerves 6–8 ± distant pairs. Perulae densely sericeous on both faces, otherwise very laxly or not lepidote . . . . . **104. R. natalicium**
3. Style lepidote to the top. Leaves 1.8–2.7(–3) cm wide. . . . . **105. R. ruttenii**

2. Style laxly hairy . . . . . **106. R. rhodosalpinx**
1. Ovary manifestly (mostly densely) set with shorter or longer hairs, or ovary both hairy *and* lepidote.
5. Leaves ± persistently soft-pubescent beneath, or very tardily glabrescent . . . **107. R. stapfianum**
5. Leaves initially with some scattered hairs at the base and early glabrescent, or mostly not hairy at all.
6. Leaves linear, 3–5 cm by 3–5 mm . . . . . **108. R. chamaepitys**
6. Leaves of other shape, much wider.
7. Anthers (5–8 mm) with a distinct, elongate apiculus or caudate appendix (0.5–1.5 mm) at the base of each cell.
8. Anthers 7–8 mm. Corolla tube slightly gradually dilated towards the lobes, the latter 2.5–3 cm ø. **109. R. macrosiphon**
8. Anthers 5–6(–7) mm. Corolla tube rather equally wide from the base to the lobes, the latter 1–1.5 cm ø.
9. Corolla subdensely lepidote outside. Leaves ± densely reticulate on both faces, veinlets ± distinct. . . . . **110. R. carringtoniae**
9. Corolla glabrous outside. Leaves much less or hardly reticulate, veinlets obscure.
10. Corolla *c.* 7 cm long in all . . . . . **111. R. carstensense**
10. Corolla (8.5–)9–10(–10.5) cm long in all. . . . . **112. R. syringoideum**
7. Anthers (2–6 mm) provided with a very short obtuse knob-like apiculus (0.3 mm) or truncate-obtuse at the base.
11. Leaves manifestly, *i.e.* ± densely and prominently or depressedly reticulate on both faces or at least underneath (well visible both in younger and older leaves).
12. Corolla tube (7–)8–8.8 cm. Leaves cuneate to obtuse at the base, manifestly petioled. **113. R. maius**
12. Corolla tube generally up to 6.5 cm (if attaining 7 cm, leaves cordate at the base, subsessile or very shortly petioled).
13. Leaves ± acutely attenuate or cuneate at the base. Style hairy at the base, glabrous for the rest. **114. R. cruttwellii**
13. Leaves broadly attenuate, obtuse or truncate-rounded or (sub)cordate at the base.
14. Style hairy and lepidote nearly to the top. Leaves ovate or elliptic-ovate, apex acuminate. Umbels 8–13(–15)-flowered . . . . . **115. R. archboldianum**
14. Style hairy and lepidote in the lower ⅔ or less.
15. Umbels (8–)15–20-flowered. Style hairy in the lower $^1/_5$–$^1/_6$. Leaves elliptic or obovate-elliptic, apex ± obtuse . . . . . **116. R. pleianthum**
15. Umbels up to 7-flowered.
16. Flowers solitary or in twos. Style hairy to the middle. Leaves subovate-elliptic, subsessile. **117. R. oliganthum**
16. Umbels 3–7-flowered.
17. Style hairy but for *c.* 5 mm above the base. Leaves ovate or subovate-rounded, sessile or nearly so . . . . . **118. R. carrii**
17. Style hairy up to the middle, or sometimes even to the lower ⅔. Leaves broad-, oblong- or subobovate-elliptic.
18. Leaves 7–9(–10) by 4–5(–6) cm. Petiole (6–)8–12 mm . . . . . **119. R. armitii**
18. Leaves 4–7 by 2.5–3.5(–5, rarely up to 6) cm.
19. Leaf base subtruncate-rounded, or sometimes subcordate; petiole 2–4 mm. Corolla tube very slightly or not widened upwards. Anthers *c.* 2.5 mm . . . . **120. R. tuba**
19. Leaf base distinctly (rather deeply) cordate; petiole 0–1 mm. Corolla tube distinctly gradually dilated upwards. Anthers 3.5–4 mm. . . . . **121. R. rhodoleucum**
11. Leaves but indistinctly and laxly (prominently or impressedly) reticulate when young, less so when fully mature, or without a trace of reticulation.
20. Corolla tube laxly to densely short-hairy, otherwise whether or not lepidote outside.
21. Corolla tube (5–)5.5–6.5 cm . . . . . **122. R. pubitubum**
21. Corolla tube 3–4.5 cm.
22. Leaves 8–12 by 3–5 cm . . . . . **123. R. pseudotrichanthum**
22. Leaves 2.5–6 (rarely up to 7.5) by (1–)1.5–3 cm.
23. Corolla lobes ciliate. Disk glabrous. . . . . **124. R. amabile**
23. Corolla lobes not ciliate. Disk pubescent. . . . . **136. R. jasminiflorum**
20. Corolla epilose outside (except some scattered hairs which may occur at the very base), otherwise whether or not lepidote.
24. Corolla tube at least 4.5 cm, mostly longer.
25. Leaves sessile or nearly so (petiole 0–2, rarely up to 4 mm), in general ± obtuse, rounded or subcordate at the base.
26. Anthers *c.* 1.8 mm . . . . . **125. R. radians**
26. Anthers 4.5–5 mm . . . . . **116. R. pleianthum**
25. Leaves distinctly petioled, in general attenuate to cuneate at the base.
27. Leaves acutely attenuate at both ends. Pedicels stoutish, *c.* 2 mm . . **126. R. oreadum**

27. Leaves obtusely acuminate (or attenuate) to rounded at apex.
28. Pedicels rather slender, *c.* 0.5 mm ø.
29. Pedicels 9–20 mm. Umbels 5–6(–7)-flowered. . . . . **127. R. cinerascens**
29. Pedicels 4–8 mm. Umbels (8–)10–12(–14)-flowered . . . . . **128. R. brachypodarium**
28. Pedicels stoutish, 1–2 mm ø, 3–7 mm long.
30. Corolla 5.7–7 cm long in all. . . . . **129. R. goodenoughii**
30. Corolla (8.5–)9–10(–10.5) cm long in all. . . . . **112. R. syringoideum**
24. Corolla tube 2–4 (rarely in part up to 4.5) cm.
31. Corolla tube ± manifestly and gradually narrowed from the base upwards. Leaves subsessile.
32. Pedicels all over densely lepidote and laxly short-hairy. Corolla ± densely lepidote outside at least initially. Leaves elliptic-oblong or -obovate . . . . . **130. R. pneumonanthum**
32. Pedicels lepidote in the distal part only, otherwise densely hairy. Corolla laxly lepidote or glabrous outside from the beginning. Leaves broadly elliptic, subovate- to suborbicular-elliptic, or orbicular . . . . . **131. R. orbiculatum**
31. Corolla tube equally wide all over or slightly and gradually widened from the base upwards. Leaves distinctly petioled, but short-petioled to subsessile in *R. jasminiflorum p.p.* and *R. orbiculatum.*
33. Corolla tube subdensely to densely lepidote outside.
34. Scales on the undersurface of the leaves subdendroid, *i.e.* the centre ± deepened into a kind of stalk, which itself rests on a low epidermal tubercle. Corolla tube 2–2.5 cm, its scales stellate . . . . . **132. R. edanoi**
34. Scales on the undersurface of the leaves sessile in minute epidermal depressions. Corolla tube 2-2.5 cm, its scales thick and roundish . . . . . **133. R. loranthiflorum**
33. Corolla tube laxly lepidote to glabrous outside.
35. Corolla tube 2–2.3 cm . . . . . **134. R. retrorsipilum**
35. Corolla tube (3–)3.5–4(–4.3) cm.
36. Pedicels very slender, practically glabrous. Style laxly hairy and lepidote in the lower half, otherwise exclusively lepidote to the top . . . . . **135. R. subpacificum**
36. Pedicels rather stoutish, lepidote and/or hairy to various degree.
37. Style laxly lepidote and hairy in the lower third, otherwise exclusively hairy to almost the top. Leaves petioled (*c.* 8 mm). . . . . **136. R. jasminiflorum**
37. Style laxly hairy except the glabrous uppermost part, sparsely or not lepidote. Leaves subsessile . . . . . **131. R. orbiculatum**

103. Rhododendron multinervium SLEUM. Reinwardtia 5 (1960) 117; Blumea 11 (1961) 117; *ibid.* 12 (1963) 102. — **Fig. 23.**

Shrub or small tree, 1.5–3 m, terrestrial or epiphytic. Branchlets divaricate, tips rather densely lepidote initially; internodes 4–6 cm. *Leaves* arranged in 3-merous pseudowhorls, obovate-elliptic or ± broadly, rarely oblong-elliptic, apex very shortly and ± abruptly obtusely acuminate, base broadly attenuate into the petiole, lepidote initially, glabrescent with age above, rather densely and ± persistently lepidote beneath (scales small, marginal zone substellate-dentate, centre becoming blackish), entire, slightly revolute towards the base of the blade, (5–)6–8 by 3.5–6 cm, midrib very slightly impressed above, robust and strongly prominent beneath, nerves 10–12(–14) pairs rather close and ± parallel to each other, ± straight below, obscurely anastomosing before the edge, with some other less distinct nerves between them, all a little prominent on both faces, reticulation lax and faintly raised underneath only; petiole grooved above, somewhat flattened, lepidote, 6–8 by *c.* 1.5 mm. *Umbels* ±5-flowered. Outer perulae broadly ovate, inner ones spathulate, all ± densely lepidote in the upper part outside, not hairy at all, lepidote-ciliate, 1–2 by 0.8–1.4 cm. Bracteoles filiform. Pedicels rather slender, densely lepidote, 6–8 mm. *Calyx* oblique, disk-shaped, very shortly lobed and wavy, *c.* 2.5 mm ø. *Corolla* salver-shaped, white, sweetly scented, tube straight, glabrous or laxly lepidote outside, scales more dense at the sinuses of the lobes, subdensely hairy in the lower half, glabrescent upwards inside, 3.5–4 cm long, at the base *c.* 2, in the middle 2.5–3 mm ø, very slightly or not dilated at the mouth, lobes spreading, obovate-elliptic, 8–12 by 6–8 mm. *Stamens* 10, slightly exserted from the throat; filaments linear below and rather densely patent-hairy to the lower ⅔, filiform and glabrous above, unequal; anthers 2.5 by 0.9 mm. *Disk* rather densely and shortly white-hairy. *Ovary* elongate columnar, shallowly 5-ribbed, very densely covered with thickish, almost round scales, 5–6 by 1.5 mm, ± gradually tapering to the slender and glabrous style (3 cm); stigma short-obconical, crenulate. *Capsule* elongate-fusiform, subdensely lepidote, 3–3.5 by 0.4–0.5 cm.

Distr. *Malesia*: New Guinea (Western Highlands; Sepik Distr.).

Ecol. On grassy slopes or in *Castanopsis-* or *Nothofagus*-forest, 1370–2050 m. *Fl.* April, Aug.-Oct.

Vern. *Aretna*, Anona.

104. Rhododendron natalicium SLEUM. Reinwardtia 5 (1960) 118.

Shrub, possibly epiphytic. Branchlets flattened, tips subdensely substellate-lepidote; internodes

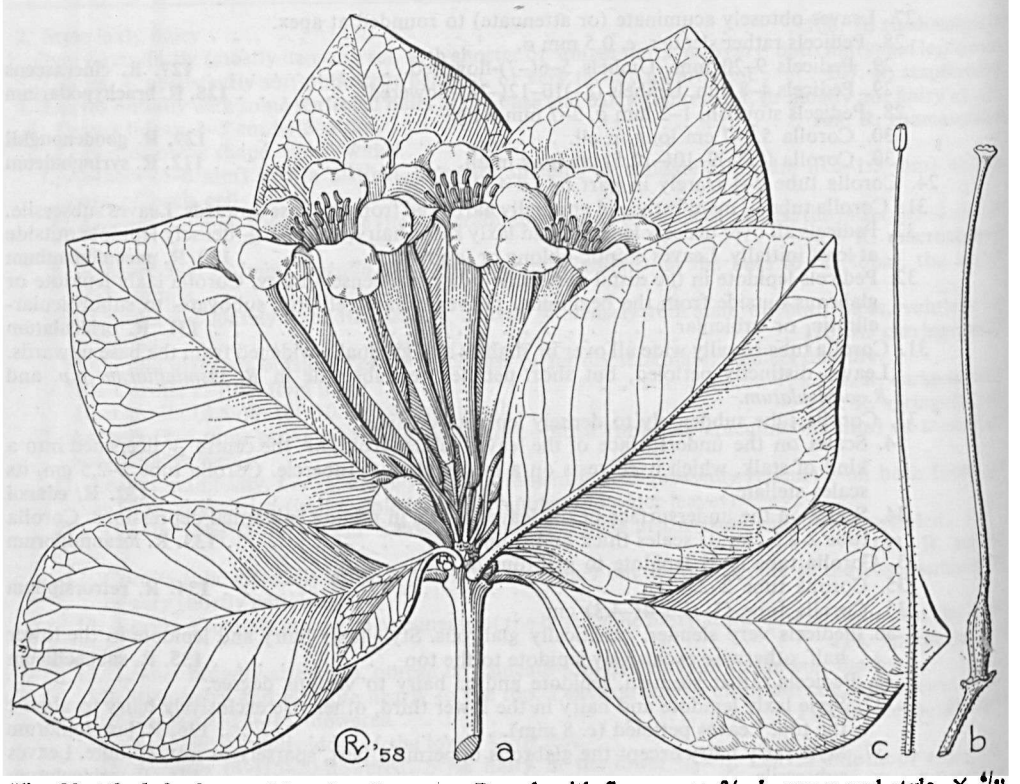

Fig. 23. *Rhododendron multinervium* SLEUM. *a.* Branch with flowers, × ⅔, *b.* ovary and style, × ⁴/₃, *c.* stamen × ⁴/₃ (*a–c* HOOGLAND & PULLEN 5863).

7–15 cm. *Leaves* in ± 4-merous pseudowhorls, oblong- or lanceolate-elliptic, apex shortly gradually acuminate, subacute, base broadly attenuate, subcoriaceous or coriaceous, entire, subrevolute, entirely glabrescent above at maturity, laxly lepidote beneath (scales very small, fuscous, irregularly incised in the marginal zone, the centre slightly impressed), 7–10 by 3.5–4.5(–5) cm, midrib slightly but distinctly impressed above, much prominent beneath to ¾ of its lower part, less so distally, more densely lepidote than the intervenium beneath, nerves 6–8 pairs, rather distant from each other, at an acute angle from the midrib, ± straight below, rather obscurely curved-anastomosing near the edge, somewhat raised above (but impressed in the very middle), ± prominent beneath, reticulation obscure; petiole subdensely lepidote, grooved above, 1–1.5 cm by 1–1.5 mm. *Umbels* ± 8-flowered. Outer perulae ovate, inner ones spathulate, all subsericeous on both faces, otherwise not or but very laxly lepidote, long-ciliate, up to 2.5 cm by 6–8 mm. Bracteoles nearly filiform and glabrous below, narrow-spathulate and hairy distally, up to 2 cm. Pedicels stoutish, rather densely substellate-lepidote, 10–12 mm. *Calyx* very oblique, irregularly shortly and obtusely 5-lobed, lepidote, *c.* 2.5 mm ø. *Corolla* salver-shaped, snow-white, tube straight or slightly curved, *c.* 4.5 cm by 3–4 mm, faintly or not dilated towards the mouth, subdensely substellate-lepidote outside, rather densely, shortly and patently whitish hairy in the lower third, gradually glabrescent distally, inside, lobes elliptic-obovate to obovate-spathulate, spreading, laxly lepidote outside, glabrous inside, 1–1.2 by 0.8–1 cm. *Stamens* 10, unequal, exserted, *c.* 5.5 cm; filaments linear and densely patently hairy below, less hairy and finally glabrous to the top; anthers oblong, obtuse base, *c.* 3 by 0.8 mm. *Disk* subdensely short-hairy. *Ovary* elongate-conical, densely set with almost roundish scales, *c.* 8 by 1.5 mm, tapering to the style, which is lepidote at the very base, glabrous otherwise, and ± equals the corolla tube in length; stigma narrowly short-obconical. *Capsule* elongate-cylindric, curved, shortly attenuate at both ends, laxly lepidote, 4–4.5 by 0.4 cm.

Distr. *Malesia*: New Guinea (Sattelberg region, Morobe Distr.: Ogeramnang; Mt Saruwaged), in forest hills at 1770–2440 m. *Fl.* March, *fr.* May.

105. Rhododendron ruttenii J. J. S. in Fedde, Rep. 30 (1932) 170; SLEUM. Reinwardtia 5 (1960) 119.

Shrub. Branchlets terete, tips only sparsely lepidote; internodes 1.7–4.5 cm. *Leaves* 4–5 per pseudowhorl, cuneate-obovate, rarely oblong- or elliptic-obovate, apex broadly attenuate, obtuse to rounded, sometimes slightly retuse, base cuneate-

attenuate, mostly rather acute, coriaceous, laxly lepidote initially, glabrescent above, more densely and persistently lepidote beneath (scales very small, the marginal zone narrow and ± coarsely dentate, each scale on top of a minute epidermal elevation), margin somewhat revolute in dry specimens, (3–)4–5.5(–6.5) by 1.8–2.7(–3) cm, midrib impressed above, manifestly raised beneath, nerves 6–8 pairs, rather straight below, curved and anastomosing before the edge, slightly impressed above, rather inconspicuously raised beneath, reticulation obscure; petiole semiterete, grooved above, lepidote, 3–7 by *c.* 1.5 mm. *Umbels* 6–12 (–14)-flowered. Well developed perulae and bracteoles not known. Pedicels rather slender, ± densely lepidote, 1–1.8 cm. *Calyx* small, obliquely disk-shaped, lobes obsolete. *Corolla* salver-shaped, white to light red, tube cylindric, straight, 3–3.5 cm by *c.* 2 mm, laxly lepidote outside, laxly hairy in the lower part inside, lobes spreading, subrotundate-obovate, laxly lepidote outside, glabrous inside, 1–1.3 by 0.6–0.8 cm. *Stamens* 10, slightly exserted; filaments nearly filiform, laxly hairy above the base only; anthers 2 by 0.9 mm. *Disk* sparsely hairy in the upper half. *Ovary* elongate-cylindric, *c.* 5 by 2 mm, gradually attenuate into the slender style (*c.* 3 cm), the latter rather densely lepidote up to almost the top; stigma shortly broad-turbinate, subcrenulate. *Capsule* lepidote, *c.* 2 cm by 3 mm. *Seeds c.* 2 cm by 0.03 mm.

Distr. *Malesia*: Moluccas (Central Ceram: Mt Murkele), twice collected.

Ecol. Primary forest, abundant on limestone, 1900–2500 m. *Fl.* July.

106. Rhododendron rhodosalpinx SLEUM. Blumea 11 (1961) 121.

Shrub. Branchlets rather slender, *c.* 2 mm ø, tips densely lepidote; internodes 1–2(–4) cm. *Leaves* in (3–)4-merous pseudowhorls at the 2(–3) upper nodes, elliptic or subobovate-elliptic, apex broadly attenuate and blunt, or almost rounded, sometimes faintly retuse, base broadly attenuate to the petiole or subcuneate, coriaceous, firm, glabrous with age above, subdensely lepidote beneath (scales small, marginal zone substellate-dented, minute centre rather deeply impressed), distinctly revolute at the edge, (3–)4–5 by (1.5–)1.8–2.6 cm, midrib very narrowly impressed above, as thick as the petiole and much prominent below, gradually decreasing distally beneath, nerves *c.* 3 pairs, a little raised beneath only, or not rarely inconspicuous, no reticulation; petiole slightly flattened, grooved above, lepidote, 4–6 by 1 mm. *Umbels* 3-flowered. Pedicels subdensely lepidote, minutely (lens!) patently-puberulous, 1.7–2.1 cm by *c.* 0.8 mm. Bracteoles linear, *c.* 1 cm. *Calyx* subobliquely disk-shaped, very shortly and irregularly 5-lobed, *c.* 2.5 mm ø, lepidote dorsally. *Corolla* salver-shaped, apparently red, subdensely substellate-lepidote at the tube and the lower part of the lobes outside, laxly hairy at the tube below inside, otherwise glabrous, tube straight, 3–3.5 cm long, (3–)4 mm ø at base, 5–6 (–7) mm at the base of the lobes, the latter ± spreading, obovate, 1–1.2 by *c.* 0.8 cm. *Stamens* 10, equalling or in part exceeding the corolla; filaments narrow-linear, patently laxly hairy in the lower half, glabrous above; anthers narrow-oblong, base obtuse, 2.5 by 1 mm. *Disk* glabrous. *Ovary* subcylindric, closely covered with scales, which touch or even overlap each other (and possibly hide some short hairs), *c.* 6 by 1.7 mm, gradually tapering to the style, the latter rather slender, ± as long as the corolla, lepidote in the lower third, moreover laxly patently short-hairy in the lower ⅔, glabrous above; stigma capitate, shortly 5-lobed.

Distr. *Malesia*: W. New Guinea (Swart R. Valley, *c.* 138° 15′–3° 30′), once found at 1600–2000 m. *Fl.* April.

107. Rhododendron stapfianum HEMSL. *ex* PRAIN, Bot. Mag. (1911) *sub* t. 8372; MILLAIS, Rhodod. (1917) 247; SLEUM. Reinwardtia 5 (1960) 119; Blumea 11 (1961) 117; *ibid.* 12 (1963) 102. — *R. lacteum* STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 197, t. 15, f.A 1–2; MERR. En. Born. (1921) 461, *non* FRANCH. 1886.

Epiphytic shrub. Branchlets terete, densely softly greyish tomentellous and laxly caducously stellate-lepidote at the upper 3–5 internodes, glabrescent below; internodes 1.5–3(–4) cm. *Leaves* scattered, mostly close together towards the apex of the internodes, not rarely in (3–)4–7-merous pseudowhorls at the very nodes, linear-oblong, sessile or nearly so, apex ± obtuse, base truncate, coriaceous or subcoriaceous, shortly soft-hirtellous on both faces, longer and more densely patent-hairy at the margin and along the midrib beneath, never completely glabrescent, furthermore initially covered with rusty scales beneath (scales star-shaped, minute, on epidermal, finally ± disappearing protuberances, very deeply incised similar to a stellate hair, rather early caducous for their greater number), margin strongly revolute, (2.5–)3–5(–5.6) by (0.6–)1–1.5 (–1.7) cm, midrib impressed above, manifestly obtusely raised beneath the full length, nerves obsolete; petiole 1–2 by 1–1.5 mm. *Umbels* 5–7-flowered. Perulae ovate to spathulate-obovate, sericeous outside, up to 2 by 1.5 cm, forming a thick obovate bud (3 by 1.5 cm) before the anthesis. Bracteoles linear to linear-subspathulate, laxly hairy. up to 3 cm by 0.5–1.5 mm. Pedicels rather stoutish, densely whitish tomentulose and caducously lepidote, (3–)4–6(–8) mm, thickened towards the calyx. *Calyx* minute, shortly cup-shaped, densely hairy, lobes rather obsolete. *Corolla* salver-shaped, white or very lightly suffused with pale violet, or pale pink, tube ± straight, subdensely white-hairy and very laxly stellate-lepidote outside, glabrous inside, (4–)4.5–5.5 cm by *c.* 2.5 mm, lobes obovate to oblong-elliptic, ± spreading horizontally, glabrous on both faces, 1–1.5 by 0.6–0.7 cm. *Stamens* 10, exserted for 5–6 mm; filaments linear, glabrous or practically so; anthers broad-oblong, (1–)1.5 by 0.8 mm. *Disk* hairy. *Ovary* cylindric, densely clad with fulvous or whitish greyish appressed hairs which completely

cover the scales, (6–)7–8 by 1.5–2 mm, gradually tapering to the style, the latter rather slender, exserted, subdensely hairy and laxly lepidote to nearly the top, 4(–5) cm; stigma short-obconical, lobulate. *Capsule* reddish, 3–3.5 by 0.4 cm, oblong-fusiform, slightly 10-ribbed, crowned by the rest of the style, subdensely rufous-tomentellous and stellate-lepidote.

Distr. *Malesia*: Borneo (Mt Kinabalu; and Mt Palimasan in W. Kutai).

Ecol. Mossy ridge forest, (800–)1065–1525 m. *Fl.* Jan.-Dec.

108. Rhododendron chamaepitys SLEUM. Bot. Jahrb. 71 (1940) 144; Reinwardtia 5 (1960) 119; Blumea 12 (1963) 112.

Shrub. Branchlets terete, tips rather densely papillose-puberulous, glabrous elsewhere; internodes 3–5 cm. *Leaves* in 7–10-merous, spaced pseudowhorls, linear or oblong-linear, apex obtuse, base broadly attenuate, coriaceous, glabrous above at full age, subdensely stellate-lepidote beneath (scales incised at the marginal zone almost to the small centre, each on top of a very minute epidermal elevation, ± early caducous), strongly revolute parallel to the margin, 3–5 cm by 3.5–5(–7) mm in revolute state, midrib impressed above, somewhat raised in its lower part beneath, nerves obscure; petiole 1–1.5 by 1 mm. *Umbels* 4–6-flowered. Perulae ovate to ovate-lanceolate, long-acuminate, acute, glabrous, ciliate, 5–7 mm. Bracteoles linear, up to 1 cm. Pedicels slender, densely rusty-lepidote and very shortly pubescent, 8–10 mm. *Calyx* obliquely disk-shaped, wavy and indistinctly 5-lobed, *c.* 2.5 mm ø. *Corolla* salver-shaped, colour not known, tube (3–)3.5–4 cm, 2–3 mm ø at base, a little wider at the throat, laxly rufescent-lepidote outside, pubescent at the base inside, lobes rounded, very laxly lepidote outside, glabrous inside, wavy, *c.* 8–10 by 5–7 mm. *Stamens* 10, slightly exserted from the throat; filaments filiform, glabrous; anthers broadly oblong, 1.5 by 1 mm. *Disk* glabrous. *Ovary* elongate-conical, 5–6 by 1.5 mm, densely lepidote and short-pubescent; style slender, laxly pubescent and lepidote to almost the top, 4–4.5 cm; stigma capitate. *Capsule* oblong-fusiform, densely lepidote sparsely hairy, 2.5 by 0.4 cm.

Distr. *Malesia*: Borneo (Sarawak: Mt Lambia or Lambir), 300–450 m. *Fl.* May, *fr.* June.

109. Rhododendron macrosiphon SLEUM. Blumea 11 (1961) 118.

Subscandent shrub, *c.* 4 m. Branchlets robust, caducously lepidote, pruinose; internodes 6–9 cm. *Leaves* in 4–5-merous pseudowhorls at the upper nodes, obovate-elliptic, broadly to very broadly attenuate towards the apiculate apex, or apex obtuse, rarely rounded, base cuneate and slightly decurrent into the petiole, very coriaceous, rigid, similar to those of *R. scabridibracteum* in form and nervation, glabrous above with age, densely lepidote beneath (scales minute, variously stellate-dented in the hyaline, early caducous, marginal zone, centre thick, rather small, deeply impressed), ± flat, 7–10 by (4–)4.5–6 cm, midrib narrowly impressed above, as stout as the petiole and much prominent in the lowest part, decreasing upwards beneath, nerves 6–7 irregular pairs, with shorter ones (or veins) between them, all ± spreading and anastomosing, strongly impressed above, not much raised beneath, reticulation faintly sunk above, slightly prominent or sometimes rather obscure beneath; petiole semiterete, grooved above, densely lepidote initially, (2–)2.5 by *c.* 0.3 cm. *Umbels* 8–10-flowered. Outer perulae not known, inner ones elongate-spathulate, hirsutulous on both faces, up to 3 cm. Pedicels very densely lepidote, (4–)5–8 by *c.* 1.5 mm. Bracteoles linear, glabrous, up to 2.5 cm. *Calyx* obliquely disk-shaped, irregularly 5-lobed, densely lepidote dorsally, 5–6 mm ø. *Corolla* tubular below, rather abruptly expanded at the lobes, white, subdensely or more laxly lepidote at the tube and the median part of the lobes outside, with dense appressed white retrorse hairs (*c.* 1 mm) at the tube inside, glabrous otherwise, tube 6–7 cm long, *c.* 5 mm ø at base, gradually dilated to 1–1.5 cm across the throat, lobes subspathulate-obovate or suborbicular, 2.5–3 by 2.5(–3) cm. *Stamens* 10, exserted for 1–1.5 cm from the throat; filaments linear (1 mm) and densely clothed with retrorse hairs below, more laxly hairy and slender upwards, glabrous and filiform for the ultimate 1.5 cm; anthers elongate-oblong, 7–8 by 1.5 mm; each theca narrowed into a distinct basal appendix (*c.* 1 mm). *Disk* thick, 10-lobed, more densely hairy at than between the lobes. *Ovary* cylindric, *c.* 1.5 by 0.3 cm at anthesis, densely covered with rather coarse yellowish, forward directed hairs which cover the scales, gradually tapering to the style, the latter 1.5–2 mm ø below, gradually decreasing upwards, hirsute for the lower ⅔, more laxly hairy and ± caducously lepidote above, glabrous for the ultimate 10 mm; stigma capitate, *c.* 2 mm ø, lobes thick.

Distr. *Malesia*: Central New Guinea (Star Mts: near the mouth of the Minam R. into the Bon R.), one collection.

Ecol. In a depression on peaty ground in primary forest, 1500 m, rather common locally. *Fl.* July.

110. Rhododendron carringtoniae F. v. M. Vict. Nat. 4 (1887) 110, *reimpr.* Bot. Centralbl. 33 (1888) 55; Descr. Not. 9 (1890) 63; SLEUM. Reinwardtia 5 (1960) 120.

Tall shrub, up to 5 m. Branchlets terete, stoutish, tips rather densely covered with thin scales; upper internodes 2–3 cm. *Leaves* scattered or mostly in 3–4-merous pseudowhorls, obovate to elliptic-obovate, apex very broadly obtusely attenuate or mostly rounded, broadly attenuate towards the base, the very base rounded or mostly truncate, rarely broadly subcuneate, stiff-coriaceous, practically glabrous above at full age, subdensely to laxly lepidote beneath (scales thin, their marginal zone ± persistent, ± shallowly and irregularly dentate, centre small, impressed), slightly or not recurved at the margin, (3.5–)4–7 by (2.5–)3–4.5 cm, midrib

somewhat impressed above in its lower half, strongly prominent beneath, but less so towards the apex of the blade, nerves 6–8 pairs, often forked before the edge, both anastomosing among each other and with the stronger veins, the latter laxly reticulate, prominent as are the nerves on both faces, veinlets reticulate, less manifestly, but well visibly raised on both faces; petiole somewhat flattened and grooved above, lepidote, 2–5(–6) by 2–2.5 mm. *Umbels* about 6-flowered. Perulae roundish to obovate-spathulate, dorsally lepidote, not or only laxly short-pubescent, up to 2.5 by 1.5 cm. Bracteoles linear. Pedicels stoutish, subdensely lepidote, 5–8 mm. *Calyx* rim-like, membranous, irregularly and very shortly 5-dentate, fimbriate, *c.* 2 mm ø. *Corolla* salver-shaped, white, tube cylindric, slightly curved, 5–6(–7) cm long, rather equally 4.5–5.5 mm across, subdensely lepidote outside, copiously set from the base to the middle with short ± spreading hairs, glabrescent upwards inside, lobes obovate to broadly elliptic-orbicular, spreading, 1–1.5 by (0.6–)1–1.3 cm, very laxly lepidote outside, glabrous inside. *Stamens* 10, in part slightly exserted; filaments linear, densely clad with spreading hairs below, gradually glabrescent distally; anthers subobovate-oblong, 5–6 (rarely –7) by 1–1.2 mm, base of each theca with a distinct spur-like subobtuse or acute appendix (0.5–1 mm). *Disk* densely hairy. *Ovary* narrow-cylindric, slightly attenuate towards the base, densely covered with yellowish whitish, ascending hairs which cover numerous scales, *c.* 1 cm by 1.5 mm, gradually attenuate to the rather thick style (5.5–6.5 cm), which is hairy and ± densely lepidote except the glabrous 6 mm below the shortly turbinate stigma. *Capsule* narrow-cylindric, short-attenuate at both ends, with 5 thick ribs, subdensely hairy and lepidote, *c.* 5 cm by 6 mm. *Seeds* with very narrow appendages.

Distr. *Malesia*: SE. New Guinea (Owen Stanley Range: Mts Obree and Victoria; Mt Dayman).

Ecol. In open hillside, declivities, along rocky river banks, 1830– 2440 m. *Fl.* Jan., June.

111. Rhododendron carstensense WERNH. Trans. Linn. Soc. Bot. II, Bot. 9 (1916) 96; SLEUM. Reinwardtia 5 (1960) 132.

Shrub. Branchlets subangular, pruinose, smooth, early glabrescent; internodes 7–10 cm. *Leaves* in 3–4-merous pseudowhorls, elliptic to obovate-elliptic, apex obtusely and very broadly attenuate to rounded, base short-attenuate into the petiole, glabrous above at maturity, subdensely lepidote beneath (scales small, marginal zone irregularly dentate, centre a little impressed), 6.5–10 by 4–5.5 cm, midrib somewhat sunk above, rather strongly prominent beneath, nerves 8–10 pairs, rather irregular, straight below, curved anastomosing before the edge, slightly impressed above, not much prominent beneath, veins laxly reticulate, raised beneath only, veinlets ± obscure; petiole grooved above, 1–1.5 cm by *c.* 2 mm. *Umbels* 6–9-flowered. Perulae obovate-lanceolate, dorsally densely sericeous in the middle and with longer and ± appressed hairs in the lower part on both faces, up to 4 by 1.8 cm. Bracteoles filiform, pubescent, 3–5 cm. Pedicels stoutish, lepidote, *c.* 5 mm. *Calyx* minute, oblique, annular, obscurely 5-lobed. *Corolla* salver-shaped, *c.* 7 cm long in all, tube cylindrical, hardly widened upwards, *c.* 5.5 by 0.7 cm, glabrous outside, densely hairy inside in the lower half, lobes obovate-subrotundate, *c.* 1.7 by 1.4 cm, glabrous. *Stamens* 10, somewhat exserted from the throat; filaments linear, densely hairy to $^4/_5$, glabrous distally; anthers oblong, *c.* 6 by 1 mm, each cell caudate-appendiculate (1–1.5 mm) at base. *Disk* subglabrous. *Ovary* elongate-cylindric, *c.* 7 by 1.8 mm, very densely clothed with yellowish hairs, gradually tapering to the style, the latter yellowish pubescent in the lower third, glabrous otherwise; stigma thick-obconical.

Distr. *Malesia*: W. New Guinea (Mt Carstensz), once found at 1675–2040 m.

112. Rhododendron syringoideum SLEUM. Blumea 12 (1963) 104.

Terrestrial or sometimes epiphytic shrub, *c.* 2 m. Branches robust, erecto-patent; branchlets obtusangular or laterally compressed, upper 2 internodes laxly stellate-lepidote, (5–)8–12 cm by 3–5(–6) mm. *Leaves* in 5–6-merous pseudowhorls at the upper 3–6 nodes or mostly laxly arranged in the upper third of the internodes, broadly elliptic or subovate- or subobovate-elliptic, apex broadly attenuate to rounded, sometimes slightly retuse, base broadly attenuate to rounded, or rarely even subcordate, coriaceous and stiff, laxly set with rufescent scales on both faces initially (scales angular or dented to various degree, slightly impressed with the small centre), 6–9 by 4–5.5 (–6) cm, a little revolute at the very edge, especially towards the base, midrib thick and prominent, gradually becoming flattish distally above, much raised below, less so towards the apex of the blade below, nerves 7–8 pairs, rather irregular, in part deeply forked, rather indistinctly anastomosing before the edge, slightly impressed above, prominent below, veins obscurely reticulate below; petiole 1–2 cm by *c.* 2 mm. *Umbels* 8–12(–14)-flowered. Outer perulae ovate to roundish, *c.* 2 cm across, inner ones spathulate, up to 3.5 by 1.8 cm, innermost ones elongate-spathulate, up to 5 by 1 cm, all dorsally laxly short-hairy to glabrescent, internally more densely and longer appressedly substrigose. Bracteoles subspathulate-linear, hairy especially along the margin, 4–5 cm by 2–5 mm. Pedicels laxly lepidote, 5–7 by 1.5–2 mm. *Calyx* much oblique, patellar or only rim-like, obscurely lobed, *c.* 5 mm across. *Corolla* trumpet-shaped, known only in a rather withered state, apparently fleshy and white when fresh, a little zygomorphous, scantily lepidote or glabrous outside, subdensely hairy for ¾ of the tube inside, (8.5–)9–10(–10.5) cm long in all, tube slightly curved, 5–6 mm ø at base, gradually dilated to 6–8 mm at the mouth, lobes ± spreading, oblong-obovate, 1–1.5 by *c.* 0.8 cm. *Stamens* 10, almost equalling the corolla;

filaments linear and hairy for *c.* ¾ below, narrower and glabrous above; anthers narrow-oblong, wider distally, 5–6 by 1–1.3 mm, base of each cell protracted into a subacute 0.3–0.4 mm long apiculus. *Disk* hardly prominent, glabrous. *Ovary* elongate-cylindric, 12–15 by 3 mm in a developed state, densely set with whitish or yellowish appressed hairs, which cover the scales, tapering to the rather slender style, which is almost as long as the corolla, and densely covered with hairy and scales below, less hairy and more lepidote upwards, glabrous for the ultimate centimetre; stigma 5-lobed, *c.* 1.5 mm ø. *Fruit* apparently up to 5 cm by 7 mm.

Distr. *Malesia*: W. New Guinea (Arfak Mts: Mt Saru-mot, Anggi Gigi Lake).

Ecol. Both epiphytic in rather dense forest and terrestrial in ± open devastated *Nothofagus* summit forest or scrub, 2200–2350 m. *Fr.* Jan.

113. Rhododendron maius (J. J. S.) SLEUM. Reinwardtia 5 (1960) 120; Blumea 11 (1961) 119. — *R. carringtoniae* F. v. M. *var. maius* J. J. S. Nova Guinea 12 (1917) 511; *ibid.* 12 (1918) t. 205.

Terrestrial or epiphytic shrub, up to 2 m. Branchlets robust, terete, tips laxly lepidote; the only internode known 14 cm by 4.5 mm. *Leaves* 6–10 in a pseudowhorl, oblong to elliptic-oblong, apex broad-attenuate, obtuse, base broadly cuneate to subtruncate-obtuse, coriaceous, margin slightly revolute, subdensely minutely impressed-punctulate above with age, subdensely and ± persistently lepidote beneath (scales dark, marginal zone coarsely dentate or incised, centre somewhat impressed), (4.7–)6–8.7 by (2.2–)2.5–3.4(–4) cm, midrib slightly impressed above, strongly prominent beneath, though more slender towards the apex of the lamina, nerves 9–10 pairs, lower 4–5 ones slightly curved, upper ones more straight, all ± branched distally and anastomosing with each other and the rather laxly arranged veins, nerves and veins slightly impressed above, rather prominent beneath, the finer reticulation ± dense and visibly prominent beneath; petiole lepidote, (4–)6–10 by *c.* 1.5 mm. *Umbels* (5–)12–15-flowered. Perulae ovate to obovate, short-pubescent and lepidote outside, up to 2.5 by 1.5 cm. Bracteoles linear to spathulate, 1–2 cm by 0.5–2.5 mm, sparsely pubescent or glabrous. Pedicels thickened below the oblique calyx, subdensely covered with thin rufescent scales, 2–2.5 cm by 1 mm. *Calyx* small, *c.* 6 mm ø, 5-dentate, teeth irregularly triangular, obtuse or acute, one of them mostly longer (up to 2 mm). *Corolla* salver-shaped, white at the lobes, pinkish at the tube, or even darkening to red at the base, carnation-scented, tube slightly curved, subcylindric, 8–8.8 cm long, 3–4 mm ø at base, gradually dilated to 6.5 mm at the throat, laxly appressed-lepidote outside (scales thin, irregularly dentate), inside rather densely hairy in the lower, more laxly so in the upper part, lobes obovate to orbicular, rounded, glabrous except some scales which may be found at the sinuses or the base of the lobes, 1.4–1.7 by 1.1–1.7 cm. *Stamens* 10, somewhat exserted from the throat; filaments linear, laxly hairy in the lower half, gradually glabrescent upwards, at last completely glabrous; anthers narrow-oblong, 3.5 by 1 mm, base obtuse. *Disk* laxly appressed-puberulous or nearly glabrous. *Ovary* cylindrical or elongate-conical, 11–12 by 2 mm, densely subappressed-tomentose by coarse yellowish hairs, which cover the scales, tapering gradually to the style, the latter 5–5.5 cm, rather densely patent-hairy below, laxly hairy and lepidote in the middle, glabrous in the upper third; stigma capitate-turbinate, crenulate.

Distr. *Malesia*: W. New Guinea (Hubrecht Mts and Habbema Lake). A form with but 5-flowered umbels on Mt Wilhelm.

Ecol. In open places or on open banks of a stream within the mossy forest, 2770–3000 m. *Fl.* Feb.-Oct.

114. Rhododendron cruttwellii SLEUM. Reinwardtia 5 (1960) 120; Blumea 12 (1964) 339. — **Fig. 24.**

Small tree, 4.5–6 m. Branchlets subterete; internodes (2.5–)4–14 cm, upper ones laxly lepidote, lower ones greyish corticate. *Leaves* in 5–7-merous pseudowhorls, part of them reduced in size, normal ones obovate-elliptic or -lanceolate, sometimes elliptic-lanceolate, apex shortly ± gradually acuminate, subacute, with a small terminal gland, base ± acutely attenuate or cuneate to the petiole, subcoriaceous or coriaceous, dark green and shining above, paler and rather dull beneath, glabrous above, laxly to subdensely lepidote beneath (scales in the rather broad and very thin marginal zone variously dentate or lacerate, the centre small, somewhat sunk and longer persistent), entire, subrevolute, (5.5–)6–12.5 by 3–6 cm, midrib slightly depressed above, raised beneath, nerves 8–10 pairs, lower ones irregular, upper ones more straight and subparallel, curved-anastomosing with each other in a certain distance from the edge, prominent on both faces, reticulation dense and slightly but well visibly raised on both faces; petiole ± flattened, grooved above, lepidote, 6–12 by 1.5–2 mm. *Umbels* 4–7(–9)-flowered. Perulae ovate-acuminate, laxly lepidote in the middle dorsally, furthermore sericeous all over the upper- and undersurface, glandular-ciliate, up to 1.5 by 1 cm. Bracteoles narrow-linear, glabrous, up to 1.5 cm. Pedicels stoutish, laxly patent-hairy, lepidote especially in the upper third, 1–1.5(–2) cm, obliquely thickened below the calyx. *Calyx* small, margin membranaceous, indistinctly 5-lobed, rather glabrous, very laxly ciliate, *c.* 2.5 mm ø. *Corolla* salver-shaped, pure white, tube slightly curved, a little 5-saccate at the very base, but slightly dilated towards the mouth, (5–)5.5–6 cm, at the base 3–4 mm ø, in the middle *c.* 5 mm, sparsely lepidote outside, ± densely hairy in the lower half, glabrous distally inside, lobes spreading, broadly obovate to suborbicular, 1–1.3 by 0.9–1.3 cm, glabrous. *Stamens* 10, somewhat exserted from the throat; filaments linear, hairy in the lower half, glabrous above; anthers oblong, base obtuse, 2–2.3 by 1 mm. *Disk* very low, glabrous. *Ovary* cylindric,

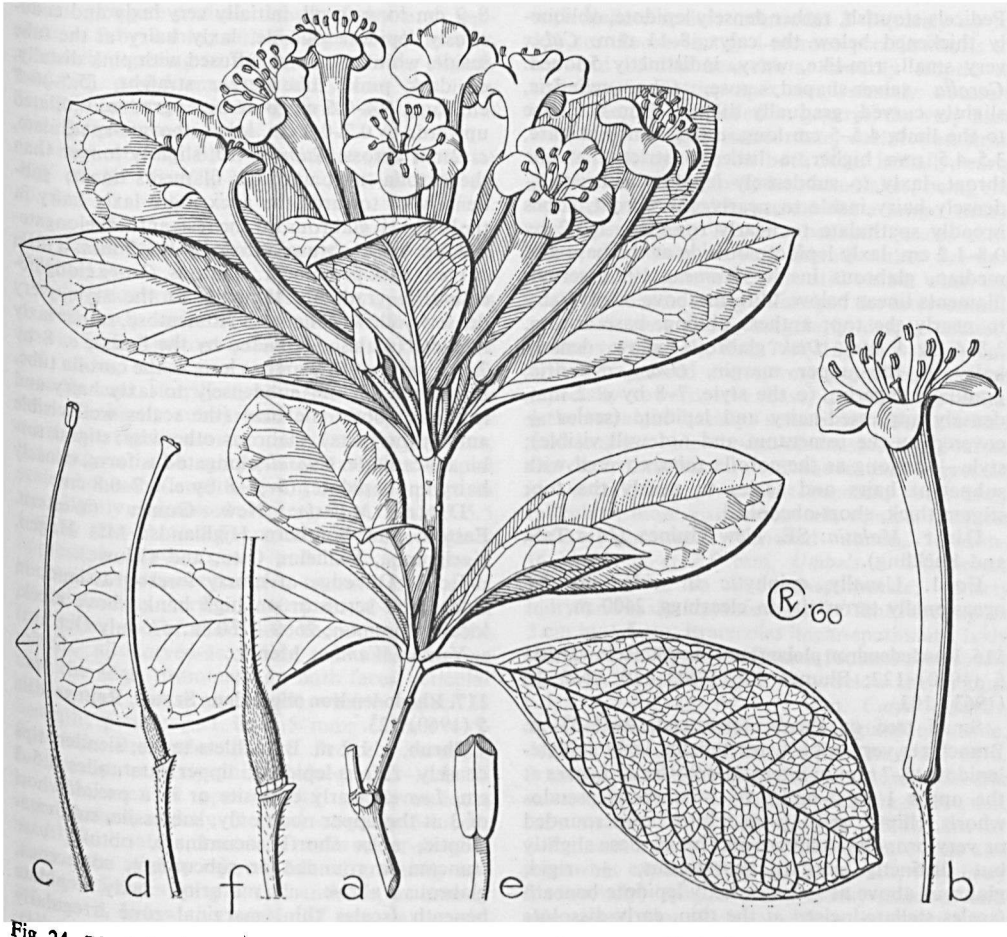

Fig. 24. *Rhododendron cruttwellii* SLEUM. *a.* Branch with flowers, × ⅔, *b.* flower, × 1, *c.* stamen, × 1, *d.* ovary and style, × 1, *e.* anther, × 4, *f*, ovary, × 2 (*a–f* CRUTTWELL 1020).

gradually narrowed to the slender style, densely covered with subpatent whitish or greyish hairs, no scales, 6–7 by 1.5 mm; style exserted, *c.* 6 cm, at the base laxly hairy for *c.* 6 mm, completely glabrous otherwise; stigma turbinate-capitate, crenulate.

Distr. *Malesia*: SE. New Guinea (Maneau Range: Mt Maneao, Mt Yauyama; Mt Simpson).

Ecol. In thin evergreen forest, edge of small patch of wood in gully, among non-calcareous rocks in shades, on moss-covered ground, 1860–2600 m. *Fl.* June-Aug.

115. Rhododendron archboldianum SLEUM. Reinwardtia 5 (1960) 121.

Tall shrub, epiphytic or rarely terrestrial. Branchlets terete, stout; internodes 6–16 cm, ultimate ones subdensely lepidote, lower ones glabrescent. *Leaves* in 5–7-merous pseudowhorls, in which 3–4 leaves are normal, the rest smaller (reduced), apparently with some very small and early caducous leaflets along the internodes, their scars only seen; normal leaves ovate to elliptic-ovate, not rarely somewhat unequal, apex short-acuminate, subacute, base broadly attenuate or mostly subtruncate-rounded, sometimes subcordate, coriaceous, subdensely lepidote on both faces (scales tardily caducous above, persistent for a long time beneath, flat, small, the margin irregularly and ± deeply dentate, the centre not immersed), entire, subrevolute below, (4–)5–11 by (2–)3–6 cm, midrib slightly depressed above, thick-prominent beneath in the lower, less so in the upper part, nerves 8–10(–12) pairs, slightly curved, ± irregular, anastomosing with each other and the veins before the edge, faintly impressed or elevated above, raised beneath, reticulation dense, more visible beneath only; petiole a little flattened, grooved above, subdensely lepidote, (4–)6–9 (sometimes up to 13) by 1.5–2 mm. *Umbels* 8–13(–15)-flowered. Perulae ovate to broadly obovate, laxly lepidote and sericeous dorsally, up to 1 by 0.7 cm. Bracteoles narrow-linear, glabrous or laxly lepidote, up to 1.5 cm.

Pedicels stoutish, rather densely lepidote, obliquely thickened below the calyx, 8–11 mm. *Calyx* very small, rim-like, wavy, indistinctly 5-lobed. *Corolla* salver-shaped, rose, tube cylindric, slightly curved, gradually dilated from the base to the limb, 4.5–5 cm long, *c.* 2.5 mm ø at base, 3.5–4.5 mm higher, a little constricted at the throat, laxly to subdensely lepidote outside, ± densely hairy inside to nearly the throat, lobes broadly spathulate to nearly rounded, 1–1.2 by 0.8–1.2 cm, laxly lepidote outside at the base and median, glabrous inside. *Stamens* 10, exserted; filaments linear below, filiform above, short-hairy to nearly the top; anthers oblong, base obtuse, 3.5–4 by 1 mm. *Disk* glabrous below, densely hairy at the upper margin. *Ovary* cylindric, gradually tapering to the style, 7–8 by *c.* 2 mm, densely appressed-hairy and lepidote (scales ± covered by the tomentum and not well visible); style ± as long as the corolla tube, covered with subpatent hairs and scales to nearly the top; stigma thick, short-obconical.

Distr. *Malesia*: SE. New Guinea (Mts Tafa and Suckling).

Ecol. Usually epiphytic in ridge forests, occasionally terrestrial in clearings, 2400 m.

116. Rhododendron pleianthum SLEUM. Reinwardtia 5 (1960) 122; Blumea 11 (1961) 119; *ibid.* 12 (1963) 103.

Small tree or shrub, terrestrial, 2–4(–6) m. Branchlets very robust, terete, tips laxly stellate-lepidote, 5–7 mm ø; internodes 9–16 cm. *Leaves* at the upper 1 or 2 nodes in 5–7-merous pseudowhorls, elliptic or obovate-elliptic, apex rounded or very broadly attenuate and blunt, base slightly but distinctly cordate, coriaceous, ± rigid, glabrous above at full age, laxly lepidote beneath (scales stellate-incised at the thin, early dissolute marginal zone, centre small, but slightly impressed), finally minutely impressed-punctulate beneath, flat, (6.5–)7–10(–14) by (4–)4.5–6.5(–9) cm, midrib dilated below, gradually narrowed upwards, impressed for the whole length above, thick and obtusely prominent beneath, 2–3 mm broad at the base, nerves *c.* 8 pairs, irregular, ± spreading, divided and anastomosing before the edge, impressed above, prominent beneath, veins and veinlets forming an impressed lax reticulation above, which is but faintly raised or ± obscure beneath; petiole flattened, glabrous 2–4(–6) by 2–3 mm. *Umbels* (8–)15–20-flowered. Outer perulae ovate, inner ones oblong-spathulate, obtuse, at the back densely, inside more laxly shortly substrigose or almost sericeous, up to 2 by 1 cm. Bracteoles linear-subspathulate, more densely short-hairy at the dorsal middle line, *c.* 2 cm by up to 2 mm. Pedicels densely lepidote and very shortly pubescent, *c.* 2 cm by 1 mm at anthesis. *Calyx* disk-shaped, slightly oblique, *c.* 4 mm ø, subglabrous dorsally, shortly subacutely 5-lobed, or occasionally with irregular 2–9 mm long teeth or laciniae, which are glabrous or very shortly pubescent, *c.* 1 mm wide at base. *Corolla* long-tubular below, ± expanded at the lobes, 8–9 cm long in all, initially very laxly and caducously lepidote outside, laxly hairy at the tube inside, white or cream, suffused with pink distally, or dark pink, tube rather straight, (5.5–)6–7 cm long, 0.4–0.5 cm ø at base, gradually dilated upwards to 0.7–0.9 cm, lobes obovate-spathulate, *c.* 2 cm across. *Stamens* 10, slightly longer than the corolla tube, unequal; filaments linear, subdensely or towards the apex more laxly hairy in the lower ¾, glabrous for the rest; anthers elongate-oblong, base obtuse, 4.5–5 by 1–1.2 mm, a little curved. *Disk* prominent, glabrous. *Ovary* elongate-cylindric, gradually tapering to the style, very densely yellowish-hairy or -tomentose, rather laxly lepidote (scales ± covered by the hairs), *c.* 8 by 2–2.5 mm; style nearly as long as the corolla tube, for about 10 mm subdensely to laxly hairy and lepidote above the base (the scales well visible among the hairs), glabrous otherwise; stigma turbinate-capitate. *Capsule* elongate-fusiform, densely hairy and lepidote, (5–)6–8 by *c.* 0.7–0.8 cm.

Distr. *Malesia*: New Guinea (Western, Eastern and Southern Highlands: Mts Hagen, Kerigomna, Wilhelm, Otto, and Giluwe).

Ecol. On edge of mossy forest-grassland, in ridge crest scrub or on high bank above creek, locally common, 2680–3260 m. *Fl.* July-Oct. ♀

Vern. *Wambu*, Mendi.

117. Rhododendron oliganthum SLEUM. Reinwardtia 5 (1960) 123.

Shrub, *c.* 1.2 m. Branchlets terete, slender, tips densely rufous-lepidote; upper internodes 1.5–3 cm. *Leaves* nearly opposite or in a pseudowhorl of 3 at the upper node only, subsessile, subovate-elliptic, apex shortly acuminate, obtuse, base truncate to rounded or subcordate, coriaceous, glabrous above at maturity, laxly lepidote beneath (scales thin, marginal zone irregularly dentate or incised, centre slightly impressed), margin somewhat recurved, (3–)3.5–5 by (1.5–)2–3 cm, midrib faintly impressed or nearly flat above, strongly raised beneath in the lower part, less so towards the apex of the lamina, nerves *c.* 8 pairs, rather straight, curved-anastomosing near the edge, prominent on both faces, veins laxly reticulate, raised specially beneath together with the veinlets; petiole 1–2 by 1–1.5 mm. *Flowers* solitary or in twos, terminal. Pedicels stoutish, oblique thickened below the calyx, rather densely lepidote and very shortly pubescent, 2.8–3 cm at anthesis. *Calyx* minute, shortly 5-lobed and wavy, *c.* 2.5 mm ø. *Corolla* broadly salver-shaped, intensely rose when fresh, tube cylindric, straight, 3.5–3.7 cm long, at base *c.* 4 mm ø, slightly dilated to 5–6 mm at the mouth, laxly lepidote and very laxly short-hairy outside, subdensely hairy inside in the basal part, less so upwards, glabrous at the throat, lobes ± spreading, broadly obovate to nearly rounded, 1–1.2 cm ø, lepidote outside at the base, otherwise glabrous. *Stamens* 10, somewhat exserted from the throat; filaments linear, subdensely to laxly hairy to the lower ⅔, glabrous distally; anthers oblong, base obtuse, *c.* 2.6 by 1 mm. *Disk* pubescent especially at the upper margin.

Ovary elongate-conical, densely hairy and lepidote, *c.* 7 by 2 mm, with 5 longitudinal furrows, gradually tapering to the style, the latter slightly exserted, *c.* 3.5 cm, laxly hairy and very laxly lepidote up to the middle, glabrous above; stigma thickly turbinate-capitate.

Distr. *Malesia*: SE. New Guinea (Mt Victoria: NW of the "Gap"), in crest forest, at 2895 m. *Fl.* Jan.

118. Rhododendron carrii SLEUM. Reinwardtia 5 (1960) 124.

Epiphytic shrub. Branchlets terete, tips glabrous or very laxly lepidote; internodes (2.5)–4–9 cm. *Leaves* in 3–4-merous pseudowhorls at the upper 3–4 nodes, ovate to subovate-rounded, apex broadly and shortly acuminate, rather obtuse, base manifestly subauriculate-cordate, sessile or nearly so, rigidly coriaceous, seemingly glabrous, but laxly set with minute irregularly star-shaped scales beneath (lens!) (leaving a minute point in the slightly impressed centre), flat, (4–)4.5–5.5 (–6) by (2.5–)3–5(–5.5) cm, midrib flat or slightly impressed above, stout and very prominent beneath in the lower part, less so towards the apex of the lamina, nerves *c.* 10 pairs, 2–3 of them from the base of the blade, the other from the midrib, all curved-ascending and anastomosing near the edge, prominent on both faces, reticulation rather dense and well visible especially beneath; petiole *c.* 1 by 1.5 mm. *Umbels* 4–5-flowered. Bracteoles linear. Pedicels stoutish, subdensely to laxly thin-lepidote, (1.3–)1.5–2.5 cm, thickened at apex. *Calyx* small, oblique, membranous, shortly (1 mm) obtusely 5-lobed, shortly fimbriate, *c.* 2 mm ø. *Corolla* salver-shaped, white, tube slightly curved, dilated gradually upwards, 5.5–6 cm long in full anthesis, at base *c.* 3.5 mm ø, below the lobes *c.* 7 mm, laxly substellate-lepidote outside, densely clad inside with retrorse hairs in the lower third or half, upwards more laxly so with spreading hairs, glabrous below the throat, lobes ± spreading, rounded-obovate, 1.2–1.5 by 1–1.5 cm, glabrous on both faces. *Stamens* 10, a little exserted; filaments narrow-linear, densely hairy at the base, more laxly and patently so in the middle, glabrous distally; anthers oblong, base obtuse, 2.8–3 by 1 mm. *Disk* densely short-hairy especially above. *Ovary* elongate-conical, densely clothed with appressed yellowish hairs and laxly clad with scales (± covered or hidden by the hairs), *c.* 10 by 2 mm, gradually extended into the style, the latter exserted, (5.5–)6–6.5 cm, laxly hairy and lepidote at the base for *c.* 5 mm only, glabrous otherwise; stigma thick-turbinate, crenulate.

Distr. *Malesia*: SE. New Guinea (Mt Victoria: NW of the "Gap"), once found on open hill side, 2440 m. *Fl.* Jan.

119. Rhododendron armitii F. M. BAILEY, Bot. Bull. Queensl. Dep. Agr. 10 (1895) 39; SLEUM. Reinwardtia 5 (1960) 124.

Shrub, dichotomously branched; bark whitish. Branchlets terete, tips sparsely to subdensely clad with stellate scales; internodes 3–7 (rarely up to 12) cm. *Leaves* in ± 4-merous pseudowhorls at the end of the branchlets, broadly elliptic to subobovate-elliptic, apex very shortly obtusely attenuate, base rounded in general, the very base truncate to slightly subcordate, coriaceous, firm, subdensely lepidote on both faces initially, early glabrescent above (only hair-like flakes, being the remains of the scales, present for a longer time), more persistently lepidote beneath (scales thin, rusty, not rarely on very minute rather flat epidermal elevations which are still visible when the scales have gone being paler than the intervenium, marginal zone thin, irregularly deeply incised, centre very small), flat, 7–9(–10) by 4–5(–6) cm, midrib impressed above, very prominent beneath especially towards the base, nerves 8–10 pairs, rather straight basally, sometimes bifurcate half their length, obscurely curved-anastomosing before the edge, somewhat raised above (but impressed in the middle), prominent beneath, veins laxly reticulate, more visible beneath, veinlets obscure; petiole semiterete, grooved above, lepidote, (6–)8–12 by *c.* 2.5 mm. *Umbels c.* 5-flowered. Perulae ovate to obovate-spathulate, densely hairy and laxly lepidote outside, fimbriate, up to 3 cm by 1.5 cm. Bracteoles linear-spathulate, laxly hairy, *c.* 2 cm by up to 2.5 mm. Pedicels subdensely lepidote, somewhat hairy only below the oblique calyx, 1.8–2.5 cm by *c.* 1 mm. *Calyx* distinct, lepidote and laxly hairy outside, glabrous inside, deeply 5-lobed, lobes deltoid, subacute, 2–3 by *c.* 2 mm at base, fimbriate, finally reflexed. *Corolla* salver-shaped, white touched with sea-shell pink, tube straight or slightly curved, 5.5–6.5 cm by 6–7 mm ø, a little wider at the 5-saccate base and somewhat expanded below the mouth, very laxly (caducously) lepidote or practically glabrous outside, densely long-hairy inside in the lower third, less densely so above, glabrous in the upper third, lobes broad-obovate to nearly rounded, spreading, glabrous, 1.8–2.2 by 1.3–1.7 cm. *Stamens* 10, slightly exserted from the throat; filaments linear (*c.* 1 mm) and densely patently hairy in the lower third, glabrescent above, filiform and completely glabrous in the upper third; anthers oblong, 4 by 1 mm, base obtuse. *Disk* glabrous. *Ovary* elongate-conical, 5-ribbed, *c.* 1.2 by 0.3 cm, densely set with subappressed yellowish or whitish hairs, which cover some scales, gradually tapering to the style, the latter stoutish and ± densely hairy and very laxly lepidote in the lower, glabrous and more slender in the upper half; stigma broad-obconical, distinctly 5-lobed.

Distr. *Malesia*: SE. New Guinea (Mt Dayman), once found on the summit, 2710 m. *Fl.* March.

120. Rhododendron tuba SLEUM. Reinwardtia 5 (1960) 125.

Terrestrial shrub, 2–5 m. Branchlets somewhat flattened, laxly lepidote, pruinose when dry; internodes 3–8(–10) cm. *Leaves* in 4–5-merous pseudowhorls at the upper 1 or 2 nodes, elliptic to oblong-elliptic, apex broadly acuminate, subacute, terminal gland not protruding beyond the leaf

margin, towards the base ± broadly attenuate, very base subtruncate or rounded, sometimes subcordate, coriaceous, subdensely lepidote on both faces initially, glabrescent above and dark olivaceous-green at full age, more persistently lepidote beneath (scales rather small, stellate-dented in the thin and early dissolute marginal zone, centre minute and impressed), finally laxly set with fine blackish pits beneath, flat, (4–)4.5–7 by 2.5–3.5 (–5, rarely up to 6) cm, midrib depressed above, thick, broad and prominent in the lower part beneath, narrowed upwards, nerves 6–8 irregular pairs divided and anastomosing before the edge, slightly impressed above, a little though distinctly raised beneath, reticulation rather obscure above, well visible, subdense and prominent beneath; petiole flattened, 2–4 by 1.5–2 mm. *Umbels* (4–) 5–7-flowered. Outer perulae ovate, inner ones obovate, ending in an apiculus or sharp point (1–3 mm), membranous, caducously lepidote at the tips dorsally, glabrous otherwise, a little shining, lepidote-ciliate, up to 1.5 by 1 cm. Bracteoles filiform below, somewhat subspathulate-dilated distally, very laxly lepidote or glabrous, up to 1.5 cm. Pedicels laxly stellate-lepidote, epilose, 1.2–2 cm by *c.* 1 mm. *Calyx* very obliquely disk-shaped, membranous, subglabrous, *c.* 4 mm ø, with 5 irregular short teeth (*c.* 1 mm) or longer laciniae (up to 4 mm). *Corolla* salver-shaped, laxly lepidote outside, laxly hairy in the lower ¾ of the tube inside, 6.5–7.5(–8) cm long in all, salmon-pink at the tube, white at the lobes, tube mostly slightly curved, 5.5–6.5 cm long, *c.* 5 mm ø at the base, not or very slightly dilated upwards, lobes ± spreading, obovate, 1–1.5 by 0.8–1.2 cm. *Stamens* 10, unequal, subequalling the corolla; filaments linear, laxly hairy in the lower ¾, glabrous for the rest; anthers subobovate-oblong, base contracted to a very short apiculus, *c.* 2.5 by 0.7 mm. *Disk* slightly prominent, hairy in the upper, glabrous in the lower part. *Ovary* cylindric, gradually tapering to the style, densely whitish hairy or -tomentose, minutely lepidote (the small scales covered by the hairs), *c.* 8 by 2.5 mm; style rather slender, as long as the stamens, laxly set with longish white hairs and scales in the lower half; stigma yellow, capitate, shortly 5-lobed.

Distr. *Malesia*: SE. New Guinea (N. side of summit of Mt Dayman).

Ecol. In margin of moss forest, at 2500–2750 m. *Fl.* June-Aug.

Note. *R. tuba* is in many respects intermediate between *R. carringtoniae* and *R. rhodoleucum*, both also known from the Maneau Range, and possibly a local natural hybrid between them.

121. Rhododendron rhodoleucum SLEUM. Blumea 11 (1961) 119.

Stiff, straggly shrub, (1–)1.5–3(–4) m, much branched distally. Branchlets rather robust, laxly lepidote at the upper internodes (3.5 cm by 2 mm), older parts early covered with thin ashy cork. *Leaves* in 4–6-merous pseudowhorls at the upper 1 (or rarely 2) nodes, (broadly) elliptic to subobovate-elliptic, (sub)sessile, apex shortly and broadly attenuate, obtuse, more rarely almost rounded, base ± deeply cordate, coriaceous, ± shining glabrous with age above, laxly lepidote beneath (scales flat, rather small, thin marginal zone rather wide, variously dented or angled, small centre slightly impressed), flat, (3–)4–7 by (2–)2.5–5(–6) cm, midrib narrowly impressed above, at base as wide as the petiole, decrescent distally, not much prominent beneath, nerves 6–8 irregular pairs, with several equally spreading and anastomosing veins between them, all conspicuously raised on both faces, as is the rather dense reticulation; petiole 0–1 mm. *Umbels* (4–) 5–6-flowered. Bracteoles almost filiform. Pedicels stoutish, subdensely or more laxly stellate-lepidote, epilose, *c.* 1.5 cm. *Calyx* very obliquely disk-shaped, indistinctly 5-lobed, 2.5–3 mm ø, ± lepidote dorsally. *Corolla* tubular, rather straight or a little curved, laxly lepidote at the tube outside, densely set with patent or retrorse hairs below, more laxly so upwards inside, lobes ± glabrous, tube red at the base, fading upwards to pink or salmon-pink, lobes white, tube 6–7(–7.5) cm long, 4–5 mm ø at base, gradually widened to *c.* 1 cm below the lobes, lobes ± spreading, obovate to subrotund, 1.5–2 cm. *Stamens* 10, a little exserted from the throat; filaments linear (*c.* 1.2 mm) and subdensely hairy below, narrower and more laxly subpatent-hairy upwards, glabrous in the upper ¼; anthers yellow, narrow-oblong, 3.5–4 by *c.* 1 mm, base obtuse. *Disk* hairy in the upper margin. *Ovary* subcylindric, 7–8 by 2 mm, densely appressed-hairy and lepidote, tapering to the style, the latter rather slender, densely or more laxly hairy and laxly lepidote in the lower ⅔, exclusively sparsely lepidote for 3–4 mm above, glabrous for the rest; stigma thick-turbinate, shortly 5-lobed. *Capsule* fusiform, *c.* 3.5 by 0.5 cm.

Distr. *Malesia*: New Guinea (Milne Bay Distr.: 3 peaks of the Maneau Range).

Ecol. On edge of (stunted) mossy forest, sometimes on very steep escarpments, 2290–2750 m, locally abundant. *Fl.* May-Oct.

122. Rhododendron pubitubum SLEUM. Reinwardtia 5 (1960) 126.

Shrub. Branchlets dark brown when dry, ± pruinose, tips laxly or very laxly lepidote; internodes 4–11 cm. *Leaves* in 3–5-merous pseudowhorls, elliptic or obovate elliptic, sometimes obovate, apex very broadly attenuate, obtuse to nearly rounded, occasionally very shortly retuse, broadly attenuate towards the base, the very base rounded, not rarely subcordate, subsessile, coriaceous, glabrous above at maturity, laxly to subdensely lepidote beneath (scales thin, marginal zone irregularly dentate or bitten, ± persistent centre blackish and sunk), subrevolute, 3–6 by 2.2–3.5(–4.2) cm, midrib slightly depressed above, much prominent beneath, evanescent distally, nerves 6–8 pairs, straight from the midrib at an acute angle, subparallel, curved anastomosing before the edge, very slightly impressed or ± obsolete above, prominent beneath, reticulation

lax and slightly visible beneath only; petiole 1–2 by 1–2 mm. *Umbels* 10–12-flowered. Perulae orbiculate to obovate, densely short-subsericeous on both faces, up to 1.5 by 1 cm. Bracteoles linear, densely rather longish patent-hairy, up to 1.5 cm by 0.5 mm. Pedicels stoutish, 8–12 mm, densely and patently greyish pubescent. *Calyx* minute, margin narrow, membranaceous, wavy and very shortly obtusely 5-lobed, somewhat hairy outside, glabrous inside. *Corolla* salver-shaped, white, scented, tube cylindric, straight, somewhat 5-saccate at the very base, barely dilated towards the mouth, (5–)5.5–6.5 cm by *c.* 2.5 mm, rather densely pubescent outside, subdensely to laxly and patently hairy inside in the lower $^4/_5$, lobes ± spreading, spathulate-obovate, hairy outside along the middle line, otherwise glabrous, 1–1.2 cm by 5–9 mm. *Stamens* 10, a little exserted; filaments narrow-linear, rather densely hairy below, more laxly so upwards, glabrous in the upper $^1/_5$; anthers broadly obovate-oblong, base obtuse, 1.8 mm. *Disk* glabrous below, pubescent at the upper margin. *Ovary* elongate-conical, densely covered with subpatent whitish hairs and scales (these covered or hidden by the tomentum), *c.* 5 by 1.8 mm, rather abruptly narrowed to the style; style as long as or a little shorter than the corolla tube, subdensely hairy and laxly lepidote below (the scales well visible there), laxly hairy in the middle, glabrous for the last 10 mm below the short-obconical stigma.

Distr. *Malesia*: Central Celebes (Masamba Distr.), two collections.

Ecol. In open places, on whether or not peaty soil on granite, 1700–2000 m. *Fl.* July-Aug.

123. Rhododendron pseudotrichanthum SLEUM. Blumea 12 (1964) 340. — *R. trichanthum* SLEUM. Reinwardtia 5 (1960) 127, *non* REHD. J. Arn. Arb. 26 (1945) 480.

Shrub. Branchlets robust, subterete; internodes 3–6 cm, upper ones rather densely lepidote and laxly hairy. *Leaves* in 3–4-merous pseudowhorls, oblong or elliptic-oblong, somewhat inequilateral, apex very broadly attenuate to rounded, not rarely minutely retuse, base very broadly attenuate to nearly rounded, thick-coriaceous, firm, glabrous above some hairs excepted, which are found at the very base, laxly lepidote beneath (scales small, ± deeply substellate-dentate, flat, centre red brown, small, slightly impressed), subrevolute, 8–12 by (3–)3.5–5 cm, midrib distinctly impressed above, stout and prominent beneath in the lower part, less so distally, nerves 6–8 pairs, rather spaced, ± straight below, curved-anastomosing before the edge, very slightly impressed above, a little prominent beneath, reticulation rather indistinct; petiole glabrous or clad with some hairs, rough, grooved above, 6–13 by 2–4 mm. *Umbels* 7–10-flowered. Perulae ovate, glabrous, irregularly shortly subserrate, up to 1.3 by 1 cm. Bracteoles linear, laxly hairy, *c.* 1 cm. Pedicels rather slender initially, finally more stoutish, densely clad with ± patent greyish hairs or nearly villous, very laxly lepidote, 2–3 (sometimes up to 4) cm at anthesis. *Calyx* annular, inconspicuous, *c.* 2 mm ø. *Corolla* salver-shaped, dilutely red-violet when fresh, tube cylindric, *c.* 3.5 cm long, at base somewhat inflated and 5-saccate, 3–4 mm ø, hardly or not widened towards the mouth, densely clothed all over with soft greyish hairs outside, equally so inside in the lower half, lobes obovate-rounded, spreading, 1–1.2 by 0.5–0.7 cm, rather densely hairy outside margin excepted, glabrous inside. *Stamens* 10, unequal, ± as long as the corolla; filaments linear, flattened, densely whitish hairy to the lower ⅓, glabrous for the rest; anthers oblong, base obtuse, 2.5 by 0.8 mm. *Disk* subglabrous. *Ovary* cylindric, 5-ribbed, very densely covered with subpatent hairs or almost villous, 4–6 by 1.5–2 mm, tapering to the slender style, which attains *c.* ⅔ of the length of the corolla and is laxly set with spreading hairs in its lower third; stigma narrow-obconical.

Distr. *Malesia*: Central E. Borneo (summit of Mt Kemul).

Ecol. In ridge forest, on humous, peaty soil, 1800–1850 m. *Fl.* Oct.

124. Rhododendron amabile SLEUM. Reinwardtia 5 (1960) 127.

Shrub. Branchlets subterete and densely lepidote at the ultimate, glabrous at the lower internodes (2.5–9 cm). *Leaves* in ± 4-merous pseudowhorls, subsessile, oblong or oblong-elliptic, sometimes elliptic, apex broadly attenuate, subobtuse, base subtruncate-rounded to subcordate, coriaceous, caducously lepidote, finally completely glabrous above, ± persistently and laxly lepidote beneath (scales irregularly dentate at margin, flat, each on top of a minute epidermal elevation), subrevolute, 2.5–6 by (1.2–)1.5–2.3(–2.8) cm, midrib flat or faintly impressed above, stout and very prominent beneath in the lower ⅔, less so upwards, nerves 7–8 pairs, rather straight below, curved-anastomosing near the edge, hardly visible above, somewhat raised beneath, reticulation ± inconspicuous; petiole lepidote, 2–3 by *c.* 1.5 mm. *Umbels* 7–9-flowered. Perulae ovate-acuminate, acute, outer ones lepidote and subdensely sericeous dorsally, inner ones sericeous only, up to 1.4 by 0.9 cm. Bracteoles linear to subspathulate-linear, laxly hairy, up to 1 cm by 1 mm. Pedicels rather densely lepidote and shortly subpatently greyish pubescent, 7–10(–12) by *c.* 0.5 mm. *Calyx* minute, membranous, wavy, irregularly fimbriate, *c.* 2.5 mm ø. *Corolla* salver-shaped, white below, rose coloured towards the limb, tube cylindric, straight, 3–3.3 cm, base rather distinctly 5-gibbous and *c.* 2.5 mm ø, slightly dilated towards the mouth, laxly short-hairy and caducously lepidote outside (scales completely gone at full anthesis), short-hairy in the lower half inside, glabrous otherwise, lobes slightly spreading, obovate-spathulate, 1–1.2 by 0.7–0.8 cm, hairy outside at the base, otherwise glabrous, though manifestly ciliolate. *Stamens* 10, slightly exserted; filaments linear, hairy in the lower third, glabrous above; anthers oblong, 1.8–2 by 0.7 mm, base obtuse. *Disk* prominently 10-gibbous, glabrous. *Ovary* subcylindric, densely

hairy and lepidote, 6–7 by 1.6 mm, rather abruptly narrowed to the style, the latter almost attaining the limb of the corolla, hairy and scaly to nearly the top; stigma thick, turbinate-capitate.

Distr. *Malesia*: Central Celebes (Masamba Distr.: near Limbung), *c.* 1700 m, rather common in secondary forest on stony and peaty soil. One collection. *Fl.* Aug.

125. Rhododendron radians J. J. S. Bull. Bot. Btzg III, 1 (1920) 403, t. 51; SLEUM. Reinwardtia 5 (1960) 130.

var. **radians.**

Shrub. Branchlets terete, tips laxly pubescent and lepidote; internodes 3–12.5 cm. *Leaves* 5–12 per pseudowhorl, ovate to ovate-oblong, subsessile, apex shortly obtusely attenuate, sometimes nearly rounded, base slightly to distinctly cordate, coriaceous, glabrous except the very base and the midrib above at maturity, laxly lepidote beneath (scales ± coarsely dentate or lacerate at the marginal zone, each mostly on top of a minute epidermal elevation, their ± persistent dark centre impressed), slightly or not revolute at the base, (2–)2.5–5.5 by 1–2.2(–2.9) cm, midrib impressed above, prominent beneath, nerves 6–8 pairs, distinctly anastomosing, slightly impressed above and prominent beneath in the oldest leaves, often ± obscure, reticulation inconspicuous; petiole laxly lepidote and pubescent, *c.* 1(–2) by 1–2 mm. *Umbels* 7–20-flowered. Outer perulae ovate-acuminate, acute, ± glabrous dorsally, inner ones ± spathulate, obtuse, rather laxly sericeous dorsally and internally, up to 1 by 0.8 cm. Bracteoles linear, patent-hairy, up to 1.5 cm by 0.5 mm. Pedicels rather stoutish, densely greyish-patent-pubescent, not lepidote, 7–13 mm. *Calyx* small, oblique, margin wavy and shortly 5-lobed. *Corolla* salver-shaped, white, tube straight-cylindric, (5–)5.5–6 cm, equally *c.* 3 mm wide, laxly to very laxly lepidote and epilose outside, subdensely to laxly short-hairy to ¾ of the lower part inside, glabrous distally, lobes spreading, broad-obovate-spathulate, very laxly lepidote outside, glabrous inside, 1–1.3 by 0.7–0.9 cm. *Stamens* 10, slightly exserted from the throat; filaments linear, laxly hairy to ¾ of their length, filiform and glabrous apically; anthers obovate-oblong, base obtuse, *c.* 1.8 by 1 mm. *Disk* glabrous at the base, but hairy within the upper part. *Ovary* subcylindric, 5 by 1.8 mm, densely ± patently hairy (and lepidote, but scales covered or hidden by the hairs), rather abruptly narrowed to the finally exserted style, which is laxly patent-pubescent to the lower $^5/_6$ and bears some scales in its lower part; stigma turbinate, rather small.

Distr. *Malesia*: Central Celebes (Mt Sinadji), one collection.

var. **minahasae** SLEUM. Reinwardtia 5 (1960) 130. — *R. verticillatum* (*non* LOW) KOORD. Minah. (1898) 514; KOORD.-SCHUM. Syst. Verz. 3 (1914) 100. — *R. jasminiflorum* (*non* HOOK.) SARASIN, Reisen in Celebes 1 (1905) 63.

Scales more deeply stellate-incised at the marginal zone, subdendroid, each on top of a more distinct minute epidermal elevation than in *var. radians*. Outer perulae ± obtuse, subsericeous at the apex or practically glabrous, somewhat shining. Style hairy and lepidote up to almost the top.

Distr. *Malesia*: NE. Celebes (Minahasa, on several volcanoes).

Ecol. In low forest, on volcanic grit or sandy soil, 1500–1700 m.

Vern. *Tente-in-talun*, Tt., Minahasa.

Note. The corolla of the type specimen from Mt Soputan is given as white and very fragrant by the collector, and other collections from that region also seem to have had white corollas, as far as this can be concluded from the dried material. Only KOORDERS says, that his specimen, also collected on Mt Soputan, has dark red corollas, but no corollas are preserved in his herbarium. BOESVELD, the collector of the type specimen of *var. minahasae*, says on the label, that he has found "a similar *Rhododendron* on Mt Klabat with red corollas", but I have seen no material from there which would agree with that. It remains open whether *var. minahasae* has always white flowers, or if, possibly, both white- and red-flowered forms exist together.

126. Rhododendron oreadum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 98; SLEUM. Reinwardtia 5 (1960) 132. — *R. filamentosum* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 97.

Shrub. Branchlets subangular, rather slender, tips subdensely lepidote, glabrescent below. *Leaves* in ± 3-merous pseudowhorls, lanceolate, sometimes broadly lanceolate, subinequilateral, apex acutely acuminate, base acutely attenuate, subcoriaceous, practically glabrous above at maturity, rather laxly stellate-lepidote beneath (scales thin, irregularly dentate or incised, flat centre small, faintly impressed), flat, 8–14 by (2.6–)3–4(–5) cm, midrib slightly impressed above, prominent beneath, nerves 8–12 pairs, rather dense together, curved-anastomosing before the edge, obscurely impressed above, raised beneath, veins and veinlets subinconspicuous on both faces; petioles laxly lepidote, 8–10 by 1.5 mm. *Umbels* compact, 8–12-flowered. Perulae ovate to broadly obovate, lepidote outside in the upper half, short-hairy otherwise on both faces in the upper, longer and appressedly so in the lower part, up to 3 by 1.8 cm. Bracteoles filiform, laxly hairy, up to 3 cm. Pedicels stoutish, lepidote, *c.* 2 mm. *Calyx* small, obtusely 5-lobed, *c.* 2.5 mm ø. *Corolla* salver-shaped, probably white when fresh, tube cylindrical, straight, *c.* 4.5 cm long, *c.* 4 mm ø at the slightly swollen base, not much (up to 8 mm) widened towards the throat, practically glabrous outside, pubescent to nearly the lobes inside, the latter broad-elliptic or elliptic-obovate, 1.6–1.8 by 0.9–1.3 cm, glabrous. *Stamens* 10, slightly exceeding the corolla tube; filaments linear and densely patent-pubescent in the lower half, gradually glabrescent above; anthers oblong, base obtuse,

c. 4 by 1 mm. *Disk* short-hairy in the upper part. *Ovary* cylindric, 8–10 by 1.7 mm, densely covered with longish, ± appressed, forwardly directed hairs and some scales between, gradually attenuate to the style, which is but laxly covered with the type of hairs found on the ovary to ⅔ its lower part, glabrous above, *c.* 4 cm at full anthesis; stigma shortly broad-obconical, indistinctly 5-lobed.

Distr. *Malesia*: W. New Guinea (Mt Carstensz), 1095–1495 m.

127. Rhododendron cinerascens SLEUM. Reinwardtia 5 (1960) 130; Blumea 12 (1963) 103.

Shrub, *c.* 2 m. Branchlets terete, rather slender, ashy, tips laxly lepidote; internodes 2.5–10 cm. *Leaves* 4–6 per pseudowhorl, lanceolate-oblong to obovate-oblong, apex shortly obtusely acuminate, rarely subrotundate, base cuneate into the petiole, coriaceous, subdensely lepidote initially on both faces (scales thin, flat, irregularly incised at the marginal zone, small centre impressed), finally glabrescent above, ± persistently lepidote beneath, entire, flat, 4–5.5 by (1.2–)1.5–2(–2.3) cm, midrib shallowly impressed above, prominent beneath especially in the lower part, nerves 6–8 pairs, rather inconspicuous on both faces; petiole ± flattened, grooved above, lepidote initially, 6–10 by *c.* 1.3 mm. *Umbels* 5–6(–7)-flowered. Perulae ovate to obovate-spathulate, laxly lepidote dorsally and sericeous apically, glabrous internally, ciliate and set with scales at the margin, up to 1.5 by 0.7 cm. Bracteoles filiform to subspathulate-linear, 1–1.5 cm by *c.* 1 mm. Pedicels rather slender, densely lepidote, laxly and very shortly hairy, 9–20 by 0.5 mm. *Calyx* small, very oblique, in form of a thin, wavy, irregularly 5-dentate rim, one or the other teeth elongate to 2–4 mm. *Corolla* salver-shaped, white, 5–6 cm long in all, tube cylindric, straight or slightly curved, (3.7–)4–5 cm, *c.* 2.5 mm ø at base, gradually dilated to 3–3.5 mm at the throat, rather densely lepidote, not hairy outside, laxly pubescent inside in the lower third only, lobes spreading, spathulate-obovate, *c.* 1 by 0.6–0.7 cm, ± laxly lepidote outside, glabrous inside. *Stamens* 10, well exserted from the corolla tube; filaments filiform, hairy in the lower half only; anthers oblong, base obtuse, *c.* 2.5 mm. *Disk* very shortly hairy at the upper margin. *Ovary* elongate-cylindrical, *c.* 5 by 1.2 mm, subdensely lepidote and subappressed-hairy, gradually narrowed to the style, the latter exserted for *c.* 1 cm, lepidote and subpatently hairy for 3 cm above the base, otherwise lepidote only to nearly the top; stigma shortly obconical-capitate.

Distr. *Malesia*: W. New Guinea (Wissel Lakes area), in secondary forest on *Sphagnum*, 1750 m. Two collections. *Fl.* April-May.

Vern. *Warade*, Kapauku.

128. Rhododendron brachypodarium SLEUM. Blumea 12 (1963) 103; Jahrb. Rhodod. Ges. Bremen (1963) 23, *in text*, f. 27. — **Fig. 25.**

Epiphytic or terrestrial shrub, 1–2(–3) m. Branchlets densely lepidote, greyish pruinose when dry; upper internodes (2–)3–10 cm by 2–3 mm. *Leaves* ± reflexed, in 4(–5)-merous pseudowhorls at the 2–3(–4) upper nodes, elliptic or more often obovate-elliptic, rarely obovate, apex broadly attenuate, obtuse or rounded, base more broadly or narrowly cuneate, coriaceous, subdensely lepidote on both faces initially, rather early glabrescent above with age, more tardily so beneath (scales flattish, marginal zone angular or dentate to various degree, centre rather small, slightly impressed), entire, hardly revolute, (4–)5–7(–8) by 2–3.5(–4) cm, midrib thick and grooved in the lower, becoming flat and slightly impressed or even evanescent distally above, as thick as the petiole at the base, gradually decrescent upwards beneath, nerves 7–10 pairs, very slightly depressed or obscure above, indistinctly curved-anastomosing and a little raised beneath, reticulation subinconspicuous; petiole very densely lepidote initially, tardily glabrescent, 6–10(–12) by 1.5–2 mm. *Umbels* (8–)10–12(–14)-flowered. Perulae greenish when fresh, outer ones ovate, firm, lepidote at apex and margin, fimbriate, inner ones much thinner, broadly spathulate, up to 2 by 1.3 cm, very laxly hairy in the lower part on both faces, otherwise glabrous. Bracteoles filiform, laxly hairy, up to 1.8 cm. Pedicels densely stellate-lepidote, 4–8 by 0.5 mm. *Calyx* much oblique, rim-like, obscurely lobed, lepidote dorsally, *c.* 2 mm across. *Corolla* narrowly tubular, pure white, 4–5.5(–6) cm long in all, ± densely stellate-lepidote outside, short-hairy at the tube inside, tube straight, 3.5–4(–5) cm by 2–2.5 mm, hardly dilated distally, lobes spreading or a little reflexed, obovate-oblong, *c.* 1 by 0.4–0.5 cm. *Stamens* 10, exceeding the corolla tube for *c.* 1 cm; filaments narrow-linear and densely hairy for the lower ¾, more slender and glabrous for the rest; anthers narrow-oblong, (3–)4 mm, base obtuse. *Disk* slightly prominent, laxly short-hairy. *Ovary* narrowly cylindric, *c.* 8 by 1.3 mm, whitish or yellowish tomentose (the hairs covering the scales), tapering to the style, the latter slender, exserted from the throat for *c.* 5 mm, densely hairy below, more laxly hairy and densely lepidote above in the lower ⅔ part, densely and exclusively lepidote for the rest; stigma obcuneate, glabrous.

Distr. *Malesia*: W. New Guinea (Vogelkop Peninsula: Tamrau, Tohkiri, and Nettoti Range).

Ecol. Both in *Castanopsis* and *Nothofagus* forest, also in mossy crest or riverine forest, 1200–2000 m. *Fl.* Oct.-Dec.

Note. The flowers become fragrant towards the evening.

129. Rhododendron goodenoughii SLEUM. Reinwardtia 5 (1960) 131.

Shrub. Branchlets 3–6 mm ø, terete, pruinose in the older parts, glabrous, tips sparsely lepidote; internodes 4–10 cm. *Leaves* in 4–6-merous pseudowhorls, elliptic to obovate-elliptic, apex very shortly acuminate, sometimes nearly rounded, base attenuate to the petiole and a little winged, coriaceous, firm, glabrous above at maturity,

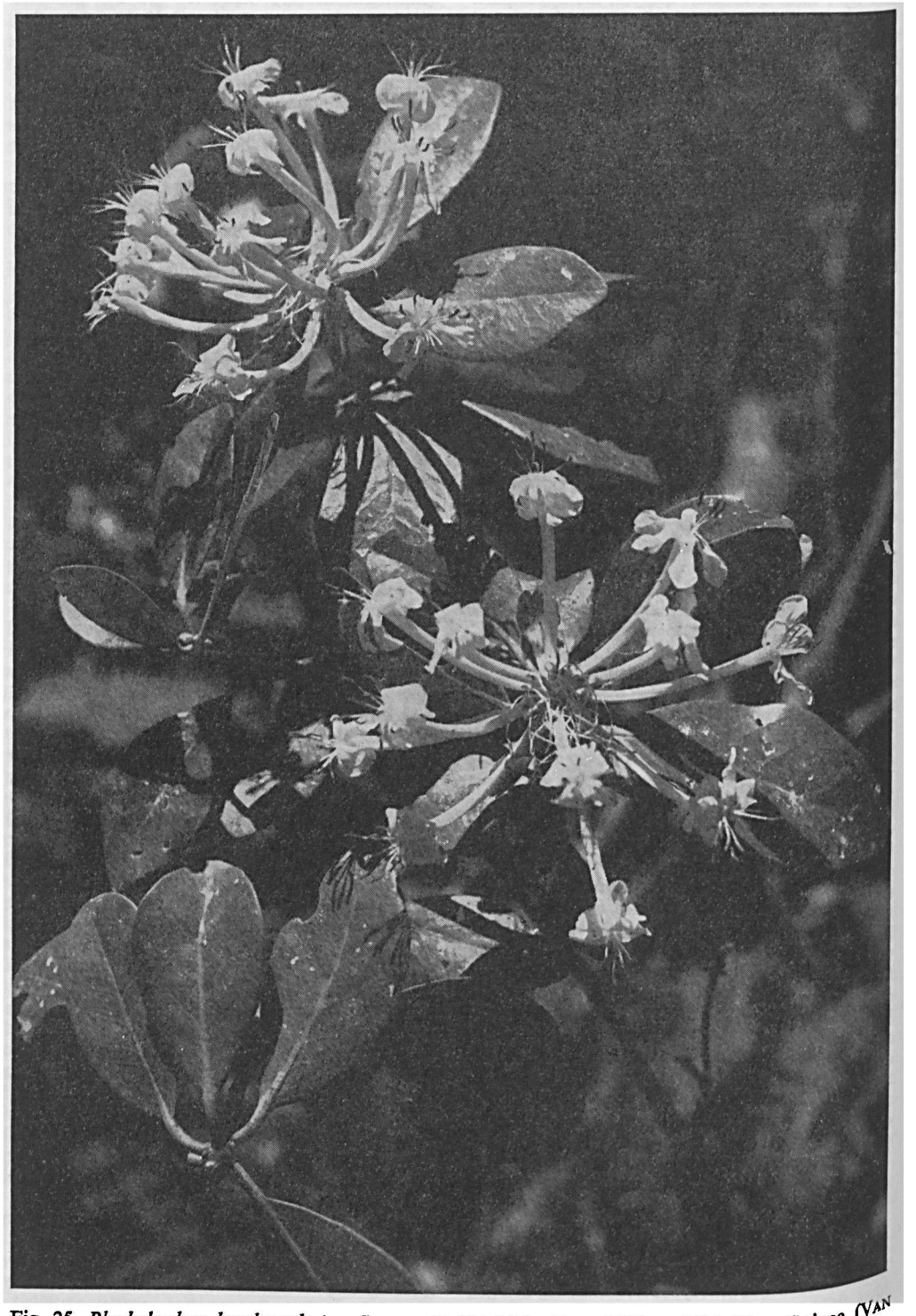

Fig. 25. *Rhododendron brachypodarium* SLEUM., Tohkiri Mts East, 1400 m, NW. New Guinea (VAN ROYEN & SLEUMER 7065) (SLEUMER, 1961).

laxly lepidote beneath (scales small, irregularly dentate or incised at the margin, centre very small impressed), 7–11 by 4–6 cm, midrib but slightly impressed above, very prominent below, less so towards the apex of the lamina beneath, nerves 7–9 pairs, the lowest 2 from the base of the blade, all at an acute angle from the midrib, rather straight below, curved and obscurely anastomosing distally, faintly impressed above, prominent beneath, ± obscure sometimes towards the edge, no reticulation; petiole flattened, grooved above, lepidote initially, a little rough, 7–15 by 2–3 mm. *Umbels* ± 10-flowered. Perulae ovate, rather blunt, outer ones rather densely lepidote and very shortly hairy dorsally, longer and appressed-pubescent internally and lepidote at the apex only, up to 2.5 by 1.8 cm. Bracteoles narrow-linear, nearly glabrous, up to 1.5 cm by *c.* 0.5 mm. Pedicels subdensely lepidote, not hairy at all, 3–5(–7) by *c.* 1 mm. *Calyx* small, very oblique, indistinctly lobed, *c.* 2.5 mm ø. *Corolla* salver-shaped, probably white when fresh, 5.7–7 cm long in all, tube cylindric, slightly curved, 4.5–5(–5.5) cm, *c.* 4 mm ø at the 5-pouched base, *c.* 6 mm at the throat, subglabrous outside below, very laxly lepidote in the upper part, subdensely hairy downwards internally, glabrescent distally, lobes spreading, obovate-rounded, 1.2–1.5 by 1–1.3 cm, very laxly lepidote outside at the base, otherwise glabrous. *Stamens* 10, ± equalling the corolla in length; filaments linear, subdensely hairy in the lower ⅔, nearly filiform and glabrous above; anthers oblong, 5–6 by 1 mm, each theca bearing a very short basal apiculus. *Disk* subglabrous. *Ovary* elongate-cylindric, densely clothed with yellowish, appressed hairs and scales (the latter covered or hidden by the hairs), 7–8 by *c.* 2 mm, gradually narrowed to the rather stoutish style, the latter *c.* 5 cm, densely clad with scales and forward directed hairs in the lower ⅔ only, glabrous for the ultimate 1–1.5 cm; stigma thick-obconical.

Distr. *Malesia*: SE. New Guinea (Mt Goodenough), one collection.

130. Rhododendron pneumonanthum SLEUM. Reinwardtia 5 (1960) 132. — *R. jasminiflorum* (*non* HOOK.) RIDL. J. Str. Br. R. As. Soc. *n.* 63 (1912) 60; MERR. Sarawak Mus. J. 3 (1928) 541.

Epiphytic shrub. Branchlets terete, very densely rusty stellate-lepidote at the upper 2–3 internodes, glabrescent and a little rough below; internodes 2.5–6 (rarely up to 10) cm. *Leaves* 4–6 per pseudowhorl, elliptic-oblong or -obovate, apex blunt, nearly rounded, sometimes very shortly retuse, base rounded or mostly slightly cordate, subsessile, coriaceous, rather densely stellate-lepidote initially on both faces (scales rather early caducous, each on top of a minute epidermal elevation, often almost cup-like, margin deeply incised, centre faintly impressed), glabrous above at maturity, lepidote beneath for a longer time, finally glabrescent and rather smooth to the touch, slightly revolute at the margin, (4.5–)5–7.5(–9) by (2–)2.5–4(–5) cm, midrib distinctly sunk above, very prominent beneath in its lower part, less so towards the apex of the lamina, nerves in 6–8 pairs, rather inconspicuous on both faces, no reticulation; petiole densely lepidote, 1–2 (rarely up to 3) by 1.5–2 mm. *Umbels* (6–)8–15-flowered. Perulae ovate to obovate-spathulate, obtuse, laxly lepidote dorsally, up to 1 by 0.7 cm. Bracteoles linear, glabrous, up to 1.5 cm. Pedicels rather stoutish, densely stellate-lepidote, furthermore clad with very short hairs, 1.5–2 cm. *Calyx* minute, obscurely wavy or lobulate, hardly 2.5 mm ø. *Corolla* salver-shaped, white or suffused with rose or light violet, but faintly scented, tube cylindric, straight, 3–3.5 cm long, shortly 5-gibbous and *c.* 3.5 mm ø at the base, somewhat swollen in the lower half (*c.* 4.5 mm ø), narrowed to *c.* 2.5 mm at the throat, ± densely lepidote (scales ± caducous), not pubescent outside, laxly hairy in the lower third, glabrous otherwise internally, lobes spreading, broad-obovate, 1–1.4 by 0.6–0.9 cm, sparsely lepidote outside at the base and along the midline, glabrous inside. *Stamens* 10, shortly exserted; filaments linear, laxly hairy above the base only; anthers oblong, truncate at each end, 2.2–2.5 mm. *Disk* glabrous below, short-pubescent above. *Ovary* elongate-cylindric, densely lepidote and subdensely very shortly patent-pubescent, *c.* 6 by 1.8 mm, gradually narrowed to the style, the latter somewhat exserted, rather densely or laxly lepidote and hairy in the lower half, glabrous above, *c.* 3 cm; stigma capitate.

Distr. *Malesia*: Borneo (Sarawak and SE. Borneo).

Ecol. In montane (mossy) forest, 1700-2400 m, once said to have been found at only 35 m. *Fl.* May, Oct.-Nov.

131. Rhododendron orbiculatum RIDL. J. Str. Br. R. As. Soc. *n.* 63 (1912) 60; MERR. En. Born. (1921) 462; SLEUM. Reinwardtia 5 (1960) 206; Blumea 11 (1961) 127; *ibid.* 12 (1963) 112. — *R. suaveolens* SLEUM. Bot. Jahrb. 71 (1940) 147; Reinwardtia 5 (1960) 133.

Treelet or shrub, sometimes epiphytic, 0.3–3 m. Branchlets terete or subangular, tips laxly lepidote, older parts glabrous; internodes 2–6.5(–8) cm. *Leaves* 3–4(–5) per pseudowhorl, or 2 leaves nearly opposite, subsessile, orbicular, broad-elliptic, or subovate- to suborbicular-elliptic, apex ± rounded or very broadly obtusely attenuate, apiculate by a thick, a little protruding gland, base rounded or mostly slightly to manifestly cordate, coriaceous, firm, at maturity glabrous above, laxly lepidote beneath (scales small, thin, margin ± deeply substellate-incised or -lobed, centre dark, ± impressed), flat, (2–)4–10(–12) by (2–)4–6(–9) cm, midrib flat or impressed in the lower part only above, slightly raised or mostly ± flat beneath, nerves (5–)7–8 pairs, slightly curved and rather indistinctly inarching before the edge, a little raised, though often sunk in the middle, above, ± obscure beneath, reticulation obsolete; petiole 1–2 by (2–)3–4 mm. *Umbels* (4–)5–7(–9)-flowered. Outer perulae ovate-acuminate, laxly lepidote dorsally, inner ones larger, ovate to spathulate,

blunt, glabrous, up to 2 by 1 cm. Bracteoles linear to filiform, glabrous, up to 1.5 cm. Pedicels rather stoutish, all over densely clothed with ±patent greyish whitish hairs, lepidote only just below the calyx, (1–)1.5–2 (sometimes up to 3.5) cm. *Calyx* small, margin, thin, laxly lepidote and may be pubescent outside, very shortly obtusely 5-lobed. *Corolla* ± salver-shaped, white or pale pink, scented, (5.5–)6–6.5 cm long in all, tube ± cylindric, 3.5–4 cm long, at the base 5-pouched and 4–5 mm ø, often gradually slightly narrower towards the lobes, laxly lepidote or glabrous outside, very laxly hairy in the lower half inside, lobes spreading, broadly obovate to suborbicular, glabrous, (1–)1.5–2 (rarely up to 2.5) cm ø. *Stamens* 10, hardly exserted; filaments linear, laxly hairy above the base, subfiliform and glabrous in the upper half; anthers oblong, apex truncate, each cell with a short basal apiculus, 2.5–3.5 by 1 mm. *Disk* subglabrous below, puberulous above. *Ovary* elongate-conical, 6–8 by 1.5–2 mm, densely set with short spreading hairs and scales, the latter ± covered by the hairs (more discernible towards the apex of the ovary), gradually tapering to the style, the latter laxly hairy except the uppermost part, scarcely or not lepidote, widely exserted; stigma subturbinate, deeply 5-lobed. *Capsule* narrow-fusiform, 5-ribbed, laxly lepidote and hairy, *c.* 4 by 4 mm, pedicel 3–5 cm.

Distr. *Malesia*: Borneo (Sarawak; Brunei; North Borneo: Mt Kinabalu).

Ecol. On Mt Kinabalu often epiphytic and with larger leaves in ridge forest between 1220 and 2135 m. In N. Sarawak and Brunei rarely epiphytic, generally terrestrial and found on extreme hill '*kerangas*', *i.e.* low scrubby vegetation on bare sandstone rocks, eroding into white sand, or in elfin woodland on rugged hill crest, 800–1750 m, locally abundant. *Fl.* Jan.-Dec.

Vern. *Kaju ala*, M.

132. Rhododendron edanoi MERR. & QUISUMB. Philip. J. Sc. 83 (1953) 333; SLEUM. Reinwardtia 5 (1960) 134.

Shrub, *c.* 1 m. Branchlets terete, very densely and ± scurfy rusty-stellate-lepidote at the uppermost internodes, glabrescent below; internodes 2–5.5 cm. *Leaves* 4–6 in a pseudowhorl, oblong-elliptic to obovate-oblong, apex very broadly attenuate, obtuse to rounded, base broadly attenuate to the petiole, coriaceous, glabrous and somewhat lustrous above when old, densely lepidote beneath (scales rather early caducous, each on top of a minute epidermal elevation, which remains for a rather long time underneath, margin deeply irregularly incised, centre very small), subrevolute, (2.5–)3–5.5 by 1.5–2.5 cm, midrib impressed above, strongly raised beneath, nerves 4–6 pairs, rather straight-ascending, anastomosing, slightly impressed above, faintly prominent or obscure beneath, reticulation obsolete; petiole semiterete, grooved above, lepidote, 5–7 by *c.* 1.5 mm. *Umbels* ± 7-flowered. Perulae ovate to elliptic or spathulate, densely lepidote outside in the upper third, glabrous elsewhere, up to 1.5 by 0.7 cm. Bracteoles linear to subspathulate, up to 1.5 cm. Pedicels rather slender, densely stellate-lepidote and laxly short-hairy, 9–12(–15) mm. *Calyx* disk-like, small, suboblique, membranous, margin narrow and obscurely 5-lobed. *Corolla* salver-shaped, white, tube cylindric, straight or but slightly curved, 2–2.5 cm in all, 2.5–3 mm ø, densely stellate-lepidote outside, laxly hairy inside in the lower third, glabrous upwards, lobes spreading, elliptic to broadly obovate, 0.8–1 by 0.6–0.7 cm, outside laxly lepidote, inside glabrous. *Stamens* 10, slightly exserted; filaments linear, subdensely hairy above the base, glabrous for the rest; anthers oblong, base obtuse, 3 by 1 mm. *Disk* densely hairy. *Ovary* cylindric, 5 by 1.8 mm, densely lepidote and short-hairy, rather abruptly attenuate to the style, the latter *c.* 2.5 cm, pubescent and lepidote in the lower third, laxly pubescent in the middle, glabrous in the upper half; stigma obconical-subcapitate.

Distr. *Malesia*: Philippines (Palawan: Mt Mantalingahan, Brooke's Point), in moss forest at 1725 m. *Fl.* May.

133. Rhododendron loranthiflorum SLEUM. Notizbl. Berl.-Dahl. 12 (1935) 485; Reinwardtia 5 (1960) 134; Blumea 11 (1961) 120.

Epiphytic, much branched shrub. Branchlets smooth, older parts terete and pruinose, tips subangular or flattened and ± densely rusty-lepidote; internodes 1.5–12 cm. *Leaves* in 3–5-merous pseudowhorls, sometimes only 2 opposite on the same node, obovate, apex broadly obtusely attenuate or mostly ± rounded, base cuneate, subcoriaceous, lepidote on both faces initially, glabrous above with age, subdensely and ± persistently lepidote beneath (scales thin, irregularly and rather shallowly dentate or lacerate at the margin, centre slightly impressed), subrevolute, 3.5–5(–6) by 2–2.5 cm, midrib faintly impressed above, prominent beneath especially in the lower part, nerves 4–5 pairs, indistinct on both faces, reticulation obscure; petiole rather slender, 5–7 mm. *Umbels* 4–5-flowered. Perulae ovate, thin, very laxly lepidote or glabrous, up to 7 by 4 mm. Bracteoles filiform, glabrous, 6–7 mm. Pedicels slender, laxly lepidote, not hairy at all, *c.* 10 mm. *Calyx* minute, disk-shaped, indistinctly 5-lobed. *Corolla* salver-shaped, white, tube cylindric, somewhat curved in anthesis, 2–2.5 cm by 2.5–3 mm, densely lepidote outside (the scales thickish, subentire), laxly papillose-hairy in the lower half inside, lobes ovate-oblong, spreading in a nearly right angle, lepidote outside, glabrous inside, *c.* 5 by 2.5 mm. *Stamens* 10; filaments filiform, shortly hairy in the lower ⅔, nearly as long as the corolla tube; anthers oblong, base obtuse, 2 mm. *Disk* low, glabrous. *Ovary* subcylindric, slightly 5-ribbed, densely lepidote (scales thickish, subentire) and very shortly subpatently hairy, gradually tapering to the style, the latter *c.* 2.2 cm, lepidote and hairy in the lower part, exclusively hairy above respectively glabrous below the thick subcapitate stigma. *Capsule* cylindric, slender, curved, attenuate

apically, 5-ribbed, ± densely rusty-lepidote and short-hairy, 4–4.5 cm by *c.* 3 mm, on fruit-pedicel *c.* 1.5 cm.

Distr. Melanesia: New Britain (headwaters of Matabunu Creek, epiphyte in high rain-forest, 180 m) and in the Solomon Is. (Bougainville, near Koniguru, Buin, in rain-forest at *c.* 1000 m).

134. Rhododendron retrorsipilum SLEUM. Blumea 11 (1961) 120; *ibid.* 12 (1963) 103.

Epiphytic shrub. Branchlets rather slender, *c.* 2 mm ø, subdensely lepidote initially, very early glabrescent and greyish corticate; upper 3–4 internodes (1–)2–4 cm, lower ones hardly longer. *Leaves* in ± 3-merous pseudowhorls at the upper 1 or 2 nodes, elliptic, apex and base broadly obtusely attenuate or more often almost rounded, coriaceous, subdensely lepidote initially on both faces, earlier glabrescent above than beneath, not rough to the touch (scales subdendroid, each on top of a minute or very minute, finally ± evanescent epidermal tubercle, small, marginal zone deeply stellate-incised, centre minute, deepened and protracted into a shorter or longer foot), hardly revolute at the very edge, 4–6.5 by 2.5–4.2 cm, midrib very narrowly impressed above, as thick as the petiole and much raised in the basal part beneath, gradually narrowed and less prominent upwards and longitudinally striate beneath, nerves *c.* 5 pairs, spreading, rather straight, faintly or not impressed above, a little raised beneath, no reticulation; petiole 6–8(–10) by 1–1.5 mm. *Umbels* ± 6-flowered, glabrous in all outer parts. Floriferous buds ovoid-oblongoid, 2.3 by 0.8 cm, outer perulae ovate, hardly 4 mm, inner ones gradually larger, up to 1.5 cm, subdensely set with sessile scales in the upper dorsal part, fimbriate. Pedicels rather slender, finely short-pubescent, 5–8 mm. Bracteoles linear, up to 1 cm. *Calyx* suboblique, disk-shaped, *c.* 2.5 mm ø, irregularly 5-lobed, lobes broadly deltoid, subacute, rather long whitish fimbriate, ± reflexed at anthesis. *Corolla* salver-shaped, white, tube 2–2.3 by *c.* 0.3 cm, subdensely set with retrorse white hairs to nearly the mouth inside, lobes narrow-spathulate, ± horizontally spreading, 8–10 by 3–4 mm. *Stamens* 10, very unequal, the shortest a little, the longest (3.5 cm) much exserted from the corolla tube; filaments filiform, densely clothed with white retrorse hairs almost to the top; anthers narrow-oblong, 3 by *c.* 0.7 mm; cells subapiculate-protracted at base, obtuse. *Disk* not much prominent, glabrous at the very base, hairy above. *Ovary* elongate-cylindric, 5–6 by *c.* 1.5 mm, densely set with appressed, forward directed hairs and with scales (which are almost hidden by the hairs), gradually narrowed to the style, the latter slender and a little longer than the corolla tube, densely hairy below, more laxly so and more distinctly lepidote upwards, glabrous but for the ultimate part below the capitate 5-lobed stigma.

Distr. *Malesia*: E. New Guinea (Morobe Distr.: range above Markham Point near Lae), at 600–900 m. *Fl.* Jan.–Feb.

135. Rhododendron subpacificum SLEUM. Blumea 12 (1963) 105.

Epiphytic shrub. Branchlets slender; internodes (1–)2–6 cm. *Leaves* in 3–4-merous pseudowhorls at the upper 2–3 nodes, oblong-obovate, apex broadly attenuate to rounded, base cuneate to the petiole, subcoriaceous, glabrous above, laxly lepidote beneath (scales small, flat, thin, margin angular or dented to various degree, centre small, slightly depressed), hardly revolute, (3.5–)4–5.5 by 1.5–2.3 cm, midrib narrowly impressed above, prominent above, prominent beneath, nerves 3–4 pairs, curved-inarching, rather obscure above, a little raised beneath, no reticulation; petiole (2–)3(–4) by 1 mm. *Umbels* 3-flowered. Bracteoles linear, glabrous, up to 6 mm. Pedicels slender, laxly caducously lepidote, glabrescent, or already glabrous in flowering time, 1–1.2 cm. *Calyx* patellar, shortly 5-lobed and wavy, reflexed, *c.* 2 mm across. *Corolla* salver-shaped, white, thin, scented, *c.* 4 cm long in all, tube straight, *c.* 3.5 cm by 3 mm, laxly substellate-lepidote outside, papillose-hairy in the lower third inside, lobes almost horizontally spreading, oblong-obovate, laxly lepidote outside, 6–8 by *c.* 4 mm. *Stamens* 10, subequalling the corolla; filaments filiform, papillose-hairy in the lower half, otherwise glabrous; anthers oblong, base obtuse, 1.5 mm. *Disk* glabrous below, otherwise densely hairy. *Ovary* cylindric, *c.* 6 by 1.5 mm, subdensely set with forward directed hairs and scales, tapering to the slender style, which is lepidote and hairy for the lowest 5 mm, and exclusively set with roundish scales almost to the slightly thickened stigma.

Distr. Melanesia: Solomon Is. (New Georgia group, Vangunu I.).

Ecol. On narrow ridge with stunted forest on crater rim at *c.* 600 m. *Fl.* Dec.

136. Rhododendron jasminiflorum HOOK. Bot. Mag. (1850) t. 4524; MIQ. Fl. Ind. Bat. 2 (1859) 1059; CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 463; HENSLOW, J. R. Hort. Soc. 13 (1891) 252, 262, f. 38, f. 42 (*fol.*), f. 43c (*fl.*); RIDL. J. Str. Br. R. As. Soc. *n.* 23 (1891) 145; K. & G. J. As. Soc. Beng. 74, ii (1905) 77; KOORD. Exk. Fl. Java 3 (1923) 7; RIDL. J. Fed. Mal. St. Mus. 7 (1916) 45; MILLAIS, Rhodod. (1917) 195; RIDL. Fl. Mal. Pen. 2 (1923) 218; BURK. & HOLTT. Gard. Bull. S.S. 3 (1923) 57; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256; Mal. Nat. J. 6 (1950) 251, f. 244; SLEUM. Reinwardtia 5 (1960) 128. — *R. elongatum* BL. Fl. Jav. Pl. inéd. (1863–83) t. 7 B, f. 1; STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 388. — *Azalea jasminiflora* (HOOK.) O. KTZE, Rev. Gen. Pl. 2 (1891) 387.

KEY TO THE VARIETIES

1. Corolla tube laxly to densely short-hairy.
2. Leaves rather narrow to ovate-oblong, cuneate to subcordate at the base. Branchlets puberulous . . . . . 3. *var.* **heusseri**
2. Leaves wider, elliptic to broadly subovate-elliptic, rounded to cordate at the base.

Branchlets not puberulous **2. *var.* punctatum**
1. Corolla epilose outside, except some scattered hairs which may occur at the very base.
3. Corolla hairy or papillose inside in the lower half only . . . . . **4. *var.* copelandii**
3. Corolla tube hairy inside for the full length.
4. Leaves obovate-elliptic to broadly elliptic, sometimes suborbicular, base ± rounded to cordate. . . . . **1. *var.* jasminiflorum**
4. Leaves oblong, base broadly cuneate. **5. *var.* oblongifolium**

1. *var.* jasminiflorum.

Small, mostly epiphytic shrub, sometimes terrestrial, also scrambling, up to 2.5 m. Branchlets subterete, upper internodes 1.5–4 cm, ± densely substellate-lepidote, lower ones up to 9 cm and glabrescent. *Leaves* in 3–5-merous pseudowhorls at the upper nodes, broadly obovate-elliptic or elliptic, sometimes suborbicular, mostly widest in the middle, apex broadly obtusely (rarely subacutely) acuminate, or rounded, base truncate-rounded or mostly slightly cordate, subsessile, coriaceous, dark green and a little glossy above, paler and rather dull beneath, initially lepidote but readily glabrescent above, rather laxly substellate-lepidote all over the undersurface, which may be rather rough to the touch (scales sometimes subdendroid, with an irregularly and ± deeply dentate or incised margin, normally each on top of a minute and blunt epidermal elevation, faintly impressed in it with the centre), margin ± revolute in dry specimens, 2.5–5(–6) by (1–) 1.5–3.2(–3.6) cm, midrib slightly impressed above, strongly raised beneath, nerves *c.* 5 pairs, rather straight, anastomosing, mostly ± inconspicuous on both faces or faintly prominent only, reticulation obscure; petiole mostly but 2–3, occasionally up to 7 mm long, 1.5–2 mm ø, lepidote. *Umbels* (3–)5–8(occasionally up to 20)-flowered. Perulae reddish when fresh, ovate to obovate-spathulate, obtuse, glabrous or rarely laxly lepidote near the top, irregularly ciliate, ± shining, up to 1 by 0.6 cm. Bracteoles linear, glabrous, up to 1 cm by 0.6 mm. Pedicels rather slender, densely and patently short-hairy and substellate-lepidote, 8–11 mm. *Calyx* obscurely obtusely 5-lobed, *c.* 2 mm ø. *Corolla* salver-shaped, very fragrant like *Narcissus*, pure white, or flushed pink below the throat, tube cylindric, ± straight, base slightly 5-gibbous, laxly lepidote (but not hairy) outside, laxly hairy from the base to near the mouth inside, 3.5–4 (–4.3) cm by 3–4 mm, lobes spreading horizontally, broadly obovate-spathulate, very laxly or not lepidote outside, glabrous inside, 0.8–1.2(–1.5) by 0.6–1(–1.1) cm. *Stamens* 10, somewhat exserted from the throat, unequal; filaments linear, laxly hairy to nearly the top; anthers broadly oblong, truncate at both ends, *c.* 1.8 by 1 mm. *Disk* densely covered with short greyish hairs. *Ovary* oblong-cylindric, densely lepidote and short-hairy, *c.* 5 by 1.8 mm, rather abruptly tapering to the style, the latter nearly as long as the corolla, laxly lepidote in the lower third, and laxly hairy to nearly the top; stigma short-obconical or subcapitate. *Capsule* narrow-ellipsoid, short attenuate at both ends, obtusely 5-ribbed, laxly short-hairy and lepidote, 1.8–2.8 cm by 4–5 mm.

Distr. *Malesia*: Malay Peninsula (Johore: Mt Ophir).

Ecol. In ridge forest, low scrub, and epiphytic, or sometimes terrestrial on rocks in more open places, 1160–1525 m. *Fl.* Dec.

2. *var.* punctatum RIDL. J. Fed. Mal. St. Mus. 4 (1909) 42; SLEUM. Reinwardtia 5 (1960) 129. — *R. jasminiflorum* (*non* HOOK. *s. str.*) RIDL. J. Fed. Mal. St. Mus. 6 (1915) 157; *ibid.* 7 (1916) 45. — *R. jasminiflorum* HOOK. *var. maculatum* RIDL. Fl. Mal. Pen. 2 (1923) 218; BURK. & HOLTT. Gard. Bull. S.S. 3 (1925) 390.

Shrub or treelet, up to 3 m. *Leaves* elliptic to broadly subovate-elliptic, base rounded to subcordate. *Corolla* white or flushed pink, with ± conspicuous bright pink spots in the throat, tube laxly short-hairy all over outside, moreover whether or not laxly lepidote. Perulae ± sericeous dorsally. Pedicels more slender and longer (mostly 1.5–2.5 cm), making the umbel less compact than in *var. jasminiflorum*.

Distr. *Malesia*: Malay Peninsula (Kedah: Kedah Peak, in the Main Range from Perak/Pahang: Cameron Highlands, down to Selangor: Mt Moyang, also in the Taiping Hills and on Mt Tahan).

Ecol. In dwarf mossy forest, damp ridges, open patch of swamps, 855–1830 m, rather common in the Cameron Highlands. *Fl.* predominantly Oct.-Dec., *fr.* March.

3. *var.* heusseri (J. J. S.) SLEUM. Reinwardtia 5 (1960) 129. — *R. retusum* [*non* (BL.) BENN.] STEEN. Arch. Hydrobiol. Suppl. 11 (1932) 318, f. 21, 22 (*phot. veg.*). — *R. longiflorum* LINDL. *var. heusseri* J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 447.

Much branched shrublet, 50 cm to 1 m, with both lepidote and puberulous branchlets. *Leaves* in 5–13-merous pseudowhorls, rather narrow-oblong to ovate-oblong, base cuneate to subcordate, puberulous above along the midrib. *Corolla* sparsely lepidote and subdensely ± patently short-pubescent outside, with an immense variety in colours of a pure white, ivory, a pale sulphur and an intense red, and many grades of salmon between pale yellow and red, furthermore all grades between red and white, as known from the cultivated *Azaleas*.

Distr. *Malesia*: Sumatra (Atjeh: Gajolands; East Coast: Sibolangit and near Pematang Siantar; around Lake Toba, especially Samosir Peninsula).

Ecol. In open rocky places on old, dry volcanic soil, apparently always near solfataras, capable to stand the gasses of SO_2, 750–1525 m. *Fl.* predominantly in June-July.

Vern. *Bunga batu*, M.

Note. Possibly a hybrid between *R. jasminiflorum* and *R. longiflorum*, but certainly nearer to the first, with which it agrees considerably in the leaves and the flowers, the influence of the latter

mainly visible in the red and yellow colour which breaks through to various degree. It is stated that the specimens with pure colours are 50 cm high in the Samosir Peninsula, whereas the specimens with intermediate colours are more luxuriant and reach 1 m in height.

4. *var.* copelandii (MERR.) SLEUM. Reinwardtia 5 (1960) 130. — *R. copelandii* MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 42; Philip. J. Sc. 3 (1908) Bot. 381; ELM. Leafl. Philip. Bot. 3 (1911) 1105; MILLAIS, Rhodod. (1917) 148; *ibid.* ser. 2 (1924) 117; MERR. En. Philip. 3 (1923) 243; COPEL. *f.* Philip. J. Sc. 40 (1929) 158, t. 7, f. 1–5.

Similar to *var. jasminiflorum*, but *corolla* hairy inside in the lower half only.

Distr. *Malesia*: Philippines (Mindanao: summit of Mt Apo), in thickets, 2350–3100 m. *Fl.* March-Nov.

Vern. *Malagos, malambaho*, Bag.

5. *var.* oblongifolium SLEUM. Reinwardtia 5 (1960) 130. — *R. verticillatum* (*non* LOW *ex* LINDL.) BECC. Malesia 1 (1878) 204. — *R. jasminiflorum* (*non* HOOK. *s. str.*) MERR. En. Born. (1921) 461.

Leaves oblong, apex obtuse, base obtuse or truncate-rounded, 4–7.5 by 1–2.8 cm; petiole 4–6, rarely up to 7 mm. *Corolla* white, laxly lepidote and epilose outside, laxly hairy inside the entire length of the tube. Perulae glabrous or laxly lepidote, ± shining.

Distr. *Malesia*: Malay Peninsula (P. Tioman, Pahang; Mt Blumut, in Johore) and Borneo (Sarawak).

Ecol. Normally in mountain forest, once found almost at sea-level in the delta of the Sarawak River, rather common on the summit of Mt Santubong.

7. *Subsection Euvireya*

COPEL. *f.* Philip. J. Sc. 40 (1929) 137, 159; SLEUM. Bot. Jahrb. 74 (1949) 541; Reinwardtia 5 (1960) 134, *s. lat.* — **Fig. 27—45.**

Scales 'star-shaped' to various degree, mostly (rather) small, already distant from each other on the young leaves, the thin marginal zone ± irregularly dented or lobed, often early dissolute (the remaining centre then giving the impression of a disk-shaped scale).

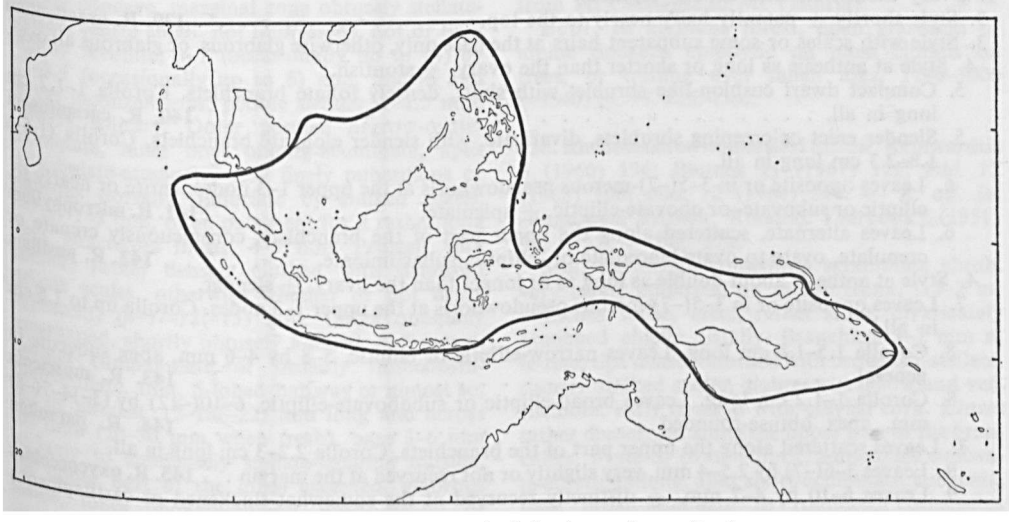

Fig. 26. Distribution of *Rhododendron subsect. Euvireya.*

istr. S. Indochina, Australia (N. Queensland), and *Malesia*. Fig. 26.

KEY TO THE SERIES

1. Leaves very small in general, 0.3–1 (rarely in the same specimen partly up to 2) by 0.2–0.6 (rarely up to 0.8) cm. *Spp.* 137–147. . . . . **1. *ser.* Linnaeoidea**
1. Leaves all or at least for the greater part (in the same specimen) more than 1.6 cm long.
2. Compact dwarf shrub, forming tussocks or mats. Leaves linear-lanceolate to oblanceolate. Flowers solitary (rarely in twos); pedicel stout, erect, distinctly emerging beyond the foliage; flower nodding. *Sp.* 148. . . . . **2. *ser.* Saxifragoidea**
2. Erect shrubs or treelets.

3. Leaves linear to narrow-lanceolate, in general (at least partly) not exceeding 7 mm in width.
4. Leaves 20 or more in each pseudowhorl, 1–1.5 mm wide. *Sp.* 149 . . . . . **3. *ser.* Taxifolia**
4. Leaves opposite or 3–8(–15) in each pseudowhorl, 3–7(–11) mm wide. *Spp.* 150–153. **4. *ser.* Stenophylla**
3. Leaves generally much wider, not linear or narrow-lanceolate.
5. Stamens 5. *Sp.* 154 . . . . . **5. *ser.* Citrina**
5. Stamens (7–)10(–14).
6. Leaves medium-sized, *i.e.* 1–4 (sometimes partly in the same specimens up to 6.5) cm long. *Spp.* 155–196. . . . . **6. *ser.* Buxifolia**
6. Leaves generally larger, *i.e.* all or at least for the greater part in the same specimen longer than 4 cm. *Spp.* 197–276. . . . . **7. *ser.* Javanica**

1. Series Linnaeoidea

SLEUM. Reinwardtia 5 (1960) 134. — *Rhododendron sect. Linnaeopsis* SCHLTR, Bot. Jahrb. 55 (1917) 144, f. 2. — *Rhododendron subsect. Linnaeopsis* (SCHLTR) SLEUM. *ibid.* 74 (1949) 541. — Fig. 27—29.

Leaves very small, 3–10 (rarely in part up to 20) by 2–6(–7, rarely up to 8) mm. Slender, often dwarf, terrestrial or epiphytic shrubs.

Distr. *Malesia*: limited to New Guinea.

KEY TO THE SPECIES

1. Ovary all over densely (predominantly) hairy *and* less densely lepidote.
2. Style at anthesis relatively short, *i.e.* ± as long as the ovary, glabrous or hairy at the base only. Corolla campanulate to broadly funnelform-campanulate, deeply 5-lobed, exclusively lepidote outside. Very slender creeping or decumbent shrublet . . . . . **137. R. anagalliflorum**
2. Style at anthesis at least two times as long as the ovary, hairy in the lower ⅔ to ¾, glabrous for the rest. Corolla ± tubular, laxly lepidote and laxly to subdensely hairy outside. Erect (sometimes scandent) shrub up to 2 m . . . . . **138. R. womersleyi**
1. Ovary exclusively and densely lepidote.
3. Style shortly ± patently hairy nearly to the top. . . . . **139. R. gracilentum**
3. Style with scales or some subpatent hairs at the base only, otherwise glabrous, or glabrous all over.
4. Style at anthesis as long or shorter than the ovary, ± stoutish.
5. Compact dwarf cushion-like shrublet with short, densely foliate branchlets. Corolla 1–1.2 cm long in all. . . . . **140. R. caespitosum**
5. Slender erect or creeping shrublets, divaricate, with slender elongate branchlets. Corolla (1.5–) 1.8–2.3 cm long in all.
6. Leaves opposite or in 3–5(–7)-merous pseudowhorls at the upper 1–3 nodes, entire or nearly so, elliptic or subovate- or obovate-elliptic, ± apiculate. . . . . **141. R. microphyllum**
6. Leaves alternate, scattered along the upper part of the branchlets, conspicuously crenate or crenulate, ovate to ovate-lanceolate or -elliptic, subacuminate. . . . . **142. R. pusillum**
4. Style at anthesis about double as long as or longer than the ovary, ± slender.
7. Leaves opposite or in 3–5(–7)-merous pseudowhorls at the upper 1–3 nodes. Corolla up to 1.8 cm in all.
8. Corolla 1.5–1.8 cm long. Leaves narrow-elliptic or elliptic, 5–8 by 4–6 mm, apex subacute in general . . . . . **143. R. muscicola**
8. Corolla 1–1.2 cm long. Leaves broad-elliptic or subobovate-elliptic, 6–10(–12) by (3–)4–7(–8) mm, apex obtuse-rounded . . . . . **144. R. parvulum**
7. Leaves scattered along the upper part of the branchlets. Corolla 2.2–3 cm long in all.
9. Leaves 3–6(–7) by 2.5–4 mm, very slightly or not recurved at the margin . . **145. R. oxycoccoides**
9. Leaves 6–10 by 4–7 mm, ± distinctly recurved at the somewhat thickened or cartilagineous margin.
10. Leaves ovate, apex acuminate, subacute. . . . . **146. R. disterigmoides**
10. Leaves ovate-elliptic to ovate-oblong, apex ± obtuse in general, but not rarely shortly apiculate. **147. R. coelorum**

137. Rhododendron anagalliflorum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 94; SLEUM. Reinwardtia 5 (1960) 136; Blumea 11 (1961) 121; *ibid.* 12 (1963) 106; *ibid.* 12 (1964) 340. — *R. linnaeoides* SCHLTR, Bot. Jahrb. 55 (1917) 144, f. 2.

Dwarf epiphytic shrublet, 5–10 (rarely up to 30) cm, much divaricately branched, prostrate or creeping. Branchlets very slender, 0.5–1 mm ø, densely clothed with shortly stipitate ('dendroid') or subsessile stellate-incised scales in the youngest, ± verruculose in the older glabrescent parts; internodes 0.5–2.5 cm. *Leaves* opposite or in 3–5-merous pseudowhorls at the upper 3–4 nodes, elliptic or oblong- or subobovate-elliptic, apex subacute or rarely more obtuse, base ± broadly cuneate, subcoriaceous, initially lepidote on both sides, glabrous above at maturity, laxly persistently lepidote beneath (scales light brown, flat or

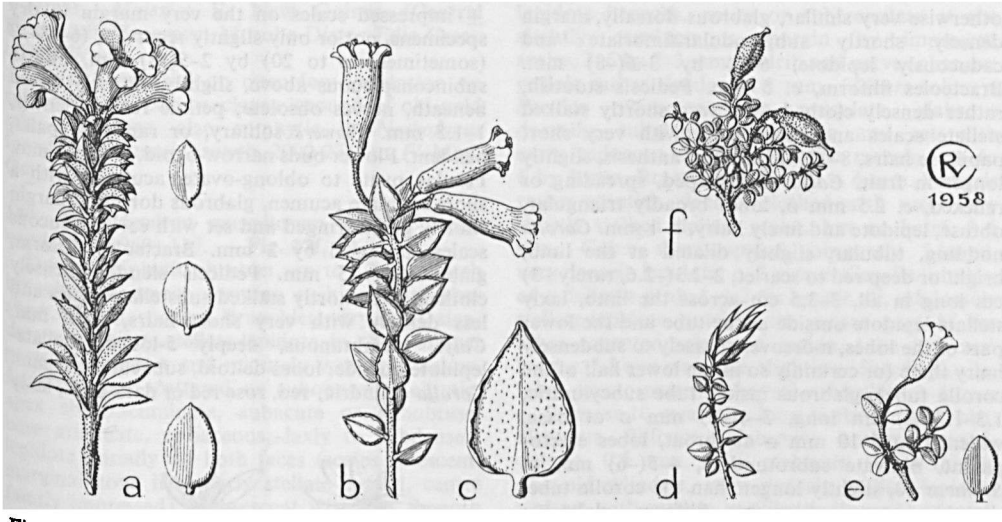

Fig. 27. *Rhododendron womersleyi* SLEUM. *a.* Branchlet with flowers and 3 single leaves, × ⅔. — *R. disterigmoides* SLEUM. *b.* Branchlet with flowers, × ⅔, *c.* leaf, × 2. — *R. oxycoccoides* SLEUM. *d.* Branchlet with flower bud, × ⅔. — *R. parvulum* SLEUM. *e.* Branchlet with flower, × ⅔, and a single leaf, × 1 ⅓. — *R. caespitosum* SLEUM. *f.* Branchlet with immature fruit, × ⅔ (*a* NGF 8918 WOMERSLEY, *b–c* BRASS 9022, *d* BRASS 12184, *e* EYMA 5203, *f* BRASS 9039).

slightly concave, marginal zone obtusely stellate-incised, centre small, not impressed), not or only slightly revolute, 3–7 (occasionally up to 14) by 2.5–3.5 (occasionally up to 6) mm, midrib and nerves inconspicuous; petiole slender, 1–1.5 mm. *Flowers* solitary. Outer perulae narrow-ovate-acuminate, inner ones oblong-acuminate, apex ± subulate-attenuate, very finely puberulous or glabrous dorsally, fimbriate by stalked scales, 3–7 by 1–3 mm, often persistent for a rather long time. Bracteoles linear, 4–5 mm. Pedicels very slender, rather densely clothed with dendroid stellate scales, otherwise whether or not finely pubescent, (4–)7–12(–15) mm. *Calyx* obliquely cup-shaped, shortly obtusely 5-lobed, *c.* 2 mm ø. *Corolla* campanulate or broadly funnelform-campanulate, thin, 5-lobed halfway or almost so, red or pinkish, 12–18(–22) mm long and across the limb (20–30 mm when fresh), base 3–6 mm ø, laxly to subdensely stellate-lepidote outside, the upper part of the lobes excepted, glabrous inside, lobes obovate-oblong, erecto-patent or ± expanded, obtuse. *Stamens* 10, unequal, the longest equalling ± half the corolla, or slightly longer; filaments linear, glabrous; anthers broad-oblong, *c.* 0.7 mm. *Disk* glabrous. *Ovary* broadly subovoid-cylindric, densely clad with short, spreading hairs, less densely with scales between these hairs, 2–2.5 mm by 1.5 mm, slightly 5-ribbed; style rather abrupt with the ovary, thickish initially, glabrous or sparsely hairy at the very base, 2.5–3 mm; stigma thick-capitate, 5-gibbous. *Capsule* fusiform, (1.2–)1.5–2 cm by 3–4 mm, short-hairy and lepidote. *Seeds* 3–4 mm including the tails.

Distr. *Malesia*: New Guinea (Main Range from Mt Carstensz to Mt Victoria).

Ecol. In montane forest, open grassland or alpine thickets, epiphytic on moss clumps on trees, or trailing over fallen logs, 1190–3000 (–3540) m. *Fl.* Jan.-Dec.

138. Rhododendron womersleyi SLEUM. Reinwardtia 5 (1960) 136; Blumea 11 (1961) 121; *ibid.* 12 (1963) 106; *ibid.* 12 (1964) 340. — *R. aff. inconspicuum* STONOR, Rhodod. Yearbook 6 (1951) 51, f. 52. — **Fig. 27a.**

Stiff, terrestrial, sometimes scrambling shrub, very rarely epiphytic on mossy trunk, 0.5–2 m; branches loose, erect, rather stout, divaricately branched chiefly distally. Branchlets 1–2 mm ø, te-rete, tips densely clothed with brownish, stellate, shortly stalked scales, glabrescent below and verruculose, early covered with greyish cork. *Leaves* rather densely set along the upper part of the branchlets, ovate to ovate-elliptic, sometimes subovate-elliptic-oblong, apex short-acuminate, subacute, base broad-attenuate to rounded, coriaceous, dark green above, paler beneath, subdensely lepidote on both faces initially, glabrescent and often a little shining above at maturity, persistently subdensely or more laxly lepidote beneath (scales rather large, flat, marginal zone irregularly obtusely stellate-incised, centre hardly impressed), margin distinctly crenulate by the impressed scales, not or very slightly revolute, 5–8(–10, rarely up to 15) by 4–6(–7, rarely up to 10) mm, midrib ± distinctly sunk, faintly prominent beneath, nerves subobscure; petiole stoutish, 1–1.5(–2) mm. *Flowers* nodding, solitary or in twos, rarely in threes. Outer perulae ovate-acuminate, shortly subulate or apiculate, inner ones narrower,

otherwise very similar, glabrous dorsally, margin densely shortly subglandular-fimbriate and caducously lepidote, 6–14 by 3–6(–8) mm. Bracteoles filiform, *c.* 5 mm. Pedicels stoutish, rather densely clothed with very shortly stalked stellate scales and more laxly with very short papillose hairs, 8–12(–15) mm at anthesis, slightly longer in fruit. *Calyx* disk-shaped, spreading or reflexed, *c.* 2.5 mm ø, lobes broadly triangular, obtuse, lepidote and finely hairy, *c.* 1 mm. *Corolla* nodding, tubular, slightly dilated at the limb, bright or deep red to scarlet, 2–2.3(–2.6, rarely –3) cm long in all, 3–3.5 cm across the limb, laxly stellate-lepidote outside at the tube and the lower part of the lobes, moreover sparsely to subdensely hairy there (or certainly so in the lower half of the corolla tube), glabrous inside, tube subcylindric, 1.3–1.7(–2) cm long, 3–4(–6) mm ø at base, widened to 5–10 mm ø at throat, lobes erecto-patent, obovate subrotundate, 4–5(–6) mm ø. *Stamens* 10, slightly longer than the corolla tube, slightly unequal; filaments filiform, glabrous; anthers oblong, *c.* 1.5 mm. *Disk* prominent, hairy. *Ovary* subcylindric, densely patently and shortly whitish hairy and subdensely lepidote, *c.* 4 by 1.5 mm, gradually tapering to the slender style, which nearly equals the corolla in length and is set with spreading fine hairs in the lower ⅔ to ¾, glabrous above; stigma club-shaped or subcapitate, shortly 5-gibbous. *Capsule* fusiform, hairy, greyish purplish when almost ripe, 1.5–2 cm by 3–4 mm. *Seeds* 4 mm including the tails.

Distr. *Malesia*: E. New Guinea (Eastern, Western and Southern Highlands; Morobe Distr.: Rawlinson Range).

Ecol. Mostly in open mossy forest or forest edge with grassland, more rarely in grassland above the timber-line, fairly common locally, 3200–3960 m. *Fl.* Feb.-Sept. Hybridizes with 191. *R. atropurpureum* on Mt Wilhelm.

Vern. *Balimbar*, Enga: Poio, *kik'borli*, *kobu*, Mendi.

139. Rhododendron gracilentum F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 22; SLEUM. Reinwardtia 5 (1960) 137; Blumea 11 (1961) 121; Jahrb. Rhodod. Ges. Bremen (1963) f. 12 — **Fig. 28.**

Erect, ascending or subprostrate small shrub with divaricate branchlets, (10–)20–40(–60) cm high, generally terrestrial, rarely epiphytic. Branchlets 1–1.5 mm ø, tips subdensely clad with rusty, stellate, shortly stipitate scales, elsewhere glabrescent and verruculose; internodes 0.5–1.5 (rarely up to 4) cm. *Leaves* opposite or in 3–7-merous pseudowhorls at the upper 3–4 nodes, often somewhat recurved, subovate- or elliptic-lanceolate or lanceolate, apex short-acuminate, mostly subacute, base acutely attenuate, coriaceous, olivaceous-green above, dilutely so beneath, glossy and rugulose above, laxly lepidote on both faces initially, glabrescent above with age, persistently lepidote beneath (scales irregularly and rather obtusely stellate-incised at the margin, centre not impressed), a little wavy and subcrenulate by the ± impressed scales on the very margin in dry specimens, not or only slightly recurved, (6–)8–12 (sometimes up to 20) by 2–5(–8) mm, midrib subinconspicuous above, slightly obtusely raised beneath, nerves obsolete; petiole rather slender, 1–1.5 mm. *Flowers* solitary, or rarely in pairs, pendent. Flower buds narrow-ovoid, *c.* 6 by 2 mm. Perulae ovate to oblong-ovate, acute or with a short subulate acumen, glabrous dorsally, margin shortly gland-fringed and set with early caducous scales, up to 6 by 3 mm. Bracteoles filiform, glabrous, *c.* 5 mm. Pedicels slender, densely clothed with shortly stalked substellate scales and less densely with very short hairs, 6–10 mm. *Calyx* membranous, deeply 5-lobed, stellate-lepidote outside, lobes deltoid, subacute, *c.* 1 mm. *Corolla* cylindric, red, rose red or dark pink, laxly

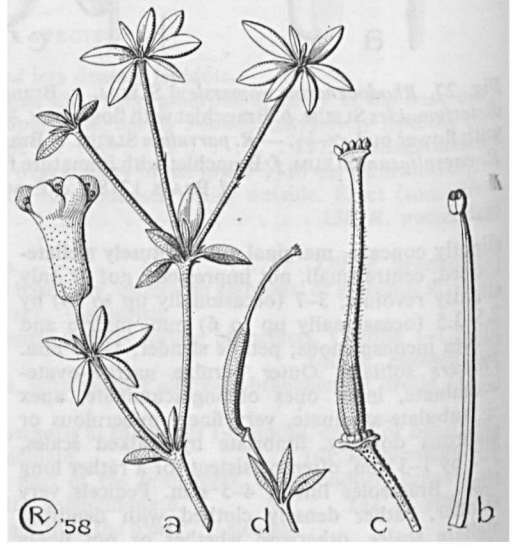

Fig. 28. *Rhododendron gracilentum* F. v. M. *a.* Habit, × ⅔, *b.* stamen, × 2, *c.* ovary and style, × 2, *d.* submature fruit, × ⅔ (*a* WOMERSLEY *s.n.*, *b–c* LAM 7747, *d* NGF 9529 WHITE).

covered with deeply stellate pale brown scales outside, glabrous inside, 1.8–2.4 cm long in all, tube 1.2–1.5 cm long, *c.* 3 mm ø at base, *c.* 5 mm at throat, lobes erecto-patent or finally much spreading, obovate-suborbicular, 4–6 mm ø. *Stamens* 10, unequal, the longest nearly as long as the corolla; filaments narrowly linear, glabrous; anthers subquadrate, truncate, 1.5 by 1.2 mm, connective swollen and darker in colour. *Disk* prominent, glabrous. *Ovary* oblong-cylindric, 3–4 by 1–1.5 mm, densely and exclusively lepidote, gradually attenuate to the slender style, which nearly attains the corolla tube in length and is set with fine, subpatent, short, whitish hairs nearly up to the clavate-capitate stigma. *Capsule* erect, oblique, oblong, a little curved, glabrescent, 1.5–2.2 by 0.3 cm, on slender pedicel *c.* 1.5 cm.

Distr. *Malesia*: E. New Guinea (Central Distr.: Mt Musgrave; Morobe Distr.: Edie Creek above Wau).

Ecol. Terrestrial on open low vegetation on rather dry slopes or clayey ground of old gold mine workings, also epiphytic in *Nothofagus* forest or in summit growth, 2000-2745 m. *Fl.* May-Oct.

140. Rhododendron caespitosum SLEUM. Reinwardtia 5 (1960) 137. — **Fig. 27f, 29.**

Dwarf, epiphytic shrublet, up to 10 cm, much branched; compact, forming cushions; branches short, robust, rooting. Branchlets very short, slender, substipitate-stellate-lepidote in the younger parts, glabrescent and minutely verrucose below. *Leaves* dense, scattered or subopposite, elliptic, apex short-acuminate, subacute or subobtuse, base attenuate, coriaceous, laxly to subdensely lepidote initially on both faces (scales rufescent, marginal zone irregularly stellate-incised, centre faintly impressed), glabrescent with age, smooth and somewhat lustrous above, dull and persistently lepidote beneath, entire or subcrenulate at the slightly cartilaginous margin by impressed scales, 3–6 by 2–3 mm, midrib and nerves obscure; petiole rather slender, *c.* 1 mm. *Flowers* solitary. Perulae ovate-acuminate, apiculate, glabrous dorsally, subglandular-fimbriate and set with early caducous scales along the margin, up to 6 by 3 mm. Bracteoles filiform, *c.* 4 mm. Pedicels rather stoutish, densely clothed with rusty very shortly stalked stellate scales, but no hairs, 5–6 mm. *Calyx* short-cupular, obscurely 5-lobed, very densely lepidote, *c.* 2 mm ø. *Corolla* tubular, of a delicate pink, 1–1.2 cm long in all, subdensely stellate-lepidote outside, the upper part of the lobes excepted, glabrous inside, tube 8–9 mm long, *c.* 2.5 mm ø at base, slightly widened apically, lobes erecto-patent, obovate-orbicular, 3–4 mm ø. *Stamens* 10, nearly as long as the corolla tube; filaments filiform, glabrous; anthers broad-oblong, 0.5 mm. *Disk* glabrous. *Ovary* thickly obovoid-cylindric, very densely stellate-lepidote and set with minute papillae between the scales, *c.* 3 by 1.5 mm; style abrupt with the ovary, slenderly columnar, glabrous, *c.* 2 mm; stigma thick-capitate. *Capsule* obovoid-cylindric, densely stellate-lepidote, 8–10 by *c.* 3.5 mm, the 5 valves rather thin, not twisted. *Seeds* with rather short tails on both ends, *c.* 2 by 0.3 mm.



Fig. 29. *Rhododendron caespitosum* SLEUM. forming a cushion on stem of a grassland treefern (*Cyathea tomentosissima* COPEL.). Lake Habbema, 3225 m, New Guinea (BRASS 9039) (BRASS, 1938).

Distr. *Malesia*: W. New Guinea (Mt Wilhelmina-Lake Habbema vicinity).

Ecol. Forming cushions on trunk of tree-ferns in alpine grassland, 2400–3225 m. *Fl.* Aug.-Sept.

141. Rhododendron microphyllum J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 51; Nova Guinea 12 (1914) 131, t. 29 c; SLEUM. Reinwardtia 5 (1960) 138. — *R. minimifolium* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 98, *p.p.*

Epiphytic slender shrublet, 20–30 cm, rooting, divaricately branched. Branchlets *c.* 1 mm ø, terete, tips ± caducously lepidote, scales rufous, shortly stipitate, stellate, older parts glabrescent, verruculose for a while, early becoming smooth and greyish corticate; internodes (0.6–)1–5 cm. *Leaves* in 3–6-merous pseudowhorls, broadly elliptic to obovate-elliptic, sometimes suborbicular, apex short-acuminate, subacute, or rather obtuse, not rarely apiculate, base broad-attenuate, coriaceous, laxly lepidote on both sides initially (scales irregularly stellate-lacerate, flat, those of the undersurface somewhat impressed), ± glabrescent above with age, persistently lepidote underneath, margin narrowly cartilaginous or thickened, subcrenulate by impressed scales, (3–)5–9 by (2–)3–6 mm, midrib slightly impressed above, somewhat raised beneath, or obsolete as are the nerves; petiole stoutish, 1–2 (rarely up to 3) mm. *Flowers* solitary, nodding. Flower buds narrow-ovoid, acuminate. Outer perulae subulate or ovate-lanceolate, densely lepidote outside, inner ones broader, ovate-acuminate, glabrous dorsally or nearly so, shortly glandular-fimbriate by a row of early caducous scales, up to 6 by 3 mm. Bracteoles filiform, *c.* 5 mm. Pedicels slender, densely clothed with rufous, dendroid, ± deeply star-shaped

scales, no hairs, (6–)10–17 mm. *Calyx* obliquely disk-shaped, slightly obtusely 5-lobed, densely stellate-lepidote outside, *c.* 3 mm ø. *Corolla* broadly tubular-subcampanulate, purplish red or pale red, laxly to subdensely rufous-stellate-lepidote outside, the upper part of the lobes excepted, glabrous inside, 1.8–2.1 cm long in all at full anthesis, tube 1.2–1.5 cm long, *c.* 4 mm ø at base, gradually widened to 6–8 mm at throat, lobes ± orbicular and spreading, 5–7 mm ø. *Stamens* 10, unequal, the longest nearly as long as the corolla tube; filaments linear, glabrous; anthers subquadrate, *c.* 1.5 mm. *Disk* glabrous. *Ovary* cylindric-conical, densely stellate-lepidote, *c.* 4 by 2 mm; style rather abrupt with the ovary, short-columnar, thickish, glabrous or with some sparse subpatent hairs at the very base, *c.* 3.5 mm; stigma subcapitate, distinctly 5-lobed. Immature *capsule* fusiform, 1.5 cm by 2.5 mm, densely lepidote.

Distr. *Malesia*: W. New Guinea (Main Range from Mt Carstenz to Mt Goliath and Mt Wilhelmina-Lake Habbema).

Ecol. On moss-covered trees in subalpine forest, locally common. *Fl.* March-April, Aug.

142. Rhododendron pusillum J. J. S. Med. Rijksherb. *n.* 25 (1915) 1; Nova Guinea 12 (1917) 498; *ibid.* 12 (1918) t. 193; SLEUM. Reinwardtia 5 (1960) 138. — *R. candidapiculatum* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 96.

Dwarfed shrublet of weak, ascendent habit, 6–25(–50) cm; main branches few, stout, 3–4 mm ø. Branchlets coming irregularly from the branches, much more slender than these (1–1.5 mm ø), often curved-ascending, densely subimbricately leaved at least in their upper part, tips ± densely clothed with sessile and substipitate, rusty-stellate scales, older parts verruculose, early covered with cork. *Leaves* ovate-lanceolate or ovate-elliptic, apex short-acuminate, subacute, mostly with a paler apiculus, base attenuate to the petiole or sometimes nearly rounded, often complicate in the upper part, stiff-coriaceous, laxly lepidote on both faces initially (scales irregularly stellate-incised, flattish, not or slightly impressed), glabrescent above with age, ± persistently lepidote beneath, margin mostly distinctly crenate or crenulate at least in the upper half, flat, somewhat cartilaginous and paler than the proper lamina, 4–8(–10) by 2–3(–4, occasionally up to 6) mm, midrib slightly sunk above, respectively raised beneath, often obscure as are the nerves; petiole rather stoutish, 1–2 mm. *Flowers* 1–2(–3), nodding from an erect pedicel. Flower buds ovoid, 10–12 by *c.* 5 mm. Perulae membranous, ovate-acuminate, shortly subulate or apiculate, outer ones lepidote dorsally, inner ones completely glabrous, up to 12 by 6 mm. Bracteoles linear, up to 8 mm. Pedicels rather stoutish, densely set with stipitate stellate scales, no hairs, (6–)10–15(–20) mm. *Calyx* disk-shaped, very shortly subacutely 5-dentate, densely lepidote, 2–3 mm ø. *Corolla* tubular-subcampanulate, suboblique, initially red, changing to orange at later stages, (1.5–)1.8–2.3 cm long in all, very laxly lepidote in the lower part or mostly glabrous outside, glabrous inside, tube 1–1.6 cm, base rounded, 3–4 mm ø, dilated gradually to 5–6 mm at throat, lobes erecto-patent or somewhat spreading, obliquely obovate-suborbicular, slightly retuse, 5–7(–9) mm ø. *Stamens* 10, unequal, ± half as long as the corolla; filaments linear, glabrous; anthers suborbicular, said to be blackish, *c.* 1.2 mm. *Disk* glabrous. *Ovary* ovoid-conical, densely stellate-lepidote, 3–4 by 2 mm; style subabrupt with the ovary, columnar, glabrous, 2–3 (sometimes up to 4) mm; stigma capitate, 5-lobed.

Distr. *Malesia*: New Guinea (Main Range from Mt Carstensz to the Oranje Mts, frequent on Mt Wilhelmina and vicinity).

Ecol. Alpine grassland, on exposed sandstone, in shallow sandy soil or on peat soil at base of rocks, also in shrubby borders of subalpine forest, 3200–3900 m, locally common. *Fl.* Sept.–Feb.

143. Rhododendron muscicola J. J. S. Nova Guinea 18 (1936) 93, t. 19, 1; SLEUM. Reinwardtia 5 (1960) 138.

Weak, divaricately branched shrub. Branchlets slender, 1–1.5 mm ø, terete, tips densely set with stellate, shortly stalked scales, older parts glabrescent, verruculose; internodes 0.9–3 cm. *Leaves* in 5–7-merous pseudowhorls at the upper 2–3 nodes, normally narrow-elliptic or elliptic, occasionally subobovate-elliptic, apex short-acuminate, subacute, or rarely more obtuse, base attenuate into the petiole, very coriaceous, laxly lepidote on both faces when young (scales irregularly and rather shallowly obtusely stellate-incised), glabrescent above at maturity, persistently and ± impressedly lepidote beneath, margin cartilaginous and somewhat paler than the lamina, ± entire, flat, 5–8 by 4–6 mm, midrib and nerves obscure; petiole stoutish, 1–1.5 mm. *Flowers* solitary. Flower buds ovoid, *c.* 7 by 3 mm. Perulae ovate to ovate-oblong or obovate, subulate-acuminate, minutely sericeous and lepidote dorsally, ciliate, up to 8 by 3.5 mm. Bracteoles filiform, glabrous, *c.* 5 mm. Pedicels very slender, densely substipitate-stellate-lepidote and laxly papillose-hairy, 8–13 mm. *Calyx* obliquely cup-shaped, 5-lobulate, *c.* 2.5 mm ø. *Corolla* narrow funnelform-campanulate, red, 1.5–1.8 cm long in all, laxly lepidote outside, the upper part of the lobes excepted, glabrous inside, tube 1–1.2 cm long, 2.5–3 mm ø at base, gradually dilated to *c.* 5 mm at throat, lobes irregularly suborbicular, 4–5 mm ø. *Stamens* 10, unequal, somewhat exserted from the corolla tube; filaments linear, a little dilated at the base, glabrous; anthers subobovate, 1–1.5 mm. *Disk* set with some hairs at upper margin, not much prominent. *Ovary* oblong-conical, longitudinally 5-ribbed, *c.* 3.5 by 1.5 mm, densely stellate-lepidote, gradually tapering to the style, the latter rather slender, nearly as long as the corolla, with some sparse, spreading, yellowish hairs at base, elsewhere glabrous, or glabrous all over; stigma subclavate-capitate.

Distr. *Malesia*: W. New Guinea (Nassau Mts, W. side), once found at 2600 m in moss-grown forest. *Fl.* Oct.

144. Rhododendron parvulum SLEUM. Reinwardtia 5 (1960) 139. — **Fig. 27e.**

Small weak shrublet, only some branchlets known, these slender, 0.6–1 mm ø, tips densely clad with dark, rusty, substipitate scales, glabrescent elsewhere, minutely tuberculate and rough to the touch; internodes 1.2–4 cm. *Leaves* in 3–4-merous pseudowhorls or opposite at the upper 2–3 nodes, broad-elliptic to subobovate-elliptic, apex rounded-obtuse, base very broadly attenuate or rounded, coriaceous, very young ones laxly to subdensely lepidote on both faces, glabrescent above with age, lepidote for a longer time beneath (scales irregularly stellate-lacerate, flat, slightly impressed), dull, margin paler than the blade, subcartilaginous, entire or subcrenulate by the impressed scales, 6–10(–12) by (3–)4–7(–8) mm, midrib and nerves obsolete; petiole rather slender, lepidote, *c.* 1 mm. *Flowers* solitary or in twos. Perulae narrow ovate-acuminate, manifestly and subdensely appressed-hairy, glandular-fimbriate and initially set with a row of (early caducous) scales along the margin, up to 6 by 2.5 mm. Pedicels very slender, densely clothed with substipitate, deeply stellate-incised scales and very short slender subpatent hairs, 7–10 mm at anthesis. *Calyx* disk-shaped, 2 mm ø, deeply obtusely 5-lobed, lepidote dorsally. *Corolla* tubular, 1–1.2 cm long in all, subdensely stellate-lepidote outside, upper half of lobes excepted, glabrous inside, tube *c.* 8 mm, *c.* 2.5 mm ø at base, widened to 3.5 mm at throat, lobes ± spreading, suborbicular, *c.* 4 mm ø. *Stamens* 10, unequal, the longest reaching ± halfway the corolla lobes; filaments filiform, glabrous; anthers obovate, hardly 1 mm. *Disk* glabrous. *Ovary* obconical-cylindric, very densely stellate-lepidote, *c.* 2 by 1.2 mm, gradually attenuate to the rather slender style (*c.* 3.5 mm); stigma clavate-subcapitate.

Distr. *Malesia*: W. New Guinea (Wissel Lakes region: summit of Mt Mutaro). One collection. *Fl.* Sept.

145. Rhododendron oxycoccoides SLEUM. Reinwardtia 5 (1960) 139. — **Fig. 27d.**

Epiphytic shrublet. Branchlets much divaricate, 0.5–1 mm ø, tips densely rusty-stellate-lepidote, older parts glabrescent and smooth. *Leaves* laxly scattered along the distal part of the branchlets, ovate, short-acuminate, subacute or more obtuse, base broadly rounded, coriaceous or subcoriaceous, initially lepidote on both sides (scales irregularly stellate-incised, not or faintly immersed), early glabrous above, ± persistently lepidote beneath, margin a little thickened, slightly or not recurved, 3–6(–7) by 2.5–4 mm, midrib and nerves invisible; petiole rather slender, 0.5–1 mm. *Flowers* solitary. Perulae membranous, ovate-lanceolate, inner ones long subulate-acuminate, quite glabrous and shining, up to 1.5 by 0.5 cm. Pedicels rather slender, 4–6 mm, densely stellate-lepidote. *Calyx* disk-shaped, limb very short, wavy, lepidote outside, *c.* 2.5 mm ø. *Corolla* tubular, slightly zygomorphous, pink, thin, 2.5–2.7 cm long in all, glabrous in- and outside, tube 1.8–2 cm, *c.* 3 mm ø at base, widened to *c.* 5 mm ø at throat, lobes erecto-patent, suborbicular, 5–7 mm ø. *Stamens* 10, unequal, the longest reaching halfway the corolla lobes; filaments linear, glabrous; anthers subquadrate, 1–1.2 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely lepidote, 3.5 by 2 mm, gradually tapering to the rather slender style (*c.* 1.4 cm); stigma capitate.

Distr. *Malesia*: New Guinea (Bernhard Camp, Idenburg R., *c.* 139°–3° 30′), once found in stunted, mossy forest on an exposed summit, 2100 m. *Fl.* Jan.

146. Rhododendron disterigmoides SLEUM. Reinwardtia 5 (1960) 140. — **Fig. 27b-c.**

Terrestrial shrub, 30–80 cm, with robust erect branches. Branchlets rigid, rather stout, 1.5–2 mm ø, tips clad with rufescent substipitate stellate scales, older parts glabrous, not or not much rugose, early covered with greyish cork. *Leaves* subdensely scattered on the youngest part of the branchlets, ovate, apex acuminate, apiculate but rather blunt, base rounded, thick-coriaceous, persistently laxly lepidote beneath (scales rather small, irregularly stellate-incised, faintly or not impressed), margin thickened and a little paler than the lamina, distinctly revolute, crenulate by impressed scales, 6–10 by 4–6 mm, midrib obtusely prominent beneath, obsolete above as are the nerves; petiole thickish, *c.* 1 mm. *Umbels* 2–4-flowered. Pedicels rather slender, densely substipitate-stellate-lepidote, not hairy, 8–12 mm. *Calyx* very shortly cupular, shortly obtusely 5-lobed, densely lepidote dorsally, *c.* 2.5 mm ø. *Corolla* tubular, deep red, 2.2–2.3 cm long in all, laxly to subdensely lepidote at the tube outside, glabrous inside, tube *c.* 1.7 cm long, 4 mm ø at base, widened to *c.* 7 mm at throat. *Stamens* 10, unequal, ± as long as the corolla or a little exserted; filaments linear, glabrous; anthers broadly obovate-oblong, *c.* 1.8 by 1 mm. *Disk* glabrous. *Ovary* subconical-cylindric, very densely lepidote, 4–5 by 2 mm, gradually tapering to the glabrous, columnar style (8–9 mm); stigma subclavate-capitate.

Distr. *Malesia*: W. New Guinea (Lake Habbema), common in shrubberies on peaty ridges, 3225 m. One collection. *Fl.* Aug.

147. Rhododendron coelorum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 96; SLEUM. Reinwardtia 5 (1960) 140; Blumea 11 (1961) 121.

Apparently decumbent terrestrial shrublet, *c.* 15 cm. Branchlets slender, firm, tips covered with stipitate stellate scales, older parts glabrescent, laxly verruculose, early covered with greyish cork. *Leaves* rather densely scattered along the upper branchlets, ovate-elliptic to ovate-oblong, apex shortly obtusely acuminate or apiculate, base ± rounded, thick-coriaceous, mature ones glab-

rous, rugulose and a little lustrous above, laxly lepidote beneath (scales irregularly obtusely stellate-lobed, slightly or not impressed), margin thickened, ± entire, manifestly revolute in dry specimens, 6–10 by 4–7 mm, midrib slightly impressed above and raised beneath, nerves obscure; petiole thickish, 1–1.5 mm. *Flowers* 1–2 (–3–4). Pedicels rather slender, subdensely stellate-lepidote, epilose, 15–17 mm. *Calyx* disk-shaped, obscurely 5-lobed, lepidote outside, *c.* 2.5 mm ø. *Corolla* tubular, slightly oblique, 2.5–3 cm long in all, laxly stellate-lepidote outside at the tube, glabrous inside, 5–6 mm ø at base, widened to *c.* 1 cm at throat, lobes erecto-patent, suborbicular, 5–6 mm ø. *Stamens* 10, unequal, ± as long as the corolla; filaments linear, glabrous; anthers suborbicular, 1.5 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely lepidote, *c.* 6 by 2 mm, gradually attenuate to the slender, quite glabrous style, which is nearly as long as the corolla; stigma obconical-capitate.

Distr. *Malesia*: New Guinea (Mt Carstensz), at 3200–3810 m. One collection. *Fl.* Jan.

2. Series Saxifragoidea

SLEUM. Reinwardtia 5 (1960) 141. — **Fig. 30, 34 d—e.**

Compact shrub, forming cushions or mats, very densely foliate. *Leaves* linear-lanceolate or oblanceolate. *Flowers* solitary, or more rarely in twos, nodding from the apex of a robust, upright pedicel which is much outstanding above the foliage.

Distr. *Malesia*: monotypical in New Guinea.

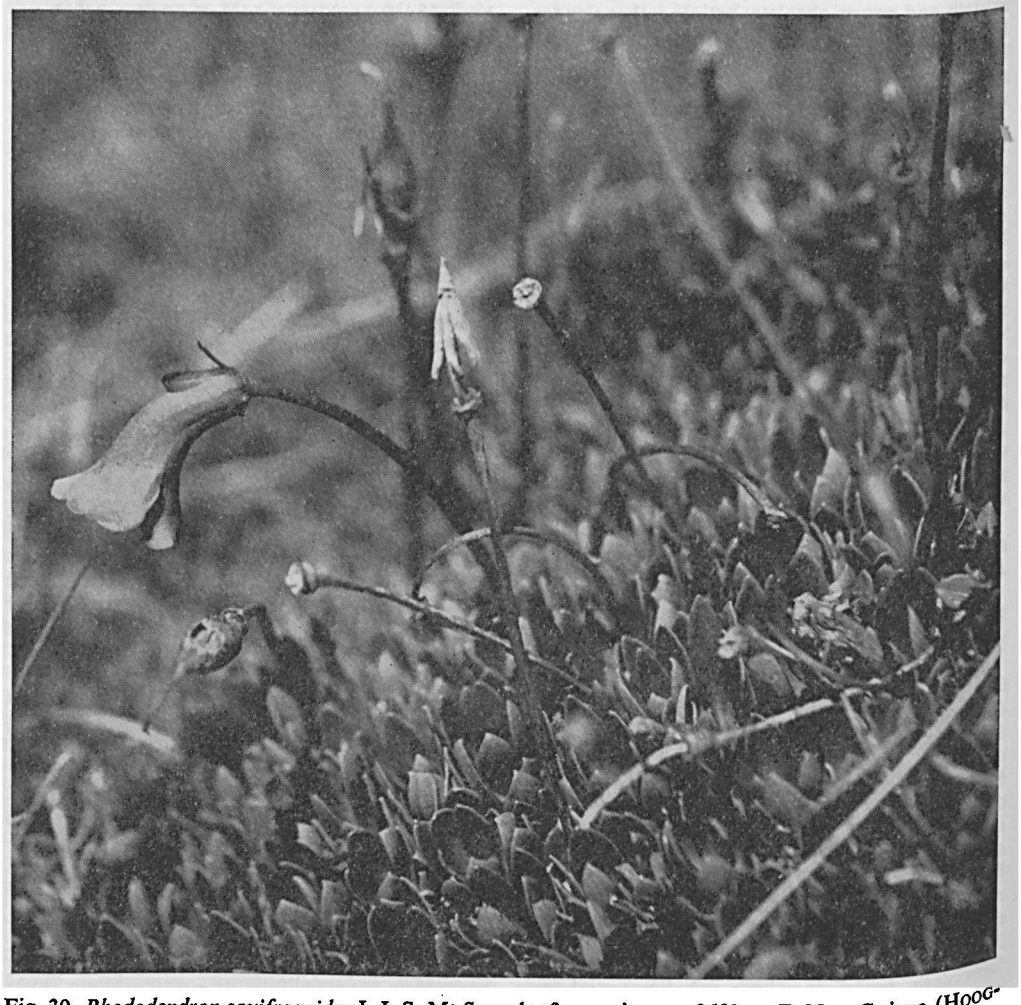

Fig. 30. *Rhododendron saxifragoides* J. J. S. Mt Sugarloaf summit area, 3650 m, E. New Guinea (HOOGLAND & PULLEN 7131) (HOOGLAND, 1960).

148. Rhododendron saxifragoides J. J. S. Med. Rijksherb. *n.* 25 (1915) 3; Nova Guinea 12 (1917) 503; *ibid.* 12 (1918) t. 198; SLEUM. Reinwardtia 5 (1960) 141; Blumea 11 (1961) 121. — *R. aff. fuchsioides* STONOR, Rhodod. Yearbook 6 (1951) 51, f. 51. — **Fig. 30, 34 d-e.**

Completely dwarf, rooting shrub, 5–15 (rarely up to 30) cm high, forming tussocks, large cushions or dense mats. 0.3–1 m ø, much divaricately branched, woody parts ± in the ground. Branchlets stout, mostly abbreviate and very short, stellate-lepidote at the ± free apex which is densely packed with somewhat spreading leaves, sometimes more elongate, somewhat decumbent and showing 2 internodes, the leaves then in 6–10-merous pseudowhorls at the apex and the ultimate node. *Leaves* linear-lanceolate or oblanceolate, apex short-acuminate, not rarely apiculate or almost mucronate, gradually attenuate to the ± flattened base, very coriaceous and stiff, a little shining especially above, practically glabrous above at maturity, laxly lepidote beneath (scales rather small, marginal zone irregularly and often ± obtusely dentate or angular, centre a little sunk), margin ± revolute in dry specimens, (1.6–)2.3–4 (very rarely up to 5.5) by 0.3–0.5(–0.7, very rarely up to 0.8) cm, midrib impressed above, obtusely prominent beneath, nerves 2–3 steeply ascending pairs, very slightly sunk above, or often inconspicuous as they are beneath; petiole flattened, darker brown than the lamina in dry specimens, 3–6(–8) by 1–2 mm. *Flowers* solitary, or rarely in twos, nodding at first, erect in later stages. Perulae ovate, subulate-acuminate, membranous, lepidote initially, early glabrescent dorsally, laxly fimbriate, up to 1.5 by 0.5 cm. Bracteoles linear, glabrous, fimbriate, up to 1 cm. Pedicels erect, reddish, 1–1.5 mm ø, laxly to subdensely lepidote, sometimes also laxly set with short hairs, which go in later stages, (2.5–)4–6(–7) cm at anthesis. *Calyx* oblique, disk-shaped, wavy and obtusely 5-lobed (sometimes with longer, up to 2 mm, subacute lobes), often fringed with subglandular hairs, *c.* 4 mm ø, lepidote and whether or not short-hairy. *Corolla* obliquely tubular below, expanded at the lobes, blood-red, pale scarlet or pinkish red, rather densely stellate-lepidote outside, the margin of the lobes excepted, puberulous at the tube inside, 2.5–3 cm long in all, tube broad-cylindric, slightly curved, (1.7–)2–2.5 cm long, base *c.* 5 mm ø, widened to 8–10 mm at apex, lobes broadly spathulate or suborbicular, *c.* 1 by 0.7–0.9 cm. *Stamens* 10, subequal, attaining about half the length of the corolla lobes, purple; filaments linear, laxly patent-hairy to the lower third, glabrous for the rest; anthers broad-oblong-obovate, *c.* 2.5 mm. *Disk* prominent, glabrous. *Ovary* conical, a little constricted at base, rather abruptly tapering to the style, 5–6 by 2.5–3 mm, velutinous and lepidote, hairs covering the scales; style as long as or slightly shorter than the stamens, stoutish, hairy at the base, glabrous elsewhere; stigma rather large, oblique. *Capsule* erect, thick-fusiform, short-hairy and lepidote, 1.5–2 by (0.5–)0.7–0.8 cm, splitting from apex into 5 valves, axis and style persistent for a long time, valves reflexed, somewhat twisted, rather thick; fruit-pedicel 6–11 cm. *Seeds* tailed on both ends, *c.* 2.5 mm.

Distr. *Malesia*: New Guinea (Main Range from Mt Carstensz to the Oranje Mts; Western and Southern Highlands: Hagen Range, Mt Giluwe, Mt Sugarloaf).

Ecol. Alpine grassland, occasionally on shrubby ridges, 3225–4000 m, locally abundant and a conspicuous feature in bogs or forest glades, on peaty soil. *Fl. fr.* Aug.-Dec.

Vern. *Kamungunjari*, Enga: Poio, *kinwi*, Mendi.

3. Series Taxifolia

SLEUM. Reinwardtia 5 (1960) 141.

Leaves linear, 1–1.5 mm wide, in dense ± 20-merous pseudowhorls.

Distr. *Malesia*: Philippines (Luzon).

149. Rhododendron taxifolium MERR. Philip. J. Sc. 30 (1926) 419; COPEL. *f. ibid.* 40 (1929) 156, t. 6; SLEUM. Reinwardtia 5 (1960) 141.

Epiphytic shrub, *c.* 1 m. Branches terete, glabrous. Branchlets slender, papillose-puberulent and sparingly lepidote; internodes 1–3 (rarely up to 5) cm. *Leaves* crowded to dense pseudowhorls at the upper 3–4 nodes, 20 or more together, linear, sessile or nearly so, rather rigid and coriaceous, brown when dry, paler and ± shining beneath, apex obtuse, base attenuate into the petiole, glabrous above at full maturity, laxly lepidote beneath (scales flat, small, seemingly disk-shaped, but in fact irregularly lobed to various degree in the marginal zone, centre small, somewhat impressed), margin shallowly crenulate by impressed scales, flat, (1.8–)2–3.5 cm by 1–1.5 mm, midrib very slightly impressed above and obtusely raised beneath, nerves obsolete; petiole 0–2 mm, not clearly distinct from the lamina. *Flowers* solitary or in twos. Perulae membranous, broad-ovate, abruptly subulate at the apex, glabrous dorsally, margin set with caducous scales, up to 1.2 by 0.6 cm. Bracteoles linear, very laxly hairy and lepidote, *c.* 6 mm. Pedicels slender, pubescent and laxly lepidote, *c.* 1 cm. *Calyx* disk-shaped, lepidote and pubescent outside, obtusely and shortly 5-lobed, 3–4 mm ø. *Corolla* tubular-subcampanulate, white, thin, 2–2.2 cm long in all, sparingly substellate-lepidote outside, a broad marge of the lobes excepted, pubescent within, tube *c.* 1 cm long, at base *c.* 4 mm ø, widened to 7–8 mm at apex, lobes broad-obovate, apex rounded, *c.* 1 by 0.8 cm. *Stamens* 10, subequal, ± as long as the corolla tube; filaments linear, subdensely to laxly patently hairy to nearly the

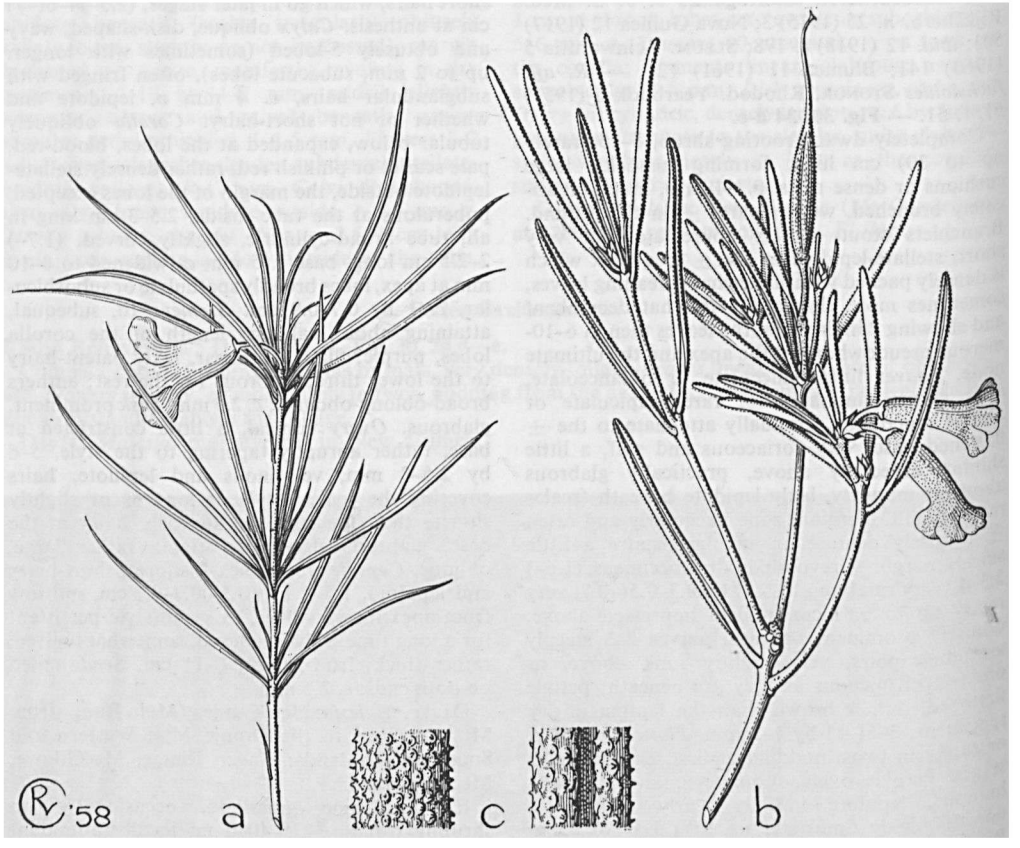

Fig. 31. *Rhododendron stenophyllum* HOOK. *f. a.* Habit, × ⅔. — *R. hooglandii* SLEUM. *b.* Habit, × ⅔, *c.* detail of upper resp. undersurface of leaf with epidermal tubercles, × 6 (*a* GRISWOLD 121, *b–c* HOOGLAND & PULLEN 5576).

top; anthers oblong, *c.* 2 mm. *Disk* glabrous. *Ovary* subcylindrical, densely patently white-hairy, with apparently but a few scales between the hairs, *c.* 3 by 1.5 mm; style columnar, hairy below, glabrous distally, *c.* 5 mm; stigma subcapitate. *Capsule c.* 1 cm.

Distr. *Malesia*: Philippines (Luzon: Mt Pulog), twice found on trees in the mossy forest at *c.* 2700 m. *Fl.* Feb.-March.

4. Series Stenophylla

SLEUM. Reinwardtia 5 (1960) 141. — *Rhododendron sect. Zygomorphanthe* SCHLTR, Bot. Jahrb. 55 (1918) 145, *p.p.* — Fig. 31—32.

Leaves linear or narrow-lanceolate, opposite or in 3–8 (sometimes up to 15)-merous pseudowhorls, 3–7 (rarely up to 11) mm wide (at least 1.3 cm long, mostly much longer).

Distr. *Malesia*: Borneo and New Guinea.

KEY TO THE SPECIES

1. Ovary densely whitish tomentellous, the hairs covering the small scales . . . **150. R. stenophyllum**
1. Ovary densely and exclusively lepidote.
2. Leaves (1.3–)1.6–2 cm long . . . . . **151. R. myrsinites**
2. Leaves longer than 2.7 cm.
3. Leaves 1.5–3 mm wide . . . . . **152. R. subulosum**
3. Leaves 4–7(–11) mm wide . . . . . **153. R. purpureiflorum**

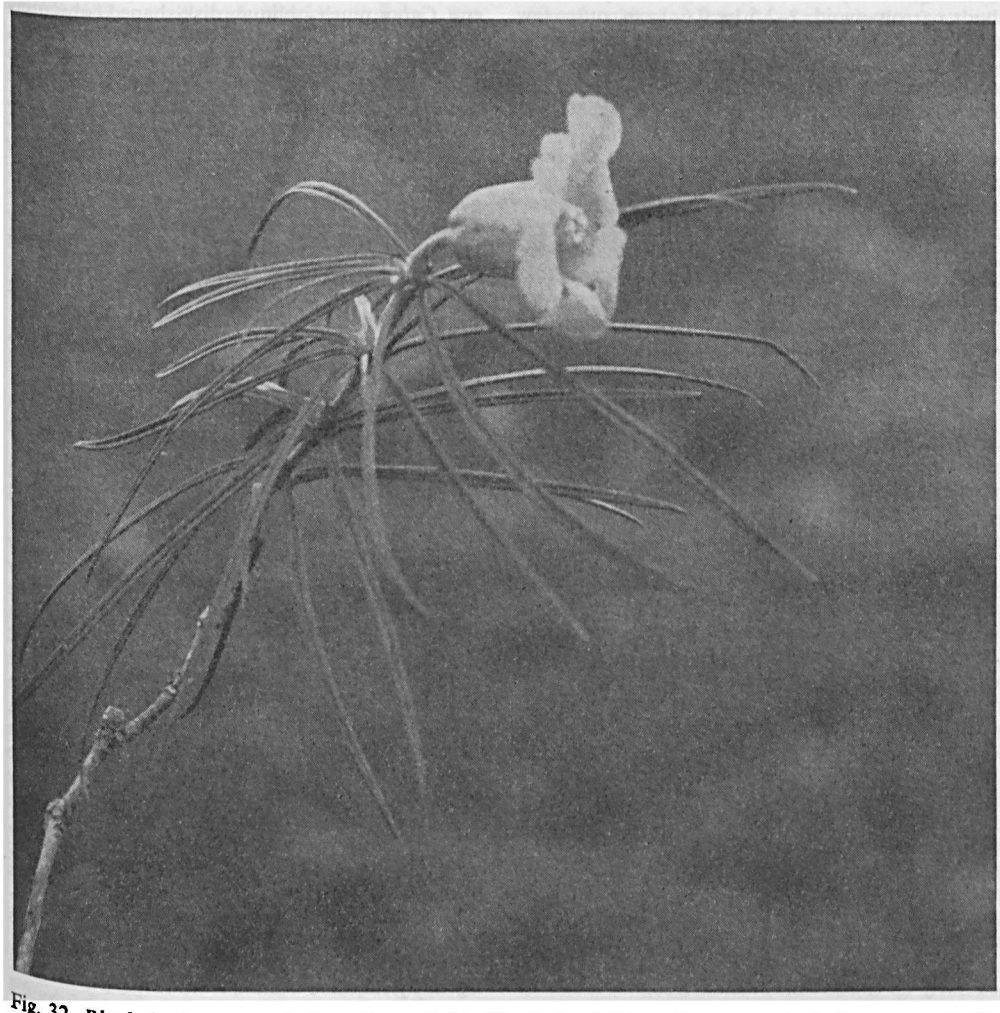

Fig. 32. *Rhododendron stenophyllum* HOOK. *f.* Mt Kinabalu, 2130 m (SLEUMER 4685) (SLEUMER, 1963).

150. **Rhododendron stenophyllum** HOOK. *f. ex* BECC. Malesia 1 (1878) 203 *in obs., nom. nud.*; BURBIDGE, The Garden of the Sun (1880) 274, fig., *descr. abbrev., fig. repr.*: The Garden 18 (1880) 546; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 196; GIBBS, J. Linn. Soc. Bot. 42 (1914) 104; MILLAIS, Rhodod. (1917) 248; MERR. En. Born. (1921) 463; J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 452. *incl. var. angustifolium* J. J. S. *l.c.*; SLEUM. Reinwardtia 5 (1960) 142; Blumea 11 (1961) 122; *ibid.* 12 (1963) 106; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 9, *non* MAKINO, 1910. — **Fig. 31a-32.**

Lanky shrub, (0.3–)0.6–1(–1.2) m, with slender stem, epiphytic or on the ground, sparsely and divaricately branched. Branchlets terete, 1–1.5 mm ø, dilutely brown, upper internode set with some sparse scales initially, early practically glabrous; internodes (1.5–)2–10 cm. New flush starting with several scattered, scarious, subulate, early caducous thin leaves, ending with normal persistent *leaves*, these ± condensed into (6–)8–15-merous pseudowhorls at the upper (1–)2–5 nodes, narrow-linear, apex ± acute, often subsetaceous or nearly pungent, base attenuate into the very short and broad, hardly distinguishable petiole, subsessile, coriaceous, dark glossy green, glabrous and rugulose above, medium green and very laxly lepidote beneath (scales small, flat, suborbicular, thin marginal zone variously angled or obtusely dented, centre dark, not impressed), finally glabrescent on both faces, edge thinned out, flat, not revolute, (4–)5–8 (rarely up to 11) cm by (1–)2–3 (rarely up to 4) mm, midrib impressed above, prominent beneath, nerves obscure; petiole broad, flattened, 0–2 (rarely up to 4) mm. *Flowers*

nodding, mostly in twos, rarely solitary. Flower buds narrow-ovoid, 2–2.5 by 0.6–1 cm, outer few perulae subulate, more inner ones ovate-acuminate, ending in a subulate acumen, inner ones ovate-oblong and ± shortly subulate to obtuse, all firmly membranous, brownish reddish when fresh, glabrous and somewhat lustrous, up to 2.8 by 0.8 cm. Bracteoles filiform, glabrous, *c.* 1 cm. Pedicels stoutish, laxly substellate-lepidote and ± densely puberulous, 0.6–1.2 cm by *c.* 1 mm. *Calyx* patellar, rather fleshy, wavy, very shortly and obtusely 5-lobed, *c.* 4 mm ø, laxly lepidote, furthermore puberulous at the base. *Corolla* narrow-campanulate to broadly funnel-shaped, of a shining waxy texture, flame coloured, *i.e.* bright to dark red or of a clear orange-scarlet, sometimes light red or orange, often with orange tinge especially in the interior, or red towards the base, 2–2.5 (rarely up to 3) cm long in all, glabrous in- and outside, tube 1–1.5(–1.7) cm long, base 4–6 mm ø, gradually widened to 8–10 mm, lobes broadly obovate-spathulate, slightly spreading, subretuse, 0.8–1.2 (–1.4) by 0.6–0.8 cm. *Stamens* 10, ± equalling the corolla tube in length; filaments linear, broadened and laxly pubescent at the base or the lower ¼; anthers narrow-oblong, shortly bilobed at the base, 3–4 by 1–1.3 mm. *Disk* prominent, glabrous. *Ovary* cylindric or subovoid, abrupt with the style, densely shortly whitish pubescent and minutely lepidote, 4–5 by 2–2.5 mm; style glabrous, 6–9 mm; stigma obconical or subcapitate. *Capsule* subcylindric, slightly curved, reddish-purplish, laxly covered with very small scales, more densely with spreading hairs, *c.* 3 by 0.4 cm, on fruit-pedicel *c.* 1.5 cm.

Distr. *Malesia*: Borneo (Mts Kinabalu, Batu Tiban, Trus Madi, and Kemul).

Ecol. Primary forest, locally plentiful but mostly sterile, on Mt Kinabalu a very common shrub in the upper montane oak forest, also in mossy forest, on mountain ridges, or on low rock cliff at river's edge, in light shade, 1525–2500 m, sparsely up to 3350 m. *Fl.* Jan.-Dec.

151. Rhododendron myrsinites SLEUM. Reinwardtia 5 (1960) 142.

Epiphytic shrub, 0.5 m; branches 2–3 mm ø. Branchlets *c.* 1 mm ø, subdensely substellate-lepidote; internodes 2–4(–5) cm. *Leaves* in 3–5-merous pseudowhorls at the upper 2 or 3 nodes, or close together in the upper third of the internodes, lanceolate, apex short-acuminate and plicate, minutely apiculate, base broadly attenuate into the petiole, coriaceous, laxly lepidote on both faces initially, glabrous above in later stages, persistently lepidote beneath (scales variously substellately incised or lobed in the marginal zone, centre minute and slightly impressed), edge subcrenulate by somewhat impressed scales, subrevolute, (1.3–)1.6–2 by 0.3–0.4 cm, midrib slightly sunk above, prominent beneath, nerves obsolete; petiole slender, lepidote, *c.* 2 mm. *Flowers* solitary or in pairs. Perulae membranous, red-brown, shining, ovate, in the upper 5–6 mm subulate-acuminate, glabrous, up to 2 by 0.6 cm. Pedicels slender, densely stellate-lepidote, *c.* 1.8 cm. *Calyx* much oblique, disk-shaped, obscurely lobed, *c.* 2 mm ø. *Corolla* tubular, rather fleshy, red, quite glabrous in- and outside, *c.* 3.5 cm long in all, tube slightly curved, 2.5 cm, base saccate, *c.* 4 mm ø, widened to *c.* 8 mm at apex, lobes erecto-patent, broadly obovate, 8–9 by 5–6 mm. *Stamens* 10, unequal, the longest slightly longer then the corolla tube; filaments linear, glabrous; anthers obovate, 1–1.3 mm. *Disk* glabrous. *Ovary* subcylindric-fusiform, very densely lepidote, epilose, *c.* 6 by 2 mm, gradually tapering to the style, the latter rather slender, lepidote at the base only, glabrous elsewhere, *c.* 1.4 cm; stigma capitate.

Distr. *Malesia*: New Guinea (Bernhard Camp, Idenburg R.), on tall trees in mossy forest, at 2150 m. Once found. *Fl.* Feb.

152. Rhododendron subulosum SLEUM. Reinwardtia 5 (1960) 143.

Weak epiphytic shrublet, 20–30 cm; stem *c.* 3 mm ø, few-branched, roots much thickened, *c.* 5 mm ø. Branchlets 1–1.5 mm ø, glabrous below, subdensely clothed with star-shaped and shortly stalked, caducous scales, respectively tardily glabrescent and minutely warty at the tips or the ultimate internode; internodes 1–4 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 1 or 2 nodes, linear, apex acute or nearly so, base narrowed to the petiole, coriaceous, dark green and somewhat glossy above, paler beneath, glabrous above with age, laxly lepidote beneath (scales variously angular or obtusely dented in the marginal zone, centre much darker and hardly impressed), edge slightly revolute, (3.5–)4–8 cm by 1.5–3 mm, midrib ± distinctly sunk above, very prominent beneath, red, nerves obscure; petiole subterete, red, much darker than the lamina in dry specimens, 2–4 by *c.* 0.5 mm. *Umbels* 1–3-flowered. Outer perulae subulate, more inner ones narrow-ovate-subulate, innermost ones ovate, abruptly subulate-acuminate in the upper half and acute, glabrous dorsally, reddish, up to 2 by 0.5 cm. Pedicels slender, very densely stellate-lepidote, 5–7 mm. *Calyx* obliquely disk-shaped, margin membranaceous and very shortly 5-dented, lepidote dorsally, *c.* 2 mm ø. *Corolla* tubular, probably red, *c.* 1.5 cm long in all, glabrous in- and outside, tube *c.* 1 cm long, 2–3 mm ø, but faintly dilated upwards, lobes broadly obovate-suborbicular, *c.* 4 mm ø. *Stamens* 10, 1.4–1.6 cm; filaments filiform, glabrous; anthers subglobose, *c.* 1.5 mm ø. *Disk* prominent, glabrous. *Ovary* subcylindric, very densely stellate-lepidote, *c.* 3 by 1.3 mm, abrupt with the style, the latter rather slender, glabrous, 5–6 mm; stigma club-shaped. *Capsule* *c.* 1.5 by 0.4 cm, valves reflexed and twisted. *Seeds* very narrow, tailed at both ends, 2–3 mm; fruit-pedicel *c.* 1.7 mm.

Distr. *Malesia*: New Guinea (Doormantop), ridge at 1450 m. Once collected. *Fl.* Nov.

153. Rhododendron purpureiflorum J. J. S. Med. Rijksherb. *n.* 25 (1915) 3; Nova Guinea 12 (1917)

502; *ibid.* 12 (1918) t. 197; SLEUM. Reinwardtia 5 (1960) 143. — *R. podocarpoides* SCHLTR, Bot. Jahrb. 55 (1918) 149.

Epiphytic shrub, 20–50 cm; branches numerous, terete, rather slender. Branchlets 1–1.5 mm ø, subdensely clothed with rufous stellate scales; internodes (1.8–)2.5–5.5 cm. *Leaves* in 3–6-merous pseudowhorls at or near the upper 3–4 nodes (several much reduced ones as subulate bracts along the upper internodes), linear-lanceolate, apex obtuse or subacute, base attenuate into the petiole, rather coriaceous, lepidote on both faces initially, glabrescent above with age, laxly persistently lepidote beneath (scales irregularly, often obtusely lobed or dented in the marginal zone, flat, rather pale, centre faintly or not sunk), margin flat, 2.7–4.5(–7) cm by 4–6(–7, sometimes up to 11) mm, midrib impressed above, rather strongly obtusely prominent beneath, nerves obscure; petiole lepidote, stoutish, 2–4(–5) mm. *Umbels* 2–4-flowered. Pedicels slender, subdensely rufous-stellate-lepidote, 1.2–1.5 cm. *Calyx* disk-shaped, oblique, lepidote, very shortly obtusely 5-lobed, *c.* 2.5 mm ø. *Corolla* tubular, somewhat zygomorphous, red-lilac or pale pink, very laxly substellate-lepidote or glabrous outside, glabrous inside, 2.7–3.2 cm long in all, tube subcylindric, 1.7–2.2 cm, at the 5-saccate base *c.* 4 mm ø, widened to 6–7 mm at apex, lobes erecto-patent, broad-obovate, 7–8(–9) by 5–6 mm. *Stamens* 10, unequal, the longest equalling or somewhat exceeding the corolla tube; filaments linear, glabrous; anthers obovate, *c.* 1.5 mm. *Disk* much prominent, glabrous. *Ovary* fusiform, attenuate at the base, gradually tapering to the style, densely lepidote, *c.* 4 by 1.6 mm; style slender, glabrous, ± equalling the stamens; stigma suboblique, capitate, purple.

Distr. *Malesia*: New Guinea (Perameles and Schrader Mts, and near Bernhard Camp, Idenburg R.).

Ecol. Mossy forest on tall trees, 1100–2150 m. *Fl.* Dec., Feb., May-June.

5. Series Citrina

SLEUM. Reinwardtia 5 (1960) 144.

Differs from all other series of *subsect. Euvireya* by having only 5 stamens.

Distr. *Malesia*: Sumatra, Java, and Bali.

154. Rhododendron citrinum (HASSK.) HASSK. Cat. Hort. Bog. (1844) 161; MORITZI, Syst. Verz. (1846) 42; WALP. Rep. 6 (1847) 420; HOOK. Bot. Mag. (1854) t. 4797; ZOLL. Syst. Verz. 2 (1854) 137; PLANCH. Fl. Serres 10 (1854–55) 5, t. 970; WALP. Ann. 5 (1858) 452; MIQ. Fl. Ind. Bat. 2 (1859) 1058; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 43, *incl.* β *albiflorum* MIQ. *l.c.*; KOORD. Teysmannia 10 (1899) 450; Exk. Fl. Java 3 (1912) 4; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 106; J. J. S. in K. & V. Bijdr. 13 (1914) 94; KOORD. Fl. Tjib. 3 (1918) 3; STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 387, 388; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 4; SLEUM. Reinwardtia 5 (1960) 144; STEEN. Endeavour 21 (1962) 189. t. 2. — *Azalea citrina* HASSK. Flora 25 (1842) Beibl. p. 30; O. KTZE, Rev. Gen. Pl. 2 (1891) 387. — *R. zippelii* BL. Fl. Jav. Pl. inéd. (1863–83) t. 4. — *R. jasminiflorum* (*non* HOOK.) KOORD. Junghuhn Gedenkb. (1910) 184, *cf.* HALLIER *f.* Med. Rijksherb. *n.* 1 (1910) 35.

var. **citrinum.**

Rather small, epiphytic, divaricately branched shrub, 0.7–2 m. Branchlets 1–1.5(–2) mm ø, terete, tips ± densely clothed with flattish rufescent scales, glabrescent below, greyish corticated in the older parts; internodes 2–5 cm. *Leaves* in 4–5-merous pseudowhorls at the upper 1–2(–3) nodes, unequal in the same pseudowhorl, elliptic, oblong-elliptic or nearly lanceolate, rarely obovate-elliptic, apex ± broadly acuminate, subacute or mostly obtuse (terminal gland very small), base attenuate to the petiole, coriaceous, dark green and glossy above, dilutely green with brown scales beneath, densely lepidote initially in the youngest leaves, early glabrescent on the upper surface, which is a little wrinkled in dry specimens, more persistently and subdensely lepidote beneath (scales distant, flat, rather small, variously obtusely angled or more deeply dented in the marginal, early dissolute zone, dark centre small, somewhat impressed), finally ± glabrescent beneath too, margin slightly revolute in dry specimens, (1.5–)2.5–5(–6.5) by (1–)1.5–2.5(–2.7, rarely up to 4) cm, midrib slightly impressed above, prominent beneath, nerves 5–8 pairs, widely spreading, anastomosing, faintly raised beneath, often inconspicuous; petiole lepidote, rather slender, semiterete, (3–)4–9(–12) mm. *Umbels* 2–4(–5)-flowered, occasionally reduced to a solitary flower. *Flowers* a little fragrant, nodding. Flower buds ovoid, outer perulae ovate-acuminate, finely sericeous dorsally, the middle line set with early caducous scales, inner ones oblong to spathulate, glabrous dorsally, all fimbriate along the margin or at the top only, up to 10 by 3 mm. Bracteoles filiform, practically glabrous, up to 8 mm. Pedicels red, slender, puberulent and laxly lepidote below, more densely so upwards, *c.* 1.5 cm at anthesis. *Calyx* oblique, obtusely 5-lobed (lobes 1–2 mm, or sometimes one or the other lobe a little longer), lepidote dorsally, 3–4 mm ø. *Corolla* broadly funnelform-campanulate, pale or creamy yellow, yellowish white, or lemon, lobed nearly halfway, 1.5–1.7 cm long in all, outside very laxly lepidote or almost glabrous in the Javanese, subdensely lepidote in the Balinese specimens, glabrous inside, tube *c.* 4 mm ø at base, gradually dilated to 6 mm at apex, lobes ± spreading, somewhat unequal, obovate-spathulate, apex rounded, very slightly or not retuse, 7–8 mm.

Stamens 5, unequal, a little exserted from the corolla tube, *c.* 1.2 cm; filaments linear, glabrous, red or orange; anthers oblong, deeply emarginate on both ends, 2.2–2.5(–2.8) by *c.* 1 mm, yellow or orange, dorsifix, the connective white. *Disk* very prominent, glabrous. *Ovary* obliquely oblong-ellipsoid, somewhat 5-angled respectively -ribbed, lepidote at the base, glabrous for the rest, *c.* 4 by 1.5 mm, green, initially gradually tapering to the slender glabrous style (5–6 mm), but rather abrupt in later stages; stigma turbinate-subcapitate. *Capsule* obliquely cylindric, shortly attenuate at both ends, slightly curved, red, deeply 5-grooved, glabrous, 2–2.5 cm by 4 mm. *Seeds* very narrow, *c.* 4 mm including the filiform tails at both ends.

Distr. *Malesia*: W. Java and Bali.

Ecol. In very humid primary forest, subalpine forest or forest border, (1000–)1450–2400(–2900) m. *Fl.* Sept.-March.

Vern. *Tjantigi*, S.

Note. Reported for Central Java and possibly growing on Mt Diëng; no specimens seen.

var. **discoloratum** SLEUM. Reinwardtia 5 (1960) 145. — *R. citrinum* (*non* HASSK. *s. str.*) MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 251, 586; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 58; SP. MOORE, J. Bot. 63 (1925) Suppl. 57. — *R. multicolor* (*non* MIQ.) SP. MOORE, *l.c.*

Corolla laxly to subdensely lepidote outside, mostly orange red to bright scarlet, rarely light lemon yellow. *Ovary* not rarely completely or for a long time covered with scales.

Distr. *Malesia*: Sumatra (Atjeh: West Coast; Palembang; Lampong).

Ecol. In mossy (*Vaccinium*-)forest, on ridges, 1220–2500 m.

Vern. *Mata kunai*, M.

6. Series Buxifolia

SLEUM. Reinwardtia 5 (1960) 145. — *Rhododendron sect. Zygomorphanthe* SCHLTR, Bot. Jahrb. 55 (1918) 145, *p.p.* — *Rhododendron subsect. Malesia* COPEL. *f.* Philip. J. Sc. 40 (1929) 136, 152. — *Rhododendron subsect. Linearanthera* COPEL. *f. l.c.* — *Rhododendron subsect. Astrovireya* SLEUM. Bot. Jahrb. 74 (1949) 539. — Fig. 33—37.

Leaves medium-sized, (0.6–)1–4 (rarely in part in the same specimen up to 7) by (0.4–)1–2 (rarely in part in the same specimen up to 2.5, very rarely up to 3) cm, of various form other than linear or narrow-lanceolate.

Distr. *Malesia.*

KEY TO THE SPECIES

1. Ovary hairy *and* lepidote to various degree (scales sometimes sparse or ± covered (hidden) by the hairs).
2. Filaments manifestly ± patently hairy at least in the lower third.
3. Corolla broadly tubular-campanulate (tube straight, ± equally wide), lobes erect and short, equalling but $^1/_4$–$^1/_5$ of the total length of the corolla. Leaves obovate-lanceolate, (1.6–)2–3.5 by (0.4–)0.5–0.7(–0.8) cm. . . . . **155. R. frey-wysslingii**
3. Corolla open-campanulate, funnel-shaped or tubular (tube widened towards the lobes and often ± curved), lobes erect or expanded, equalling ¼–½ of the total length of the corolla.
4. Corolla short, open-campanulate . . . . . **156. R. pubigermen**
4. Corolla ± elongate, funnelform, tubular-funnelform or tubular(-zygomorphous).
5. Umbels 2–4(–6)-flowered.
6. Style hairy at least in the lower third, mostly up to almost the top.
7. Corolla white.
8. Style hairy *and* lepidote . . . . . **245. R. luraluense**
8. Style exclusively hairy . . . . . **157. R. vidalii**
7. Corolla pink, or red (scarlet).
9. Corolla elepidote, glabrous or laxly hairy outside. . . . . **158. R. hatamense**
9. Corolla lepidote, otherwise whether or not hairy outside.
10. Corolla hairy *and* lepidote outside. . . . . **159. R. vandeursenii**
10. Corolla exclusively lepidote outside to various degree.
11. Style hairy in the lower third. . . . . **268. R. culminicolum**
11. Style hairy in the lower ½–¾, or almost to the top.
12. Corolla 2.5 cm. Nervation of the leaves subinconspicuous on both faces. **160. R. cornu-bovis**
12. Corolla at least 3.6 cm. Nervation of the leaves much impressed above, prominent beneath. **268. R. culminicolum *var.* nubicola**
6. Style hairy at the base only (up to $^1/_6$ of its total length), or mostly entirely glabrous.
13. Style as long as the ovary.
14. Umbels 2–3-flowered. Leaves 3–4.5 by 1.2 cm. . . . . **161. R. planecostatum**
14. Flowers solitary. Leaves 1.5–2.3 (–2.7) by 0.5–0.8(–1) cm . . . . . **162. R. bagobonum**
13. Style distinctly longer than the ovary.
15. Anthers dorsally glabrous.

16. Corolla exclusively lepidote, or glabrous outside, no hairs present at all.
17. Corolla yellow. Leaves gradually long-acuminate at apex . . . . **163. R. nieuwenhuisii**
17. Corolla pink to red. Leaves broadly and/or shortly acuminate, or obtuse at apex.
18. Leaves quite entire.
19. Corolla laxly lepidote outside . . . . . **268. R. culminicolum**
19. Corolla completely glabrous outside, (2.5–)3(–3.2) cm . . . . . **261. R. arfakianum**
18. Leaves minutely though distinctly crenulate.
20. Corolla completely glabrous outside. . . . . **164. R. pseudobuxifolium**
20. Corolla lepidote to various degree outside . . . . . **165. R. commonae**
16. Corolla exclusively hairy, or hairy *and* lepidote outside.
21. Leaves linear to linear-oblong, revolute to or almost to the midrib, 2–2.5(–4) cm by 1.5–2(–3) mm in the revolute state. Umbels 2–3-flowered . . . . **166. R. abietifolium**
21. Leaves elliptic, or elliptic- or obovate-oblong, revolute to various degree, at least 4 mm wide. Umbels 5 (or more)-flowered.
22. Leaves elliptic- or obovate-oblong, base ± cuneate to the petiole, (4–)6–10(–13) mm wide . . . . . **167. R. sheilae**
22. Leaves elliptic, base broadly attenuate to rounded, 15–20(–26) mm wide. **198. R. rugosum *var.* coriifolium**
15. Anthers dorsally ± densely hairy. . . . . **168. R. pauciflorum**
5. Umbels 7–12-flowered
23. Leaves quite entire. Corolla densely lepidote outside . . . . . **169. R. psammogenes**
23. Leaves manifestly crenulate. Corolla laxly hairy *and* lepidote outside **198. R. rugosum *var.* coriifolium**
2. Filaments glabrous or practically so.
24. Style hairy at least in the lower ⅓, mostly so to or almost to the top.
25. Corolla (2–)2.5(–2.8) cm long in all. Branchlets verruculose.
26. Leaves thick-coriaceous, rigid, apex ± rounded, a terminal gland not visible, nerves ± distinctly prominent in fully mature leaves. Corolla red. . . . . **170. R. vitis-idaea**
26. Leaves thin-coriaceous, apex mostly acuminate, rarely rounded, the terminal gland mostly forming an outstanding apiculus, nerves subinconspicuous. Corolla white, pink at the throat. **171. R. rhodostomum**
25. Corolla 3.5–5(–6) cm long in all, red. Branchlets smooth or almost so.
27. Corolla exclusively stellate-lepidote at the tube outside . . . **268. R. culminicolum *var.* nubicola**
27. Corolla stellate-lepidote *and* hairy outside. . . . . **159. R. vandeursenii**
24. Style hairy at the base only (up to $^1/_6$ of its total length), or quite glabrous.
28. Corolla practically glabrous outside.
29. Umbels 3–4-flowered. Leaves 2.5–3.5(–4) by 1.2–1.8(–2) cm. Petiole flattened, 1.5–3 by 1–1.5 mm. **172. R. alternans**
29. Flowers solitary. Leaves (2–)2.2–3 by (0.7–)0.8–1 cm. Petiole subterete, 3–4(–5) by *c.* 0.8 mm. **173. R. leptomorphum**
28. Corolla laxly to subdensely lepidote outside.
30. Leaves cuneately decurrent into the ± flattened petiole.
31. Leaves entire or faintly crenulate, 1.5–2.5(–3) by 0.8–1.5 cm. Corolla 1.5–1.8(–2) cm long in all. **174. R. pseudonitens**
31. Leaves more manifestly crenulate, (2–)2.5–3.5(–4) by (0.8–)1–1.5 cm. Corolla 3–3.5 cm. **175. R. helodes**
30. Leaves (manifestly crenulate) ± truncate at the very base, hardly or not decurrent, the petiole well distinguishable, a little or not flattened . . . . . **165. R. commonae**
1. Ovary exclusively lepidote (but hairs may be present on the style).
32. Style hairy to various degree (not lepidote).
33. Style patent-hairy per *c.* 2 mm above the base. Leaves obovate, 1.2–1.8 by (0.5–)0.7—1.1(–1.3) cm. Filaments glabrous . . . . . **176. R. papuanum**
33. Style with a ring of short patent hairs at its very base. Leaves oblong-obovate, 2.3–3.5 by 0.7–1.2 cm. Filaments pubescent at the base. . . . . **179. R. ripleyi *var.* basitrichum**
32. Style exclusively lepidote up to the middle, or mostly quite glabrous.
34. Filaments laxly to subdensely and ± patently hairy or at least papillose-puberulous below.
35. Corolla (tubular-funnelform) yellowish white, rather densely hairy at the tube inside. **177. R. acrophilum**
35. Corolla pink-red to scarlet, glabrous inside.
36. Corolla up to 3 cm long in all.
37. Corolla ± open campanulate, *c.* 2 cm. Leaves oblanceolate, apex slightly notched, lacking a terminal gland. Disk glabrous . . . . . **178. R. banghamiorum**
37. Corolla funnelform-campanulate, 2.5–3 cm. Leaves oblong-obovate or oblong-elliptic, rarely elliptic or subobovate-elliptic, apex bluntish, ending in a whether or not protruding gland. **179. R. ripleyi**

36. Corolla 5–5.5 cm long in all (subfunnelform-tubular) . . . . . **180. R. alticolum**
34. Filaments completely glabrous.
38. Corolla widely campanulate. Leaves oblanceolate . . . . . **181. R. pyrrhophorum**
38. Corolla tubular or funnel-shaped. Leaves of other shape.
39. Style ± as long as or shorter than the ovary. Corolla (strictly tubular) 1–1.3(–1.6) cm long in all.
40. Leaves in general elliptic-oblong, 2.3–3.5(–4) by (0.8–)1–1.5 cm; petiole 3–5 mm. **182. R. luteosquamatum**
40. Leaves in general ovate-elliptic, or elliptic, (1–)1.2–2.4(–3.5) by 0.6–1.5(–2) cm; petiole 1–2 (rarely up to 3) mm . . . . . **183. R. inconspicuum**
39. Style much longer than the ovary. Corolla longer than 2 cm.
41. Corolla glabrous outside or practically so.
42. Leaves subsessile, ± imbricately arranged, *i.e.* the pseudowhorls very close together, petiole 1–2 by 3–4 mm . . . . . **184. R. lamii**
42. Leaves manifestly petioled, scattered or in manifestly spaced pseudowhorls; petiole (2–)3–5 by 1–2.5 mm.
43. Corolla 2–2.5 cm long in all. Calyx and pedicels exclusively lepidote.
44. Branchlets smooth. Leaves ± obovate, 3–4.5(–5) by 1.5–2(–2.3) cm . **185. R. porphyranthes**
44. Branchlets verruculose. Leaves lanceolate to subobovate-oblong, 1.5–2 by 0.6–1 cm. **186. R. simulans**
43. Corolla 3.5–5.5 cm long in all.
45. Calyx and pedicels exclusively lepidote.
46. Leaves (1.8–)2–2.7 by (1–)1.4–1.9 cm; nerves subinconspicuous . . . **187. R. ultimum**
46. Leaves 3–4(–5) by 1.8–2.7 cm; nerves conspicuous above or mostly so on both faces. **188. R. brassii**
45. Calyx and pedicels lepidote *and* shortly pubescent.
47. Umbels 2-flowered, or rarely a solitary flower. . . . . **189. R. subuliferum**
47. Umbels 3–6-flowered . . . . . **190. R. scarlatinum**
41. Corolla laxly or mostly subdensely lepidote outside.
48. Corolla (3–)4–5(–5.5) cm long in all.
49. Leaves broadly elliptic or ovate-elliptic, sometimes subobovate-elliptic, base rounded or mostly slightly cordate . . . . . **191. R. atropurpureum**
49. Leaves obovate or rarely oblong-obovate, base cuneate . . . . . **189. R. subuliferum**
48. Corolla (2–)2.5–3 (rarely up to 3.5) cm long in all.
50. Leaves densely arranged in much approximate 5–8-merous pseudowhorls, broad-elliptic, ± rounded or subcordate at the base, manifestly crenulate. . . . . **192. R. buxifolium**
50. Leaves laxly arranged, in distinctly spaced pseudowhorls, ± attenuate at the base, subcrenulate to entire.
51. Perulae small, up to 0.8 by 0.4 cm . . . . . **193. R. wrightianum**
51. Perulae rather large, 1–2 by 0.4–0.9 cm, laxly lepidote, or mostly glabrous dorsally.
52. Branchlets distinctly verruculose. Leaves elliptic, sometimes subovate- or subobovate-elliptic, 2–2.8(–3) by (0.8–)1–1.4 cm; petiole 2–3 by 1.5–2 mm. Corolla 2.5–3 cm. **194. R. subcrenulatum**
52. Branchlets smooth.
53. Leaves oblong to elliptic- or subobovate-oblong, (2–)2.3–3.8 (rarely up to 5) by 1–1.6 cm; petiole 3–5(–7) by 1–1.5 mm. Corolla 2–2.6 cm . . . . . **195. R. rubrobracteatum**
53. Leaves narrow-oblong, or elliptic-oblong, 2–2.5 by 0.5–0.9 cm; petiole 2–3 by 0.7–1 mm. Corolla 3(–3.5) cm . . . . . **196. R. calosanthes**

155. Rhododendron frey-wysslingii J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 123; SLEUM. Reinwardtia 5 (1960) 149.

Small terrestrial, much branched shrub, up to 75 cm. Branchlets terete, tips sparsely to subdensely covered with substellate ± sessile scales, older glabrescent parts first minutely verruculose, early becoming smooth; internodes 0.3–3.5 cm. *Leaves* in dense 5–8-merous pseudowhorls at the upper 1–3 nodes, obovate-lanceolate, apex obtuse or rounded, base cuneate into the petiole, ± coriaceous, young ones cinnamon-lepidote on both faces, mature ones glabrescent above, lepidote for a long time beneath (scales small, flattish, narrow marginal zone subentire or mostly irregularly shallowly lobed, centre relatively large, somewhat impressed), finally ± glabrescent beneath too, margin very slightly revolute, (1.6–)2–3.5 by (0.4–)0.5–0.7(–0.8) cm, midrib impressed above, obtusely raised beneath in the lower half, becoming ± obsolete distally, nerves obsolete; petiole lepidote, flat, 1–2 mm. *Flowers* solitary or more rarely in twos, nodding. Perulae narrow ovate-acuminate, long-subulate, membranous, laxly lepidote and papillose at apex, glabrous below, margin set with ± caducous scales, up to 6 by 2 mm, early caducous. Pedicels rather stoutish, 1–1.3 cm in anthesis, densely set with stellate scales and sparingly very shortly hairy. *Calyx* small, disk-shaped, thin, shortly 5-dented, *c.* 3 mm ø, lepidote and often short-hairy dorsally. *Corolla* broadly tubular-campanulate, thin, red,

1.4–1.6 cm long in all, ± densely covered with subentire, thickish scales outside, laxly long-hairy in the lower half of the tube inside, tube broad-cylindric, 1–1.2 cm, rounded and *c.* 5 mm ø at base, slightly widened to apex, lobes ovate, subacute, somewhat expanded, *c.* 3.5 by 3.5 mm. *Stamens* 10, subequal, somewhat exceeding the corolla tube; filaments linear, dilated at the base, ± densely patently hairy to nearly the top; anthers subquadrangular, truncate, *c.* 1.4 mm. *Disk* glabrous. *Ovary* ovoid-conical, densely lepidote and villous, the hairs predominant, covering the scales at first, *c.* 4 by 2 mm, rather abrupt with the style, the latter 7–8 mm at anthesis, covered to the lower $^2/_5$ with whitish hairs; stigma capitate. *Capsule* subcylindric, laxly hairy and lepidote, *c.* 1.3 by 0.4 cm. *Seeds* 4 mm, the long tails included.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Bur ni Tèlong and Rĕdĕlong Volcano), on slopes, 1800–2000 m. *Fl.* Jan., June, Sept.

156. **Rhododendron pubigermen** J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 122; SLEUM. Reinwardtia 5 (1960) 149.

Small, generally epiphytic shrub, up to 1.2 m; branches slender, divaricate. Branchlets terete, *c.* 1 mm ø at the upper internodes, which are ± densely substellate-lepidote and finely patent-puberulous; internodes (1–)2–6 cm. *Leaves* in (4–)6–10-merous pseudowhorls at the upper 2–3 nodes, oblong- or lanceolate-obovate, apex obtuse-rounded, base gradually cuneate, coriaceous, rather stiff, lepidote on both sides initially, glabrous above at full maturity, subdensely and more persistently lepidote beneath (scales flat, pale brown, marginal zone relatively narrow, irregularly and shallowly incised, centre small, ± conspicuously impressed), margin ± revolute in dry specimens, (1.3–)1.8–3(–4.5, rarely up to 5.5) by (0.5–)0.7–1.2(–1.5) cm, midrib impressed above, strongly prominent in the lower half beneath, nerves obsolete; petiole ± flattened, lepidote, 1(–2) mm. *Flowers* 1–2(–3). Flower buds ovoid, *c.* 0.8 by 0.6 cm; perulae suborbicular-ovate, outer ones obtuse, inner ones subacuminate, glabrous and lustrous dorsally, margin set with caducous scales, up to 7 by 5 mm. Bracteoles linear-subspathulate, glabrous, *c.* 8 mm. Pedicels rather slender, densely lepidote and minutely pubescent, 1–1.6 cm. *Calyx* oblique, shortly cup-shaped, shortly 5-dented or -lobed, *c.* 3 mm ø. *Corolla* open-campanulate, gradually attenuate from the limb to the base, nearly halfway 5-lobed, rather fleshy, red, scarlet or crimson, 1.7–1.9(–2.3) cm in all, laxly or subdensely substellate-lepidote outside, margin of the lobes excepted, glabrous inside, tube straight, 8–10 mm, at base rounded and 4–6 mm ø, lobes broadly obovate-spathulate, subtruncate, slightly spreading, 10–12 by 7–10 mm. *Stamens* 10, alternately unequal, the longer ones attaining ± half the length of the corolla lobes; filaments linear, patently hairy in the lower $^1/_4$–$^1/_3$, glabrous for the rest; anthers broad-oblong or subquadrate, 2 mm. *Disk* prominent, glabrous. *Ovary* ovoid, *c.* 3.5 by 2.5 mm, densely set with longish subpatent hairs which cover the scales; style very abrupt with the ovary, glabrous, (5–)6–8 mm; stigma subcapitate. *Capsule* subovoid-elliptic, subdensely long-hairy, laxly lepidote, 1.2–1.7 cm, the valves twisted.

Distr. *Malesia*: Sumatra (East and West Coast).

Ecol. In rain-forest, mossy forest or light, also secondary, jungle, 1200–2560 m. *Fl.* Jan.-Dec., *fr.* June.

157. **Rhododendron vidalii** ROLFE, J. Bot. 24 (1886) 348; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 43; Philip. J. Sc. 1 (1906) Suppl. 111; *ibid.* 3 (1908) Bot. 381; MILLAIS, Rhodod. (1917) 258; BROWN, Min. Prod. Philip. For. 3 (1921) 218); MERR. En. Philip. 3 (1923) 245; MILLAIS, Rhodod. ser. 2 (1924) 257; COPEL. *f.* Philip. J. Sc. 40 (1929) 152, t. 4, f. 3–4, t. 5; SLEUM. Reinwardtia 5 (1960) 151; Blumea 12 (1963) 106; Jahrb. Rhodod. Ges. Bremen (1963) f. 3. — *R. verticillatum* (*non* LOW *ex* LINDL.) VIDAL, Rev. Pl. Vasc. Filip. (1886) 171; CERON, Cat. Pl. Herb. Manila (1892) 106. — *R. lussoniense* RENDLE, J. Bot. 34 (1896) 356; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 43; MILLAIS, Rhodod. (1917) 204; *ibid.* ser. 2 (1924) 179. — *R. whiteheadii* RENDLE, J. Bot. 34 (1896) 356; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 43; Philip. J. Sc. 3 (1908) Bot. 381; MILLAIS, Rhodod. (1917) 262; *ibid.* ser. 2 (1924) 260; MERR. En. Philip. 3 (1923) 245; COPEL. *f.* Philip. J. Sc. 40 (1929) 154, t. 4, f. 5–11. — *R. curranii* MERR. Philip. J. Sc. 3 (1908) Bot. 255, 381; MILLAIS, Rhodod. (1917) 151; *ibid.* ser. 2 (1924) 121; MERR. En. Philip. 3 (1923) 243. — Fig. 33.

Terrestrial or epiphytic shrub, stiff-woody, 0.8–2(–3) m, with grey bark; branches divaricate. Branchlets 1–2 mm ø, greyish corticate in the older parts, tips laxly lepidote and ± patent-puberulent; internodes 1.5–5 cm. *Leaves* crowded in 3–5(–7)-merous pseudowhorls at the upper 1–2(–3) nodes, oblanceolate to obovate-oblong, more rarely (broadly) obovate, apex rounded or subemarginate, base cuneate to the petiole, coriaceous, medium-green and rather shining above, paler beneath, laxly to subdensely lepidote on both faces when young (scales flat, rufescent, the relatively narrow marginal zone irregularly ± obtusely stellate-lobed, seemingly roundish, when the marginal zone has gone and the centre has become blackish with age, the latter slightly or not impressed, early ± disappearing above, remaining for a longer time beneath), ± glabrescent with age on both sides, edge slightly recurved, (1.5–)2–4 (in part sometimes up to 5.5) by (0.8–)1–1.5 (–2, very rarely up to 3) cm, midrib impressed above, prominent beneath, nerves 4–6 pairs, faintly visible above, slightly raised beneath, veins subinconspicuous; petiole ± flattened, lepidote, 2–3(–5) mm. *Umbels* 2–3(–4)-flowered, sometimes reduced to a single flower. Flower buds narrow-ovoid, *c.* 1.5 cm. Perulae membranous, glabrous or mostly subdensely to sparingly sericeous and laxly lepidote dorsally, short glandular-fimbriate,

outer ones broad-ovate, short-acuminate, subacute, inner ones larger, ovate-oblong to spathulate, up to 1.5 by 1 cm. Bracteoles filiform, laxly hairy, up to 12 mm. Pedicels rather slender, laxly caducously substellate-lepidote, furthermore mostly laxly to subdensely shortly patently hairy (but sometimes entirely epilose!), (1.2–)1.5–2.5 cm at anthesis. *Calyx* small, disk-shaped, obscurely dented, *c.* 3 mm ø, lepidote and ± short-hairy dorsally. *Corolla* funnel-shaped, white (or apparently sometimes crimson, possibly due to hybridizing with a red-flowered other species), fragrant, (2.2–)2.5–3 cm long in all, limb *c.* 3 cm ø, laxly lepidote at the tube and the lower half of the lobes outside, laxly to subdensely hairy at the tube out- and inside, tube straight, (1–)1.5 cm, at base *c.* 4 mm ø, gradually widened to 8–10 mm at apex, lobes spreading, broadly cuneate-spathulate, obtuse, 0.8–1.3 by *c.* 1 cm. *Stamens* 10, subequal, attaining half the corolla lobes; filaments linear and ± densely subpatently hairy in the lower half, filiform and glabrous distally; anthers narrow-oblong, *c.* 3 by 1 mm. *Disk* prominent, glabrous below, short-hairy at the upper margin. *Ovary* subfusiform-cylindric, densely patent-hairy, the hairs covering small scales, *c.* 5 by 2 mm, rather abruptly tapering to the style, which is patently hairy in its lower ⅓–⅔, glabrous towards the top, and ± as long as the stamens; stigma turbinate-capitate. *Capsule* subcylindric, somewhat oblique and curved, subattenuate at the base, 1.5–2 by 0.4–0.5 cm, densely pubescent, the valves becoming recurved and twisted. *Seeds* *c.* 3 mm including the long-tailed appendices on both ends.

Distr. *Malesia*: Philippines (Luzon).

Ecol. Mostly in moss forest, but also terrestrial on banks in rather barren places or grassland, epiphytic on large, moss covered trees or terrestrial on shrubby mountain side or exposed ridges, locally not rare, 1000–2100 m. *Fl.* Jan.-Dec.

Vern. *Lofong, lopong, tingei*, Bon., *ballaybay, kaykayyin, ayalea*, If.

Uses. The plant is used as a cure for itches.

158. Rhododendron hatamense BECC. Malesia 1 (1878) 202; J. J. S. Nova Guinea 12 (1914) 135; SLEUM. Reinwardtia 5 (1960) 153; Blumea 12 (1963) 106.

Low shrub, *c.* 0.5 m, branches divaricate. Branchlets irregular, slender, tips laxly lepidote; internodes 0.8–6 cm. *Leaves* in 3–5(–6)-merous

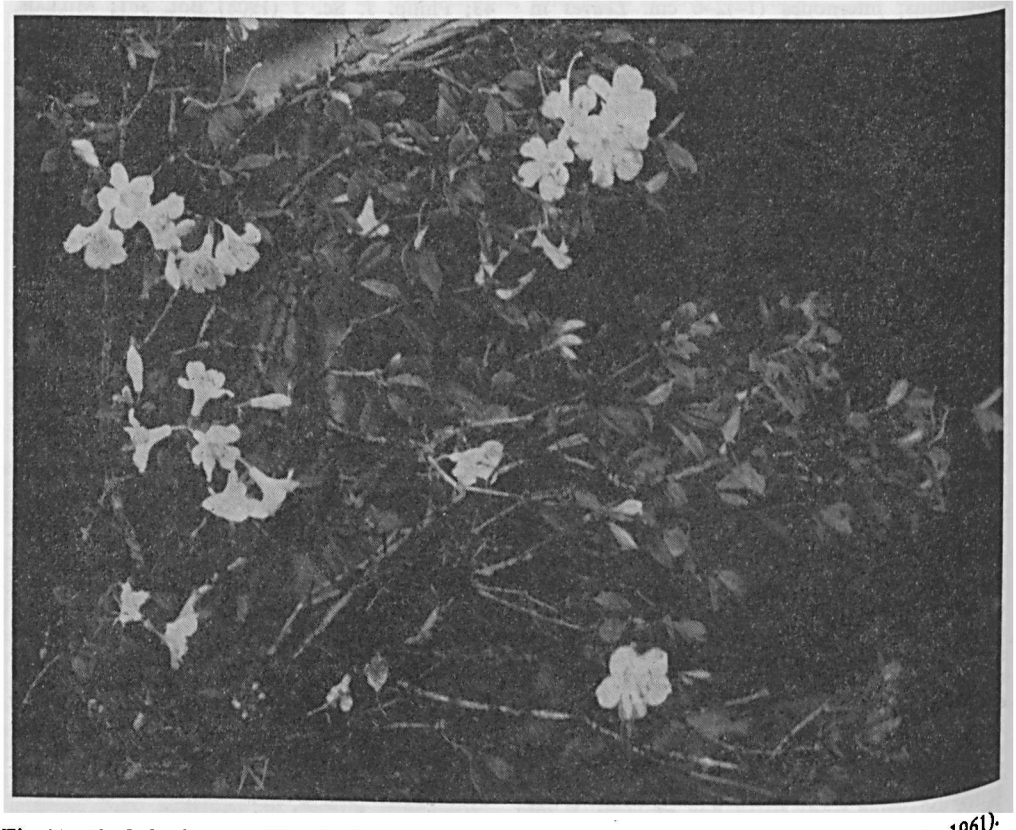

Fig. 33. *Rhododendron vidalii* Rolfe. Mt Polis, 2000 m, Luzon, Philippines (STEINER 2175) (SLEUMER, 1961).

pseudowhorls at the upper 1–2 nodes, ovate-elliptic to elliptic, apex short-acuminate or broad-attenuate, obtuse or sometimes rounded, or apiculate, base broad-cuneate or attenuate, thin-coriaceous, glabrescent above with age, subdensely lepidote for a long time beneath (scales small, flat, substellate, faintly sunk), finally ± glabrescent beneath with only the blackish small pits remaining, margin slightly cartilaginous, mostly rather distinctly revolute, 2–4(–7) by (0.9–) 1.5–2 (rarely up to 3.5) cm, midrib impressed above, prominent beneath, nerves 4(–6) pairs, rather straight below, ± looping near the edge, finely sunk above, ± distinctly raised beneath, or subobscure as are the veins; petiole flattish, 2–3(–4) mm. *Umbels* 2–4(–6)-flowered. Perulae ovate-acuminate, short-subulate, membranous, glabrous, margin fimbriate by caducous scales, up to 10 by 5 mm. Bracteoles filiform, up to 1 cm. Pedicels rather slender, densely lepidote and patently hairy to subvillous, 1–1.8(–2.4) cm. *Calyx* disk-shaped, often reflexed, obscurely 5-lobed, *c.* 3 mm ø, lepidote and hairy dorsally. *Corolla* tubular-funnelform, suboblique, *c.* 2.5 cm long in all, bright to dark red or crimson, waxy and glossy, laxly pubescent, chiefly in the lower half, or sometimes glabrous, and certainly bearing no scales outside, laxly patently hairy in the lower half of the tube inside, tube subcylindric, *c.* 1.5 cm long, 4–5 mm ø at base, a little widened upwards, lobes much spreading, broadly obovate-spathulate, *c.* 0.8–1.2 cm. *Stamens* 10, equalling halfway the corolla lobes; filaments linear, laxly patently hairy above the base to the lower ¼, glabrous above; anthers dark purple to almost blackish, oblong-obovate, 2 mm. *Disk* glabrous. *Ovary* subovoid, densely shortly set with spreading hairs or tomentulose, the hairs covering the scales, *c.* 5 by 3 mm, tapering to the style, the latter ± equalling the stamens, hairy to near the top; stigma subcapitate.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Arfak, Tamrau and Nettoti Mts).

Ecol. Epiphytic in mossy *Nothofagus* forest, 1550–1900 m, apparently very scattered or rare.

Fl. Oct.-March.

Vern. *Bingnoi*, Hattam.

159. Rhododendron vandeursenii SLEUM. Blumea 11 (1961) 123; *ibid.* 12 (1963) 108.

Erect epiphytic or terrestrial shrub, 0.5–1 m; upper internodes rather slender, lepidote, 0.4–4 (–6) cm, lower ones early glabrescent. *Leaves* in 3–4-merous pseudowhorls at the upper 2(–3) nodes, obovate or elliptic-obovate, apex rounded, sometimes faintly retuse, base cuneate to the petiole, ± convex above, coriaceous, laxly lepidote on both faces initially, glabrous and a little glossy above with age, rather dull and subdensely lepidote beneath (scales flattish, hyaline marginal zone variously dented or incised, early dissolute, centre thick and more persistent, scales thus sometimes seemingly rotund and entire), edge much revolute, (1.5–)2–4(–5) by (0.8–)1–1.8 (rarely up to 2.5) cm, midrib flat and rather inconspicuous above, thick and obtusely prominent below, decreasing upwards beneath, nerves *c.* 5 irregular pairs, slightly prominent beneath only, or hardly visible, no reticulation; petiole lepidote initially, 3–4(–5) by *c.* 1 mm. *Flowers* pendent, solitary, rarely in twos. Perulae broadly ovate, subacuminate-apiculate, keeled and lepidote dorsally, manifestly fimbriate, known up to 6 mm. Pedicels rather stoutish, 1.3–2.3 cm, laxly to subdensely stellate-lepidote and laxly subpatently hairy. *Calyx* ± obliquely disk-shaped, shortly subacutely 5-lobed, lepidote dorsally, 2.5–3.5 mm ø. *Corolla* tubular, not much subcampanulate-dilated upwards, 4.5–5 (–5.5) cm in all, red or deep crimson, laxly stellate, lepidote and short-hairy at least in the lower part outside, practically glabrous inside, tube rather straight or slightly curved, 3.5–4.3 cm, 4–5 mm ø at base, widened to 1.2–1.5(–2) cm at apex, lobes erect, broadly subspathulate-obovate or almost rounded, 8–10 by 6–8 mm. *Stamens* 10, ± as long as the corolla; filaments linear (1 mm), laxly hairy or almost glabrous; anthers broad- or subobovate-oblong, 2.7–3 by *c.* 1 mm, base obtuse. *Disk* glabrous below, hairy at the upper margin. *Ovary* subcylindric, densely set with subpatent hairs and with scales, 6–7 by 2 mm, tapering to the style, the latter ± as long as the corolla, laxly subpatently hairy in the lower ⅓ to ½, elepidote; stigma thick-turbinate.

Distr. *Malesia*: New Guinea (Central Highlands).

Ecol. Mossy, primary and secondary forest, 2285–2770 m. *Fl.* July.

160. Rhododendron cornu-bovis SLEUM. Reinwardtia 5 (1960) 152.

Small, straggling shrub, up to 2 m, with rather slender, divaricate branches. Branchlets subterete, *c.* 1 mm ø, tips ± flattened and densely clothed with rufescent substellate scales; internodes 1.5–4 (–6) cm. *Leaves* in 4–6-merous pseudowhorls at the upper 2–3 nodes, obovate-oblong to obovate, apex broadly attenuate, obtuse or rounded, base cuneate into the petiole, coriaceous, firm, youngest ones lepidote on both faces, early glabrescent above, persistently subdensely lepidote beneath (scales rather large, flat, irregularly substellate-lacerate in the marginal zone, centre slightly impressed), edge slightly recurved, 2.5–3.5(–4) by 0.8–1.4 cm, midrib grooved above, prominent beneath, nerves 3–4 pairs, subinconspicuous, often obsolete beneath; petiole lepidote, 2–3(–4) mm. *Umbels* 2–3-flowered. Perulae broad-ovate to ovate-oblong, rather obtuse, glabrous dorsally, margin fimbriate by caducous scales, up to 8 by 5 mm. Bracteoles filiform, very laxly lepidote, *c.* 5 mm. Pedicels rather slender, subdensely stellate-lepidote and sparsely very shortly patent-pubescent, 1–1.4 cm. *Calyx* disk-shaped, oblique, lepidote and short-pubescent dorsally, indistinctly 5-dented, 2.5 mm ø. *Corolla* obliquely tubular-funnel-shaped, *c.* 2.5 cm long in all, pinkish red or crimson, subdensely or more laxly clothed with rufescent substellate scales outside, laxly hairy at the tube inside, tube slightly curved, 1.2–1.4 cm, at base

4–5 mm ø, widened to 6–8 mm at apex, lobes ± spreading, obovate-spathulate, 9–10 by 6–7 mm. *Stamens* 10, subequal, reaching halfway the corolla lobes; filaments filiform, laxly patently hairy to the lower ⅔, glabrous elsewhere; anthers broad-oblong, *c.* 1.6 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely shortly whitish greyish hairy and lepidote, the scales ± covered by the hairs, *c.* 5 by 2 mm; style a little oblique, gradually narrowed from the ovary, laxly patently hairy in its lower half, elepidote, glabrous for the rest, nearly equalling the corolla in length; stigma subcapitate. Submature *capsule* subfusiform-cylindric, somewhat curved, densely hairy and lepidote, 2.2 by 0.4 cm.

Distr. *Malesia*: W. New Guinea (Waigeou I.: top of Mt Nok: Buffelhoorn), rather common there in mossy forest shrub vegetation at 860 m. *Fl.* June.

161. Rhododendron planecostatum SLEUM. Reinwardtia 5 (1960) 153.

Epiphytic, much branched shrub. Branchlets terete, tips appressedly lepidote, glabrous below; internodes 2–4 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 1–2 nodes, oblong-elliptic or subovate-oblong, apex shortly acuminate, rather obtuse, base cuneate, coriaceous, glabrous above at full maturity, subdensely lepidote beneath (scales irregularly substellate-dented or -incised in the marginal zone, centre minute, slightly impressed), somewhat recurved at the edge in dry specimens, 3–4(–4.5) by 1–2 cm, midrib slightly grooved above the base, but ± flattish distally on the upper, dilated below and gradually narrowed distally on the undersurface, paler than the lamina and flat or faintly sunk there, nerves *c.* 6 pairs, irregular, slightly raised above, rather inconspicuous beneath, reticulation 0; petiole much flattened, 3–4 by *c.* 1.5 mm. *Umbels* 2–3-flowered. Flower buds narrow-ovoid, 1.7–2 by 0.8 cm. Perulae ovate-acuminate, subacute, membranous, glabrous dorsally, very shortly fimbriate, up to 1.7 by 0.7 cm. Bracteoles linear, glabrous, *c.* 1 cm. Pedicels rather robust, (7–)10–15 mm, laxly caducously lepidote and more densely clothed with short subpatent hairs. *Calyx* disk-shaped, very shortly 5-dented, subglabrous, 2.5 mm ø. *Corolla* tubular, *c.* 2 cm long in all, thin, said to be of a beautiful red, glabrous outside, laxly hairy in the lower half of the tube inside, tube 1.3–1.4 cm long, at base 4–5 mm ø, widened to 6–7 mm at apex, lobes erecto-patent, broadly obovate, 6–7 by *c.* 5 mm. *Stamens* 10, very unequal, 1.2–1.5 cm; filaments linear and densely patent-pubescent in the lower third, glabrous and filiform for the rest; anthers obovate-oblong, 2 mm. *Disk* glabrous. *Ovary* thick-cylindric, densely appressedly hairy, practically elepidote, *c.* 4 by 2 mm; style rather abrupt with the ovary, glabrous, slender, 4 mm; stigma subclavate-capitate.

Distr. *Malesia*: Borneo (Mt Kinabalu), epiphyte on big tree over the Liwago R., 1830–2135 m. Once found. *Fl.* Dec.

162. Rhododendron bagobonum COPEL. *f.* Philip. J. Sc. 40 (1929) 151, t. 4, f. 1–2; SLEUM. Reinwardtia 5 (1960) 154; Blumea 12 (1963) 106. — *R. cuneifolium* STAPF *var. subspathulatum* RIDL. J. Str. Br. R. As. Soc. *n.* 33 (1900) 23; MERR. En. Born. (1921) 461. — *R. galioides* J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 445.

Epiphytic shrublet up to 0.6 m, widely branched. Branchlets slender, terete, tips only laxly lepidote and whether or not patent-puberulous; internodes 0.9–5 cm. Young shoots with linear, rather long persistent ramenta. *Leaves* in (6–)8–12-merous pseudowhorls at the upper 2–4(–6) nodes, spathulate-lanceolate, apex short acuminate, obtuse or subacute, base long-cuneate into the petiole, subcoriaceous, but stiff, glabrescent above, laxly to subdensely and ± persistently lepidote beneath (scales irregularly dented or lobed at the thin marginal zone, centre rather small, slightly impressed), entire to faintly wavy or crenulate, but slightly revolute at the very edge in dry specimens, 1.5–2.3(–2.7) by 0.5–0.8(–1) cm, midrib ± flat above, slightly raised in the lower half beneath, nerves obscure; petiole 0.5–1.5 mm. *Flowers* solitary. Perulae narrow ovate-acuminate or lanceolate, shortly subulate, membranous, glabrous, up to 1.4 by 0.3 mm. Bracteoles linear-spathulate, *c.* 5 mm. Pedicels stoutish, densely shortly patently hairy and lepidote, 4–6 mm. *Calyx* disk-shaped, obscurely obtusely 5-lobed, sparsely lepidote and hairy, 2.5 mm ø. *Corolla* tubular, red or scarlet, sometimes red tinged orange, laxly lepidote outside, laxly hairy in the lower half of the tube inside, *c.* 1.2 cm long in all, tube straight, *c.* 9 mm long, at base 4–5 mm ø, somewhat narrowed below the lobes, the latter suberect, ovate to suborbicular, *c.* 2.5 mm ø. *Stamens* 10, as long as the corolla tube; filaments flat linear, laxly patently hairy in the lower half; anthers obovate, 1 mm. *Disk* very low, glabrous. *Ovary* subovoid-cylindric, densely pubescent and lepidote (scales covered by the hairs), 4–5 by 2.5 mm; style rather abrupt with the ovary, slenderly columnar, glabrous, *c.* 4 mm. Submature *capsule* cylindric-subfusiform, 2–2.5 cm by 3.5–4.5 mm, with a very short (4 mm) subpersistent style, laxly hairy and lepidote, on a stoutish fruit-pedicel 9–12 mm. *Seeds* narrow-fusiform, *c.* 3 mm including the long tails.

Distr. *Malesia*: Borneo, Philippines (Mindanao).

Ecol. In primary (moss) forest on mountain ridges, also in heath forest, locally common on Mt Kinabalu mostly in open sunny places, 900–2135 m. *Fl.* Jan.-Dec.

Vern. *Mogang-bagobo*, Philippines.

163. Rhododendron nieuwenhuisii J. J. S. Ic. Bog. 4 (1910) t. 323; MERR. En. Born. (1921) 462; SLEUM. Reinwardtia 5 (1960) 154; Blumea 11 (1961) 122; *ibid.* 12 (1963) 107.

Slender, generally epiphytic shrub. Branchlets elongate, terete, 1–1.5 mm ø, tips densely rusty-stellate-lepidote; internodes (2–)3–7 cm. *Leaves* in 3–5(–6)-merous pseudowhorls at the upper 3–4 nodes, together with subulate ± persistent

ramenta (*c.* 0.7 cm), lanceolate, rarely ovate-lanceolate, apex gradually long-acuminate and often somewhat curved, subacute, base attenuate, acute or subobtuse, subcoriaceous, ± densely lepidote on both faces initially, finally glabrescent above, more persistently lepidote beneath (scales rusty, sessile, deeply and rather regularly stellate-incised at the marginal zone, centre small, not impressed), edge slightly or not recurved, 2.5–5.5 (rarely up to 6.5) by 0.7–1.8(–2) cm, midrib sunk above, very prominent beneath, nerves 7–11 pairs, subpatent, a little raised above and impressed beneath, lamina thus becoming ± bullate between the nerves, veins ± obscure; petiole subterete, grooved above, densely lepidote, 3–5 by *c.* 1 mm. *Flowers* solitary or in twos. Flower buds ovoid, outer perulae subulate, inner ones larger, ovate-acuminate, acute, stellate-lepidote dorsally, fimbriate, up to 2 by 0.7 cm. Pedicels rather robust, densely stellate-lepidote, 3–5 mm. *Calyx* oblique, shortly 5-dented, lepidote dorsally, *c.* 2.5 mm ø. *Corolla* tubular-funnel-shaped, deep bright yellow, 5-parted to $^1/_3$–$^3/_5$, *c.* 2.8 cm long in all, tube subcylindric, straight, 1–1.2 cm long, at base 4 mm ø, slightly dilated upwards, laxly stellate-lepidote outside, glabrous inside, lobes obovate, glabrous, 1.2–1.6(–1.8) by (0.8–)1–1.6 cm. *Stamens* 10, *c.* 1.8 cm; filaments filiform, glabrous to *c.* 3 mm above the base, nearly villous for the following 4–6 mm, again glabrous distally; anthers linear-oblong, 3.5–4.5 by 0.8 mm. *Disk* prominent, hairy at the upper margin. *Ovary* subcylindric, villous, the hairs covering the scales, *c.* 6 by 2 mm, seemingly abrupt with the style, the latter thickish, *c.* 1 cm; stigma club-shaped, oblique, deeply 5-lobed. *Capsule* fusiform-cylindric, densely villous, *c.* 1.8 by 0.35 cm.

Distr. *Malesia*: Borneo.

Ecol. In dense forest, along river, also in 'heath-forest', (100–)350–800 m, as far as indicated on the collector's labels, possibly at higher altitudes in Central Borneo. *Fl.* Sept.-Nov.

164. Rhododendron pseudobuxifolium SLEUM. Reinwardtia 5 (1960) 154.

Low, apparently not much branched shrub. Branchlets short, stiff, 1.5–2 mm ø, laxly puberulous and ± caducously lepidote; internodes 2–4 cm. *Leaves* crowded in the distal part of the upper 1–2 internodes, or in oligomerous pseudowhorls, elliptic, apex broad-attenuate, obtuse, not rarely minutely apiculate, base broadly attenuate or nearly rounded, coriaceous, rigid, glabrous, blackish-punctulate and somewhat shining above, dull and laxly lepidote for a rather long time beneath (scales flat, variously angular or substellately dented in the marginal zone, centre small and impressed), finally ± glabrescent on both faces, edge distinctly cartilaginous and crenulate, 1–1.8 by 0.7–1 cm, midrib narrow-impressed above, robust and obtusely prominent beneath, nerves 3–4 pairs, curved and looping near the edge, faintly impressed above, slightly raised beneath, often hardly visible; petiole slightly flattened, 2–3 by *c.* 1 mm. *Umbels* 3–4-flowered. Perulae ovate-oblong to broadly oblong-subspathulate, apiculate or mucronulate, rigidly membranous, purplish and lustrous when dry, glabrous dorsally, margin caducously lepidote, 1.3–2 by 0.6–0.9 cm. Pedicels densely substellate-lepidote and very shortly pubescent, 1.5–2 cm by *c.* 1 mm. *Calyx* membranous, disk-shaped, margin wavy and reflexed, very shortly obtusely 5-lobed, *c.* 3 mm ø. *Corolla* tubular below, expanded at the limb, *c.* 3 cm long in all, wine-red, quite glabrous outside, laxly hairy in the lower ⅔ of the tube inside, tube straight, *c.* 2 cm, at base 5 mm ø, slightly dilated upwards, lobes obovate, ± spreading, *c.* 1 by 0.8 cm. *Stamens* 10, very unequal, the longest hardly equalling the corolla tube; filaments linear, laxly hairy in the lower third, glabrous for the rest; anthers broadly oblong-elliptic, *c.* 2 by 1 mm. *Disk* glabrous. *Ovary* ovoid-conical, densely clothed with whitish hairs, which are directed upwards and cover the scales, rather abrupt with the style, the latter ± slender, glabrous, some hairs at the very base excepted, *c.* 8 mm; stigma capitate, deeply 5-lobed.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range: Mt Rantemario), once found at 3300 m. *Fl.* June.

165. Rhododendron commonae FOERSTER in Fedde, Rep. 13 (1914) 223; SCHLTR, Bot. Jahrb. 55 (1918) 154; LANE-POOLE, For. Res. Papua (1925) 130; WHITE & FRANCIS, Proc. R. Soc. Queensl. 39 (1928) 68; DIELS, Bot. Jahrb. 62 (1929) 487; SLEUM. Reinwardtia 5 (1960) 163; Blumea 11 (1961) 124; *ibid.* 12 (1963) 108; Jahrb. Rhodod. Ges. Bremen (1963) f. 26. — *R. stonori* SLEUM. Reinwardtia 5 (1960) 155. — **Fig. 34a-c–35.**

Compact, stiff, not rarely flat-topped terrestrial shrub, (0.2–)0.5–1.5 (rarely up to 6) m; branches covered with a grey or blackish, peeling cork. Branchlets stoutish, upper parts angular, reddish purplish and stellate-lepidote, older ones (those of the past season) with numerous blackish minute pits besides the numerous thick cushions of the fallen leaves; internodes (1.5–)2–4.5 cm. *Leaves* spirally arranged, most of them rather dense together in the upper half, but in part scattered in the lower part of the ultimate shoot, not in proper pseudowhorls, elliptic to obovate-elliptic, rarely more obovate or obovate-oblong, apex shortly broad-acuminate or ± rounded, apical gland thickish and a little or hardly prominent, base ± broadly attenuate (very base subtruncate), not or hardly decurrent into the petiole, coriaceous, stiff, olivaceous-green or -brownish and ± shining when dry above, paler (yellowish to brownish) and ± dull beneath, provided with numerous blackish pits (scars of former scales) above with age, rather densely and subpersistently lepidote beneath (scales distant, hyaline marginal zone irregularly stellate-lobed or -incised to various degree, centre small, rather dark and deeply sunk), glabrescent (and pitted) finally beneath too, edge somewhat cartilaginous and subrevolute, distinctly subserrulate-crenulate, (1.2–)2–3.5(–4.3) by (0.8–)1.2–2 cm, midrib impressed above, broad

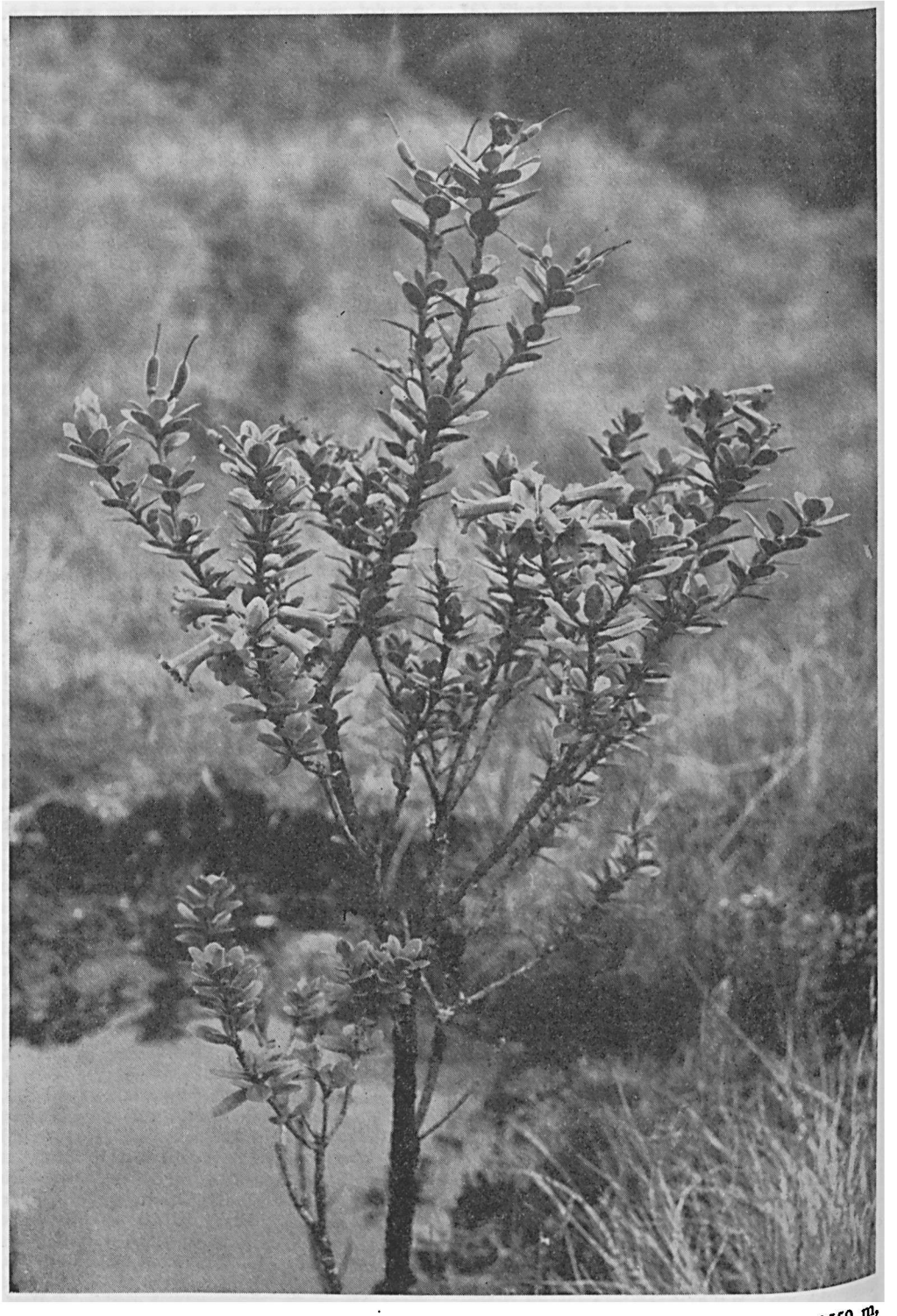

Fig. 35. *Rhododendron commonae* FOERSTER. Swampy place at Lake Aunde, Mt Wilhelm, 3550 m, E. New Guinea (SLEUMER 4166) (SLEUMER, 1961).

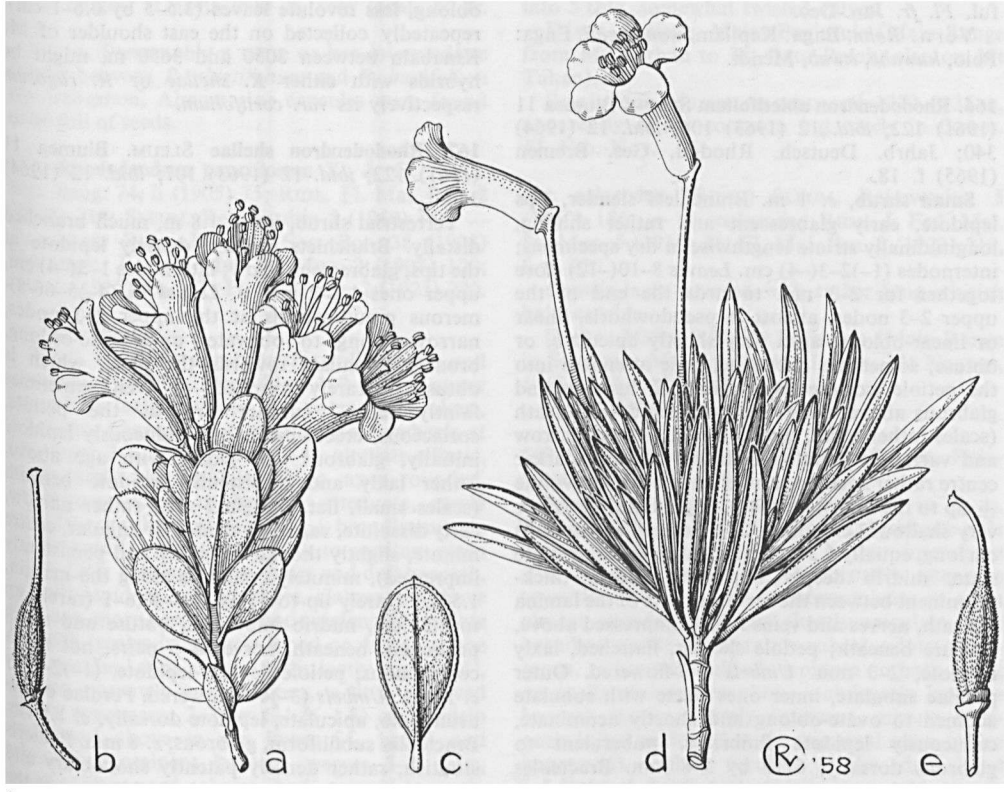

Fig. 34. *Rhododendron commonae* FOERSTER. *a.* Habit, × ⅔, *b.* ovary and style, × ⅔, *c.* leaf from underneath, showing the crenulate margin, × 1. — *R. saxifragoides* J. J. S. *d.* Habit, × ⅔, *e.* submature fruit with style, × ⅔ (*a–c* HOOGLAND & PULLEN 6044, *d* BRASS 21106, *e* BRASS & MEIJER DREES 10184).

and obtusely prominent in the lower half, upwards less so and ± obscure distally beneath, nerves 4–6 pairs, irregular, curved-ascending, looping near the edge, slightly impressed in fully mature leaves above, faintly raised or hardly visible beneath, veins subinconspicuous; petiole thick, hardly or not flattened, 2–4(–5) by 1–1.5 (rarely up to 2) mm. *Umbels* (3–)4–6-flowered. Outer perulae subulate, intermediate ones ovate-acuminate, abruptly subulate in the upper ¼–½, innermost ones obovate-spathulate, shining, glabrous or lepidote along the dorsal midrib and at the apex (never hairy!), irregularly short-fimbriate, up to 15 by 11 mm. Bracteoles linear, up to 12 by 1 mm. Pedicels stoutish, laxly to rather densely rusty-stellate-lepidote, epilose or with sparse papillose hairs between the scales, 12–18 mm at anthesis. *Calyx* oblique, lepidote at the base, deeply 5-lobed, *c.* 4 mm ø, lobes narrow-deltoid or subulate to linear-subspathulate, acute or obtuse, glabrous, or occasionally long-fimbriate at apex, irregular both in shape and length, normally *c.* 1 mm, occasionally 2–5(–8) mm long and 1–1.5 mm wide at the base, appressed to the corolla, subpersistent. *Corolla* tubular, ± oblique and curved, (2–)2.5–3(–3.5) cm long in all, deep blood-red to purplish or crimson, laxly to subdensely stellate-lepidote at the tube and the lower part of the lobes outside, glabrous or short-hairy inside, tube *c.* 2 cm, (4–)5–6 mm ø at the 5-pouched or swollen base, up to 1 cm at apex, lobes obliquely subspathulate-orbicular, 6–8(–10) mm ø, markedly veined. *Stamens* 10, as long as the corolla, or slightly exserted; filaments linear, glabrous or laxly shortly papillose-hairy; anthers obovate-oblong, 2–2.3 by 1 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely covered with rather short grey hairs which cover small scales, 5–6(–7) by 2–3 mm, abrupt with the style, the latter stoutish, glabrous or with some hairs at the base, nearly equalling the stamens; stigma obliquely capitate. *Capsule* subfusiform-cylindric, oblique, 2–2.5 by *c.* 0.6 cm, subdensely short-hairy and lepidote. *Seeds c.* 3 mm, the tails included.

Distr. *Malesia*: New Guinea (Western, Eastern and Southern Highlands; Mt Saruwaged and vicinity).

Ecol. Grassland and edge of *Papuacedrus* forest, in open semi-swampy places, also on crests of high ridges, stony ground, 2600–3990 m, becoming microphyllous at high altitudes, flowering freely in fully exposed position, locally plenti-

ful. *Fl. fr.* Jan.-Dec.

Vern. *Rohn*, Enga: Kepilam, *wamangali*, Enga: Poio, *kuwabe*, *kwab*, Mendi.

166. Rhododendron abietifolium SLEUM. Blumea 11 (1961) 122; *ibid.* 12 (1963) 106; *ibid.* 12 (1964) 340; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 18.

Small shrub, *c.* 1 m. Branchlets slender, tips lepidote, early glabrescent and rather shining, longitudinally striate lengthwise in dry specimens; internodes (1–)2–3(–4) cm. *Leaves* 8–10(–12) close together for 2–3 mm towards the end of the upper 2–3 nodes, almost in pseudowhorls, linear or linear-oblong, apex very shortly apiculate, or obtuse, sometimes subretuse, base attenuate into the petiole, coriaceous, rather stiff, lustrous and glabrous above, paler and laxly lepidote beneath (scales rather small, sessile, marginal zone narrow and variously stellate-dented or -divided, darker centre rather small, not much impressed), revolute ± up to the midrib beneath, edge slightly wavy or very shallowly crenulate, 2–3 (sometimes up to 4) cm long, equally 1.5–3(–5) mm wide in the revolute state, midrib deeply impressed above, thick-prominent between the revolute parts of the lamina beneath, nerves and veins faintly impressed above, obscure beneath; petiole slender, flattened, laxly lepidote, 2–3 mm. *Umbels* 2–3-flowered. Outer perulae subulate, inner ones ovate with subulate acumen to ovate-oblong and shortly acuminate, caducously lepidote fimbriate, puberulent to glabrous dorsally, 6–10 by 3–8 mm. Bracteoles linear, glabrous, irregularly incised distally, *c.* 1 cm by 0.5 mm. Pedicels slender, densely patently long-hairy, laxly and caducously lepidote, 1–1.5 cm. *Calyx* patellar, hardly 5-lobed, wavy and ±reflexed, hairy dorsally, *c.* 2 mm across. *Corolla* broadly tubular below, subcampanulate-dilated towards the limb, brownish red in fresh, intensely carmine at the lobes, paler at the tube in dry specimens, 2.5–3 cm long in all, subdensely set with soft, whitish, patent hairs and almost elepidote at the tube, sparsely lepidote and not hairy at the lobes outside, practically glabrous inside, tube 1.5–1.8 cm long, *c.* 4 mm ø at the slightly 5-saccate base, *c.* 1 cm at apex, lobes broadly obovate-spathulate, *c.* 1 by 0.6–0.8 cm. *Stamens* 10, ± half as long as the corolla; filaments linear, patently hairy for the lower ¼–⅓, glabrous above; anthers broad-oblong, 2–2.5 by 1 mm, each cell provided with a small basal red apiculus or gland. *Disk* prominent, glabrous. *Ovary* subconical-cylindric, densely subappressedly white-hairy, caducously lepidote, *c.* 3 by 1.5 mm, rather abrupt with the style, the latter slender, quite glabrous, *c.* 1.3 cm; stigma shortly turbinate. *Capsule* thickly obovoid-cylindric, densely short-hairy and laxly lepidote, *c.* 1.2 by 0.4–0.5 cm, on fruit-pedicel 2 cm by 1 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu: Mesilau East route).

Ecol. In summit shrubberies at 3160–3650 m, rather frequent locally. *Fl.* July-Dec., *fr.* Aug.

Note. Forms with longer and wider, narrow-oblong, less revolute leaves (3.5–5 by 0.6–1 cm), repeatedly collected on the east shoulder of Mt Kinabalu between 3050 and 3650 m, might be hybrids with either *R. sheilae* or *R. rugosum* respectively its *var. coriifolium*.

167. Rhododendron sheilae SLEUM. Blumea 11 (1961) 122; *ibid.* 12 (1963) 107; *ibid.* 12 (1964) 340.

Terrestrial shrub, up to 1.8 m, much branched distally. Branchlets slender, densely lepidote at the tips, glabrescent below; internodes 1–3(–4) cm, upper ones 1.5–2 mm ø. *Leaves* in (4–)5–6(–8)-merous pseudowhorls at the upper 2–3 nodes, narrow-oblong to obovate- or elliptic-oblong, broadly attenuate towards the apex, which is obtuse or rarely rounded, or even sometimes faintly retuse, cuneate towards the petiole, coriaceous, erecto-patent, ± caducously lepidote initially, glabrous and glossy with age above, rather laxly and persistently lepidote beneath (scales small, flat, marginal zone rather narrow, early dissolute, variously dented or angular, centre minute, slightly though distinctly and persistently impressed), minutely crenulate along the margin, 1.5–2.5 (rarely up to 4) by (0.4–)0.6–1 (rarely up to 1.3) cm, midrib impressed, obtuse and much prominent beneath, nerves 4–5 pairs, not much conspicuous; petiole densely lepidote, (1–)2–3 by *c.* 1 mm. *Umbels* (3–)4–6-flowered. Perulae ovate-acuminate, apiculate, lepidote dorsally, *c.* 1.5 cm. Bracteoles subfiliform, glabrous, *c.* 8 mm. Pedicels stoutish, rather densely patently short-hairy and more laxly and ± caducously lepidote as is the calyx, 1.2–2 cm, somewhat accrescent after flowering time. *Calyx* obliquely patellar, subobscurely 5-lobed or -wavy, *c.* 3 mm ø. *Corolla* ± funnel-shaped, broadly tubular below, dilated towards the spreading lobes, deep purple red, subdensely to more laxly lepidote and shortly white-hairy at the tube and the base of the lobes outside, laxly hairy in the lower part of the tube inside, glabrous for the rest, 2.5–3.2 cm long in all, tube cylindric, *c.* 1.5 cm, 4–6 mm ø below, widened to 9–10 mm at apex, lobes broadly obovate, 1–1.3 by *c.* 1 cm. *Stamens* 10, subequal, reaching about halfway the corolla lobes; filaments linear, slightly dilated and laxly hairy below, glabrous for the upper ⅔; anthers broadly oblong, *c.* 2.5 by 1 mm, each theca ± distinctly protracted into a short basal apiculus. *Disk* prominent, hairy but for the upper margin. *Ovary* conical-cylindric, 3–4 by 2–2.5 mm, densely white-hairy and more laxly set with small subrotund, finally ± caducous scales especially distally, abrupt with the style, the latter thickish, hardly exserted from the corolla tube, quite glabrous; stigma thick-turbinate, very shortly 5-lobed.

Distr. *Malesia*: North Borneo (eastern shoulder of Mt Kinabalu, mainly at junction of the Mesilau East and the Royal Society Expedition (1961) route, just below pinnacles of main massif).

Ecol. On fairly flat crest of ridges or boulders, in dense vegetation of low trees and shrubs of

equal height, at 3240–3670 m, very local. *Fl. fr.* Aug.

Note. Presumably a more or less intermediate hybrid between *R. abietifolium* and *R. buxifolium var. robustum*. Almost ripe capsules were found te be full of seeds.

168. Rhododendron pauciflorum K. & G. J. As. Soc. Beng. 74, ii (1905) 75; RIDL. Fl. Mal. Pen. 2 (1923) 219; SLEUM. Reinwardtia 5 (1960) 156. — *R. elegans* RIDL. J. Linn. Soc. Bot. 38 (1908) 314, repr. J. Fed. Mal. St. Mus. 2 (1908) 120; *ibid.* 6 (1915) 49, 157; Fl. Mal. Pen. 2 (1923) 220.

var. **pauciflorum.**

Small, epiphytic shrub, with swollen roots and divaricate branches. Branchlets 1–2 mm ø; upper internodes laxly lepidote and patent-puberulous, 1.5–3 cm. *Leaves* in 3–6-merous pseudowhorls at the upper 2–3 nodes, obovate to obovate-elliptic, more rarely oblanceolate-elliptic, apex rounded, sometimes retuse, or broadly attenuate, rarely apiculate or subacuminate, base ± broadly cuneate to the petiole, coriaceous, dark to medium green and a little shining above, paler and dull beneath, initially lepidote on both faces, glabrescent above with age, more persistently and subdensely lepidote beneath (scales irregularly lobed or dented at the thin marginal zone, centre ± distinctly impressed), margin narrowly cartilaginous, a little recurved in dry specimens, 2–3 by 1–1.5(–1.8) cm, midrib impressed above in the lower ⅔, broad and obtusely prominent beneath, nerves 3–4 pairs, faintly impressed above and raised beneath, mostly rather inconspicuous; petiole flattened, laxly pubescent initially, glabrescent, 1–2 by *c.* 1 mm, sometimes hardly discernible from the lamina. *Flowers* solitary or in twos. Perulae few, ovate-acuminate, short-subulate or mucronate, acute, glabrous or very finely sericeous dorsally, fimbriate along the margin by caducous scales, up to 1.4 by 0.4 cm, persistent for a long time. Bracteoles filiform, up to 1 cm. Pedicels rather stoutish, densely short-hairy and stellately lepidote, 8–12 mm. *Calyx* obliquely cup-shaped, shortly obtusely 5-dented, *c.* 2.5 mm ø. *Corolla* narrow-tubular campanulate, bright red or rose-red, 1.5–1.8 (–2.2) cm long in all, 1.5 cm ø at the limb, mostly sparingly caducously lepidote, rarely quite glabrous outside, glabrous inside, tube straight, 1–1.3 cm, base rounded 4–6 mm ø, gradually widened to 7–8 mm at apex, lobes spreading, broad-obovate to suborbicular, 4–5 mm ø. *Stamens* 10, alternately longer for the length of an anther, the longest slightly surpassing the corolla tube; filaments linear, laxly to subdensely set with longish, spreading, white hairs to the top and on the back of the anther, *i.e.* on the connective; anthers broad-oblong, 1.5–2 mm. *Disk* low, glabrous. *Ovary* ovoid-conical, densely clothed with scales and whitish hairs, 3–4 by 2 mm; style abrupt with the ovary, glabrous or with some hairs at the very base, 5–6 mm; stigma subcapitate. *Capsule* subcylindric, subdensely hairy and lepidote, (1–)1.5(–2) by 0.4–0.5 cm, splitting into 5 thin, somewhat twisted valves.

Distr. *Malesia*: Malay Peninsula (Main Range from Mt Kerbau to Mt Batu Puteh; also on Mt Tahan).

Ecol. Mossy forest, on peaty soil, 1370–2135 m, apparently rather common but rarely in flower. *Fl.* Feb.-Nov.

var. **calocodon** (RIDL.) SLEUM. Reinwardtia 5 (1960) 156. — *R. calocodon* RIDL. J. Fed. Mal. St. Mus. 5 (1914) 38; Fl. Mal. Pen. 2 (1923) 219, f. p. 220.

Corolla laxly covered with rather long whitish hairs outside.

Distr. *Malesia*: Malay Peninsula (Main Range in Selangor: Mt Mengkuang Lebak, Mt Nuang), 1465–1770 m. *Fl.* Feb., May.

Vern. *Lubang pasir*, Selangor.

169. Rhododendron psammogenes SLEUM. Reinwardtia 5 (1960) 150.

Small, erect, terrestrial shrub, up to 1 m. Branchlets terete, laxly covered with minute pale scales at the tips, glabrous below; internodes 3–8(–10) cm. *Leaves* elliptic, broadly attenuate towards the apex which is subacuminate or often almost rounded and very shortly apiculate, base broad-attenuate, more rarely subrotundate, coriaceous, rather stiff, initially lepidote on both faces, gradually glabrescent above, subdensely lepidote beneath (scales dilutely rufescent, minute, variously lobed or dented in the marginal zone, centre impressed), slightly revolute at the edge, 2.5–4 (–5.5) by 1.4–2.8 cm, midrib impressed above, stout and prominent beneath in its lower part, less prominent distally, nerves 5–6 pairs, irregular, rather straight below, ± obscurely anastomosing, slightly or faintly impressed above, slightly or not raised beneath, veins hardly visible; petiole ± flattened, thickish, 2–4 mm. *Umbels* 7–9-flowered. Outer perulae ovate, inner ones ovate-oblong to subspathulate, membranous, caducously lepidote dorsally, or early glabrous, margin fimbriate or very shortly irregularly lacerate, up to 1 by 0.5 cm. Bracteoles linear, laxly lepidote, *c.* 1 cm. Pedicels rather slender, densely clothed with thick, variously lobed scales, 2.5–3 cm at anthesis. *Calyx* oblique, patellar, *c.* 3 mm ø, irregularly 5-dented, teeth normally short (1 mm), but sometimes up to 3 mm elongate-triangular and acute. *Corolla* funnel-shaped, suboblique, white or of a pale yellow, thin, 3–3.3 cm long in all, densely set with thickish, suborbicular or variously dented scales outside margin of the lobes excepted, subdensely clad with whitish ± spreading hairs in the lower half of the corolla tube inside, tube cylindric, 1.8–2 cm, at base 3–4 mm ø, hardly widened upwards, lobes spreading, obovate-spathulate, shallowly retuse, 1–1.2 by 0.7–0.8 cm. *Stamens* 10, unequal, attaining ± half the corolla lobes; filaments linear and ± densely patently hairy below, much more slender and glabrous distally; anthers oblong, *c.* 2.5 mm. *Disk* glabrous below, shortly yellowish pubescent at the upper margin. *Ovary* subcylindric, densely

clothed with scales and white, upwards directed hairs, *c.* 5 by 2 mm, gradually attenuate to the style, the latter rather slender, laxly patently hairy and lepidote in the lower ⅓ to ½, glabrous in the upper part, as long as or slightly longer than the stamens; stigma thick, subturbinate-capitate.

Distr. *Malesia*: W. New Guinea (Balim R. Valley), once found at 2100 m, amongst bracken in unfertile sandy soil. *Fl.* Dec.

Note. A similar form, differing in a higher lepidote style, which is hairy to ⅓ only, is found in the Lake Habbema region, on sandy soil in forest opening.

170. Rhododendron vitis-idaea SLEUM. Reinwardtia 5 (1960) 156.

Slender, epiphytic shrub, 0.6–2 m high. Branchlets 1–2 mm ø, tips densely set with stalked stellate scales, glabrescent and densely verruculose downwards, a little rough to the touch, epilose; internodes 2.5–6 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 2–3 nodes, obovate-elliptic or obovate, sometimes oblong-obovate, apex very broadly attenuate or mostly rounded, not apiculate, base cuneate to the petiole, coriaceous, rigid, subdensely or laxly lepidote on both faces initially, glabrous and shining above with age, lepidote for a long time beneath (scales flat, irregularly stellate-incised at the marginal zone, centre impressed), finally ± glabrescent and set with impressed blackish points on the undersurface, margin cartilaginous, slightly recurved in dry specimens, 1.5–2.5(–3.5) by (0.8–)1–1.5 (–2) cm, midrib minutely sunk above, obtusely prominent beneath, nerves *c.* 3 pairs, obsolete above, somewhat raised and curved-anastomosing beneath in full-grown leaves, reticulation 0; petiole subterete, lepidote, 2(–3) by 0.8–1 mm. *Flowers* solitary. Perulae narrow-ovate-acuminate, acute, membranous, glabrous dorsally, margin short-fimbriate by caducous scales, up to 8 by 4 mm, persistent for a long time. Pedicels slender, ± densely clothed with rufous stellate scales and very short spreading hairs, (0.8–)1–1.5 cm. *Calyx* very obliquely disk-shaped, shortly obtusely 5-lobed, *c.* 2.5 mm ø, lepidote outside. *Corolla* tubular, bright red or scarlet, membranous, tube laxly stellate-lepidote and minutely papillose-pubescent outside, glabrous inside, somewhat curved, 1.5–2 cm, at base 3–4 mm ø, gradually dilated to 5–6 mm at apex, lobes ± spreading, broad-obovate or suborbicular, 5–7 mm ø. *Stamens* 10, slightly exceeding the corolla tube; filaments linear, glabrous; anthers obovate-oblong, 1.8–2 by 1 mm. *Disk* prominent, glabrous below, pubescent at the upper margin. *Ovary* subcylindric, slightly attenuate at the base, gradually tapering to the style, densely shortly patent-hairy and subdensely lepidote, *c.* 4 by 1.5 mm; style slender, ± as long as the stamens, patently hairy in the lower half; stigma subcapitate.

Distr. *Malesia*: E. New Guinea (Owen Stanley Range; Morobe Distr.: Rawlinson Range).

Ecol. Forest or open hill side, 2195–2590 m. *Fl.* Jan.

171. Rhododendron rhodostomum SLEUM. Reinwardtia 5 (1960) 157.

Epiphytic shrub, 0.3–0.6 m; branches divaricate. Branchlets terete, 1–1.5 mm ø, tips densely set with substellate and shortly stalked scales, older parts glabrescent and manifestly verruculose, a little rough to the touch; internodes 2–4(–6) cm. *Leaves* in 4–5-merous pseudowhorls at the upper 1–2(–3) nodes, elliptic or obovate-elliptic, rarely broadly obovate-oblong, sometimes obovate, apex broad-attenuate, or rarely nearly rounded (very tip apiculate or mucronulate by a very short thickened gland), base cuneate into the petiole, thin-coriaceous, very young ones lepidote on both sides, mature ones glabrescent and rather dull above, subdensely lepidote for a long time beneath (scales variously dented, angular or obtusely lobed in the narrow marginal zone, thickish and rather large centre impressed, becoming blackish), edge slightly revolute, 2–3.5 by 1–1.8(–2.1) cm, midrib slightly impressed above in its lower part and raised beneath, nerves subinconspicuous; petiole flattened, lepidote, 1–3 (occasionally up to 5) mm. *Flowers* solitary. Perulae ovate-acuminate, ± mucronulate or subulate, membranous, lepidote at the tips dorsally, glabrous elsewhere, margin with caducous scales and subglandular-fimbriate, up to 12 by 5 mm. Bracteoles filiform, glabrous, 8 mm. Pedicels rather slender, very densely rufous-stellate-lepidote, not hairy at all, *c.* 1 cm. *Calyx* oblique, disk-shaped, lepidote dorsally, very shortly obtusely 5-lobed, *c.* 2.5 mm ø. *Corolla* tubular, fleshy, white, the throat pink, 2.3–2.7 cm long in all, subdensely substellate-lepidote at the tube outside, glabrous inside, tube cylindrical, slightly curved, *c.* 2 cm, base 6–7 mm ø, ± dilated upwards, lobes broad-obovate or suborbicular, 6–7 mm ø, glabrous, not ciliate. *Stamens* 10, nearly equalling the corolla in length; filaments flattened and linear, glabrous, anthers subobovate-oblong, 2.5 by 1 mm, cells often contracted at the base into a short apiculus. *Disk* prominent, puberulous at the upper margin, glabrous elsewhere. *Ovary* subcylindric, densely very shortly greyish hairy and substellately lepidote, *c.* 5 by 2 mm, gradually attenuate to the style, the latter rather slender, patently hairy in the lower half, glabrous for the rest, ± equalling the corolla in length; stigma club-shaped. Immature *capsule* fusiform, 2 by 0.3 cm, dense puberulous and laxly lepidote.

Distr. *Malesia*: E. New Guinea (Mt Saruwaged and Rawlinson Range).

Ecol. In mossy bush or mossy bush margin, 1525–3655 m. *Fl.* Feb.-March, June.

172. Rhododendron alternans SLEUM. Reinwardtia 5 (1960) 159.

Terrestrial or epiphytic shrub, 2–3 m, divaricately branched. Branchlets terete, 2–3 mm ø, tips laxly stellate-lepidote, older parts early glabrescent and smooth; internodes 4–8 cm. *Leaves* close together in the upper third of the upper internode, *i.e.* the uppermost ones opposite or in a 3(–4)-

merous pseudowhorl, the other 2 or 3 spiral and somewhat distant from each other, elliptic or ovate-elliptic, more rarely subobovate- or oblong-elliptic, apex shortly and broadly subacuminate, or more rarely almost rounded (apical gland hardly prominent), base broad-attenuate or mostly subrotundate, sometimes subtruncate or subcordate, coriaceous, youngest ones subdensely lepidote on both faces, fully mature ones glabrescent above, remaining lepidote for a long time beneath (scales substellately dented or obtusely lobed in the rather wide marginal zone, centre minute, slightly impressed), cartilaginous at the paler margin, entire or faintly crenulate by impressed scales, 2.5–3.5(–4) by 1.2–1.8(–2) cm, midrib dilated below, impressed above, prominent in the lower half, becoming hardly visible towards the apex of the blade beneath, nerves *c.* 5 pairs, spreading, slightly conspicuous above only; petiole flattened, 1.5–3 by 1–1.5 mm. *Umbels* 3–4-flowered. Outer perulae ovate, subacuminate or obtuse, inner ones ovate-oblong to subspathulate, all sericeous dorsally and fimbriate by caducous scales, not ciliate, up to 1.8 by 0.7 cm. Bracteoles linear, very laxly hairy, up to 1.5 cm. Pedicels rather slender, densely clad with rufous substellate scales and very short whitish hairs, 1.5–2 cm. *Calyx* oblique, disk-shaped, margin wavy and obscurely lobed, lepidote and very shortly hairy, *c.* 2.5 mm ø. *Corolla* tubular, red, glabrous in- and outside, 3–3.5 cm long in all, tube cylindric, rather straight, 2–2.5 cm, at the 5-pouched base *c.* 4 mm ø, dilated to 6–7 mm at apex, lobes ± spreading, obovate-spathulate or nearly orbicular, 7–9 mm ø. *Stamens* 10, unequal, the longest nearly as long as the corolla; filaments linear, glabrous; anthers oblong, 2.7 by 1 mm, base sometimes very shortly biappendiculate. *Disk* prominent, glabrous. *Ovary* thick, subovoid-conical, densely clothed with rather short and subpatent yellowish hairs and with scales between these hairs, 4 by 2.5 mm, abrupt with the style, the latter slender, quite glabrous, ± as long as the stamens; stigma subcapitate. *Capsule* subcylindric, attenuate at both ends, 2–2.8 by *c.* 0.5 cm, subdensely hairy and laxly lepidote, on fruit-pedicel *c.* 2 cm by 1 mm.

Distr. *Malesia*: Central Celebes (summit of Mt Kambuno), terrestrial in shrub vegetation, or epiphytic in low forest, *c.* 3000 m, common. *Fl.* July.

173. Rhododendron leptomorphum SLEUM. Reinwardtia 5 (1960) 160.

Terrestrial shrub, *c.* 2 m high. Branchlets 1.5 mm ø, densely stellate-lepidote at the upper internodes, glabrescent and smooth in the lower parts. *Leaves* in ± 4-merous pseudowhorls at the upper 1–2 nodes, narrow-elliptic or oblong-elliptic, apex shortly acuminate, subacute, base attenuate to the petiole, coriaceous, glabrous and rugulose above at maturity, brown and subdensely lepidote beneath (scales flat, irregularly crenate or substellate-lobed in the marginal zone, the rather large centre impressed), cartilaginous margin slightly revolute, wavy and subcrenulate, (2–)2.2–3 by (0.7–)0.8–1 cm, midrib very narrowly impressed below on the upper surface and prominent beneath, darker coloured, nerves subinconspicuous; petiole subterete, lepidote, 3–4(–5) by *c.* 0.8 mm. *Flowers* solitary. Pedicels densely stellate-lepidote, less densely puberulous, 1.5–2 cm by *c.* 0.6 mm. *Calyx* disk-shaped, limb membranous, reflexed and obscurely dented, *c.* 4 mm ø. *Corolla* tubular, scarlet, slightly oblique, *c.* 3 cm long in all, glabrous or with several stellate scales at its base outside, glabrous inside, tube nearly straight, 1.9–2.2 cm, at base slightly saccate, *c.* 6 mm ø, dilated to *c.* 1 cm at apex, lobes broadly obovate-spathulate to suborbicular, 8–10 by 7–9 mm. *Stamens* 10, unequal, the longest reaching halfway the corolla lobes; filaments linear below, filiform distally, glabrous; anthers broad-oblong, *c.* 2.5 by 1.2 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely shortly yellowish hairy, no scales visible, 4 by 1.8 mm, ± gradually attenuate to the style, the latter stoutish, quite glabrous, *c.* 2.3 cm or slightly exceeding the stamens; stigma turbinate-capitate.

Distr. *Malesia*: Eastern Central Celebes (summit of Mt Lumut), once found at *c.* 2280 m. *Fl.* Sept.

174. Rhododendron pseudonitens SLEUM. Blumea 11 (1961) 124. — *R. nitens* SLEUM. Reinwardtia 5 (1960) 162, *non* HUTCH. 1936.

Terrestrial shrub, erect-branching or spreading, usually less than 1 m, but occasionally attaining 2 or more m. Branchlets divaricate, stiff, angular and subdensely appressedly stellate-lepidote at the tips, subterete and glabrescent below; internodes 2–6 cm. *Leaves* spiral and crowded in the upper half or third of the upper 1–2 internodes, the uppermost leaves forming almost a pseudowhorl, obovate or oblong-obovate, apex very broadly and obtusely attenuate or rounded, sometimes very shortly emarginate, base cuneate to the petiole, coriaceous, stiff, glabrous and rugulose above, ± dull, smooth and subdensely lepidote for a long time beneath (scales small, flat, variously stellate-incised at the marginal zone, centre minute, impressed, blackish), margin very narrowly cartilaginous and revolute, ± entire, 1.5–2.5(–3) by 0.8–1.5 cm, midrib impressed above, obtusely, thick-prominent in the lower part beneath, nerves *c.* 6 pairs, curved-ascendent and anastomosing, but in full mature leaves impressed above, hardly or not visible beneath, veins laxly reticulate-impressed above; petiole flattened, grooved above, lepidote, 2–3 by 1–1.5 mm, on a thick leaf-cushion. *Umbels* 4–8-flowered. Perulae ovate-acuminate, apex shortly subulate, membranous, lepidote at the dorsal mediane, margin set with early caducous scales, up to 8 by 4 mm. Bracteoles linear, glabrous, *c.* 8 mm. Pedicels rather slender, subdensely clothed with appressed stellate scales, 1.5–2 cm by 0.6 mm at anthesis. *Calyx* oblique, deeply and rather irregularly 5-lobed, lobes narrow-deltoid, acute, appressed to the corolla, membranous, glabrous, (2–)3–4 mm. *Corolla* tubular, sub-

oblique, dark red, 1.5–1.8(–2) cm in all, densely stellate-lepidote at the tube outside, glabrous inside, tube *c.* 1.5 cm, base ± dilated, *c.* 4 mm ø, widened to *c.* 6 mm at apex, lobes oblique, expanded, suborbicular, *c.* 5 mm ø. *Stamens* 10, subequal, slightly exceeding the corolla tube; filaments linear, glabrous; anthers subquadrate, 1.5 mm. *Disk* glabrous. *Ovary* subcylindric, deeply 5-grooved longitudinally, densely very shortly whitish greyish hairy, with small scales between the hairs, *c.* 4 by 2 mm; style rather abrupt with the ovary, nearly as long as the stamens, glabrous or with sparse hairs at the very base; stigma oblique, capitate, very shortly 5-lobed. *Capsule* thick-fusiform, oblique at the base, puberulous and lepidote, rather early glabrescent, 1.5–1.8 by 0.6 cm. *Seeds* 2.5 mm including the tailed appendages.

Distr. *Malesia*: New Guinea (Central Distr.: Murray Pass, Wharton Range), said to be abundant in open grasslands or in glades in forest on top of range, at 2840 m. *Fl.* June-Sept.

175. Rhododendron helodes SLEUM. Reinwardtia 5 (1960) 161.

Terrestrial shrub, with robust, divaricate branches, 0.5 m high. Branchlets terete, *c.* 3 mm ø, densely clad with appressed substellate scales at the distal part, glabrescent below; internodes 3.5–8 cm. *Leaves* in 4–6(–8)-merous pseudowhorls at the upper 2–3 nodes, oblong or lanceolate-oblong, rarely subobovate-oblong in the same specimen, apex shortly broad-acuminate, subacute or bluntish, rarely really blunt, apiculate by a gland protruding ± beyond the margin of the lamina, base ± broadly and cuneately decurrent into the petiole, rigidly coriaceous, laxly impressed-lepidote or ± glabrescent above in mature state, more distinctly and persistently lepidote beneath (scales distant from each other on the intervenium, more dense and ± touching each other towards the base of the lamina and on the petiole, marginal hyaline zone rather large and variously stellate-dentate or -lobed, early disappearing, centre rather small, much impressed), finally glabrescent beneath too leaving lax, impressed, blackish points, margin narrow-cartilaginous, irregularly crenulate by impressed scales or subentire, (2–)2.5–3.5(–4) by (0.8–)1–1.5 cm, midrib impressed in the lower ⅔ above, and dilated and obtusely prominent beneath, gradually disappearing apically, 2 pairs of nerves suprabasal and high-ascendent, 2–3 other ones from the midrib, not much conspicuous; petiole much flattened, 3–5 by 2–3 mm. *Umbels* (1–)2–4-flowered. Outer perulae few, short, ovate-subulate, inner ones more numerous, broadly obovate-spathulate, shortly acuminate, subacute, first densely rufescent-lepidote, early glabrescent, up to 1.8 by 0.7 cm. Pedicels very densely covered with rufous or copper-coloured stellate scales, but no hairs, 2–3 cm by *c.* 1 mm. *Calyx* disk-shaped, *c.* 5 mm ø, lepidote dorsally, the membranous margin reflexed and irregularly lobed or lacerate, lobes up to 1 mm and ± appressed to the corolla. *Corolla* tubular, red or yellowish red, 3–3.5 cm long in all, subdensely stellate-lepidote outside margin of the lobes excepted, glabrous inside, tube slightly curved, 2–2.5 cm, base saccate-dilated, 6–7 mm ø, slightly attenuate above, gradually dilated again to 10–12 mm at apex, lobes erect or somewhat spreading, broadly spathulate or suborbicular, very slightly emarginate, 0.9–1.1 by 0.7–0.9 cm. *Stamens* 10, unequal, the longest as long as the corolla tube; filaments linear, glabrous; anthers obovate, 2 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, rather abrupt with the style, very densely clothed with whitish or yellowish, subhirsute hairs, which are directed forwards and cover numerous scales, *c.* 8 by 3 mm; style rather slender, *c.* 2 cm, surpassing the stamens, short-hairy for the lowest 2 mm, glabrous for the rest; stigma capitate.

Distr. *Malesia*: New Guinea (Lake Habbema region).

Ecol. In low shrubberies on long-grass marshes, open boggy slopes, locally frequent, at 3225 m. *Fl.* Aug.

176. Rhododendron papuanum BECC. Malesia 1 (1878) 201; SLEUM. Reinwardtia 5 (1960) 163; Blumea 12 (1963) 108; Jahrb. Rdodod. Ges. Bremen (1963) f. 31. — ? *R. wrightianum* KOORD. *var. piliferum* J. J. S. Nova Guinea 12 (1914) 131. — **Fig. 36.**

Much branched, epiphytic or terrestrial shrublet, 20–50 cm, with fleshy roots. Branchlets 1–2 mm ø, the upper 1–2 internodes subdensely set with minute rufescent stalked scales, glabrescent and minutely verruculose or a little scabrid to the touch in the lower parts, finally quite glabrous; internodes 2–7 cm. *Leaves* in 4–6 merous pseudowhorls at the upper 2–3 nodes, obovate, apex rounded, rarely slightly retuse, base broad-cuneate, coriaceous, glabrous above at full age, subdensely lepidote beneath (scales rather small, variously angled or substellately lobed at the marginal zone, centre dark, small and distinctly impressed), margin slightly revolute, (1–)1.2–1.8 by (0.5–)0.8–1.1(–1.3) cm, midrib impressed above, obtusely prominent in the lower ½–¾ beneath, ± disappearing distally, nerves obsolete; petiole somewhat flattened, lepidote, *c.* 2 by 0.6–1 mm. *Umbels* (1–)2–3-flowered. Perulae membranous, ovate to ovate-oblong, obtuse, glabrous dorsally, fimbriate by caducous scales, up to 6 by 3 mm. Bracteoles filiform, glabrous, up to 6 mm. Pedicels slender, erect, densely clad with shortly stalked stellate rusty scales, practically epilose, *c.* 1.5 cm at anthesis, up to 2.5 cm in fruit. *Calyx* rusty-lepidote. *c.* 2.5 mm ø, irregularly 5-dented, lobes 1–1.5 (one or two of them up to 2.5) mm, subacute, spreading or reflexed. *Corolla* tubular, deep pink to purplish red or carmine, glossy, 1.3–1.5 cm long in all, subdensely lepidote outside, glabrous inside, tube straight, 0.8–1 cm long, at base *c.* 3 mm ø, slightly widened to apex, lobes suborbicular, 4–5 mm ø, ± spreading at anthesis. *Stamens* 10, *c.* 1.2 cm; filaments linear, glabrous; anthers obovate, 1 mm. *Disk* low, glabrous. *Ovary* subcylindric, densely stellate-lepidote, completely



Fig. 36. *Rhododendron papuanum* BECC. Mt Nettoti, 1750 m, NW. New Guinea (VAN ROYEN & SLEUMER 7410) (SLEUMER, 1961).

epilose, with 5 deep longitudinal furrows, 4.5 by 1.5 mm, subabrupt with the style, the latter slender, lepidote at the base, laxly patently hairy for the following 2 mm, glabrous for the rest, 6–7 mm in all; stigma dilated, obliquely short-obconical. Submature *capsule* subobovoid-fusiform, densely lepidote, 1.8–2.3 by *c.* 0.4 cm, surmounted by the style (8–10 mm).

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Arfak, Nettoti and Tamrau Mts, possibly also in the Oranje Mts).

Ecol. Terrestrial in open places on moss-cushions, or epiphyte in mossy forest, (1525–) 1800–2550 m. *Fl.* July-Dec.

177. **Rhododendron acrophilum** MERR. & QUISUMB. Philip. J. Sc. 82 (1953) 333; SLEUM. Reinwardtia 5 (1960) 163.

Shrub, 1 m; branches slender, divaricate. Branchlets 1–2 mm ø, terete, covered with flattish, stellate scales at the upper 1–2 internodes, glabrescent in the lower parts; internodes 1.5–4 cm. *Leaves* in ± 4-merous pseudowhorls at the upper 3–7 nodes, oblong-elliptic, or sometimes rather obovate-elliptic, apex short-acuminate, subacute or subobtuse (terminal gland not protruding beyond the leaf-margin), base ± broadly cuneate to the petiole, coriaceous, young ones subdensely lepidote on both faces (scales irregularly stellate-lobed or -lacerate at the marginal early disappearing zone, centre slightly impressed), glabrescent above in later stages, more tardily so beneath, edge slightly revolute, 2.5–5 by 1–2 cm, midrib very slightly impressed above, obtusely prominent at least in the lower half beneath, nerves 6–8 pairs, ascendent, slightly raised on both sides; petiole flattened, lepidote, 1–2.5 by 1–1.5 mm. *Flowers* mostly solitary, rarely in twos. Perulae ovate-oblong to oblong, membranous, lepidote dorsally, especially towards the top, up to 2 by 0.6 cm. Pedicels stoutish, subdensely stellate-lepidote, epilose, *c.* 1 cm. *Calyx* obliquely thickened, disk-shaped, obscurely lobed, *c.* 3 mm ø. *Corolla* tubular-funnel-shaped, yellowish white, *c.* 3 cm long in all, 5-lobed halfway, sparsely stellate-lepidote all over outside, rather densely whitish

hairy at the lower ⅔ of the tube inside, tube slightly dilated upwards, 4–5 mm ø at the pouched base, lobes erecto-patent, obovate-spathulate, *c.* 1.5 by 1.2 cm. *Stamens* 10, unequal, 1.7–2 cm; filaments linear and ± densely white-hairy in the lowest 5–6 mm, glabrescent or glabrous and filiform towards the top; anthers narrow-oblong, thecae very shortly appendiculate, 2.7–3 by 0.8–1 mm. *Disk* glabrous, prominent. *Ovary* cylindric, rather abrupt with the style, very densely stellate-lepidote, *c.* 5 by 2 mm; style stout, completely glabrous or with some scales at the very base, 1–1.4 cm; stigma turbinate, with 5 rounded lobes. Submature *capsule* subfusiform-cylindric, rather densely lepidote, 3.5 by 0.5 cm, on pedicel *c.* 2 cm by 1–1.3 mm.

Distr. *Malesia*: Philippines (Palawan), once found in mossy forest on top of Mt Mantalingahan, Brooke's Point, at *c.* 1725 m. *Fl.* May.

178. Rhododendron banghamiorum (J. J. S.) SLEUM. Reinwardtia 5 (1960) 163. — *R. pubigermen* J. J. S. *var. banghamiorum* J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 123.

Shrub, *c.* 1.2 m, slenderly branched. Branchlets subterete, laxly lepidote, *c.* 2 mm ø; internodes 2–5 cm. *Leaves* oblanceolate, set in 5–7-merous pseudowhorls at the upper 2–5 nodes, apex rounded, shortly retuse, base cuneate to the petiole, which is winged to nearly the base by the decurrent lamina, coriaceous, initially subdensely lepidote on both faces, glabrescent above, persistently lepidote beneath (scales small, marginal zone irregularly stellate-lacerate, rather early dissolute, centre small, red brown, impressed), margin mostly slightly revolute, entire or subcrenulate by impressed scales, 2–3.5 by (0.5–) 0.6–1 cm, midrib impressed above, obtusely prominent in the lower half beneath, becoming flat towards the apex of the lamina, nerves and reticulation obscure; petiole flattened, 1–2 by *c.* 1 mm. *Umbels* 2–3-flowered, sometimes reduced to a solitary flower. Perulae ovate-subacuminate, glabrous and shining dorsally, ciliolate, up to 6 by 4 mm. Bracteoles filiform below, subspathulate distally, glabrous, *c.* 8 mm. Pedicels rather slender, densely stellate-lepidote, epilose, 1.2–1.5 cm. *Calyx* shortly cup-shaped, mostly very oblique, *c.* 3 mm ø, densely lepidote, lobes obtuse, *c.* 1 mm. *Corolla* ± open campanulate, membranous, rose-red, *c.* 2 cm long in all, lobed ± halfway, laxly lepidote outside, quite glabrous inside, tube 3–4 mm ø at base, gradually widened to *c.* 1 cm at apex, lobes obovate-subspathulate, 6–7 mm wide. *Stamens* 10, slightly unequal, *c.* 1.2 cm; filaments linear, subdensely ± patently hairy below; anthers broadly obovate-oblong, *c.* 2 by 1.2 mm, obtuse. *Disk* glabrous. *Ovary* ovoid-conical, ± abrupt with the style, very densely lepidote, *c.* 4 by 2 mm; style slender, glabrous, 6–8 mm at anthesis; stigma subturbinate-capitate.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Redelong Volcano), *c.* 1830 m. One collection. *Fl.* Jan.

179. Rhododendron ripleyi MERR. Not. Nat. Ac. Nat. Sc. Philad. 47 (1940) 4; SLEUM. Reinwardtia 5 (1960) 164.

KEY TO THE VARIETIES

1. Style quite glabrous.
   2. Disk hairy at the upper margin. Scales light coloured. . . . . **1. *var.* ripleyi**
   2. Disk quite glabrous. Scales dark chestnut brown . . . . . **2. *var.* cryptogonium**
1. Style with a ring of short patent hairs at its very base . . . . . **3. *var.* basitrichum**

1. *var.* ripleyi.

Shrub, 1.2–2.5 m; branches terete, divaricate. Branchlets 1–2 mm ø, the upper 1–2 internodes subdensely set with flattish scales, older parts quite glabrous, finally covered with a thin grey cork; internodes 2–5 cm. *Leaves* in 4–8-merous pseudowhorls at the upper 2–5(–6) nodes, but mostly 1–2 leaves a little lower than the others, oblong-obovate to oblong-elliptic, rarely elliptic or subobovate-elliptic, apex ± obtuse, or apiculate by a protruding obtuse gland, base cuneate to broad-attenuate, coriaceous, rather densely lepidote initially on both sides, glabrescent above with age, ± persistently and distally lepidote beneath (scales small, of a rather light colour, the thin narrow marginal zone irregularly crenate or lobed, centre darker, much impressed, a blackish pit in old leaves), margin finely crenulate by impressed scales and ± distinctly recurved, (2–)2.5–3.5 by (0.7–)1–1.5(–1.8) cm, midrib slightly impressed above, somewhat prominent but in general rather flattish beneath, nerves 4–5 pairs, spreading, impressed above in old leaves, ± inconspicuous beneath, or ± obsolete on both faces; petiole ± flattened, lepidote, 2–3(–5) by 1–2 mm. *Umbels* (1–)2-, sometimes 3(–4)-flowered. Perulae ovate-elliptic, short-acuminate, membranous, glabrous dorsally, very shortly fimbriate, often persistent at the base of the pedicels, up to 1 by 0.5 cm. Bracteoles linear, glabrous, up to 1 cm. Pedicels stoutish, ± densely appressedly substellate-lepidote, epilose, 1–2 cm at anthesis. *Calyx* shortly cup-shaped, margin obtusely shallowly 5-lobed, *c.* 3.5 mm ø, lepidote outside. *Corolla* funnelform-campanulate, the base contracted into a short and broad tube, 2.5–3 cm long in all, rose-red, laxly substellate-lepidote outside, glabrous inside, tube *c.* 1.5 cm long, gradually widened from the base (*c.* 4 mm ø) to 1 cm at apex, lobes subpatent, spathulate-obovate to suborbicular, 0.8–1.3 by 0.6–0.8(–1) cm. *Stamens* 10 (sometimes 8), unequal, the longest reaching halfway the corolla lobes; filaments linear, ± densely set with longish, white, subpatent hairs for *c.* 2 mm above the base, glabrous for the rest; anthers broad-oblong, base of each cell somewhat saccate, 2 by nearly 1 mm. *Disk* prominent, short-hairy at the upper margin only. *Ovary* ovoid-conical, abrupt with the style, densely stellate-lepidote, epilose, *c.* 3.5 by 2 mm; style rather slender, quite glabrous, 8–13(–17) mm; stigma capitate, ± deeply 5-lobed.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Mt Losir).

Ecol. In mossy jungle, 2500 m. *Fl.* April.

2. *var.* cryptogonium SLEUM. Reinwardtia 5 (1960) 164.

Differs by a quite glabrous *disk*, below sparsely to very sparsely hairy filaments and darker scales. *Leaves* as in *var. ripleyi*, but up to 6 by 2.3 cm. *Flowers* cerise red or scarlet.

Distr. *Malesia*: N. Sumatra (Gajo Lands), 1850–3000 m, in ridge scrub, locally common. *Fl.* Jan., Feb.

Note. The dark chestnut scales suggest a hybrid of *R. ripleyi* with *R. malayanum*; they are very dense in the youngest, not yet full developed leaves, touching each other as in *R. malayanum*.

3. *var.* basitrichum SLEUM. Reinwardtia 5 (1960) 164.

Style with a ring of short patent hairs at its very base. *Leaves* oblong-obovate, 2.3–3.5 by 0.7–1.2 cm, with a distinct apical gland as in *var. ripleyi*. *Corolla* scarlet.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Mt Kemiri), in ridge scrub at 2800 m. *Fl.* March.

Note. Possibly a hybrid of *R. ripleyi* with *R. pubigermen*.

180. Rhododendron alticolum SLEUM. Reinwardtia 5 (1960) 164.

Small tree with sparse foliage. Branchlets divaricate, nodose, caducously appressed-lepidote at the upper internodes, older parts early covered with ashy cork; internodes 1.5–2.5 cm long, 1.5–2.5 mm ø. *Leaves* in 3–4-merous pseudowhorls at the upper 1–2 nodes, obovate or elliptic-obovate, apex very broadly attenuate and obtuse or not rarely rounded, base broadly attenuate to the petiole, coriaceous, rather rigid when full-grown, dark green above, yellow-green beneath, glabrescent above, rather laxly lepidote beneath for a long time (scales small, marginal zone very thin, early dissolute, variously dented or lobed, centre minute, dark, impressed), edge narrowly cartilaginous, (2–)2.5–4 by (1.2–)1.5–2.3(–2.7) cm, midrib narrow and impressed above in the lower, flat or slightly raised in the upper part above, as thick and prominent as the petiole, gradually less so apically, nerves in 6–7(–8) pairs, ± irregularly curved-ascendent, anastomosing, faintly impressed in old leaves above, a little prominent beneath, reticulation lax, visible beneath only; petiole somewhat flattened, grooved above, 5–7(–9) by 1–1.5 mm. *Umbels* (1–)2–3-flowered. Perulae ovate-acuminate, laxly lepidote dorsally. Bracteoles filiform below, slightly dilated above, *c.* 1 cm. Pedicels rather slender, laxly lepidote, 1.5–2 cm. *Calyx* obliquely patellar, irregularly and shortly 5-dented, *c.* 4 mm ø. *Corolla* tubular in general, somewhat funnelform-dilated towards the limb, 5–5.5 cm long in all, apparently red, laxly substellate-lepidote at the tube outside, glabrous inside, tube slightly curved, *c.* 4 cm long, at base *c.* 5 mm ø, widened upwards to *c.* 1 cm, lobes ± expanded, obovate-spathulate, *c.* 1.5 by 1–1.3 cm. *Stamens* 10, unequal, the longest attaining half the length of the corolla lobes; filaments linear and laxly papillose-puberulous below, more filiform and quite glabrous distally; anthers oblong-obovate, *c.* 2.5 by 1 mm. *Disk* very prominent, glabrous. *Ovary* obovoid-cylindric, very densely lepidote, *c.* 6 by 2 mm, rather abruptly tapering to the style, the latter rather slender, lepidote but at the very base, glabrous for the rest, slightly exserted; stigma thick, subcapitate. *Capsule* subcylindric, narrowed towards the base, exclusively subdensely lepidote, submature 2.2 by 0.5–0.6 cm.

Distr. *Malesia*: New Guinea (Central Distr.: Mt Albert Edward), once found, *c.* 3600 m. *Fl.* May-July.

Note. Growths together with *R. culminicolum var. culminicolum*, and differs from it by larger corollas and an entirely epilose ovary. Possibly only a variety of *R. culminicolum* or a local hybrid of it with another species.

181. Rhododendron pyrrhophorum SLEUM. Reinwardtia 5 (1960) 165.

Slender, much divaricately branched shrub. Branchlets terete, *c.* 1 mm ø, laxly to subdensely set with flat appressed scales but at the ultimate internodes, epilose, older parts glabrescent and smooth; internodes 2–6 cm. *Leaves* in 5–7-merous pseudowhorls at the upper 1–2 nodes, oblanceolate, apex rounded-obtuse, base cuneate and somewhat decurrent into the petiole, coriaceous, very young ones subdensely but distantly lepidote on both faces, mature ones glabrescent, blackish punctulate, minutely rugose and ± dull above, subdensely persistently lepidote beneath (scales irregularly crenate, lobed or shortly incised in the marginal chestnut brown zone, centre darker and slightly sunk), edge shortly distinctly revolute, 2.5–4 (–4.5) by 0.5–1(–1.2) cm, midrib markedly sunk above, stoutish and much prominent beneath, nerves inconspicuous; petiole flattened, densely lepidote, 2–4 by *c.* 1 mm. *Flowers* solitary or in twos. Perulae ovate-oblong, membranous, glabrous dorsally, lustrous, margin with early caducous scales, up to 8 by 4 mm. Bracteoles linear-filiform, glabrous, *c.* 6 mm. Pedicels rather slender, densely stellate-lepidote, epilose, 1–1.5 mm. *Calyx* patellar, very oblique, obscurely subacutely 5-lobed, densely lepidote dorsally, 2.5 mm ø. *Corolla* campanulate, thin, fiery red, 5-lobed halfway, 1.5–1.8 cm long in all, tube at base *c.* 4 mm ø, gradually dilated to *c.* 1.5–2 cm at apex, subdensely or more laxly stellate-lepidote outside, glabrous inside, lobes broadly obovate-spathulate, slightly spreading, 6–8 mm wide. *Stamens* 10, unequal, reaching halfway the corolla lobes; filaments linear, slightly dilated at the base, becoming filiform distally, quite glabrous; anthers elliptic, *c* 1.8 by 1 mm. *Disk* prominent, glabrous. *Ovary* ovoid-conical, very densely stellate-lepidote, 3 by 1.5 mm, very abrupt with the style, the latter rather slender, glabrous, *c.* 8 mm; stigma obconical, deeply 5-lobed.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Mt Goh Lembuh), once found on forest ridge, 1850 m. *Fl.* Feb.

182. Rhododendron luteosquamatum SLEUM. Reinwardtia 5 (1960) 166; Blumea 11 (1961) 125; *ibid.* 12 (1963) 108.

Slender shrub up to 3 m, with stiff, erect, at apex divaricate branches. Branchlets 1–2 mm ø, densely clothed with subsessile, yellowish, substellate scales in the young, somewhat flattened parts, lower parts terete, glabrescent, brownish and a little rough to the touch; internodes (2–)4–7 cm. *Leaves* in 3-merous pseudowhorls at the upper 4–6 nodes (one or the other leaf occasionally on the internode), or opposite, mostly elliptic-oblong, or partly subovate- or obovate-elliptic, shortly acuminate towards the apex, the very apex ± obtuse, base attenuate to the petiole, ± coriaceous, medium green above, very pale below, in submature state subdensely set with yellow scales which are thickened and raised above, somewhat impressed beneath, at maturity glabrescent and ± smooth above, ± persistently lepidote beneath (scales rather small, dense but not touching each other, markedly impressed, variously substellate-dented or-lobed in the thin, early caducous marginal zone, centre minute), margin very shortly revolute and minutely crenulate by impressed scales, (2.3–)2.5–3.5(–4) by (0.8–)1–1.5 cm, midrib narrowly impressed above, much prominent below in the lower, less so in the upper part, nerves 4–5 pairs, slightly raised beneath only, or subinconspicuous; petiole subterete, lepidote, 3–5 by *c.* 1 mm. *Umbels* 3–4-flowered. Outer perulae ovate, inner ones ovate-oblong, dorsally lepidote at the apex, glabrous elsewhere, margin set with caducous scales, up to 7 by 4 mm. Bracteoles filiform, up to 6 mm. Pedicels stoutish, *c.* 10 mm at anthesis, very densely clothed with yellow substellate scales. *Calyx* patellar, obscurely lobed or wavy, densely lepidote externally, *c.* 3 mm ø. *Corolla* tubular, suboblique, *c.* 10 mm long in all, tube at base *c.* 3 mm ø, hardly dilated distally, red or pale pink, very densely yellow-lepidote at the tube, laxly so at the lobes outside, glabrous inside, lobes 4, erecto-patent, suborbicular, *c.* 3.5 mm ø. *Stamens* 10, *c.* 8 mm; filaments filiform, base dilated, glabrous; anthers obovate-truncate, 1 mm. *Disk* glabrous. *Ovary* subcylindric, very densely clad with substellate, yellow scales, 3 by 2 mm; style abrupt, slender, glabrous, 4 mm; stigma subcapitate, shortly 5-lobed. *Capsule* cylindric, very densely lepidote, 1.3–1.5 by 0.5 cm, valves finally recurved and twisted.

Distr. *Malesia*: E. New Guinea (Morobe Distr.: Edie Creek Road, above Wau), 1830–2060 m, frequent there on land slides respectively old gold workings and high, clayey road banks. *Fl. fr.* May-July.

183. Rhododendron inconspicuum J. J. S. Med. Rijksherb. *n.* 25 (1915) 1; Nova Guinea 12 (1917) 499; *ibid.* 12 (1918) t. 194; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 479; SLEUM. Reinwardtia 5-(1960) 167; Blumea 11 (1961) 125; *ibid.* 12 (1963) 108.

Erect, slender, rather compact shrub, 1–3(–5) m, or slender tree, occasionally up to 10 m, much divaricately branched; bark pale green. Branchlets stoutish, 1.5–2 mm ø, terete, reddish, upper internodes densely covered with substellate ± stalked scales, lower ones glabrescent, minutely warty and rough to the touch, early covered with cork; internodes 1.5–4 cm. *Leaves* partly assembled at or near the upper 3–4 nodes in 3-merous pseudowhorls, partly scattered in the upper half of the internodes, elliptic or ovate-elliptic, more rarely ovate, or partly obovate- or oblong-elliptic, apex broadly attenuate, obtuse or sometimes rounded, base cuneate to rounded, rarely subcordate, coriaceous, rather dark green above, much paler and often yellowish green or brownish beneath, very densely lepidote initially on both faces, early glabrescent but rather densely marked with blackish minute pits above, more persistently and densely lepidote beneath (scales roundish to angular, distant, or only partly touching each other with the thin, ± large marginal zone, which goes rather early and is irregularly crenate or shortly substellate-lobed, centre dark yellow, ± thickish and a little impressed), margin subcartilaginous, ± distinctly crenulate, slightly or not revolute, (1–)1.2–2.4(–3.5) by (0.6–)0.8–1.5(–2) cm, midrib narrowly sunk above, much prominent beneath in the lower part, less so distally, nerves 4–6(–8) pairs, spreading, faintly impressed above and raised beneath in fully mature leaves, often ± inconspicuous; petiole somewhat compressed dorsally, densely lepidote, 1–2 (rarely up to 3) mm. *Umbels* 3–5(–7)-flowered. Perulae ovate, outer ones acute or apiculate, inner ones ± obtuse, thin-membranous, with some scales on the dorsal middle line, or quite glabrous and shining, margin very shortly irregularly dented or fimbriate (not ciliate!), up to 10 by 4 mm. Bracteoles linear below, subspathular apically, scantily lepidote, up to 1 cm. Pedicels rather slender, very densely set with substipitate scales, (8–)10–14 mm. *Calyx* disk-shaped, irregularly, very shortly and obtusely 5-lobed, densely lepidote dorsally, 2.5–3.5 mm ø. *Corolla* obliquely wide-tubular, 1.1–1.3(–1.6) cm long in all, pink, red, or bright crimson, very densely covered with thickish, substellate, yellow scales outside, glabrous inside, tube rather straight, 0.7–1.2 cm long, at base *c.* 4 mm ø, widened to *c.* 6 mm at apex, lobes ± erecto-patent, obliquely suborbicular, 3–4.5 mm ø. *Stamens* 10, unequal, ± reaching halfway the corolla lobes; filaments filiform, glabrous; anthers obovate-subquadrate, 1 mm. *Disk* low, glabrous. *Ovary* ovoid-conical, very densely set with thickened suborbicular scales, 3–4 by 1.5–2 mm, rather abruptly tapering to the style, the latter stoutish, quite glabrous, ± as long as the ovary; stigma subcapitate, deeply 5-lobed. *Capsule* subfusiform-cylindric, longitudinally 5-ribbed, somewhat curved, (1.2–)1.5–1.7 cm by 4–5 mm, densely lepidote, crowned by the subpersistent style (4–5 mm). *Seeds c.* 3 mm including the fine tail-like

appendages.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Arfak Mts; along the Main Range to Mt Dayman in Milne Bay Distr.).

Ecol. In mossy forest or forest openings, or in *Vaccinium*-shrubbery, apparently not rarely in woody growth of old landslides, also on edge of deep gully or very steep mountain side with grassy slopes, shrubs and stunted trees in full sun, often on infertile sandy soil, sometimes on limestone ridges, locally common, 1800–3400 m. *Fl. fr.* Jan.-Dec.

Vern. *Kanamungar, rohn*, Enga: Poio and Kepilam.

Note. Similar in habit to 94. *R. yelliotii* WARB. (*subsect. Albovireya*) and sharing with that species many foliar and floral characters. The main differences between the two species are: in *R. inconspicuum* the scales on the undersurface of the mature leaves are ± dense, but in general distant from, and touching each other but occasionally or for a small number; the perulae are caducously lepidote along the dorsal middle line, fimbriate, but not properly pubescent at all, mostly quite glabrous and ± shining, whilst in *R. yelliotii* the scales are much denser, generally all of them touching each other; the perulae are lepidote and shortly subsericeous-pubescent dorsally, the margin manifestly ciliate. Much related to *R. luteosquamatum*, which is perhaps only a variety of *R. inconspicuum*.

184. Rhododendron lamii J. J. S. Nova Guinea 18 (1936) 96, t. 20, 1; SLEUM. Reinwardtia 5 (1960) 168.

Lax shrub with long branches, up to 2 m. Branchlets terete, 5–6 mm ø, upper internodes laxly lepidote, lower ones with the thick cushions of fallen leaves and an irregularly warty cork; internodes 0.8–1.7 cm. *Leaves* in crowded 6–7-merous pseudowhorls, broad-elliptic-obovate, apex broadly subacuminate or mostly obtuse to rounded, with a thick and somewhat protruding gland, base broadly attenuate and decurrent into the petiole, subsessile, stiff-coriaceous, initially subdensely lepidote on both faces (scales small, marginal zone narrow, irregularly substellate-lobed or -crenate, centre slightly or hardly sunk), early glabrescent above, less quickly so beneath, edge distinctly crenulate, a little or not recurved, 1.8–3.3 by (0.8–)1–1.8 cm, midrib faintly impressed above, rather flat beneath, nerves 4–6 pairs, erecto-patent, rather obscure on both sides, reticulation subinconspicuous; petiole flattened, 1–2 by 3–4 mm. *Umbels* 3–4-flowered. Perulae relatively large, membranous, glabrous dorsally, outer ones ovate, apiculate, *c.* 1 by 0.8 cm, more inner ones ovate-oblong, 2–3.5 by *c.* 1.5 cm, innermost ones oblong-obovate or -spathulate, up to 5 by 2 cm, not fimbriate. Bracteoles linear, glabrous, up to 2 cm by 1 mm. Pedicels rather densely lepidote, epilose, *c.* 1 cm by 1 mm at anthesis. *Calyx* oblique, disk-shaped or rim-like, shortly subacutely 5-lobed, *c.* 4 mm ø. *Corolla* funnel-shaped, dark red, rather fleshy, glabrous in- and outside, 5-lobed nearly halfway, *c.* 3 cm long in all, tube at base *c.* 4 mm ø, gradually dilated to *c.* 1 cm at apex, limb spreading to 4.5 cm ø, lobes obovate-suborbicular, 1.2-1.5 cm ø. *Stamens* 10, unequal, slightly exserted; filaments linear, dilated above the base, glabrous; anthers obovate, base subacutely attenuate into 2 appendages which are very close together, *c.* 3.5 by 1.8 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, 6 by 2.5–3 mm, very densely lepidote, tapering to the stoutish glabrous style, which somewhat exceeds the stamens in length; stigma obconical, distinctly lobed. *Capsule* thick-fusiform, *c.* 2.5 by 0.7 cm, on pedicel nearly 3 cm by 2 mm.

Distr. *Malesia*: W. New Guinea (Mt Doorman), on open slope with rocks, 3280 m. *Fl.fr.* Oct.

185. Rhododendron porphyranthes SLEUM. Blumea 12 (1963) 108.

Weak, erect, 1-few-stemmed, terrestrial shrublet, 0.3–0.5 m, few-branched distally. Branchlets slender, young ones purplish, laxly lepidote; internodes 3–9 cm by 1–2 mm. *Leaves* 4–6 on each of the upper 2–3 internodes, 3 or 4 of them laxly arranged in the upper third of the internode, 1 or 2 near the top, obovate to elongate-obovate, apex rounded, sometimes a little emarginate, base cuneate to the petiole, immature ones subdensely or more laxly lepidote on both faces, mature ones thin-coriaceous, shining, early glabrescent above, tardily so beneath (scales rather small, flattish, marginal zone angular or stellate-dented to various degree, centre small and impressed), edge slightly revolute and subcrenulate by impressed scales, 3–4.5(–5) by 1.5–2(–2.3) cm, midrib slightly grooved in the lower, flat in the upper part above, as thick as the petiole at the base, gradually decreasing upwards beneath, nerves 3–4 pairs, rather obscure, no reticulation; petiole winged in the upper part by the decurrent lamina, subterete below, (6–)7–10 by *c.* 1 mm. *Umbels* 2-flowered. Flower bud oblongoid, *c.* 2 by 0.8 cm; outer perulae ovate, distinctly keeled, inner ones obovate to spathulate, all shining and laxly lepidote dorsally, fimbriate by early caducous scales, up to 1.2 by 0.7 cm. Pedicels slender, subdensely substellate-lepidote, 1 cm. *Calyx* oblique, patellar, wavy, *c.* 2 mm across. *Corolla* subcampanulate-tubular, ± zygomorphous, nodding, waxy, magenta in fresh specimens, lustrous, quite glabrous, *c.* 2.3 cm long in all, tube rather straight, 1.5–1.8 cm, at base *c.* 3 mm ø and distinctly 5-pouched, dilated to *c.* 6 mm at apex, lobes erect, broadly obovate-spathulate, 6–8 mm ø. *Stamens* 10, reaching halfway the corolla lobes; filaments linear, glabrous; anthers subovate-elliptic, base obtuse, *c.* 2 by 1.5 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, 2.5 by 1.2 mm, tapering to the style, the latter rather slender, glabrous, 7–8 mm; stigma clavate.

Distr. *Malesia*: W. New Guinea (Arfak Mts: Mt Sarumot near Iray, Anggi Gigi Lake), one collection.

Ecol. *Nothofagus* forest at 2320 m, locally rare. *Fl.* Jan.

186. Rhododendron simulans SLEUM. Reinwardtia 5 (1960) 168. — *R. wrightianum* KOORD. *var. ovalifolium* J. J. S. Nova Guinea 18 (1936) 94, *p.p.*

Shrub, *c.* 0.7 m; branches rather robust, covered with a blackish bark. Branchlets terete, tips densely set with stalked scales, lower parts glabrescent, rather densely verruculose and somewhat scabrid, 1.5–2 mm ø; internodes 2–6 cm. *Leaves* crowded at the ultimate 2–3 nodes or in 3–4 merous pseudowhorls, lanceolate or oblong or subobovate-oblong, apex short-acuminate, subacute, the terminal gland hardly prominent, cuneate towards the base in the petiole and ± decurrent, the very base often subtruncate, thick-coriaceous, stiff, fully mature ones here and there with a flat scale above, or mostly quite glabrescent, subdensely lepidote beneath (scales variously angular or lobed, flat, centre small, impressed in minute elevations of the epidermis), margin cartilaginous, distinctly revolute especially towards the base, 1.5–2 by 0.6–1 cm, midrib impressed above, robust in the lower part and ± as thick as the petiole beneath, gradually narrowed upwards, nerves inconspicuous; petiole subterete, 2–3 by *c.* 1 mm. *Umbels* 2(–3, very rarely up to 4)-flowered. Perulae membranous, outer ones subulate, inner ones ovate-acuminate, apex subulate-attenuate, quite glabrous and glossy, up to 2 by 0.6 cm. Pedicels stoutish, densely set with rufous stellate scales, no hairs, *c.* 1.5 cm. *Calyx* obliquely disk-shaped, red, very shortly irregularly 5-dented, lepidote dorsally, *c.* 3 mm ø. *Corolla* tubular below, funnel-shaped apically, rather fleshy, bright or fiery red, with a scale here and there, or mostly glabrous outside, glabrous inside, *c.* 2.5 cm long in all, tube rather straight, 1.6–2 cm long, base 5-saccate, *c.* 5 mm ø, widened to 7–10 mm at apex, lobes a little spreading, broadly obovate or suborbicular, 7–10 mm ø. *Stamens* 10, subequal, 2.2–2.4 cm long; filaments linear, *c.* 1 mm wide at the base, glabrous; anthers elliptic, 2–2.5 by 1 mm. *Disk* very prominent, glabrous. *Ovary* subovoid-cylindric, very densely rufous-stellate-lepidote, ± gradually attenuate to the style, *c.* 5 by 2.5 mm; style stoutish, glabrous, *c.* 1.7 cm; stigma thick-obconical, manifestly 5-lobed. *Capsule* subcylindric, 2–2.3 by 0.6 cm, the thin valves twisted, pedicel *c.* 2 cm by 1 mm.

Distr. *Malesia*: New Guinea (Mt Doorman), on steep open slopes with rocks, 3300–3500 m. *Fl.* Oct.

187. Rhododendron ultimum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 99; SLEUM. Reinwardtia 5 (1960) 169.

Small shrub. Branchlets *c.* 2 mm ø, pruinose and subdensely covered with substellate scales at the ultimate internodes, glabrescent, with numerous thick cushions of fallen leaves; internodes 2.5–6(–8) cm. *Leaves* rather densely spirally arranged along the upper internodes, broad-elliptic to elliptic-obovate, apex ± rounded, with a small protruding apical gland, base broad-attenuate to the petiole, coriaceous, stiff, rather laxly to subdensely lepidote initially on both sides, early glabrescent above, ± persistently lepidote beneath (scales rather small, flat, suborbicular, marginal zone large, thin, variously angled or substellate-dented or crenate, centre small, dark faintly impressed), margin minutely crenulate and slightly revolute, (1.8–)2–2.7 by (1–)1.4–1.9 cm, midrib slightly impressed above, broad and obtusely prominent beneath in the lower part, nerves subinconspicuous; petiole subterete or somewhat flattened, 2–3(–4) by 1–2 mm. *Umbels* (2–)3–4-flowered. Outer perulae ovate, inner ones obovate to spathulate, apex short-acuminate, or obtuse, membranous, entirely glabrous, outer ones 1–1.5, inner ones 2–2.5 by 0.8–1.5 cm. Bracteoles linear, glabrous, up to 1.8 by 1 mm. Pedicels densely substellate-lepidote, epilose, 1.2–1.5 cm by 0.8 mm. *Calyx* obliquely disk-shaped, obscurely lobed, lepidote dorsally, *c.* 3 mm ø. *Corolla* funnel-shaped in outline, 3.5–4.5 cm long in all, rose-red, rather fleshy, glabrous in- and outside, tube straight, 2–2.5(–3) cm long, at base *c.* 5 mm ø, widened to 9–10 mm at apex, lobes broad-obovate to suborbicular, erecto-patent, 1.4–1.7 by 1.2–1.3(–1.5) cm. *Stamens* 10, unequal, reaching ± halfway the corolla lobes; filaments linear, glabrous; anthers obovate-oblong, *c.* 2.8–3 by 1.3–1.5 mm, each cell ending in a short basal apiculus. *Disk* prominent, glabrous. *Ovary* subcylindric, densely substellate-lepidote, *c.* 6 by 2.5 mm, tapering to the style, the latter lepidote at the base, glabrous for the rest, slightly longer than the stamens; stigma short-obconical.

Distr. *Malesia*: New Guinea (Mt Carstensz), 3200–4100 m, twice found.

188. Rhododendron brassii SLEUM. Reinwardtia 5 (1960) 170.

Lax, suberect shrub, 1–2.5 m. Branches 6–8 mm ø, greyish corticate. Branchlets subterete, reddish and pruinose when dry, smooth, tips laxly clothed with small substellate early caducous scales; internodes 5–16 cm. *Leaves* spiral, rather equidistant along the upper internodes, elliptic or elliptic- or oblong-obovate, apex broadly obtusely attenuate or rounded, apiculate by a thick ± prominent gland, cuneate towards the base and somewhat decurrent on the petiole, coriaceous, stiff, apparently lepidote initially on both faces, very early glabrescent and with minute pits above, ± persistently and subdensely lepidote beneath (scales small, suborbicular, variously substellate-angular or -dented in the marginal zone, centre minute, slightly impressed), edge cartilaginous and distinctly subserrulate-crenulate, 3–4(–5) by 1.8–2.7 cm, midrib impressed above especially at base and obtusely prominent beneath, nerves 6–8 pairs, ascending at an angle of *c.* 45°, slightly but markedly impressed above, raised or subinconspicuous beneath, veins laxly reticulate, visible mostly beneath only; petiole flattened, 3–6 by 1.5–2 mm. *Umbels* 3–5(–6)-flowered. Flower buds ovoid-oblong, 3.5 by 1.2 cm, perulae membranous, quite glabrous, outer ones ovate, obtuse and shorter, inner ones ovate-oblong, subacuminate, 2–3.5 by *c.* 1.5 cm. Bracteoles linear, *c.* 2 cm by

1–1.5 mm. Pedicels laxly substellate-lepidote below, densely to very densely so upwards, epilose, *c.* 2 cm by *c.* 1 mm. *Calyx* very obliquely disk-shaped, shortly (1 mm) obtusely 5-lobed, lepidote dorsally, 4–5 mm ø. *Corolla* funnelform-tubular, somewhat oblique and fleshy, orange at the tube, yellowish at the lobes, or (greenish) yellow or orange suffused with red, glabrous in- and outside, (4–)4.5–5(–5.5) cm long in all, tube *c.* 3 cm long, rather straight, at base a little pouched, 5–6 mm ø, widened to 1–1.5 cm at apex, lobes erecto-patent, broadly obovate-spathulate or suborbicular, 1.2–1.5 by 1–1.5 cm. *Stamens* 10, very unequal, the longest reaching halfway the corolla lobes; filaments linear, glabrous; anthers obovate-elliptic, 2.5–3 by 1.3–1.5 mm, cells with a basal apiculus. *Disk* prominent, glabrous. *Ovary* subovoid-cylindrical, very densely clothed with rufous suborbicular or variously angled and flat scales, *c.* 5 by 2.5 mm, gradually tapering to the style, the latter rather slender, laxly lepidote at the base for *c.* 1 cm, glabrous for the rest, shortly exserted from the corolla at anthesis; stigma thick-capitate. Submature *capsule* obliquely fusiform-cylindric, 1.5 by 0.6 cm; pedicel *c.* 3 cm by 1.5 mm.

Distr. *Malesia*: W. New Guinea (Lake Habbema vicinity and Wamena R. on N. slope of Mt Wilhelmina).

Ecol. Shrubby forest borders, or grassy edges of *Podocarpus* forest, or open shrubberies on a ridge, locally plentiful, 3200–3225 m. *Fl.* Aug.-Sept.

189. Rhododendron subuliferum SLEUM. Reinwardtia 5 (1960) 171.

Epiphytic or terrestrial shrub, 1–2 m. Branches terete, *c.* 5 mm ø, with grey bark. Branchlets *c.* 2 mm ø, rather densely clothed with rufous substellate and very shortly stalked scales at the upper internodes, early glabrescent in the lower parts, which are a little rough to the touch; upper internodes 1–3, lower ones 3–9 cm. *Leaves* in 4–6-merous pseudowhorls at the upper 1–2 nodes, obovate, more rarely oblong-obovate, apex ± rounded-obtuse, sometimes minutely emarginate, the apical gland subinconspicuous, base cuneate to the petiole, coriaceous, rigid, fully developed ones glabrous, and densely rugulose above, densely lepidote beneath (scales variously angular or obtusely substellate-dented in the thin and early caducous marginal zone, small persistent centre thickened, reddish brown and slightly impressed), margin subcartilaginous, minutely crenulate or wavy and subentire, slightly or not revolute, 2–3(–3.5, very rarely up to 4) by 1–1.5 (–2.2) cm, midrib slightly impressed above, obtusely thick-prominent in the lower part beneath, nerves 3–4 pairs, subinconspicuous; petiole lepidote, flattened, 3–4 by 1–1.5 (rarely up to 2) mm. *Flowers* in twos, rarely solitary. Outer perulae narrow-subulate, 1–1.5 cm long, inner ones ovate, tapering into a subulate acumen, 0.8–1.2 by 0.5–0.6 cm, membranous, glabrous dorsally, margin with early caducous scales, often still present at anthesis. Bracteoles filiform, *c.* 1 cm. Pedicels rather slender, densely clothed with substellate scales and very short hairs, 1.2–1.5 cm by 0.6 mm. *Calyx* patellar, oblique, very shortly irregularly 5-dented and revolute, lepidote and pubescent externally, ciliolate, *c.* 3 mm ø. *Corolla* tubular, (4–)4.5–5(–5.5) cm long in all, very laxly and caducously lepidote or quite glabrous outside, glabrous inside, dark red, tube 3–4 cm long, straight, at the base with 5 minute pouches, 4–5 mm ø, gradually dilated to 0.8–1(–1.3) cm at apex, lobes erect, broadly spathulate-obovate or suborbicular, 1–1.3(–1.5) by 0.8–1.3 cm. *Stamens* 10, unequal, the longest a little exserted from the corolla; filaments linear, 1 mm wide at the base, glabrous; anthers broad-oblong or obovate-oblong *c.* 3 by 1 mm, cells obtuse or provided with an indistinct basal apiculus. *Disk* prominent, glabrous. *Ovary* subcylindric, densely substellate-lepidote, 6–8 by *c.* 2 mm, gradually attenuate to the style, the latter quite glabrous, as long as or slightly longer than the corolla; stigma subcapitate.

Distr. *Malesia*: New Guinea (Bele R. Valley, NE. of Lake Habbema).

Ecol. High epiphyte, frequent in midmountain forest or, apparently terrestrially, frequent in old sandy clearings of mossy forest, at 2300 m. *Fl.* Oct.-Nov.

190. Rhododendron scarlatinum SLEUM. Reinwardtia 5 (1960) 168.

Apparently small and slender shrub; branches with grey bark and thick cushions of the fallen leaves. Branchlets terete, 1–1.5 mm ø, laxly substellate-lepidote and pruinose at the upper internodes, lower parts glabrescent and smooth; internodes 2.5–5 cm. *Leaves* partly crowded in pseudowhorls at the upper 1–2 nodes, partly spirally arranged along the internodes, elliptic, apex ± rounded, not rarely very shortly apiculate, base nearly rounded or broadly attenuate, thin-coriaceous, firm, laxly lepidote initially, glabrescent and a little rugose with age above, laxly and ± persistently lepidote beneath (scales flat, suborbicular, variously angular or irregularly dented in the rather wide chestnut coloured marginal zone, centre minute, darker, hardly impressed), margin subcartilaginous, undulate-crenulate or subentire, 2–3 by 1–1.8 cm, midrib very narrowly impressed above, broader, ± flattened and faintly or not prominent beneath, nerves subinconspicuous; petiole compressed dorsally, 2–3 by 1–2 mm. *Umbels* 3–6-flowered. Bracteoles filiform, glabrous, *c.* 1.3 cm. Pedicels subdensely clothed with stellate scales and very short patent hairs, 1.5–2 cm by 0.5 mm. *Calyx* disk-like, irregularly and very shortly 5-dented (but one or the other tooth may be elongated), lepidote and hairy dorsally, *c.* 3 mm ø. *Corolla* tubular, scarlet, *c.* 3.5 cm long in all, glabrous in- and outside, tube straight, cylindric, *c.* 2.5 cm long, base 5-pouched, 5–6 mm ø, hardly widened upwards, lobes erecto-patent, broadly obovate-spathulate, *c.* 1 by 0.7–0.8 cm, very slightly retuse, *Stamens* 10, unequal, 2.7–3.3 cm; filaments linear, glabrous; anthers oblong-

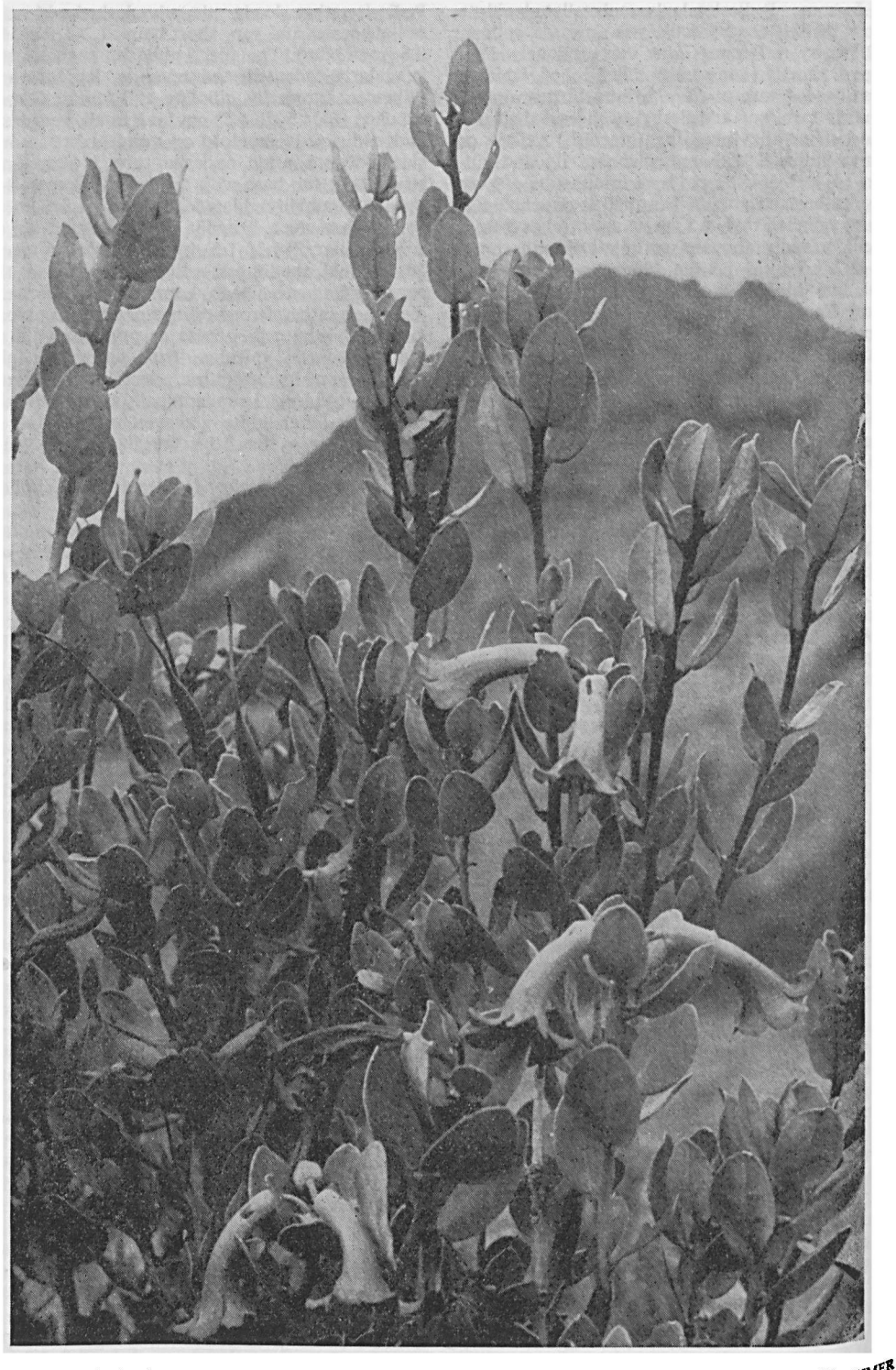

Fig. 37. *Rhododendron atropurpureum* SLEUM. Mt Wilhelm, E slope at 3600 m, E. New Guinea (SLEUMER 4160) (SLEUMER, 1961).

obovate or nearly obcordate, 3 by 1.5 mm, cells attenuate towards the base, apiculate at the very base. *Disk* prominent, glabrous. *Ovary* subovoid-cylindrical, very densely substellate-lepidote, epilose, rather abrupt with the style, the latter slender, glabrous, 2.8–3.2 cm; stigma obconical. Immature *capsule* subcylindric, 1.5 by 0.4 cm.

Distr. *Malesia*: Central Celebes (Latimodjong Range: W. slope of Mt Rante Mario), once found in forest, 2950 m. *Fl.* June.

191. Rhododendron atropurpureum SLEUM. Reinwardtia 5 (1960) 172; Blumea 11 (1961) 125; Jahrb. Rhodod. Ges. Bremen (1963) f. 25; Blumea 12 (1963) 109; *ibid.* 12 (1964) 340. — **Fig. 37.**

Erect shrub up to 3 m. Branchlets *c.* 2.4 mm ø, densely clad with substellate, shortly stalked rufescent scales and very short papillose hairs at the upper internodes, older parts glabrescent and minutely warty; internodes 3.5–9 cm. *Leaves* spirally arranged in the upper ⅔ of 2 internodes, the upper 2–3 leaves ± in a pseudowhorl, broad-elliptic or ovate-elliptic, sometimes subobovate-elliptic, apex broad-attenuate, subacuminate or mostly ± rounded-obtuse, the thick apical gland a little prominent, base rounded or mostly slightly cordate, coriaceous, rigid, fully mature ones still with the remains of scales, a little rough, finally entirely glabrous above, subdensely lepidote beneath (scales small, membranous marginal zone irregularly crenate or denticulate, early dissolute – scales seemingly orbicular then –, centre persistent, rather large and thick, blackish red and markedly impressed), margin indistinctly cartilaginous and manifestly crenulate, flat, 1.7–2.6 (–3) by (1.2–)1.5–2.2 cm, midrib reddish chestnut brown and more densely (or for a longer time) lepidote than the rest of the upper surface, slightly impressed above, robust and obtusely prominent beneath, nerves 3–4(–5) pairs, spreading, faintly impressed above, slightly raised beneath, often subinconspicuous above or rarely so on both faces; petiole flattened, densely lepidote, 4–5 by 1–1.5 mm. *Umbels* 2–3-flowered. Outer perulae ovate, blunt, inner ones obovate, glabrous, lepidote-ciliate, 1–1.5 by 0.8–1.2 cm. Pedicels very densely clothed with dark rufous stellate-incised and shortly stalked scales, no hairs, 1–1.5 cm by 1 mm. *Calyx* patellar, shortly obtusely 5-lobed, 3–4 mm ø, densely lepidote outside. *Corolla* tubular-funnel-shaped, suboblique, red to crimson when fresh, becoming magenta in the drying process, (3.5–)4–4.5 cm long in all, densely clad with thickish, substellate scales outside, margin of the lobes excepted, glabrous inside, tube rather straight, 2.5–3 cm long, base with 5 small pouches, 5–6 mm ø, widened to 1–1.3 cm at apex, lobes ± spreading, broad-obovate or suborbicular, slightly retuse, 1–1.5 by 1–1.3 cm. *Stamens* 10, unequal, reaching ± halfway the corolla lobes; filaments linear, 1.5 mm wide at base, glabrous; anthers broadly elliptic-oblong, 3.5–4 by 1.5 mm, each cell bearing a short basal apiculus. *Disk* prominent, glabrous. *Ovary* ovoid-conical, gradually attenuate to the style, exclusively very densely substellate-lepidote, 5–6 mm long, *c.* 3 mm ø at base; style nearly equalling the stamens, subdensely to laxly lepidote in its lower third, glabrous for the rest; stigma subturbinate-capitate. *Capsule* fusiform-cylindric, shortly attenuate at base, longer so towards apex, a little oblique, 2–2.5 by 0.6 cm, densely lepidote.

Distr. *Malesia*: E. New Guinea (Eastern Highlands: Mt Wilhelm, where it hybridizes with 138. *R. womersleyi*; Western Highlands: Mt Kinkain), common here in edge of subalpine forest or alpine shrubbery, at 3590–3840 m. *Fl.* June-Sept.

Vern. *Kage*, Chimbu.

192. Rhododendron buxifolium Low *ex* HOOK. *f.* in Hook. Ic. Pl. (1852) t. 890; WALP. Ann. 5 (1858) 146; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 197; MILLAIS, Rhodod. (1917) 131; MERR. En. Born. (1921) 460; SLEUM. Reinwardtia 5 (1960) 173; Blumea 12 (1963) 109; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 14.

var. **buxifolium.**

Shrub, (1.2–)3–5 m, becoming smaller and flat-topped at high altitudes. Branches at the ends *c.* 6 mm ø, terete, with blackish bark. Branchlets stoutish, upper 1–2 internodes brownish, initially laxly clothed with substellate scales and sometimes also with very fine papillose hairs, lower parts early glabrescent, lower ones greyish corticate and with thick cushions of fallen leaves; internodes 1–3(–4) cm. *Leaves* dense, in much approximate 5–8-merous pseudowhorls at the upper 3–4 nodes, broad-elliptic, sometimes subovate- or obovate-elliptic, apex broadly attenuate, often rounded-obtuse, sometimes slightly emarginate, the apical gland rather inconspicuous, base rounded to subcordate, stiff-coriaceous, subdensely lepidote on both faces initially, rather early glabrescent or with minute pits above, more persistently lepidote beneath (scales irregularly crenate or lobed in the thin, early dissolute marginal zone, persistent orbicular centre small, thick, dark brown to blackish, rather deeply impressed), edge distinctly crenulate, not properly revolute, 1–2 by 0.6–1.2 cm, midrib narrow and slightly sunk above, broad and obtusely prominent beneath, nerves 5–6 pairs, somewhat irregular, spreading, ± joined near the edge, slightly impressed above in old leaves, ± inconspicuous beneath, veins lax and faintly sunk above, obsolete beneath; petiole flattened, rugose, 1.5–2.5 by 1–1.5(–2) mm. *Umbels* (2–)3–5 (sometimes up to 8)-flowered. Outer perulae ovate, the dorsal midrib tapering to a short subulate acumen, finely sericeous and laxly to subdensely lepidote externally, inner ones ovate-obtuse to spathulate and mostly ± glabrescent, up to 1.5 by 1 cm. Bracteoles linear below, subspathulate distally, up to 2 cm by 1 mm. Pedicels ± densely substellate-lepidote, whether or not with very sparse short hairs, (1–)1.5–2 (sometimes up to 2.5) cm by 0.7 mm. *Calyx* obliquely disk-shaped, very shortly irregularly 5-lobed or -dented, often ± revolute, 3–4 mm ø. *Corolla* broad-funnel-shaped or subcampanulate, sub-

oblique, pink to deep red or rich carmine, waxy, scentless, subdensely lepidote outside, glabrous inside, 2.5(–3) cm long in all, tube ± straight, *c.* 1.5 cm long, at the somewhat pouched base 4–5 mm ø, widened to ± 1 cm, lobes mostly ± spreading, obovate-spathulate, 1–1.5 by 1–1.3 cm. *Stamens* 10, subequal, ± equalling the tube; filaments linear, glabrous; anthers oblong, (2–)2.5–3 by 1 mm, cells obtuse or mostly narrowed into a short, ± distinct basal apiculus. *Disk* prominent, glabrous. *Ovary* subovoid-conical, apex obtuse and much abrupt with the style, very densely substellate-lepidote (but occasionally with some very sparse hairs on some or other ovary in the same specimen), *c.* 4–5 by 2–3 mm; style glabrous, ± as long as the stamens; stigma subclavate-capitate. *Capsule* thickly ovoid-fusiform, oblique, 1–1.2 by 0.5–0.6 cm, lepidote, finally ± glabrescent, crowned by the rest of the then thick style. *Seeds* *c.* 2.5 mm including the tails.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In Ericaceous forest above 2745 m, but apparently more frequent within shrub vegetation in open places on granite amongst rocks, on crests of ridges, in fissures up to the very top of Mt Kinabalu at 4096 m. *Fl.* Jan.-Dec.

var. **robustum** SLEUM. Reinwardtia 5 (1960) 173; Blumea 12 (1963) 109. — *R. verticillatum* (*non* LOW *ex* LINDL.) LOW *ex* HOOK. *f.* in Hook. Ic. Pl. (1852) t. 884; WALP. Ann. 5 (1858) 447, *p.p.*; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 197; MERR. En. Born. (1921) 463, *p.p.*

A form with larger *leaves*, 1.8–3(–3.5) by 1.2–2 (–2.5) cm, otherwise not distinct.

Distr. *Malesia*: North Borneo (Mt Kinabalu) with the normal form.

Ecol. A constituent of the Ericaceous forest, but also in open places (upper limit of scrub forest at slanting rock) on granite, sometimes together with *var. buxifolium*, (2440–)3350–3800 m.

193. Rhododendron wrightianum KOORD. Nova Guinea 8 (1912) 880; J. J. S. *ibid.* 12 (1914) 130, *incl. var. ovalifolium* J. J. S. *l.c.* 131, t. 29B; *ibid.* 18 (1936) 94; SLEUM. Reinwardtia 5 (1960) 173; Blumea 11 (1961) 125.

KEY TO THE VARIETIES

1. Perulae sericeous and ± lepidote outside, at least in the upper part.
   2. Leaves 1–1.5(–2) by 0.5–0.9 (rarely up to 1.5) cm. Pedicels lepidote, otherwise whether or not papillose . . . . . **1. *var.* wrightianum**
   2. Leaves (1.3–)2–3(–4) by 0.7–1.7 cm. Pedicels lepidote *and* rather densely short-pubescent. **2. *var.* cyclopense**
1. Perulae outside laxly lepidote, not hairy at all. Leaves 1–2 by 0.6–1.2(–1.5) cm. Pedicels lepidote, otherwise whether or not very shortly pubescent . . . . . **3. *var.* insulare**

1. *var.* wrightianum.

Small diffuse, terrestrial or epiphytic shrub, 0.2–1 m. Branches much divaricate, 2–4 mm ø. Branchlets subterete, 1–2 mm ø, densely set with shortly stalked, stellate scales at the upper 1–2 internodes, not hairy, lower parts glabrescent and warty by the remaining stalks of the then gone scales, finally greyish corticate; internodes (1–) 2–4(–6) cm. Leaves in 3(–5)-merous pseudowhorls at the upper 1–3(–4) nodes, obovate-oblong to obovate, apex mostly obtuse or rounded, base ± broadly cuneate, coriaceous, laxly lepidote beneath (scales irregularly crenulate or substellately dented at the rather narrow marginal, early dissolute zone, centre dark, proportionally large and somewhat impressed), margin subcrenulate by impressed scales or entire, minutely cartilaginous and ± recurved, 1–1.5(–2) by 0.5–0.9 (rarely up to 1.5) cm (in sterile young shoots up to 4 by 2 cm), midrib slightly or not impressed, rather prominent beneath, nerves 2–3 spreading pairs, ± obsolete; petiole 1–2 by 0.5–1 mm. *Umbels* (1–)2–3-flowered. Outer perulae ovate, subacuminate or obtuse, inner ones oblong, all manifestly sericeous and laxly lepidote dorsally at least in the upper half, and shortly fimbriate, often still persistent at flowering time, up to 8 by 4 mm. Bracteoles filiform, up to 7 mm. Pedicels slender, very densely set with ± stellate and shortly stalked scales, and mostly with very short papillose hairs, 0.5–1.5 cm. *Calyx* shortly cup-shaped, oblique, the 5 lobes or teeth irregular (0.5 mm), *c.* 2.5 mm ø, densely lepidote externally. *Corolla* tubular, dilated upwards, glossy-red to deep crimson, thin suboblique, (2.2–)2.5–3 cm long in all, laxly to subdensely stellate-lepidote outside, glabrous inside, tube slightly curved, ± 2 cm long, at base 4–5 mm ø, dilated to 8–10 mm at apex, lobes erecto-patent, suborbicular, *c.* 7 mm ø. *Stamens* 10, unequal, reaching ± halfway the corolla lobes; filaments linear, glabrous; anthers broad-oblong-elliptic, 2 by 1 mm, the base of each theca subapiculate. *Disk* glabrous. *Ovary* subcylindric, densely lepidote, 4–5 by 1.5–2 mm, gradually tapering to the style, which is lepidote in its lower $^1/_5$–$^1/_3$ and 1.7–2 cm long; stigma subclavate-capitate. Submature *capsule* narrow-fusiform, *c.* 3.5 cm by 3.5 mm.

Distr. *Malesia*: New Guinea (Oranje and Nassau Mts; Milne Bay Distr.: Mt Garatun).

Ecol. In mossy forest, occasionally (high) epiphyte, in shrubby opening, on sandy or peaty soil, 1370–2800 (–3250) m. *Fl.* Oct.-March.

2. *var.* cyclopense J. J. S. Nova Guinea 12 (1914) 130; SLEUM. Reinwardtia 5 (1960) 173; Blumea 12 (1963) 109.

Leaves (1.3–)2–3(–4) by 0.7–1.7 cm. Pedicels lepidote and rather densely short-pubescent. Perulae as in *var. wrightianum*.

Distr. *Malesia*: N. New Guinea (Mt Cycloop).

Ecol. Epiphytic or on moss-covered soil, in ± open *Nothofagus-Rapanea* ridge forest, 1480–1800 m. *Fl.* June-Oct.

3. *var.* insulare SLEUM. Reinwardtia 5 (1960) 174.

Leaves 1–2 by 0.6–1.2(–1.5) cm. Perulae laxly lepidote dorsally, not hairy at all, up to 8 mm in

length. Pedicels lepidote, sometimes furthermore laxly and very shortly hairy.

Distr. *Malesia*: New Guinea (Milne Bay Distr.: Normanby and Goodenough Is.).

Ecol. Common high epiphyte in tall mossy forest, 820–1600 m. *Fl.* Jan., Oct.

194. Rhododendron subcrenulatum SLEUM. Reinwardtia 5 (1960) 174.

Erect, terrestrial shrub, 0.3–0.5 m; branches terete, 4–5 mm ø; bark blackish grey. Branchlets divaricate, *c.* 2 mm ø, densely set with substellate and distinctly stalked scales at the upper internodes, early glabrescent at the lower ones, early greyish corticate and minutely warty, a little rough to the touch; internodes 2.5–5 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 3–5 nodes, ± narrowly elliptic or more rarely subovate- or subobovate-elliptic, short-acuminate towards the apex, ± blunt at the very apex by a thick gland, base broad-attenuate or subtruncate-obtuse, very coriaceous, subdensely lepidote on both faces, early glabrescent above with age, ± persistently lepidote beneath (scales rather small, marginal zone thin, variously dented or irregularly crenate, centre thickish and much impressed), edge narrowly cartilaginous and slightly or not revolute, subcrenulate or entire, 2–2.8(–3) by (0.8–)1–1.4 cm, midrib ± distinctly and narrowly sunk above, thick and obtusely prominent in the lower part beneath, nerves inconspicuous; petiole densely lepidote, a little flattened, 2–3 by 1.5–2 mm. *Umbels* (1–)2–4-flowered. Outer perulae ovate, with a 4–5 mm long subulate acumen, more inner ones ovate-oblong (acumen *c.* 1 cm), innermost ones subspathulate, obtuse, 1–1.5 by 0.5–0.8 cm, lepidote dorsally in the upper part or quite glabrous (no sericeous pubescence), margin initially fimbriate by scales. Bracteoles linear, *c.* 1 cm. Pedicels very densely clad with rufous stellate scales (no hairs), 1.5–2 cm by *c.* 1 mm. *Calyx* subobliquely disk-shaped, shortly obtusely 5-lobed, very densely stellate-lepidote, 3–4 mm ø. *Corolla* tubular, suboblique, dark red, 2.5–3 cm long in all, subdensely stellate-lepidote outside margin of the lobes excepted, glabrous inside, tube rather straight, 2–2.3 cm long, base but faintly saccate, *c.* 4 mm ø, dilated to 8–10 mm at apex, lobes erecto-patent, suborbicular, 5–7 mm. *Stamens* 10, unequal, the longest almost as long as the corolla; filaments linear, glabrous; anthers broad-oblong, 2.5 by 1 mm, blunt at the base. *Disk* glabrous, or short pubescent at the upper margin only. *Ovary* subcylindric, very densely stellate-lepidote, 6–7 by 2.5 mm, gradually attenuate to the style, which ± equals the stamens and is lepidote in its lower $^1/_5$–$^1/_3$, glabrous for the rest; stigma subcapitate; pedicel 3 cm.

Distr. *Malesia*: W. New Guinea (Lake Habbema), 3225–3345 m, common on edges of mossy forest, or in open mossy thickets, also in thin shrubberies on a dry ridge. *Fl.* Aug.

195. Rhododendron rubrobracteatum SLEUM. Reinwardtia 5 (1960) 175.

Small, epiphytic or terrestrial shrub, up to 60 cm. Branchlets 1.5–2 mm ø, laxly substellate-lepidote at the upper 1–2 internodes, glabrescent and smooth downwards; internodes 2–7 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 2–3 nodes (with one or two leaves inserted lower than the rest), oblong to elliptic oblong, apex short-acuminate, subacute or blunt, not rarely apiculate by a gland, base broad-attenuate, more rarely truncate-subrotundate, coriaceous, minutely rugose above in old leaves, with scale remains or quite glabrous, rather laxly and more persistently lepidote beneath (scales irregularly substellate-dented at the thin marginal zone, centre slightly impressed), margin minutely cartilaginous and paler than the proper lamina, entire, wavy or subcrenulate, hardly revolute, (2–)2.3–3.8 (very rarely up to 5) by 1–1.6 cm, midrib ± impressed above, obtusely prominent beneath, nerves subinconspicuous; petiole a little flattened, lepidote, 3–5(–7) by 1–1.5 mm. *Umbels* (2–)3(–5)-flowered. Perulae ovate-acuminate, attenuate or almost subulate into a short acumen, red, membranous, rather glossy, glabrous, initially with scales along the margin, (1–)1.2–2 by 0.4–0.9 cm. Bracteoles filiform, *c.* 6 mm. Pedicels rather slender, very densely rufous-stellate-lepidote, furthermore ± densely papillose, 1.3–2 cm. *Calyx* obliquely disk-shaped, obscurely and bluntly 5-dented, lepidote dorsally, *c.* 3 mm ø. *Corolla* tubular, suboblique, red or of a delicate pale red, or pale orange-pink, thin, 2–2.6 cm long in all, laxly to subdensely stellate-lepidote outside, glabrous inside, tube rather straight or somewhat curved, 1.6–2 cm long, base 5-pouched *c.* 5 mm ø, widened to 7–8 mm at apex, lobes erecto-patent, broadly obovate or suborbicular, slightly retuse, 5–6 mm ø. *Stamens* 10, unequal, the longest almost as long as or sometimes slightly longer than the corolla; filaments linear, glabrous; anthers broad oblong, *c.* 2 mm, base obtuse. *Disk* glabrous. *Ovary* subcylindric, very densely stellate-lepidote, *c.* 4 by 1.5 mm, ± gradually narrowed to the style, which is rather slender, glabrous and nearly equals the stamens; stigma subcapitate. Immature *capsule* fusiform, *c.* 2.2 by 0.35 cm.

Distr. *Malesia*: New Guinea (Lake Habbema and vicinity).

Ecol. In open thickets of higher ridges, also epiphytic on high trees in mossy forest, 2900–3345 m. *Fl.* Aug., Oct.

Note. A *Rhododendron* with similar leaves and larger corollas (3 cm) was found on Mt Hellwig, 1900 m.

196. Rhododendron calosanthes SLEUM. Blumea 11 (1961) 125.

Shrub, *c.* 40 cm. Branchlets slender, laxly substellate-lepidote at the youngest, glabrescent at the older parts, smooth, 1–2 mm ø; internodes (1.5–)2–5 cm. *Leaves* 4–6 on each of the ultimate 2 or 3 nodes at short intervals, or partly (2 or 3) more close together or even in a pseudowhorl, narrowly oblong or oblong-elliptic, apex subacutely attenuate or subacuminate, base attenuate to sub-

cuneate, coriaceous, initially laxly lepidote on both faces, tardily glabrescent above, subpersistently lepidote beneath (scales of medium size, variously substellate-dented or -incised at the thin marginal zone, centre small, ± impressed), narrowly marginate, margin subcrenulate by impressed scales or ± entire, 2–2.5 by 0.5–0.9 cm, midrib hardly impressed above or even flat, thick and obtusely prominent beneath, nerves and veins inconspicuous; petiole 2–3 by 0.7–1 mm. *Flowers* solitary or mostly in twos, nodding. Perulae membranous, red, glabrous and shining dorsally, ovate-oblong, outer ones acuminate-apiculate, inner ones obtuse, up to 2 by 1 cm. Pedicels rather slender, densely stellate-lepidote, 1.5–2 cm. *Calyx* obliquely disk-shaped, often included by the basal saccate part of the corolla tube, hardly lobed, ± 2.5 mm ø, lepidote dorsally. *Corolla* a little zygomorphous, red or fiery red, thin, laxly substellate-lepidote at the tube inside, otherwise quite glabrous, 3(–3.5) cm long in all, tube straight, 2(–2.5) cm long, at base 5–6 mm ø, dilated to 8–10 mm at apex, lobes erecto-patent, broadly obovate-oblong, *c.* 1 by (0.5–)0.6–0.8 cm. *Stamens* 10, very unequal, the longest hardly exserted from the corolla tube; filaments linear, glabrous; anthers obovate-oblong, base obtuse, 1.5–1.8 by 1 mm. *Disk* prominent, glabrous. *Ovary* subobliquely cylindric, 4 by 1.5 mm, densely set with substellate, ferrugineous scales (no hairs), tapering to the slender style, which bears some scales at the base and is glabrous for the rest; stigma turbinate, shortly 5-lobed.

Distr. *Malesia*: Central New Guinea (Mt Antares, Star Mts).

Ecol. Alpine or semi-alpine shrub vegetation, 3000–3200 m, rare. *Fl.* July.

7. Series Javanica

SLEUM. Reinwardtia 5 (1960) 176. — *Rhododendron sect. Schistanthe* SCHLTR. Bot. Jahrb. 55 (1917) 140, *p.p.* — *Rhododendron sect. Hapalanthe* SCHLTR, *ibid.* 55 (1918) 155. — *Rhododendron sect. Zygomorphanthe* SCHLTR. *l.c.* 145, *p.p.* — *Rhododendron subsect. Euvireya* COPEL. *f.* Philip. J. Sc. 40 (1929) 137, 159, *s. str.* — *Rhododendron subsect. Leiovireya* COPEL. *f. l.c.* 137, 167. — *Rhododendron subsect. Schizovireya* SLEUM. Bot. Jahrb. 74 (1949) 538. — **Fig. 38—45.**

Leaves rather large, all or at least for their greater number in the same specimen longer than 4 cm, mostly much longer, and of various shape.

Distr. S. Indochina, *Malesia.*

KEY TO THE SPECIES

1. Corolla outside rather laxly to densely (rarely very densely) short-hairy, otherwise whether or not lepidote.
 2. Leaves very shortly soft-hairy beneath at least when young . . . . **197. R. verticillatum *f.* velutinum**
 2. Leaves without hairs beneath.
  3. Style glabrous or with some spreading hairs at the base or up to the lower third, rather abruptly set off against the ovary.
   4. Leaves ± bullate; scales stalked, *i.e.* subdendroid to dendroid . . . . . **198. R. rugosum**
   4. Leaves not bullate (though the main nerves are markedly impressed above); scales not stalked, flat. **199. R. keditii**
  3. Style pubescent to almost the top, ± gradually tapering from the ovary.
   5. Leaves cordate at the base, subsessile . . . . . **200. R. christi**
   5. Leaves rounded to attenuate at the base, distinctly petiolate.
    6. Corolla 5–6.5 cm long in all. Leaves 10–13 by 5–7 cm. . . . . **201. R. curviflorum**
    6. Corolla up to 4.5 cm long in all. Leaves up to 8.5 by 4.5 cm.
     7. Corolla 3–4(–4.5) cm long in all . . . . . **202. R. villosulum**
     7. Corolla *c.* 2.5 cm long in all . . . . . **158. R. hatamense**
1. Corolla outside not or practically not hairy (some hairs may be present at the base, *cf.* 197. *R. verticillatum*), otherwise whether or not lepidote.
 8. Ovary glabrous or lepidote, not hairy at all.
  9. Ovary very densely and persistently lepidote.
   10. Filaments quite glabrous.
    11. Anthers obovate or obcordate, *i.e.* much narrowed towards the base, each cell with a distinct basal apiculus.
     12. Leaves oblong, entire, apex shortly acuminate, subacute; petiole 0.8–1.2 cm. **203. R. glabriflorum**
     12. Leaves obovate, subserrulate-crenulate, apex obtuse to rounded, petiole 0.3–0.5 cm. **204. R. pachycarpon**
    11. Anthers broad-oblong, base obtuse. Leaves elliptic, entire, apex subacuminate to rounded; petiole 0.4–1(–1.2 cm) . . . . . **205. R. celebicum**
   10. Filaments distinctly hairy at least in the lower part.
    13. Style with some sparse hairs at the very base, or not hairy at all, otherwise whether or not lepidote.
     14. Leaves manifestly reticulate (impressed or prominent) on both faces . . . . **206. R. sayeri**

14. Leaves faintly or not reticulate.
15. Corolla (7–)7.5–8 cm long in all. Anthers 8 mm . . . . . **207. R. pachystigma**
15. Corolla up to 6 cm long in all. Anthers up to 6.5 mm.
16. Leaves ovate-lanceolate. Corolla 5.5–6 cm. Anthers narrow-oblong, 5.5–6.5 mm. **208. R. angulatum**
16. Leaves oblong-elliptic or more rarely elliptic. Corolla 2–3.5 cm.
17. Calyx shortly cup-shaped, distinctly irregularly dented. Anthers 1–1.5 mm. **209. R. loerzingii**
17. Calyx disk-shaped, obliquely 5-angular. Anthers 3.5–4 mm.
18. Leaves in 4–5-merous pseudowhorls at the upper nodes, 6.2–8.3 by 2.4–3.2 cm. **210. R. impressopunctatum**
18. Leaves scattered along the upper internodes, 9–12 by 3.5–5 cm . . **211. R. xanthopetalum**
13. Style rather densely set with short spreading hairs (and some scales) in its lower half. **212. R. hirtolepidotum**
9. Ovary initially laxly to subdensely lepidote, ± early glabrescent during the anthesis, or glabrous from the beginning.
19. Filaments quite glabrous.
20. Nerves (15–)17–20 pairs, from the midrib at an almost right angle, straight ± towards the margin, curved before the edge. Style (4–)5–6 mm. Leaves spirally arranged. **213. R. pseudomurudense**
20. Nerves (6–)8–13 pairs, from the midrib at a more acute angle, mostly ascending or curved. Style exceeding 6 mm.
21. Most or all leaves scattered along the internodes.
22. Corolla 5-lobed to *c.* $^3/_5$ of its length, orange, salmon, light or brilliant red. Pedicels (1.5–)2–3 cm in anthesis, 3–4 cm in fruit . . . . . **214. R. seranicum**
22. Corolla lobed halfway, yellow. Pedicels 1–1.5 cm at anthesis, 1.5–2 cm in fruit. **215. R. loboense**
21. Leaves in distinct pseudowhorls, though 1–2 leaves may be inserted up to 1 cm below the rest.
23. Corolla white . . . . . **216. R. williamsii**
23. Corolla yellow, salmon or red.
24. Leaves ± coriaceous. Corolla 3–3.5 cm, yellow to salmon or orange, sometimes light red. **217. R. robinsonii**
24. Leaves ± thick-coriaceous. Corolla 2–2.5 cm, red to dark red or crimson, rarely orange red. **218. R. rarilepidotum *var.* rarilepidotum**
19. Filaments ± densely hairy at least in their lower part.
25. Style longer, often much longer than the ovary, at least 7 mm.
26. Corolla 1.5–2(–2.5) cm. Leaves ± subcoriaceous, lanceolate or oblong-lanceolate, (3–)4–7 by (0.7–)1–1.5(–2, very rarely up to 2.5) cm. Capsule 1.8–2.2 by 0.5 cm . . **219. R. multicolor**
26. Corolla longer. Leaves ± stiffly coriaceous and mostly also the capsules larger.
27. Corolla lobed to ⅔, tube pubescent inside along 5 vertical stripes . . . **220. R. brevitubum**
27. Corolla lobed about halfway, equally short-pubescent, or glabrous inside.
28. Leaves sessile or nearly so (the base ± truncate-rounded).
29. Corolla (3–)3.5–4 cm. Capsule 2.5–3 by 0.6–0.7 cm . . . . . **221. R. sessilifolium**
29. Corolla (5–)5.5–6.5 cm. Capsule (4–)4.5–5.5(–6) by 0.6–0.7 cm . . . . **222. R. beccarii**
28. Leaves distinctly petioled (the base cuneate to rounded).
30. Leaves narrow in relation to their length, lanceolate, apex subacutely acuminate, 14–18 (–23) by (2–)2.5–4(–4.5) cm . . . . . **272. R. retivenium**
30. Leaves wide in relation to their length, apex subacute to obtuse.
31. Corolla tube narrow, 3–4(–5) mm ø at base, elongate, equalling *c.* $^3/_5$ of the total length of the corolla, which is laxly lepidote outside. . . . . **223. R. kemulense**
31. Corolla tube wider, 5–8 mm ø at base, shorter, equalling mostly *c.* ½ (rarely up to $^3/_5$) of the total length of the corolla, which is glabrous outside.
32. Nerves (16–)18–20 pairs, close to each other, ± straight and rectangular from the midrib. **224. R. moultonii**
32. Nerves 7–10(–13) pairs, more distant from each other and ± curved-ascending.
33. Corolla (3–)3.5–4 cm. Leaves shortly petioled. . . . . **221. R. sessilifolium**
33. Corolla generally much longer. Leaves relatively long petioled . . . **225. R. javanicum**
25. Style short, ± as long as the ovary.
34. Leaves ovate to oblong-ovate; petiole 4–6 by 3 mm . . . . . **226. R. perplexum**
34. Leaves elliptic to oblong; petiole 12–18 by 3–4 mm. . . . . **227. R. crassifolium**
8. Ovary hairy to various degree, otherwise whether or not lepidote.
35. Style hairy (or hairy and lepidote) to at least half its length, often so to nearly the top.
36. Leaves velutinous all over the undersurface at least initially, glabrescent to various degrees in later stages. . . . . **197. R. verticillatum *f.* velutinum**
36. Leaves without hairs underneath.

37. Leaves ± long-attenuate and (sub)acutely (subcaudate-)acuminate at the apex.
38. Corolla tubular, tube very slightly expanded upwards, 4–5 cm long . . . . **228. R. rhodopus**
38. Corolla funnel-shaped, *i.e.* tube short (up to *c.* 1.5 cm), if longer, manifestly dilated upwards.
39. Corolla 7.5–9(–10) cm.
40. Pedicels 2.4–4 cm . . . . . **229. R. baenitzianum**
40. Pedicels (6–)7–11 cm . . . . . **230. R. englerianum**
39. Corolla up to 6.5 cm.
41. Corolla lobed to *c.* ⅔, tube 1–2.1 cm.
42. Leaves ovate to lanceolate-ovate; petiole rather slender, 1–1.5 mm across. **231. R. wentianum**
42. Leaves lanceolate to subovate- or oblong-lanceolate; petiole stout, 2–3 mm across. **232. R. cuspidellum**
41. Corolla lobed up to halfway, tube 3–4 cm.
43. Leaves acutely attenuate at the base . . . . . **233. R. commutatum**
43. Leaves rounded or slightly cordate at the base.. . . . . **234. R. subcordatum**
37. Leaves shortly (acutely or mostly rather bluntly) acuminate or attenuate, or obtuse to rounded at the apex.
44. Leaves lanceolate to (sub)oblong-lanceolate.
45. Anthers (3–)4–5 mm.
46. Pedicels hairy *and* lepidote. Petiole (0.4–)0.6–1 cm. Corolla (3.7–)4.5–5.5(–6) cm. **235. R. vanvuurenii**
46. Pedicels lepidote, epilose. Petiole 1.5–2 cm. Corolla 6.5–7 cm . . . . **228. R. rhodopus**
45. Anthers 2 mm. Pedicels lepidote, epilose. . . . . **236. R. leptobrachion**
44. Leaves oblong, elliptic or ovate, more rarely subobovate.
47. Corolla at least 14 cm long in all.
48. Leaves oblong-elliptic, apex ± obtuse, 13–17 by 6–8 cm. Corolla 5-merous. **237. R. schlechteri**
48. Leaves ± oblong, apex ± subacuminately attenuate, (18–)20–28 by 6–10.5 cm. Corolla 7-merous . . . . . **238. R. leucogigas**
47. Corolla up to 10 cm long in all.
49. Corolla glabrous (elepidote) or practically so outside.
50. Corolla *c.* 2.5 cm long . . . . . **158. R. hatamense**
50. Corolla longer than 4 cm.
51. Corolla tubular-funnel-shaped, 4–5 cm.
52. Leaves 7–10.5 by 2.8–4.4 cm. Anthers exappendiculate . . . . . **239. R. lompohense**
52. Leaves (7–)12–16 by (4–)5–7.5 cm. Anthers glandular-appendiculate at base. **240. R. buruense**
51. Corolla tubular, (6.5–)7–7.5 cm. . . . . **241. R. bloembergenii**
49. Corolla laxly to densely lepidote outside.
53. Corolla lobed to ½–⅔ of its total length, tube up to 1 cm long . . . **242. R. macgregoriae**
53. Corolla lobed to ¼–½ of its total length, tube longer than 1.5 cm.
54. Filaments glabrous, or practically so (very sparse hairs found at the base only).
55. Leaves ovate to ovate-elliptic, base cordate . . . . . **243. R. rosendahlii**
55. Leaves elliptic to obovate-oblong, rarely obovate, base broadly attenuate to the petiole. **268. R. culminicolum**
54. Filaments distinctly hairy at least in the lower third.
56. Leaves (2.5–)4–8 (rarely in the same specimen in part up to 9) by (1.5–)2–4(–5) cm.
57. Corolla white or pale pink.
58. Leaves distinctly petioled.
59. Inflorescences (8–)9–13-flowered. . . . . **244. R. comparabile**
59. Inflorescences (3–)4–5-flowered. . . . . **245. R. luraluense**
58. Leaves subsessile. Inflorescences (4–)5–7(–9)-flowered . . . . **131. R. orbiculatum**
57. Corolla coloured otherwise.
60. Corolla greenish, yellowish greenish, yellow or orange-yellow.
61. Corolla greenish or yellowish greenish, 4–5 mm across the base . . **246. R. flavoviride**
61. Corolla yellow or orange-yellow, 7–8(–10) mm across the base.
62. Corolla widely tubular-subcampanulate. Perulae up to 1.5 by 0.8 cm. **247. R. christianae**
62. Corolla broadly funnel-shaped. Perulae 3.5(–5) by 1.5(–2) cm . . **248. R. laetum**
60. Corolla pure red.
63. Reticulation of the leaves dense, subimpressed above, distinctly raised beneath. **249. R. scabridibracteum**
63. Reticulation of the leaves practically absent . . . . . **250. R. longiflorum**
56. Leaves (5–)7–15(–18) by (2.5–)3–8 cm.
64. Pedicels exceeding 6 cm at anthesis at least in part in the same specimen.

65. Leaves shortly (rarely up to 1 cm) petioled. Corolla *c.* 8 cm . . **230. R. englerianum**
65. Leaves petioled for 2–4 cm. Corolla *c.* 4 cm . . . . . **251. R. polyanthemum**
64. Pedicels shorter than 6 cm at anthesis at least in the greater part of the same specimen.
66. Outer and middle perulae up to 2.5 cm long, glabrous, lepidote or finely sericeous and lepidote dorsally.
67. Corolla white or pale pink, tubular to almost salver-shaped.
68. Leaves petioled for 1.5–2 cm. . . . . **252. R. kochii**
68. Leaves subsessile . . . . . **131. R. orbiculatum**
67. Corolla yellow, orange, pale to deep red, ± funnel-shaped.
69. Leaves sessile or subsessile, petiole 1–2(–3) by 3–4 mm . . . . . **253. R. brevipes**
69. Leaves ± manifestly petioled.
70. Leaves thick-coriaceous, stiff, base ± rounded or often subcordate. **197. R. verticillatum *f.* verticillatum**
70. Leaves subcoriaceous to coriaceous, base usually ± cuneate, sometimes rounded.
71. Perulae ± densely lepidote in the upper part both in- and outside. Scales on the leaves of a scurfy, somewhat detersile type . . . . . **254. R. aurigeranum**
71. Perulae lepidote and whether or not sericeous outside, mostly early glabrescent, glabrous inside. Scales on the leaves not scurfy, though (very) early caducous. **250. R. longiflorum**
66. Outer and middle perulae distinctly larger, sometimes up to 5 cm long, all over densely covered with a rather scabrid, ± appressed tomentum of shorter or longer and ± stoutish hairs outside for a long time, glabrescent in later stages.
72. Corolla ± tubular, densely lepidote outside. Leaves manifestly reticulate at least beneath . . . . . **249. R. scabridibracteum**
72. Corolla ± funnel-shaped, ± laxly lepidote outside. Leaves faintly or not reticulate.
73. Leaves ± coriaceous, broadly to subovate-elliptic, subsessile or shortly (rarely up to 7 mm) petioled. Corolla of a pure yellow initially, turning orange or reddish at the lobes in later stages; anthers 4–5 mm. . . . . **248. R. laetum**
73. Leaves thin-coriaceous, elliptic to oblong-elliptic, rarely subovate-elliptic or ovate-oblong, generally manifestly (5–15 mm) petioled. Corolla orange, or tube yellow and lobes orange-red from the beginning; anthers (5–)6–8 mm . . **255. R. zoelleri**
35. Style hairy at the base, or rarely hairy up to the lower third, or glabrous.
74. Leaves markedly bullate . . . . . **256. R. maxwellii**
74. Leaves not bullate.
75. Leaves narrow-lanceolate, (0.6–)1–2 cm wide.
76. Leaves (2.7–)5–7.5 cm long, sessile or nearly so, reticulation distinctly finely prominent on both faces. Corolla red. . . . . **257. R. nervulosum *var.* nervulosum**
76. Leaves 10–15 cm long, petioled for (3–)4–6 mm, reticulation, if any, faintly visible on the upper surface only. Corolla yellow or orange. . . . . **258. R. salicifolium**
75. Leaves lanceolate or of other shape, at least in part in the same specimen wider than 2 cm.
77. Leaves 4–8 (rarely in the same specimen partly up to 10) cm long.
78. Style markedly abrupt with the short-conical or obovoid-cylindrical ovary, glabrous or with some scattered hairs at the very base.
79. Leaves sessile or nearly so. . . . . **259. R. lanceolatum**
79. Leaves manifestly petioled.
80. Corolla broadly funnel-shaped, lobed at least halfway.
81. Leaves rounded-obtuse at apex. Perulae up to 8 by 5 mm, dorsally sericeous. **260. R. sumatranum**
81. Leaves acuminate, the very apex only subobtuse. Perulae up to 2 by 1 cm, quite glabrous dorsally . . . . . **218. R. rarilepidotum *var.* ootrichum**
80. Corolla tubular or funnel-shaped, lobed to *c.* ⅓.
82. Corolla (2.5)–3–3.5 cm long, quite glabrous outside. Leaves in distinct pseudowhorls. **261. R. arfakianum**
82. Corolla laxly lepidote outside.
83. Leaves in distinct pseudowhorls. Corolla (4.5–)5–5.5(–6) cm . . . **262. R. fuchsii**
83. Leaves scattered along the branchlets. Corolla (3.5–)4–5 cm . . . **263. R. impositum**
78. Style continuous or subabrupt with the ovoid to cylindrical ovary, pubescent up to the lower third, or glabrous.
84. Corolla lobed halfway or more.
85. Corolla ± densely lepidote outside, lobes much often horizontally, spreading. Pedicel slender, generally longer than the corolla. . . . . **242. R. macgregoriae**
85. Corolla glabrous outside, lobes erecto-patent. Pedicel rather stout, much shorter than the corolla . . . . . **264. R. leytense**
84. Corolla lobed less than halfway.
86. Style reaching halfway the stamens. . . . . **265. R. brachygynum**

86. Style nearly as long as or longer than the stamens.
87. Corolla white. Perulae up to 3.5 by 1.5 cm. . . . . **266. R. mindanaense**
87. Corolla light to dark red, or orange. Perulae, as far as known, up to 2 by 1 cm.
88. Ovary predominantly hairy (tomentose), bearing a few, early caducous scales. Capsule hairy, not lepidote . . . . . **267. R. renschianum**
88. Ovary hairy (even tomentose) *and* distinctly lepidote (scales, often hidden by the hairs on the ovary, persistent and at least well visible on the capsule).
89. Corolla completely glabrous outside . . . . . **261. R. arfakianum**
89. Corolla laxly to subdensely lepidote outside . . . . . **268. R. culminicolum**
77. Leaves all or at least most of them in the same specimen longer than 8 cm.
90. Corolla laxly to subdensely lepidote outside.
91. Leaves ± long and acutely (subcaudate-)acuminate.
92. Leaves lanceolate or oblong-lanceolate, 1.5–3 cm wide . . . . . **269. R. mollianum**
92. Leaves (2.5–)3.5–6.3 cm wide.
93. Leaves ovate to lanceolate-ovate; petiole slender, 1–1.5 mm ø . . . **231. R. wentianum**
93. Leaves lanceolate, sometimes subovate- or oblong-lanceolate; petiole stout, 2–3 mm ø. **232. R. cuspidellum**
91. Leaves shortly and acutely or mostly obtusely acuminate or attenuate, or obtuse at all at the apex.
94. Corolla 3.5–6 cm long in all, tube at least 1.6 cm long
95. Style at least thrice as long as the ovary.
96. Corolla funnel-shaped . . . . . **270. R. poremense**
96. Corolla obliquely tubular . . . . . **268. R. culminicolum**
95. Style ± as long as the ovary . . . . . **265. R. brachygynum**
94. Corolla (1.8–)2–2.8 cm long in all, tube 0.5–1 cm.
97. Leaves sessile or nearly so . . . . . **259. R. lanceolatum**
97. Leaves distinctly petioled . . . . . **242. R. macgregoriae**
90. Corolla quite glabrous outside from the beginning.
98. Style ± as long as the ovary.
99. Leaves subsessile. Corolla red . . . . . **257. R. nervulosum *var.* exuberans**
99. Leaves 1.5 cm petioled. Corolla yellow . . . . . **265. R. brachygynum**
98. Style much longer than the ovary.
100. Leaves manifestly cordate . . . . . **271. R. stresemanni**
100. Leaves rounded (rarely subcordate) or attenuate at the base.
101. Ovary sparsely and shortly hairy (lens!). Leaves lanceolate to lanceolate-oblong, finely and remarkably reticulate on both faces . . . . . **272. R. retivenium**
101. Ovary subdensely to densely and rather longish white-hairy.
102. Leaves large, (12–)14–23 by (5–)6–13 cm (leaf index 2–2.5), stiffly coriaceous; petiole stout and flattened, 3–10(–15) by 3–5(–6) mm.
103. Umbels (6–)7–12-flowered. Pedicels laxly lepidote, epilose. Anthers 5 mm. **273. R. lowii**
103. Umbels 2-flowered. Pedicels densely short-hairy, elepidote. Anther *c.* 8 mm. **274. R. intranervatum**
102. Leaves mostly smaller, only (2–)2.5–5 (partly in the same specimen occasionally up to 9) cm wide (leaf index 3–5, but only 1 if wider than 5 cm), less stiff; petiole mostly more slender.
104. Leaves oblong-ovate, nervation manifestly impressed above . . . **275. R. toxopei**
104. Leaves lanceolate to oblong or elliptic-oblong, sometimes subovate or subobovate-oblong, nervation but faintly or not impressed above.
105. Leaves broadly oblong to subovate- or subelliptic-oblong. Corolla (3–)4–5(–5.5, rarely up to 6) cm . . . . . **225. R. javanicum**
105. Leaves oblong to lanceolate. Corolla mostly 6–7(–8) cm, rarely shorter. **276. R. brookeanum**

197. Rhododendron verticillatum LOW *ex* LINDL. J. Hort. Soc. Lond. 3 (1848) 86, *c. icon.* p. 89; PLANCH. Fl. Serres 5 (1849) 477–480, fig.; WALP. Ann. 5 (1858) 477, *p. p.*; MILLAIS, Rhodod. (1917) 258; MERR. En. Born. (1921) 463, *p.p.* SLEUM. Reinwardtia 5 (1960) 185; Blumea 11 (1961) 126, *non* LOW *ex* HOOK. *f.* in Hook. Ic. Pl. (1852) t. 884.

f. **verticillatum.**

Generally epiphytic shrub; roots reported to be long and fleshy. Branchlets downy and ± laxly, early caducously lepidote at the upper internodes; internodes (2–)5–10(–15) cm by 3–4(–5) mm. *Leaves* in 4–6-merous pseudowhorls at the upper 2–4 nodes, variable in shape and size in the same specimen, oblong or elliptic-oblong to elliptic, not rarely subovate- or subcordate-elliptic or -oblong, apex subacutely to broadly subobtusely acuminate or obtusely attenuate, sometimes even rounded, base very broadly attenuate or mostly rounded to slightly cordate, thick-coriaceous, stiff, lepidote

initially on both faces, early glabrescent above midrib excepted, remaining laxly lepidote for a long time beneath (scales minute, dark, stellate-dentate at the marginal zone, centre very small, slightly impressed), finely ± glabrescent on the intervenium, entire, slightly revolute at the margin in dry specimens, (5–)6–10(–11) by (2–)3–4 (sometimes up to 6) cm, midrib broadened above the base, narrowed and flat or a little sunk distally, as thick and rugose as the petiole, much prominent beneath in the lower part, nerves 7–9(–10) curved-ascending pairs, somewhat impressed above, rather indistinctly raised beneath, often ± obsolete on both faces; petiole rugose, flattened and grooved above, lepidote for a long time, (1–)1.5–2(–2.5) cm by 2–3 mm. *Umbels* compact, (8–)10–15-flowered. Outer perulae ovate-subacuminate, inner ones oblong to spathulate, sericeous and minutely lepidote dorsally, lepidote at the ± reflexed apex internally, up to 2 by 1.5 cm. Bracteoles filiform (0.5 mm) below, subspathulate (up to 7 mm) distally, laxly short-hairy, up to 2 cm. Pedicels densely to laxly clad with rather long and subpatent hairs, laxly clothed with small caducous scales, (3–)3.5–4.5 cm by 1–1.5 mm at anthesis. *Calyx* oblique, patellar, irregularly and shortly 5-dented (one tooth occasionally more acutely acuminate and up to 2 mm long), *c.* 4 mm ø, pubescent outside. *Corolla* funnel-shaped, reddish crimson, red-pink or salmon, rather densely to laxly lepidote and occasionally set with some scattered hairs at the very base outside, subdensely hairy at the tube inside, (4–)5–5.5 cm long in all, tube *c.* 3 cm, base a little pouched, 5 mm ø, dilated in its upper third to *c.* 1 cm, lobes erecto-patent, broad-spathulate, 2–2.5 by 1.5–1.8(–2) cm. *Stamens* 10, subequal, attaining ± half the corolla lobes, or finally slightly exserted; filaments filiform, rather laxly pubescent in the lower third, glabrous for the rest; anthers oblong, curved, 2.5–3.5 by 1 mm. *Disk* densely white-pilose at its upper margin, glabrous below. *Ovary* subcylindric-conical, rather abrupt with the style, densely clad with rufescent subpatent hairs, which cover very small scales, 4–5 by 2–2.5 mm; style equalling or slightly exceeding the stamens in full anthesis, slender, hairy and lepidote for the lower $^3/_5$–$^4/_5$, glabrous above; stigma subcapitate. Immature *capsule* cylindric, 2.4–2.7 by 0.5 cm, patent-hairy and lepidote.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. Epiphytic in moss-forest, but also found in moss on ground, apparently rare. *Fl.* Jan., Feb.

f. **velutinum** (BECC.) SLEUM. Reinwardtia 5 (1960) 185. — *R. velutinum* BECC. Malesia 1 (1878) 204; MERR. En. Born. (1921) 463.

Leaves with short, soft hairs beneath. *Corolla* besides the scales with short hairs all over the tube outside, or at least so at the base.

Distr. *Malesia*: Borneo (Sarawak), in forest, 700–1430 m.

198. Rhododendron rugosum LOW *ex* HOOK. *f.* in Hook. Ic. Pl. (1852) t. 885; WALP. Ann. 5 (1858) 446; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 197; GIBBS, J. Linn. Soc. Bot. 42 (1914) 104; MILLAIS, Rhodod. (1917) 237; MERR. En. Born. (1921) 463; SLEUM. Reinwardtia 5 (1960) 185; Blumea 12 (1963) 109; *ibid.* 12 (1964) 340. — *R. kinabaluense* MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 108; En. Born. (1921) 461.

***var.* rugosum.**

Shrub or small tree, in general knotty and rather straggly, 2–5(–10) m, also epiphytic and pendent. Branches robust, divaricately branched. Branchlets terete, 2–3(–4) mm ø, upper internodes with some scarious bracts, densely clothed with rufous, furfuraceous, deeply stellate-incised and ± stalked, early caducous scales, early glabrescent, remaining a little warty and rough to the touch, finally with greyish cork; internodes (1–)2–5(–8, very rarely up to 12) cm. *Leaves* in 3–5(–6)-merous pseudowhorls, mostly at the upper 1–2(–3) nodes, broadly ovate-elliptic or elliptic, more rarely oblong-elliptic, often variable in shape and size in the same pseudowhorl, rather coriaceous, apex shortly acuminate, subobtuse, base broadly attenuate into the petiole, rarely more obtuse, with a dense rufous, almost scurfy, lepidote tomentum on both faces initially, early glabrescent above, more persistently lepidote beneath (scales detersile, not rarely ± dendroid, *i.e.* small centre deepened in middle and extended into a shorter or longer foot, which stands within a minute epidermal depression, marginal zone narrowly irregularly stellate-incised, often so to nearly the centre), finally glabrescent beneath too, the remaining pits manifest, margin entire or faintly crenulate, mostly somewhat revolute, (5–)6–10 (–13) by (2.5)–3–6 cm, midrib rather narrow, the subtriangular base excepted, much impressed above, as thick as the petiole and very prominent in the lower part beneath, nerves (5–)6–8 pairs, spreading and ± curved, anastomosing before the edge, ± deeply impressed above, very prominent beneath, lamina thus bullate to various degree, veins subdensely reticulate, slightly impressed above, ± prominent, but often not much visible beneath; petiole subterete, a little flattened, grooved above, 0.7–1.5(–2, rarely up to 2.5) cm by 2–3(–4) mm, densely stellate-lepidote initially, rugulose in later stages. *Umbels* (8–)10–12(–18)-flowered, flowers nodding initially. Outer perulae ovate-acuminate, firm, apex short-apiculate or submucronate, laxly to subdensely lepidote in the upper half dorsally, often pruinose (as are the branchlets), inner ones larger, ovate-oblong to obovate, apiculate, lepidote in the upper, finely pubescent in the lower part outside, margin with caducous scales, up to 1.5 by 0.8 cm. Bracteoles filiform, laxly pubescent and lepidote, up to 2 cm. Pedicels rather stoutish, densely pubescent and lepidote, (1–)1.3–2.5 cm in anthesis, up to 4.5 cm by 1 mm in fruit. *Calyx* thick, disk-shaped, margin wavy and obtusely shortly 5-lobed, pubescent and lepidote dorsally, *c.* 4 mm ø. *Corolla* sweet-scented, tubular below, expanded at the lobes, slightly oblique, (2–)2.5–3 (rarely up to 3.5) cm long in

all, densely short pubescent and less densely lepidote outside, pubescent at the lower half of the tube inside, waxy, pink to crimson or scarlet, even deep magenta, bright purple or blood-red, tube rather straight, (1.2–)1.5–2 cm long, the base a little 5-pouched, *c.* 5 mm ø, gradually dilated in the upper third to *c.* 1 cm at apex lobes, oblong-obovate to subspathulate, subretuse, (0.8–)1–1.5 by (0.6–)0.8–1.2 cm. *Stamens* 10, unequal, somewhat exserted from the corolla tube; filaments linear, with short spreading hairs in the lower third, glabrous upwards; anthers obovate-oblong, base of each cell protracted into a short apiculus, (2–)3 by 1 mm. *Disk* hairy at the upper margin, glabrous elsewhere. *Ovary* subcylindric, green-grey-velutinous, the hairs covering small scales, rather abrupt with the style, *c.* 4 by 2 mm; style stoutish, attaining half the corolla lobes, with some patent hairs at the base or more rarely up to the lower third, glabrous for the rest; stigma broad-capitate, distinctly lobed. *Capsule* subovoid-cylindrical, very shortly attenuate at the apex and base, deeply 5-furrowed, purplish, erect, subdensely short-pubescent, laxly lepidote, 1.3–1.5 by (0.4–)0.5–0.6 cm, the valves faintly or not twisted when open. *Seeds* 2–2.5 mm including the tails.

Distr. *Malesia*: North Borneo (Mts Kinabalu and Trus Madi).

Ecol. In low mossy forest and open exposed ridge, also on edge of landslides, in widely different habitats from dense shade to full sun, locally abundant, (1525–)2100–2900 (rarely up to *c.* 3300) m. *Fl. fr.* Jan.-Dec.

Note. GIBBS found the lovely heads of waxy pink to red flowers one of the most vivid impressions in her ascent of Mt Kinabalu.

var. **coriifolium** (SLEUM.) SLEUM. Blumea 12 (1964) 340. — *R. coriifolium* SLEUM. Blumea 12 (1963) 107.

Leaves thick-coriaceous, stiff, more distinctly crenulate than in *var. rugosum*, apex and base obtuse, (2–)2.5–4(–5.5) by 1.5–2(–2.6) cm; petiole 3–4(–5) by 2(–3) mm. *Umbels* (5–)7–12-flowered. *Corolla* of a deeper red colour than usually found in *var. rugosum*.

Distr. *Malesia*: North Borneo (East slope of Mt Kinabalu), in rather open low thickets along ridges, 3050–3200 m (and possibly still higher), rather local.

Note. Replacing *R. rugosum* at higher altitudes and apparently subject to introgression by *R. buxifolium var. robustum*.

199. Rhododendron keditii SLEUM. Blumea 11 (1961) 126; *ibid.* 12 (1963) 109.

Terrestrial shrub. Branchlets robust; internodes 1.5–3 by 0.3–0.5 cm, subglabrous. *Leaves* in 3–4-merous pseudowhorls at the upper nodes, oblong or oblong-elliptic, rarely subobovate-elliptic, apex shortly attenuate or subacuminate, ± bluntish, base broadly attenuate or rounded, coriaceous, stiff, glabrous above at full age, subdensely lepidote beneath (scales minute, flat, variously dented in the thin early dissolute marginal zone, small centre much impressed), slightly convex above when dry, 6.5–10.5 by 3–6 cm, midrib slightly prominent to the base and becoming ± flattish distally above, thick-prominent in the lower part and gradually decreasing upwards beneath, nerves 6–8 irregular pairs, rather straight below, not rarely branched before the margin and anastomosing, distinctly immersed above in fully mature leaves, slightly prominent beneath, reticulation lax, faintly raised beneath only, or subobscure; petiole semiterete or flattened, rugulose, red, glabrous, (1–)1.2–1.6 cm long, (3–)4–5 mm wide, 2–3 mm thick. *Umbels* ± 10-flowered. Flower buds ovoid-subglobular, 2(–2.5) by 1.5–2 cm; outer perulae chartaceous, ovate-subrotundate, distinctly apiculate, more inner ones larger and thinner, broad-elliptic, very shortly apiculate, innermost ones oblong-obovate, obtuse, glabrous, shining, not fimbriate, 1–2(–2.5) by 1–1.5 cm. Bracteoles linear below, elongate-subspathulate distally, glabrous, 1–1.5 cm by 1–3 mm. Pedicels rather slender, red, densely very shortly patent-hairy, laxly lepidote especially below the calyx, 1.6–2.2(–2.5) cm. *Calyx* patellar, ± oblique, indistinctly 5-lobed, puberulous and very laxly lepidote dorsally, 2.5–3 mm ø. *Corolla* broadly funnel-shaped, deep pink, subdensely to more laxly short-hairy and laxly or not lepidote at the tube and the lower part of the lobes outside, hairy in the lower third of the tube inside, otherwise glabrous, 3–3.5 cm long in all, tube 4–5 mm ø at the slightly saccate base, dilated upwards to 1–1.3 (–1.5) cm at apex, limb *c.* 2.5 cm ø, lobes suberect or somewhat spreading, ± obovate, 1–1.5 by 1–1.3 cm. *Stamens* 10, slightly exserted from the corolla tube; filaments linear and densely very shortly hairy below, narrower and glabrous to the upper ⅔; anthers broadly obovate-oblong, 2.5–3 by 1 mm, cells slightly narrowed at the otherwise obtuse base. *Disk* prominent, markedly 10-lobed, glabrous. *Ovary* subconical-cylindric, densely short-hairy, not (or very early caducously) lepidote, 4–5 by 2–2.5 mm, rather abruptly narrowed to the style, the latter thickish, quite glabrous, 7–8 mm; stigma turbinate.

Distr. *Malesia*: North Borneo (Mt Kinabalu), and in Sarawak (Mt Mulu), twice found.

Ecol. In open sparse scrub on boulders or landslides, 1920–2010 m. *Fl.* Aug., *fr.* Dec.

200. Rhododendron christi FOERSTER in Fedde, Rep. 13 (1914) 222; SCHLTR, Bot. Jahrb. 55 (1918) 155, *incl. var. loniceroides* SCHLTR, *l.c.*; DIELS, *ibid.* 62 (1929) 487; SLEUM. Reinwardtia 5 (1960) 185; Blumea 11 (1961) 127; *ibid.* 12 (1963) 110. — *Rhododendron sp.*, allied to *R. wentianum*, STONOR, Rhodod. Yearbook 6 (1951) 50, f. 54.

Small, stiff, sparsely branched shrub, 0.3–1.2 m, terrestrial or epiphytic, with long virgate branches. Branchlets terete, 1.5–2 mm ø, upper internodes rather laxly lepidote, lower ones glabrescent, smooth, early covered with whitish cork; internodes 4–9(–11) cm. *Leaves* in 3-merous pseudowhorls at the upper 2 or 3 nodes, ovate, subsessile, apex shortly subabruptly acutely acuminate, base

cordate, (thin-)coriaceous, laxly lepidote initially, glabrescent above, laxly and ± persistently lepidote beneath (scales flat, small, thin marginal zone rather large, irregularly and ± deeply dented or incised, darker centre small, slightly impressed), somewhat recurved at the margin in dry specimens, (4–)5–9(–11) by 2.5–6.5 cm, midrib narrow and deeply grooved above, rather robust and prominent beneath, nerves 4–6 pairs, curved-ascending and joined, faintly or not impressed above, slightly prominent beneath, veins and veinlets rather densely reticulate, slightly raised on both faces; petiole flattened, 1–2(–3) by 1–2 mm, lepidote. *Umbels* (2–)3–4-flowered. Outer perulae ovate, apex abruptly subulate, small, glabrous dorsally, inner ones larger, ovate, apiculate or obtuse, sericeous in the upper part externally, margin minutely erose, up to 2 by 0.8 cm. Bracteoles linear below, subspathulate-dilated (3–5 mm) towards the apex, laxly pubescent, up to 2 cm. Pedicels rather stoutish, red, very densely patently short-hairy, with few or no scales, (1.5–)2–2.5 cm at anthesis. *Calyx* disk-shaped, hairy, 3–4 mm ø, with 5 short (1 mm) obtuse ciliate lobes (of which some or other occasionally extends to 5 by 1 mm). *Corolla* tubular below, expanded and oblique at the lobes, (3–)3.5–4(–4.5) cm long in all, at the basal part yellow or greenish yellow, otherwise red or orange-red, ± densely clothed with rather longish hairs in- and outside which are whitish below, becoming reddish to purplish towards the lobes, no scales, tube slightly curved, 2–2.5 cm, base *c.* 6 mm ø, slightly dilated to 8–10 mm at apex, lobes obovate-spathulate or suborbicular, 1.3–1.8 by 1–1.5(–1.8) cm. *Stamens* 10, unequal, slightly exserted; filaments narrow-linear, subdensely patently hairy in the lower ¼–⅓, glabrous for the rest; anthers obovate, apex truncate, 2–2.5 mm. *Disk* densely pubescent in its upper half. *Ovary* cylindric, continuous with the style, short-tomentose, 5–7 by 2.5–3 mm; style stout, ± densely hairy to nearly the top, ± as long as the stamens; stigma oblique, subcapitate. *Capsule* subcylindric, widest in the upper third, slightly curved, laxly pubescent, 3–3.5 by *c.* 0.5 cm, valves thin, ± twisted.

Distr. *Malesia*: E. New Guinea (Mt Saruwaged and vicinity; Eastern, Western and Southern Highlands; Wharton Range).

Ecol. Epiphyte in mossy bush and on grassland treeferns, or terrestrial in light *Quercus-Engelhardia* forest, out of rock faces on cliffs at the moss forest level, or in scrubby summit growth, 1200–2800(–3000, perhaps still higher up) m. *Fl.* May-Oct.

Vern. *Kuswamp*, Mendi.

201. Rhododendron curviflorum J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 50; Nova Guinea 12 (1914) 141, t. 36 B; SLEUM. Reinwardtia 5 (1960) 186.

Large terrestrial or epiphytic shrub, up to 2.5 m. Branchlets subterete, 2.5–4 mm ø, tips subdensely substellate-lepidote, older parts early glabrescent; internodes 4–17 cm. *Leaves* in 5-merous pseudo-whorls at the upper 1–2 nodes, oblong- to ovate-elliptic, apex short acuminate, subacute, base ± rounded, stiff-coriaceous, at full age quite glabrous above, subdensely lepidote beneath (scales small, irregularly and ± deeply stellate-incised at the pale marginal zone, centre dark, finally blackish, faintly impressed), edge not or but little revolute, 10–13 by (4.7–)5–7 cm, midrib narrowly impressed above, continuing the robust petiole beneath, nerves 5–8 pairs, spreading, straight below, curved upwards and anastomosing, slightly impressed above, prominent beneath, reticulation rather dense, faintly impressed or raised above, much more distinct and prominent beneath; petiole somewhat flattened, grooved above, glabrescent, reddish when dry, 0.7–1.7 cm by 2–3 mm. *Umbels* 5–9-flowered. Outer perulae small (± 1 cm), ovate, apiculate, inner ones gradually larger, oblong to spathulate, sericeous outside, glabrous inside, 2.5–4 by 1.5 cm. Bracteoles linear below (0.5 mm), spathulate distally (4 mm), 2.8–3.5 cm. Pedicels short-tomentose, elepidote, 2–3.3 cm by nearly 1 mm. *Calyx* disk-shaped, tomentose dorsally, 4–6 mm ø, lobes short-deltoid (1 mm), obtuse, ± reflexed at full anthesis. *Corolla* tubular, ± oblique, unequally 5-lobed, lilac (type) or yellow (BRASS 11536), (5–)5.5–6.5(–7) cm long in all, densely rather shortly pubescent outside margin of the lobes excepted, subdensely pubescent in the lower half of the tube inside, elepidote, tube curved, 3–4 cm, at the 5-pouched base 6–7 mm ø, widened to 1–1.2 cm at apex, lobes obovate-spathulate to suborbicular, 2–2.5(–3) by 1–1.5 (–1.8) cm. *Stamens* 10, unequal, the longest reaching halfway the corolla lobes; filaments linear, densely to sparsely pubescent below, more slender and glabrous towards the top; anthers broad-oblong to obovate-oblong, *c.* 4 by 1.8–2 mm, base obtuse. *Disk* prominent, densely pubescent above, less so below. *Ovary* elongate-conical, tomentose, 8–10 by *c.* 3 mm, continuous with the style, the latter ± as long as the shortest stamens, densely pubescent to nearly the top; stigma thick, capitate, much lobed.

Distr. *Malesia*: W. New Guinea (Keyts Mts and Bele R.).

Ecol. Epiphytic or terrestrial in secondary forest or in low seral growths on landslip, 1900–2200 m. *Fl.* Nov.-Dec.

Note. The size of the corolla in SMITH's description of 1914 differs from that in t. 36 B; unfortunately, the type material, conserved in formaline at Bogor, is practically useless. I have drawn a new description of it based on good and apparently conspecific specimens (BRASS 11215 and 11536) from Bele R., which have yellow flowers instead of 'lilac' as said of the type material, which came from the Keyts Mts. Also the description of the perulae, not given in the original diagnosis, is made after the BRASS collections.

202. Rhododendron villosulum J. J. S. Med. Rijksherb. *n.* 25 (1915) 5; Nova Guinea 12 (1917) 507; *ibid.* 12 (1918) t. 201; *ibid.* 18 (1936) 94; SLEUM. Reinwardtia 5 (1960) 186; Blumea 11 (1961) 127.

— *R. fransseniánum* J. J. S. Med. Rijksherb. *n.* 25 (1915) 5; Nova Guinea 12 (1917) 508; *ibid.* 12 (1918) t. 202.

Shrub, *c.* 1 m, with apparently weak, subpendent long branches. Branchlets terete, 2.5–4 mm ø, upper internodes subdensely clothed with substellate brownish, rather early caducous scales, lower parts glabrescent and smooth; internodes (4–)8–18 cm. *Leaves* in 3(–5)-merous pseudowhorls at the upper 1–2 nodes, unequal in size, elliptic or ovate-elliptic, sometimes ovate-lanceolate, apex shortly to long (1–2 cm) acuminate, often a little curved, subacute to very acute, base broadly attenuate to rounded, coriaceous to subcoriaceous, completely glabrous above with age, ± persistently and subdensely lepidote beneath (scales rather small, flat, marginal zone variously and irregularly substellate-dented or -lobed, dark centre slightly impressed), edge slightly or not recurved, (3–)3.5–8.5 by (2–)2.5–4.5 cm, midrib narrow and much impressed above, rather robust and prominent, nerves (4–)5–8(–9) pairs, irregular, spreading and anastomosing, faintly or not impressed above and raised beneath, reticulation rather dense and prominent on both faces; petiole a little flattened and grooved above, lepidote, (2–)3–5 by 1–1.5 mm. *Umbels* (2–)3–6-flowered. Flower buds ovoid, *c.* 2.5–3 by 1.5 cm; outer perulae broad-ovate, apex abruptly narrowed, apiculate, subglabrous, inner ones larger, ovate to obovate-spathulate, obtuse, ± densely sericeous dorsally especially in the upper half, up to 2.5 by 1 cm. Bracteoles linear, pubescent, up to 2 cm by 1 mm. Pedicels very densely patent-pubescent, elepidote, (1.5–)2–3 cm by *c.* 1 mm at full anthesis. *Calyx* disk-shaped, obliquely 5-angular or shortly 5-dented, densely hairy or nearly villous, *c.* 4 mm ø. *Corolla* tubular below, expanded towards the limb, oblique, dark to light red, 3–4(–4.5) cm long in all, more laxly to densely hairy all over, outside margin of the lobes excepted, and at the lower half of the tube inside, elepidote, tube curved, 2–2.5 cm, at the 5-pouched base 4–6 mm ø, widened to 7–10 mm at apex, lobes broad-obovate to suborbicular, slightly retuse, 1.2–1.5(–1.8) by 0.8–1.2(–1.6) cm. *Stamens* 10, very unequal, the longest reaching nearly halfway the corolla lobes; filaments linear and pubescent in the lower, nearly filiform and glabrous in the upper half; anthers obovate, apex obliquely truncate, 2.5–3 by *c.* 1.5 mm. *Disk* densely pubescent at the upper margin only. *Ovary* subovoid-cylindric, continuous with the style, whitish tomentose, apparently elepidote, 6–7 by 2.5–3 mm; style ± as long as the stamens, densely hairy below, less so towards the top; stigma broad-capitate, distinctly lobed.

Distr. *Malesia*: New Guinea (Wissel Lake region, Oranje and Nassau Mts, Eastern Highlands).

Ecol. Generally epiphytic in moss forest, (1755–)2400–3000 m.

Note. Certainly much related to *R. christi*, distinguished mainly by the non-cordate, more distinctly petioled leaves.

203. Rhododendron glabriflorum J. J. S. Med. Rijksherb. *n.* 25 (1915) 6; Nova Guinea 12 (1917) 509; *ibid.* 12 (1918) t. 200, b–f, t. 204 a; SLEUM. Reinwardtia 5 (1960) 186.

Shrub. Branchlets terete, *c.* 4 mm ø, upper 2 internodes subdensely lepidote, pruinose, minutely lenticellate or verruculose, older parts glabrescent; internodes 4–5 cm. *Leaves* in 6–7-merous lax pseudowhorls at the upper 2 nodes, oblong, apex short-acuminate, subacute, base broad-cuneate into the petiole, coriaceous, stiff, glabrous and finally rugulose above, rather laxly lepidote beneath (scales small, flat, thin marginal zone relatively large, irregularly angled or substellate-lobed or -dented, dark centre minute, hardly impressed), margin narrowly cartilaginous, faintly revolute, 6–9 by 2–4 cm, midrib narrow and rather deeply impressed above, robust and much prominent (being the continuation of the thick petiole) in the lower part beneath, gradually decreasing towards the apex, nerves 8–10 pairs, the lowest from the base of the blade, steeply ascending, anastomosing, slightly impressed above, raised beneath, reticulation rather dense, not or but faintly impressed above, distinct and prominent beneath; petiole a little flattened, grooved above, lepidote, 0.8–1.2 cm by 2–2.5 mm. *Umbels* ± 9-flowered. Pedicels stoutish, very densely lepidote, epilose, 1.1–1.8 cm. *Calyx* disk-shaped, but slightly oblique, obscurely and very obtusely 5-lobed, lepidote dorsally, *c.* 3.5 mm ø. *Corolla* tubular-campanulate, rather fleshy, red, the tube orange towards the base, 4.5–5.2 cm long in all, glabrous in- and outside, tube straight, *c.* 3.5 cm, at base 6–7 mm ø, widened gradually to *c.* 1.5 cm at apex, lobes erect or somewhat spreading, suborbicular, 1.4–2 cm ø. *Stamens* 10, *c.* 3.5 cm; filaments linear, glabrous; anthers obovate-obcordate, much narrowed towards the base, each cell ending there in a narrow apiculus, 4–4.5 by 2–2.2 mm. *Disk* glabrous. *Ovary* subovoid-conical, 6–7 by *c.* 3 mm, densely lepidote, rather suddenly narrowed to the style, the latter stoutish, *c.* 2 cm, lepidote in its lower third; stigma capitate-truncate.

Distr. *Malesia*: W. New Guinea (Wichmann Mts), at 3100 m. Once found. *Fl.* Feb.

204. Rhododendron pachycarpon SLEUM. Reinwardtia 5 (1960) 186; Blumea 12 (1963) 110.

Shrub, 1.2–1.5 m. Branches greyish corticate, 5–6 mm ø. Branchlets terete, *c.* 4 mm ø, ends laxly lepidote in flowering, glabrous and pruinose at fruiting time; internodes 3–6 cm. *Leaves* either scattered or in 3-merous pseudowhorls at the upper nodes, obovate, apex obtuse or rounded, sometimes slightly emarginate, base cuneate, coriaceous and rigid, glabrous above at maturity, subdensely lepidote beneath (scales small, nearly round, rather large, marginal zone variously angular or lobed, centre minute and ± distinctly impressed), margin narrowly cartilaginous and subserrulate-crenulate, flat, 5–6.5 by (2.5–)3–4.5 cm, midrib narrowly impressed above, thick, flattened and obtusely prominent beneath, nerves

6–8 pairs, lower 2 ones from near the base, the others at an angle of *c.* 45°, all high-ascending and curved-anastomosing before the edge, slightly impressed above and raised beneath, reticulation subinconspicuous, grooved above, lepidote, 3–5 by 2.5–3.5 mm. *Umbels* (3–)4–8-flowered. Pedicels ± densely lepidote, epilose, 1.5 cm by *c.* 1 mm. *Corolla* tubular below, funnel-shaped-expanded at the lobes, thin-fleshy, of a pure sulphur or lemon yellow, *c.* 5 cm long in all (6–7 cm when fresh), nodding, showy, quite glabrous in- and outside, tube *c.* 3 cm long, straight, base 5–7 mm ø, *c.* 1 cm at apex, lobes erecto-patent, obovate-suborbicular, *c.* 1.5 cm ø. *Stamens* 10, nearly equalling the corolla tube; filaments linear, glabrous; anthers obovate-obcordate, much narrowed towards the base, *c.* 3 by 1.5 mm, each cell protracted into a basal appendix. *Disk* prominent, glabrous. *Ovary* thick-obovoid-cylindric in later stages, very densely lepidote, 6–7 by *c.* 3.5 mm, abrupt with the style, the latter *c.* 3 cm, lepidote at the base, otherwise glabrous; stigma obliquely capitate, shortly lobed. *Capsule* obliquely obovoid-cylindric, short-attenuate at the base, rather abruptly so at the apex, lepidote, 2–2.5 by 0.8–0.9 cm, crowned by the rest of the style; pedicel 2–3 cm by 1.5 mm.

Distr. *Malesia*: E. New Guinea (Mt Saruwaged area: Mt Enggan; Rawlinson Range in Morobe Distr.).

Ecol. In open subalpine forest on limestone, 2135–3655 m. *Fl.* March-June.

205. Rhododendron celebicum (BL.) DC. Prod. 7 (1839) 725; MIQ. Fl. Ind. Bat. 2 (1859) 1058; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 44, t. 2 B; BL. Fl. Jav. Pl. inéd. (1863–83) t. 6; SARASIN, Reisen in Celebes 1 (1905) 235; SLEUM. Reinwardtia 5 (1960) 187. — *Vireya celebica* BL. Bijdr. (1826) 855; G. DON, Gen. Syst. 3 (1834) 848. — *R. tubulosum* REINW. Reis. I. A. (1858) 576. *nom. nud.* — *R. javanicum* [*non* (BL.) BENN.] KOORD. Minah. (1898) 514; KOORD.-SCHUM. Syst. Verz. 3 (1914) 100.— *R. discolor* WARB. in Sarasin, Reisen in Celebes 1 (1905) 28, *in text*, *nom. subnud.*, *non* FRANCH. 1895.

Epiphytic shrub, 1–1.5 m; roots said to be swollen and tuber-like at the ends. Branchlets terete, 1.5–3 mm ø, upper internodes subdensely substellate-lepidote, older parts glabrous, smooth, often pruinose; internodes 1.5–6 (rarely up to 12) cm. *Leaves* opposite or in 3-merous pseudowhorls at the upper 1–3 nodes, elliptic to lanceolate elliptic, apex short-acuminate, subacute or blunt, base broadly attenuate to the petiole, coriaceous, glabrous and slightly rugose above at full age, subdensely lepidote beneath (scales small, flat, marginal zone thin, rather large, variously angled or substellate-lobed to -dented, centre small, not impressed), edge but slightly and narrowly revolute, (3–)4–7.5 by (1.5–)2–3(–3.5) cm, midrib rather narrow and slightly impressed above, robust and prominent beneath, nerves 5–7 pairs, subpatent, anastomosing, faintly sunk above, very slightly or not raised beneath, no proper reticulation visible; petiole ± flattened, lepidote, 4–10(–12) by 1–1.5 mm. *Umbels* (2–)3–5(–7)-flowered. Perulae ovate to obovate, glabrous dorsally, margin with ± early caducous stellate scales, 0.5–1.2 by 0.4–0.7 cm. Bracteoles linear below, subspathulate-dilated and irregularly dented distally, glabrous, *c.* 1.5 cm by 1–2 mm. Pedicels slender, very densely stellate-lepidote and papillose, not properly hairy, 1.5–2 cm. *Calyx* disk-shaped, oblique, shortly obtusely 5-lobed, densely lepidote outside, 2.5–3 mm ø. *Corolla* tubular below, expanded at the lobes, thin, red to carmine, 3–3.5(–4) cm long in all, laxly to very laxly lepidote outside, glabrous inside, tube cylindric, straight, *c.* 2.5(–3) cm long, base angular by 5 pouches, 5–6 mm ø, widened to 8–10 mm at apex, lobes suborbicular, 6–10 by 6–8 mm. *Stamens* 10, unequal, the longest mostly reaching ± halfway the corolla lobes, sometimes equalling the corolla; filaments linear, glabrous; anthers broad-oblong, 2–2.5 by 1 mm, base rounded. *Disk* prominent, glabrous. *Ovary* subcylindric, very densely stellate-lepidote, 5–6 by 2 mm, continuous with the style, the latter quite glabrous or lepidote at the base only, ± as long as the corolla; stigma thick-capitate. Submature *capsule* narrow subobovoid-cylindric, 2.5–3.8 by 0.35 cm, lepidote, pedicel up to 3 cm.

Distr. *Malesia*: Celebes (Minahasa: Mt Klabat, Poso Lake area; Central part).

Ecol. Mossy forest, 1800–2600 m. *Fl.* Jan., June, Nov.

206. Rhododendron sayeri SLEUM. Reinwardtia 5 (1960) 188.

Shrub, *c.* 1.8 m. Branchlets divaricate, terete, 1.5–3 mm ø, upper internodes very densely rufous-stellate-lepidote, early glabrescent and smooth lower down; internodes 3–7 cm. *Leaves* in 3(–5)-merous pseudowhorls at the upper 1–3 nodes, broad-elliptic, sometimes obovate-elliptic, more rarely obovate, apex (very) broadly attenuate, obtuse or sometimes rounded, broadly attenuate or nearly rounded towards the base, coriaceous, mature ones quite glabrous above, subpersistently densely rufous-lepidote beneath (scales small, ± deeply stellate-dented or -lacerate in the marginal zone, minute centre dark and very slightly impressed), margin a little revolute to base or quite flat, (3.5–)4.5–6.5 by (2–)2.5–4 cm, midrib slightly impressed above, markedly prominent especially in the lower part, nerves 6–8 pairs, irregular, spreading, anastomosing before the edge, somewhat impressed or raised as are the midrib and veins above, prominent beneath, veins forming a lax, well visible network on both faces, veinlets less conspicuous beneath; petiole flattened and grooved dorsally, lepidote, 4–7 by 1–1.5 mm. *Umbels* (1–2–)3–4-flowered. Perulae ovate to obovate, obtuse, glabrous dorsally, very shortly subglandular-fimbriate, up to 1 by 0.8 cm. Bracteoles linear below, subspathulate-dilated distally, up to 1.2 cm by 0.5–1.5 mm. Pedicels very densely rufous-stellate-lepidote, 1.5–2.3 cm by *c.* 0.6 mm. *Calyx* obliquely disk-shaped, irregularly 5-dented, lepidote at the base dorsally, teeth deltoid, subacute, 0.5–2 (rarely up to 3) mm, ±

spreading, subglabrous. *Corolla* tubular below, lobes expanded, suboblique, 4–4.5 cm long in all, ± laxly stellate-lepidote outside, laxly and longish patent-hairy at the tube inside, tube ± curved, *c.* 3 cm, the 5-saccate base 4–5 mm ø, ampliate to 7–8 mm ø at apex, lobes suborbicular, 0.9–1.3 cm ø. *Stamens* 10, ± as long as the corolla tube; filaments linear, laxly patently long-hairy in the lower ⅔; anthers subobovate-oblong, 2.5 mm by *c.* 1.2 mm, base obtuse. *Disk* prominent, sparsely hairy in the upper margin. *Ovary* subcylindric, rather abruptly narrowed to the style, very densely stellate-lepidote, epilose, 5–6 by 2–2.5 mm; style ± as long as the stamens, laxly stellate-lepidote in its lower third, glabrous for the rest; stigma thick-capitate.

Distr. *Malesia*: New Guinea (Central Distr.: Mt Obree), growing in profusion on brink of precipitous cliffs at Howers Lake, *c.* 2135 m. Once found. *Fl.* Aug.

207. Rhododendron pachystigma SLEUM. Blumea 12 (1963) 110.

Terrestrial shrub, 1.5 m. Branchlets subterete, tips densely lepidote, older parts striate and pruinose; internodes 4–10(–13) cm by 3–5 mm. *Leaves* at the apex of or at the upper 2 internodes or almost at the nodes, obovate or elliptic-obovate, apex rounded, sometimes slightly retuse, base ± broadly cuneate to the petiole, when young densely lepidote on both faces, mature ones coriaceous, firm, rather early glabrescent (scales small, rufescent, sessile and flattish, detersile, marginal zone irregularly substellate-dented, centre minute, hardly or not impressed), entire, (5–) 6–8.5(–9) by (2.5–)3–4.5(–5) cm, subrevolute towards the base, midrib thick and grooved in the lower part above, as strong as the petiole at the base beneath, nerves 8–9 pairs, straight, at an angle of *c.* 45° and subparallel at the base, obtusely curved-anastomosing before the edge, faintly impressed above, a little raised beneath, no reticulation; petiole densely lepidote initially, 1–2(–2.5) cm by *c.* 2 mm. *Umbels* 2–3-flowered. Immature perulae laxly lepidote dorsally, no hairs. Bracteoles filiform, glabrous, seen up to 1.5 cm. Pedicels with dense, small rusty scales, furthermore with fine short hairs in the lower ¾, and upwards more densely with longer hairs, as on the calyx, (8–) 11–14 by 1.5–2 mm. *Calyx* obliquely patellar, 6–7 mm ø, lobes irregular, spreading, deltoid to elongate-deltoid, fimbriate and caducously lepidote along the margin, 2–3(–4) mm. *Corolla* funnel-shaped, deeply (6–)7-lobed, light orange at the tube outside, white at the lobes, fleshy, (7–)7.5–8 cm long in all, sparsely lepidote or glabrous outside, densely white-hairy in the lower part of the tube inside, tube straight, (2.5–)3 cm long, base 6–7-pouched, 8–9 mm ø, gradually widened to 2–2.5 cm, lobes obovate-spathulate, spreading, 4.5–5 by (2.5–)3–3.5 cm. *Stamens* 12–14, unequal, well exserted; filaments linear, 1 mm wide below, densely white-hairy in the basal part, filiform and glabrous in the upper part; anthers versatile, elongate-oblong, base obtuse, *c.* 8 by 1–1.2 mm. *Disk* prominent, densely white-hairy on the margin. *Ovary* thick-cylindric, 8–9 by *c.* 4 mm, red-brown stellate-scaly, no hairs, tapering to the style, the latter glabrous, *c.* 4 cm by 1–1.5 mm; stigma subpeltate, 6–8(–9) mm ø, with 6–7 thick, subglobular lobes.

Distr. *Malesia*: W. New Guinea (Balim R. Valley near Wiligimaan), once collected.

Ecol. Young secondary forest, on stony clay, *c.* 1800 m. *Fl.* June.

Vern. *Poroom*, Dani.

208. Rhododendron angulatum J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 50; Nova Guinea 12 (1914) 140, t. 36 A; SLEUM. Reinwardtia 5 (1960) 188.

Terrestrial shrub, *c.* 75 cm. Branchlets rather robust, terete, laxly lepidote. *Leaves* in ± 5-merous pseudowhorls at the upper nodes, ovate-lanceolate, apex gradually long-acuminate, very acute, base obtuse-rounded or very slightly cordate, coriaceous, glabrous above with age, subdensely lepidote beneath (scales stellate-dented in the marginal zone, centre ± impressed, leaving minute pits when the scale is gone), faintly or not recurved at margin, 11–18 by 3.5–5.8 cm, midrib narrowly grooved above, stout and much obtusely prominent beneath in the lower part, nerves 12–15 pairs, ascending, anastomosing, very slightly raised or impressed above, obscure beneath, no reticulation visible; petiole robust, compressed and grooved dorsally, transversely rugulose, minutely lepidote, 1–1.2 cm by 3 mm. *Umbels* ± 6-flowered. Pedicels laxly minutely lepidote, more densely so below the calyx, epilose 4–5 cm by 2.5 mm. *Calyx* annular, oblique, obtusely and rather inconspicuously 5-angular, ciliolate, *c.* 4.5 mm ø. *Corolla* funnel-shaped, 5-lobed in the upper ⅔, rose red and rather fleshy, 5.5–6 cm long in all, sparsely minutely lepidote outside, laxly pubescent at the tube inside, tube distinctly 5-angular or pouched at the base outside, deeply 5-grooved lengthwise in the lower part inside, the ribs extending upwards to the median of the corolla lobes, *c.* 2 cm long, *c.* 8 mm ø at base, hardly widened distally, lobes subovate-elliptic, obtuse, spreading, 3.5–4 by *c.* 2 cm. *Stamens* 10, nearly as long as the corolla; filaments linear and shortly patently pubescent below, narrower and glabrescent upwards; anthers linear-oblong, 5.5–6 by 1 mm, obtuse at the base. *Disk* much prominent, practically glabrous. *Ovary* conical-cylindric, densely clothed with thickish nearly roundish scales, no hairs, *c.* 10 by 3 mm, continuous with the style, the latter lepidote and sparsely minutely pubescent (or nearly papillose) at the base, glabrous for the rest, *c.* 4.8 cm; stigma thick-capitate.

Distr. *Malesia*: W. New Guinea (Oranje Mts: Mt Goliath), common in shadowy swampy humous places at 1500 m. Once collected. *Fl.* April.

209. Rhododendron loerzingii J. J. S. in K. & V. Bijdr. 13 (1914) 105, 107; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 3; SLEUM.

Reinwardtia 5 (1960) 189; STEEN. Endeavour 21 (1962) 189, t. 4.

Erect, much-branched, terrestrial shrub, *c.* 2.5 m. Branchlets divaricate, terete, tips subdensely clothed with flat substellate scales, lower down glabrescent and smooth; internodes 2–8(–10) cm. *Leaves* very close together or in 3–5-merous pseudowhorls at the upper nodes, mostly oblong-elliptic, more rarely elliptic, apex short-acuminate, subacute, rarely obtuse, base broadly and ± acutely attenuate to the petiole, coriaceous, initially lepidote on both faces, glabrescent above, more persistently lepidote beneath (scales dense though distant from each other, small, rufescent, the rather narrow marginal zone variously angled, lobed or substellate-dented, centre dark, distinctly impressed, pits blackish with age), edge narrow-cartilaginous and somewhat revolute, 6–8.5(–12) by 2.3–3.5(–4.4) cm, midrib narrow and slightly impressed above, rather stout and obtusely prominent beneath, nerves 8–10 pairs, spreading, anastomosing before the edge, mostly faintly impressed above, slightly raised beneath, veins subinconspicuous; petiole compressed and grooved dorsally, 4–8(–10) by 1.5–2 mm. *Umbels* (3–)5–9-flowered. Flower buds ovoid, outer perulae ovate, inner ones obovate, obtuse or mostly apiculate, glabrous except some scales on the upper part of the dorsal mediane or the very tips, margin laxly set with caducous scales, 0.4–1.7 by 0.3–0.8(–1.1) cm. Bracteoles linear below, spathulate at the apex, glabrous, 0.7–1 cm by 0.5–1 mm. Pedicels rather slender, very densely stellate-lepidote, epilose, 2–2.5 cm. *Calyx* small, obliquely annular or nearly cup-shaped, lepidote dorsally, *c.* 3 mm ø, teeth deltoid, unequal, subpatent, acute, glabrous apically, 0.5–2 (occasionally up to 3) mm. *Corolla* tubular in outline, expanded at the lobes, scarlet, membranous, sparsely stellate-lepidote outside, pubescent in lower half of the tube inside, (2.2–)2.5–3 cm long in all, tube straight, 1.5–2.2 cm long, at base 4–5 mm ø, widened to 7–8 mm at apex, lobes obovate, subequal, 0.9–1.3 by 0.6–1 cm. *Stamens* 10, ± as long as the corolla tube; filaments linear, subdensely clad with longish patent hairs in the lowest 3–5 mm, glabrous for the rest; anthers obovate, apex truncate, base subacute, 1–1.5 mm. *Disk* prominent, glabrous. *Ovary* subcylindrical-conical, much abrupt with the style, densely stellate-lepidote, or with some very short hairs in especially the lower part between the scales, *i.e.* practically epilose, 5–7 by *c.* 3 mm; style rather thick, glabrous, nearly as long as the stamens; stigma capitate, with thick lobes. *Capsule* oblique cylindric, 5-angular, densely lepidote, 2–2.3 by 0.5 cm. *Seeds c.* 6 mm including the tails; pedicel to 4.8 cm.

Distr. *Malesia*: Central Java (Kedu: Mts Tlerep and Sumbing).

Ecol. In scrub or grassland, on rather dry but fertile soil, very rich in humus, apparently rare, 1800–2000 m. *Fl.* March-Nov., *fr.* Aug.-Nov.

Vern. *Purwo gĕni*, J.

210. Rhododendron impressopunctatum J. J. S. in Fedde, Rep. 30 (1932) 164; SLEUM. Reinwardtia 5 (1960) 189.

Terrestrial shrub, *c.* 1.2 m. Branchlets subterete, upper 1–2 internodes ± densely clad with stellate scales, lower ones quite glabrous, striate, dark, later with thin grey cork; internodes 2–5(–10) cm. *Leaves* in 4–5-merous pseudowhorls at the upper 1–3 nodes, oblong-elliptic, apex short-acuminate, subacute or rarely bluntish, base broad-attenuate to nearly rounded, coriaceous, subdensely set with small, flat, non-impressed and early decoloured scales for a long time, especially on the midrib, finally glabrescent above, more densely and ± persistently lepidote beneath (scales dense, but for their greater number distant from each other, rust-coloured, rather small, marginal zone ± irregularly lobed or dented, dark centre distinctly impressed), margin slightly recurved, 6.2–8.3 by 2.4–3.2 cm, midrib grooved above, strongly and obtusely prominent beneath, nerves 8–10 pairs, spreading, but obscurely anastomosing, very slightly impressed above, not much raised beneath, reticulation inconspicuous; petiole very densely lepidote initially as is the lower part of the midrib beneath, *i.e.* the scales ± touching each other there, semiterete, much grooved above, 8–10 by 1.5–2 mm. *Umbels* 5–7-flowered. Pedicels sparsely lepidote, 1–1.9 cm by 0.7 mm. *Calyx* obliquely disk-shaped, unequally 5-angular or very shortly dented, *c.* 4 mm ø. *Corolla* tubular-funnel-shaped, red, 3–3.5 cm long in all, quite glabrous in- and outside, tube straight, 2–2.3 cm, at the somewhat saccate base *c.* 5 mm ø, slightly dilated upwards, lobes expanded, obovate to suborbicular, 1–1.3 by (0.7–)0.9–1.2 cm. *Stamens* 10, somewhat exserted from the corolla tube; filaments linear, densely patently hairy in the lowest 5–7 mm; anthers oblong, base obtuse, *c.* 3.5 by 1 mm. *Disk* prominent, glabrous. *Ovary* conical-subcylindric, very densely stellate-lepidote, epilose, 5–6 by 2–2.5 mm, rather abrupt with the style, the latter ± as long as the stamens, glabrous; stigma capitate.

Distr. *Malesia*: Moluccas (Buru), once found in peatmoor at Kunturun, 1075 m. *Fl.* Feb.

Note. Size and colour of the scales suggest, that *R. impressopunctatum* is a hybrid of *R. malayanum* with another species of the *Javanicum* group, presumably *R. seranicum*; these three species grow together at Kunturun.

211. Rhododendron xanthopetalum MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 41; Philip. J. Sc. 1 (1906) Suppl. 111; *ibid.* 3 (1908) Bot. 380; MILLAIS, Rhodod. (1917) 263; MERR. En. Philip. 3 (1923) 246; MILLAIS, Rhodod. ser. 2 (1924) 261; COPEL. *f.* Philip. J. Sc. 40 (1929) 169, t. 16, f. 1–2; SLEUM. Reinwardtia 5 (1960) 189.

Epiphytic shrub, 80 cm or less, with a stout simple or but slightly branched stem, 1 cm ø below, covered with light grey bark. Branchlets reddish brown, glabrous. *Leaves* scattered along the upper internodes, oblong-elliptic, apex slightly acuminate or merely acute, base acute, coriaceous, glabrous above, lepidote, margin revolute, 9–12 by 3.5–5 cm, midrib very stout and prominent; petiole very

robust, 1.5 cm. *Umbels* 3–4-flowered. Pedicels glabrous, 1.5 cm. *Calyx* reduced to an obscure disk. *Corolla* campanulate, yellow, 3–3.4 cm long in all and about as wide at the limb, tube 1.5 cm long, *c.* 5 mm ø at base, lobes rounded, 1.5 cm. *Stamens* 10; filaments pubescent below, 1.8 cm; anthers linear, without any basal appendix, 4 mm. *Disk* crowned with abundant hairs. *Ovary* lepidote, 8 mm; style glabrous, abrupt, 1.2 cm.

Distr. *Malesia*: Philippines (Luzon; ? Mindoro).

Ecol. Epiphyte in moss forest, 1200 m, apparently rare.

Note. An imperfectly known species of which I have seen not more than a single leaf. After COPELAND *f.*, the occurrence in Mindoro remains uncertain.

212. Rhododendron hirtolepidotum J. J. S. Nova Guinea 12 (1914) 135, t. 32; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 479; SLEUM. Reinwardtia 5 (1960) 189; Blumea 12 (1963) 110.

Terrestrial or occasionally epiphytic shrub, (0.5–)1–2(–2.5) m, not much branched; bark brown. Branchlets terete, (2–)3–5 mm ø, upper internodes or very tips only subdensely clothed with early caducous, substellate, rufescent scales, lower parts glabrous and smooth, early covered with cork; internodes (2–)4–18 cm. *Leaves* in 4–6(–8)-merous pseudowhorls at the upper 1–2 (–3) nodes, oblong-elliptic, sometimes obovate-elliptic, apex broad-attenuate or shortly subacuminate, obtuse to nearly rounded, base broadly narrowed, subtruncate to rounded, rarely subcordate, coriaceous, glabrous above at full age, rather densely and less fugaciously lepidote beneath (scales small, variously substellate-lobed or -dented in the marginal zone, dark centre but slightly impressed), finally completely glabrescent, the remaining pits blackish and shallow, edge slightly revolute, (4–)5–7.5(–10.5) by (2–)2.5–4.2 cm, midrib slightly impressed above, stout and much prominent in the lower part beneath, nerves 6–8(–10) pairs, spreading, rather straight below, curved and ± indistinctly anastomosing before the edge, slightly raised on both faces or a little impressed above, veins lax, somewhat prominent above, mostly subinconspicuous beneath, no proper reticulation; petiole semiterete, grooved above, lepidote and rugulose, (4–)6–12(–16) by 1.5–2(–2.5) mm. *Umbels* 5–9-flowered. Perulae ovate to obovate, obtuse, firm-membranous, with some sparse scales at the top dorsally or quite glabrous, up to 1.5 by 0.8 cm. Bracteoles linear below, subspathulate-dilated apically, glabrous, up to 2.2 cm by 1.5 mm. Pedicels sparsely stellate-lepidote below, more densely so distally, 3–4 cm by 0.6–0.8 mm. *Calyx* very oblique, disk-shaped, 5-angular, *c.* 4 mm ø, dorsally densely lepidote. *Corolla* tubular below, suboblique, rose-red to carmine, membranous, rather laxly to subdensely lepidote outside, short-hairy at the lower half of the tube inside, 4–4.5(–5) cm long in all, tube (2–)2.5–3 cm long, at base 5-saccate, 6–7 mm ø, slightly dilated to apex, lobes ± obliquely obovate-spathulate, (0.9–)1.3–1.7 by 1–1.2 cm. *Stamens* 10, slightly shorter than the corolla; filaments linear, densely pubescent below, less so upwards; anthers oblong, obtuse at the base, 3.5–4 by 1 mm. *Disk* short-pubescent at the upper margin, glabrous below. *Ovary* subcylindric, densely stellate-lepidote, with some spreading hairs on the very top between the scales, *c.* 8 by 2.5 mm, rather gradually tapering to the style, the latter stoutish, laxly lepidote and subdensely patent-pubescent in the lower 1–1.5 cm, glabrous for the rest, ± as long as the corolla tube; stigma capitate, deeply 5-lobed. *Capsule* subcylindric, subdensely set with red-brown scales, 3.5–4 by 0.4–0.5 cm; pedicel to 6 cm by 1.3 mm.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Arfak Mts, Nettoti Range, Mt Watjetoni).

Ecol. In light mossy forest in poor humous or sandy soil, or in swampy places with *Sphagnum* (1200–)1750–2000 m. *Fl.* April, Nov.-Dec.

Vern. *Krobua*, Kebar.

213. Rhododendron pseudomurudense SLEUM. Reinwardtia 5 (1960) 189. — *R. murudense* (*non* MERR.) J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 449.

Epiphytic shrub. Branchlets very robust, upper internode obtusangular, *c.* 5 mm ø, rather densely clothed with flat, appressed, rufescent scales, lower ones terete, 6–8 mm ø, glabrescent and smooth; internodes 5–16 cm, occasionally longer. *Leaves* spirally arranged, all or most of them (3–5) in the upper half of the upper 1–2 internodes, oblong, sometimes subovate- or elliptic-oblong, apex very broadly attenuate, obtuse, base mostly obtuse to rounded, or sometimes cordulate, coriaceous, thick and stiff, glabrous above at full maturity, subdensely lepidote for a long time beneath (scales minute, variously and irregularly substellate-dented at the marginal zone, which disappears early, centre dark, faintly or not impressed, leaving dark points when the proper scales are gone), margin flat, 12–18 by 4–7(–8) cm, midrib as robust as the petiole, obtusely prominent on both faces in the lower part, nerves (15–)17–20 pairs, very distinct and subparallel from the midrib at *c.* 90°, ± straight below, curved and anastomosing before the edge, prominent on both sides as is the rather dense reticulation; petiole red brown in dry specimens, subterete, not grooved above, glabrous, (1.3–)1.5–2.1 cm by 3–4(–5) mm. *Umbels* 12–25-flowered. Perulae ovate to ovate-oblong, glabrous (immature). Bracteoles linear or nearly filiform, glabrous, *c.* 2 cm by *c.* 1 mm. *Calyx* oblique, disk-shaped, obscurely lobed, glabrous, *c.* 4.5 mm ø. *Corolla* broad-funnel shaped, dark red to salmon, 2.5–3 cm long in all, glabrous in- and outside, tube cylindric below, widened upwards, 1.2–1.5 cm long, the 5-saccate base *c.* 4 mm ø, widened to *c.* 1 cm at apex, lobes oblong-obovate to subspathulate, 1.2–1.5 by 0.8–1 cm. *Stamens* 10, unequal, *c.* 2 cm long; filaments linear, quite glabrous; anthers obovate-elliptic, base obtuse, 3–3.5 by 1.5 mm. *Disk* thick-prominent, glabrous. *Ovary* cylindric, *c.* 4 by 2.5 mm, very abrupt with the

style, quite glabrous, somewhat rugulose, blackish when dry; style (4–)5–6 mm, glabrous; stigma capitate, distinctly lobulate, *c.* 2 mm ø. *Capsule* (immature) obliquely subcylindric, 1.5 by 0.5 cm; pedicel up to 5 cm.

Distr. *Malesia*: Central E. Borneo (Mt Kemul), 1600–1850 m (summit), common in primary forest. *Fl.* Oct.

214. Rhododendron seranicum J. J. S. in Fedde, Rep. 30 (1932) 165; Bot. Jahrb. 68 (1937) 202, *in obs.* ('*seranense*'); SLEUM. Reinwardtia 5 (1960) 189.

Shrub, up to 5 m. Branches 5–6 mm ø, with ashy cork. Branchlets 2.5–4 mm ø, terete, upper internode laxly lepidote, often pruinose, smooth; internodes 1.5–9(–11.5) cm. *Leaves* scattered along the upper 1–2 internodes, the upper 2–3 often close together near the node, elliptic, subovate- or oblong-elliptic, more rarely oblong, apex short-acuminate, subacute, base broadly attenuate to the petiole, or nearly rounded, coriaceous, quite glabrous above at maturity, rather laxly lepidote beneath for some time (scales small, flat, marginal zone irregularly lobed or dented, centre faintly or not impressed), finally ± glabrescent beneath too, edge shortly and narrowly recurved, 5–8.5 by (2–)2.5–4 cm, midrib a continuation of the thick and somewhat flattened petiole, much and bluntly prominent in the lower part on both faces, nerves 8–10 pairs, ± irregular, spreading below, curved-ascending and obscurely anastomosing towards the edge, slightly prominent on both faces, veins laxly reticulate, a little raised or often ± inconspicuous; petiole 0.5–1 (rarely up to 1.5) cm by 2–3 mm. *Umbels* 7–11-flowered. Inner perulae oblong to narrow-oblong, obtuse, membranous, glabrous, 3–3.5 by 0.5–1 cm. Bracteoles linear, glabrous, *c.* 2.5 cm by 1 mm. Pedicels thickened at apex, sparsely lepidote or practically glabrous, (1.5–)2–3 cm by *c.* 1 mm. *Calyx* very oblique, shortly cup- or disk-shaped, thickened, obscurely or not lobed, laxly lepidote outside, *c.* 5 mm ø. *Corolla* broad-funnel-shaped, light violet, rose or brownish yellow (limb orange, salmon rose towards the border), or fiery red, glabrous in- and outside, (4–)4.5–5.5 cm long in all, tube 1.7–2.1 cm long, the saccate base 5–6 mm ø, widened to 1–1.5 cm at apex, lobes unequal, oblong-obovate, *c.* 3 by 2 cm. *Stamens* 10, unequal, 2.8–3.2 cm; filaments flat-linear, glabrous; anthers oblong, somewhat curved, base blunt or minutely apiculate, 3.5–4 by 1 mm. *Disk* prominent, glabrous. *Ovary* oblong-conical, glabrous from the beginning, minutely rugulose, blackish when dry, *c.* 6 by 3 mm, rather abrupt with the style, which is glabrous and 1.5–2 cm long; stigma thick-capitate, manifestly 5-lobed. *Capsule* oblique, thick-fusiform, 3.5–4 by 0.7–0.8 cm, glabrous; pedicel 3–4 cm by 1.5 mm.

Distr. *Malesia*: Moluccas (Ceram, Buru, and Ambon).

Ecol. Light thickets on open spots and in primary forest, 900–1700 m, on limestone, locally abundant. *Fl.* Aug.–Feb.

Note. A specimen slightly differing by salmon red, 3.5 cm long corollas and manifestly biappendiculate anthers has been found in Central Celebes (Palopo-Rantepao road), in dry rocky hillside at 900 m.

215. Rhododendron loboense COPEL. *f.* Philip. J. Sc. 40 (1929) 137, 172, t. 15, f. 3, t. 16, f. 5–6; SLEUM. Reinwardtia 5 (1960) 190.

Epiphytic shrublet, 30–40 cm. Branchlets terete, *c.* 5 mm ø, glabrous. *Leaves* scattered along the upper internode (lower internodes not known), elliptic to oblong-elliptic, apex shortly subacuminate, obtuse, base broadly subacutely attenuate, very coriaceous and stiff, glabrous above at maturity, rather laxly and ± persistently lepidote beneath (scales relatively small, irregularly lobed or dented at the marginal zone, centre faintly or not impressed), finally glabrous on both faces, margin but slightly recurved, 10–12 by 4–6 cm, midrib robust, rather flattish in dry specimens, obtusely prominent on both sides, as broad as the petiole at the base, gradually narrowed upwards, nearly inconspicuous at the apex, nerves 12–15, rather dense pairs, at an acute angle, indistinctly anastomosing, ± markedly prominent at both faces, veins laxly reticulate, mostly visible beneath only; petiole somewhat flattened, (1–)1.5–2 cm by 2.5–3 mm. *Umbels* ± 5-flowered. Pedicels practically glabrous, 1–1.5 cm by *c.* 1.5 mm. *Calyx* disk-like, margin thickened, wavy and faintly lobed, glabrous. *Corolla* funnel-shaped, 3.5–4 cm long in all, yellow, glabrous on both sides, lobes unequal, oval, *c.* 2 cm. *Stamens* 10; filaments linear, glabrous, *c.* 2.5 cm; anthers oblong, base obtuse, 4 by 1 mm. *Disk* glabrous. *Ovary* subobovoid-cylindric, quite glabrous from the beginning, *c.* 7 by 2.5 mm; style abrupt with the ovary, glabrous, 1.3 cm; stigma capitate, *c.* 3 mm ø. *Capsule* subcylindric, 4 by *c.* 0.5 cm; pedicel 1.5–2 cm.

Distr. *Malesia*: Philippines (S. Luzon: Prov. Batangas, Lobo Mts). One collection. *Fl.* April.

Vern. *Malágos*, Lobo.

216. Rhododendron williamsii MERR. *ex* COPEL. *f.* Philip. J. Sc. 40 (1929) 137, 163, t. 9, t. 11, f. 2; SLEUM. Reinwardtia 5 (1960) 190. — *R. schadenbergii* (*non* WARB.) MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 40, *p.p.*; Philip. J. Sc. 3 (1908) Bot. 380, *p.p.*; En. Philip. 3 (1923) 245, *p.p.*

Small tree, 4–6 m; branches light grey or brownish, terete. Branchlets subterete, upper internodes laxly lepidote at the tips, or early glabrescent and not rarely quite glabrous and somewhat pruinose; internodes 3–10 cm. *Leaves* in 3(–4)-merous pseudowhorls at or close to the upper 1 or 2 nodes, oblong-ovate or oblong-elliptic, rather thinly coriaceous, apex shortly but sharply acuminate, ± acute, base acutely attenuate into the petiole or bluntish, practically glabrous above with age, rather laxly lepidote beneath initially (scales small, flat, variously and irregularly lobed in the very thin, early dissolved marginal zone, centre slightly darker, but faintly impressed), finally

glabrescent beneath too, leaving shallow dark pits, little or not revolute, 8–11 by 3–5(–6) cm, midrib broad (1.5–2 mm) at the base, much narrowed upwards, impressed in the upper ⅔ above, obtusely prominent below, nerves 6–10(–12) pairs, somewhat ascending, slightly impressed or raised above, more conspicuously prominent beneath, open or rather obscurely anastomosing before the edge, reticulation lax, slightly prominent on both sides, not rarely subinconspicuous; petiole 1–1.5 (–2) cm by 1.5–2.5(–3) mm, somewhat flattened. *Umbels* 5–8-flowered. Outer perulae broad-ovate, mucronulate, 1.5 by 1.2 cm, inner ones broad-oblong or elliptic, obtuse up to 2 by 1 cm with some dorsal scales or glabrous, margin very shallowly dented by early caducous scales. Bracteoles linear, glabrous, up to 2 cm by 0.5 mm. Pedicels ± densely set with rufescent flattish scales, especially towards the apex, 2–2.5 cm by 1 mm. *Calyx* very oblique, disk-shaped, shortly irregularly 5-dented (up to 1 mm), 4–5 mm ø. *Corolla* funnel-shaped, white, (2.5–)3–4 cm long in all, sparsely lepidote or mostly glabrous outside, glabrous inside, tube 1.8–2.3 cm, base 5-pouched, *c.* 7 mm ø, widened to *c.* 1 cm at apex, lobes obovate-suborbicular, subexpanded, 1–1.5 cm ø. *Stamens* 10, as long as or slightly exceeding the tube; filaments linear, glabrous; anthers oblong, *c.* 3 by 1 mm, each cell with a short basal apiculus. *Disk* glabrous, prominent. *Ovary* subovoid-cylindric, initially with rather dense, flat, rufescent, stellate scales, glabrescent, subabrupt with the style, (5–)6–8 by 2.5–3 mm; style *c.* 2 cm, with some scales at the base, otherwise glabrous; stigma thick-capitate, 3 mm ø. *Capsule* oblong-fusiform, 2.5–3 by 0.6–0.7 cm, bearing the long persistent style, which may attain 2.5 cm; pedicel to 4 cm by 1.5 mm. *Seeds* 5–6 by 0.2 mm including the tails.

Distr. *Malesia*: Philippines (Luzon: Mountain and Zambales Prov.).

Ecol. Along streams, in ravines, 1500–2200 m.

217. Rhododendron robinsonii RIDL. J. Fed. Mal. St. Mus. 4 (1909) 44; *ibid.* 5 (1914) 39; Fl. Mal. Pen. 2 (1923) 216; HENDERS. Mal. Nat. J. 6 (1950) 261; SLEUM. Reinwardtia 5 (1960) 190. — *R. javanicum* [*non* (BL.) BENN.] CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 463; RIDL. J. Str. Br. R. As. Soc. *n.* 23 (1891) 145; K. & G. J. As. Soc. Beng. 74, ii (1905) 74; RIDL. J. Fed. Mal. St. Mus. 5 (1914) 38; Fl. Mal. Pen. 2 (1923) 216; BURK. & HENDERS. Gard. Bull. S. S. 3 (1925) 390; HENDERS. Mal. Nat. J. 6 (1950) 262. — *R. teysmannii* (*non* MIQ.) HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256.

Small, epiphytic or sometimes terrestrial shrub, 1–2.5 m. Branchlets subterete, very tips laxly lepidote, lower parts glabrous, upper 1–2 internodes dark, older ones with a thin, ashy cork; internodes 4–8(–10) cm. *Leaves* in 3–4(rarely up to 8)-merous pseudowhorls at the upper 2–3 nodes, and often 1–2 additional ones below the nodes (several scars in the lower part of the internodes from early caducous, much reduced bract-like leaflets), elliptic or mostly elliptic-oblong, sometimes lanceolate, apex short-acuminate, mostly ± acute, base acutely narrowed to the petiole, ± coriaceous, glabrous and with numerous minute impressed darker points at maturity above, laxly lepidote beneath (scales variously irregularly lobed or dented in the marginal zone, dark centre but shallowly impressed), finally ± completely glabrescent beneath too, margin very slightly or not revolute, (5–)6–12(–16, rarely up to 17) by (2–)2.5–4(–6) cm, midrib as stout as the petiole, obtusely prominent in its lower part at both faces, ± impressed distally above, nerves 8–10 (–12) pairs, curved-spreading and obscurely interarching at some distance from the edge, slightly prominent on both sides, reticulation obscure, or faintly visible beneath only; petiole rugulose, somewhat flattened, (0.7–)1–1.5(–2) cm by 1.5–2(–3) mm. *Umbels* (4–)5–8(–12)-flowered. Flower buds ovoid, acuminate, 3–3.5 by 2 cm, outer perulae ovate-acuminate, subacute, initially laxly lepidote dorsally, but very early glabrescent, inner ones ovate-oblong, more obtuse, glabrous, up to 2.5 by 1.3 cm. Bracteoles linear below, subspathulate at the apex, glabrous, up to 2 cm by 0.5–2 mm. Pedicels laxly lepidote, early glabrescent, 2–3.5 (–4.5) cm by 0.5–1 mm at anthesis. *Calyx* oblique, disk-shaped or merely rim-like, obscurely lobed or wavy, glabrescent, 3–4 mm ø. *Corolla* funnel-shaped, golden to deep creamy yellow, flushed apricot-pink, sometimes yellowish salmon, bright red or diluted crimson, thin, 3–3.5 cm long and wide, glabrous in- and outside, tube *c.* 1.5 cm long, base distinctly 5-pouched, 5–6 mm ø, widened to 1–1.5 cm at apex, lobes ± expanded, broad-oblong-obovate, 1.3–1.8 by 1–1.3(–1.5) cm. *Stamens* 10, unequal, 2–2.5 cm; filaments linear, quite glabrous; anthers oblong, a little curved, base obtuse, 3–3.5 by 1–1.3 mm. *Disk* prominent, glabrous. *Ovary* ovoid-conical, initially with some early caducous substellate scales, or mostly glabrous from the begin, often faintly verruculose, 5–6 by 2–2.5 mm, ± abrupt with the style, the latter *c.* 1.5 cm, rather slender, glabrous; stigma large, capitate, thickly and markedly 5-lobed, 2–3 mm ø. *Capsule* thick-fusiform, somewhat oblique and curved, glabrous, *c.* 3 by 0.6 cm.

Distr. *Malesia*: Malay Peninsula (Main Range from Perak to Selangor, and in the Taiping Hills).

Ecol. Epiphytic on lofty trees, also terrestrial on rocks by stream, in wooded hillside or swamp, locally common, but rare in general, 1035–1830 m. *Fl. fr.* Jan.-Dec.

Vern. *Nubang bintang*, Selangor, *akar*, Pahang.

218. Rhododendron rarilepidotum J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 126; SLEUM. Reinwardtia 5 (1960) 191.

var. **rarilepidotum.**

Shrub, 1.5–4 m, said to be often much branched. Branchlets subterete, *c.* 3 mm ø, upper internodes laxly lepidote, lower ones glabrescent, not rarely pruinose, smooth; internodes 4–11 cm. *Leaves* 3–6 in a pseudowhorl at the upper 1–3 nodes, further sometimes 1–2 inserted 1–2 cm lower, elliptic or

oblong-elliptic, not rarely oblong-lanceolate, apex short-acuminate, subobtuse or pointed, base ± broadly and subacutely attenuate to the petiole, ± thick-coriaceous, stiff, ± densely lepidote at both sides on young shoots, quite glabrous above at full age (often minutely blackish punctate there), laxly to subdensely lepidote for a long time beneath (scales small, irregularly substellate-dented or -lobed in the marginal zone which disappears with age, dark centre rather large, minutely but well visibly sunk), finally ± glabrescent beneath too, edge but little revolute, (4.5–)5–8(–15) by 1.8–3.7 cm, midrib a continuation of the robust petiole, rather flat above, more pronounced and obtusely prominent beneath, nerves 6–10(–12) pairs, spreading, mostly faintly impressed or rather inconspicuous above, slightly raised beneath, reticulation lax, faintly prominent beneath only; petiole a little flattened, slightly grooved above, initially lepidote, 0.7–1.5 cm by 2–3 mm. *Umbels* (6–)8–12-flowered. Perulae membranous, quite glabrous from the beginning, outer ones ovate, subobtuse, inner ones ovate-oblong, slightly keeled, all early caducous, up to 2.5 by 1.2 cm. Bracteoles linear below, subspathulate-dilated apically, glabrous, *c.* 2 cm by 0.5–1.5 mm. Pedicels ±laxly, rarely subdensely lepidote, 1.5–2 cm by 1 mm. *Calyx* very oblique, rim-like, wavy, *c.* 4 mm ø. *Corolla* broadly funnel-shaped, 2–2.5 cm long in all, *c.* 3.5 cm ø at the limb, (dark) red to crimson, rarely orange-red, laxly lepidote or mostly glabrous outside, glabrous inside, tube 1–1.3 cm, subcylindric in the lower half, obtuse base slightly 5-saccate, 5–6 mm ø, widened to 1–1.5 cm at apex, lobes obovate-suborbicular, spreading, 1–1.3 by *c.* 1 cm. *Stamens* 10, unequal, reaching ± halfway the corolla lobes; filaments linear, glabrous; anthers subelliptic-oblong, 2.5–3.2 by 1.3 mm, obtuse at the base. *Disk* very prominent, glabrous. *Ovary* subcylindric-conical, mostly quite glabrous from the beginning, rarely ± laxly lepidote at first, becoming glabrous during the anthesis, 4–6 by 2–2.5 mm, abrupt with the style, the latter rather slender, 1.2–1.8 cm; stigma subcapitate, large, 2–3 mm ø, lobes distinct. *Capsule* subcylindric, oblique, slightly curved, glabrous, 2.5–3 by 0.5–0.7 cm; pedicel up to 4 cm.

Distr. *Malesia*: N. Sumatra (Gajo Lands; East Coast).

Ecol. In subalpine scrub or bush, apparently always terrestrial, on slopes, (975–)1800–2500 m. *Fl.* Jan.-Dec.

Vern. *Balingan, pariama*, Karo.

Note. *R. rarilepidotum* is closely related to *R. robinsonii* from the Malay Peninsula and mainly differs by its smaller, generally red to dark red corollas.

var. **ootrichum** SLEUM. Reinwardtia 5 (1960) 191.

Differs by the white-tomentose *ovary*, broader and more shortly acuminate *leaves*, more densely lepidote pedicels and slightly smaller perulae. *Corolla* scarlet, very laxly hairy inside. *Capsule* 2–2.5 by *c.* 0.6 cm.

Distr. *Malesia*: Sumatra (East Coast: Mt Sibayak and Mt Pinto), 1750–2100 m.

Note. Occurs together with *R. sumatranum* and is probably a local hybrid of that species with typical *R. rarilepidotum*.

219. Rhododendron multicolor MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 251, 586; HOOK. *f.* Bot. Mag. (1884) t. 6769; HENSLOW, J. R. Hort. Soc. 13 (1891) 263, f. 42 (*fol.*), 43d (*fl.*), *incl. var. curtisii* HENSLOW, *l.c.*; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 58; MILLAIS, Rhodod. (1917) 216; J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 124; SLEUM. Reinwardtia 5 (1960) 191. — *R. salicifolium* BL. Fl. Jav. Pl. inéd. (1863–83) t. 7 C, f. 2, *cf.* STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 388. — *R. curtisii* T. MOORE, Florist & Pomologist (1884) 113, t. 615; ANON. Garten-Zeitung Berlin 3 (1884) 469, fig.; ANON. Ill. Gartenzeitung Stuttgart 30 (1886) t. 10. — *Azalea multicolor* (MIQ.) O. KTZE, Rev. Gen. Pl. 2 (1891) 387. — *R. javanicum* [*non* (BL.) BENN.] STEEN. Arch. Hydrobiol. Suppl. 11 (1932) 318.

Shrub, epiphytic or mostly terrestrial, 1–1.5 m. Branches lax. Branchlets slender, terete, upper 1(–2) internodes reddish and *c.* 2 mm ø, laxly to subdensely set with flat, substellate scales, older parts glabrescent; internodes 1.5–4(–7) cm. *Leaves* in 3–5-merous pseudowhorls at the upper 1–2 nodes, lanceolate to oblong-lanceolate, apex ± shortly acuminate, subacute, base ± broad-attenuate to the petiole, sometimes ± obtuse, ± subcoriaceous, subdensely lepidote initially on both faces, glabrescent above, lepidote for a long time beneath (scales small, irregularly lobed or dented at the marginal zone, dark centre minute, but shallowly impressed), edge flat, (3–)4–7 by (0.7–)1–1.5(–2, very rarely up to 2.5) cm, midrib rather robust and prominent in the lower part on both sides, nerves 6–8 pairs, rather straight and ascending, indistinctly anastomosing before the edge, very slightly raised on both faces, often almost obsolete; petiole flattened dorsally, 2–6 by 1–2 mm. *Umbels* (3–)4–6-flowered. Perulae ovate-oblong to oblong, membranous, obtuse, glabrous and shining, up to 2.2 by 0.7(–0.9) cm. Bracteoles linear, glabrous, up to 1.5 cm by 1 mm. Pedicels stoutish, very sparsely lepidote or glabrous, 1.8–2.5(–3) cm. *Calyx* oblique, disk-shaped or rim-like, *c.* 4 mm ø, obtusely angled or very shortly lobed, sometimes acute and up to 1 mm. *Corolla* broad-funnel-shaped, 1.5–2(–2.5) cm long in all, sometimes sweet-scented, whitish cream to yellow, rose or fiery red, lobed ± halfway, glabrous outside, short-pubescent at the tube inside, tube *c.* 5 mm ø at the 5-pouched obtuse base, *c.* 1 cm ø at apex, lobes somewhat expanded, broadly obovate-spathulate, 1–1.3 by 0.7–1 cm. *Stamens* 10, unequal, as long as or a little longer than the corolla tube; filaments linear, densely set with rather longish, spreading, white hairs in the lower ¼–⅓, glabrous for the rest; anthers broad-oblong to obovate, 1.5–2 by 1 mm. *Disk* prominent, glabrous. *Ovary* obovoid-cylindric, glabrous, slightly rugose, *c.* 4 by 2 mm, abrupt with the style, the latter slender, glabrous, (7–)8–10 mm; stigma

obconical. *Capsule* subcylindric, 1.8–2.2 by 0.5 cm.

Distr. *Malesia*: Sumatra.

Ecol. Mostly terrestrial in open places, hillside or pastures, also near solfataras, sometimes epiphytic in mountain forest, at (900–)1000–1700 (–2100) m, locally common, both on fertile soil and stony ground, volcanic tuff, on rocks. *Fl.* Jan.-Dec.

Vern. *Sarodang*, Toba, *karamunting-rimbo-njang djanten*, Batangbaru, M.

220. Rhododendron brevitubum J. J. S. Ic. Bog. 4 (1914) 253, t. 381; MERR. En Born. (1921) 460; SLEUM. Reinwardtia 5 (1960) 192.

Epiphytic shrub. Branchlets terete, 3.5–6 mm ø, glabrous, upper 2 internodes red brown, 3–5 cm. *Leaves* mostly 2 subopposite at the upper 2(–3) nodes, and 1 or 2 scattered on the internodes, broad-elliptic or subovate-elliptic, apex broad-attenuate, obtuse, base rounded or ± distinctly cordulate, ± stiff-coriaceous, finally glabrous above, laxly to subdensely lepidote beneath for a long time (scales minute, irregularly dented or lobed in the marginal zone, which is early discarded, dark centre slightly impressed), finally glabrescent underneath too, edge somewhat recurved, (7–) 8–12 by 3.7–7.5 cm, midrib robust, much broadened, usually much prominent on both faces, nerves 10–12 pairs, at an angle of *c.* 70°, rather straight below, slightly curved distally and ± anastomosing before the edge, all ± parallel, little but conspicuously raised on both sides, veins and veinlets forming a rather dense network; petiole much flattened and a little convex above, 7–12 by 3–4 mm, sparsely lepidote or glabrous. *Umbels* 3–4-flowered. Perulae ovate, obtuse, glabrous, up to 1.7 by 1 cm in an immature flower bud. Pedicels glabrous, *c.* 1 cm by 1.5 mm. *Calyx* obliquely and very shortly cup-shaped, subentire, wavy, glabrous, *c.* 6 mm ø. *Corolla* broad-funnel-shaped, *c.* 5.5 cm long in all, *c.* 8 mm ø at the much expanded limb, rather fleshy, glabrous outside, densely pubescent at the tube inside along 5 vertical stripes, tube subcylindric, *c.* 1.5 cm long, *c.* 1.3 cm ø at the 5-saccate base, widened to *c.* 2 cm at apex, lobes broad-obovate-spathulate, 3.5–3.7 by 2.4–3.1 cm. *Stamens* 10, unequal, 2.2–3 cm; filaments filiform and glabrous in the upper, yellowish villous in the lower dilated half, 1.7–2.5 cm; anthers linear, curved, versatile, 0.6–0.8 by 1.3 mm. *Disk* puberulous on the upper margin, otherwise glabrous. *Ovary* cylindric-conical, 5-ribbed, *c.* 9 by 4 mm, rather abrupt with the style, the latter thickish, glabrous, *c.* 1.5 cm; stigma capitate, distinctly lobed.

Distr. *Malesia*: Central Borneo (Liang Gagang and B. Mi'li). *Fl.* Nov.

221. Rhododendron sessilifolium J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 125; SLEUM. Reinwardtia 5 (1960) 192.

Terrestrial, or rarely epiphytic shrub, 1–3 m. Branchlets terete, brown when dry, 2–3 mm ø, upper 1–2 internodes sparsely to subdensely covered with flat, rather early caducous scales, smooth; internodes 4–10 cm. *Leaves* in ± 5-merous pseudowhorls at the upper 1–2 nodes, sessile or subsessile, lanceolate to oblong-lanceolate, sometimes subobovate-oblong, apex gradually or rarely abruptly acuminate, subacute or more bluntish, base broadly attenuate to rounded or subtruncate, occasionally slightly cordate, coriaceous, stiff, finally glabrous above, lepidote for a long time beneath (scales rather small, irregularly stellate-dented at the marginal zone, dark centre shallowly or not impressed), finally glabrescent beneath too, but remaining brownish punctulate, very edge somewhat revolute, (8–)10–17.5 by 2.4–4(–5) cm, midrib as thick as the petiole, obtuse or ± flattened, *c.* 2 mm wide at the very base, nerves 10–13 spreading pairs, straight below, curved upwards, but indistinctly anastomosing, very slightly impressed above in old leaves, or mostly a little raised on both faces, not rarely obsolete, reticulation mostly obscure; petiole 0–4 (rarely up to 5) by 2–3(–4) mm. *Umbels* (4–) 6–8(–10)-flowered. Flower buds ovoid, 2–2.5 by *c.* 1.5 cm, outer perulae ovate, obtuse, inner ones ovate-oblong to oblong, obtuse, glabrous, up to 2.5 by 1.2 cm. Bracteoles subfiliform, glabrous, up to 1.5 cm. Pedicels laxly stellate-lepidote, epilose, 2.5–3 cm by 1–1.5 mm. *Calyx* oblique, rim-like, obscurely lobed, *c.* 4 mm ø. *Corolla* broad-funnel-shaped, (3–)3.5–4 cm long in all, a clear to light orange yellow (possibly occasionally also red?), glabrous outside, very laxly and shortly pubescent inside, tube 1.5–2 cm long, base 5-saccate, 5–6 mm ø, *c.* 1.5 cm ø at apex, lobes obovate, 1.4–1.8(–2) by 1–1.5(–1.7) cm. *Stamens* 10, subequal, attaining ± halfway the corolla lobes; filaments linear and densely subpatent-hairy in the lower ¼, glabrous above; anthers broad-oblong, *c.* 4 by 1.3 mm. *Disk* prominent, much lobed, glabrous. *Ovary* thick-cylindric, a little narrowed towards the base, with some scales initially, early glabrescent, or glabrous from the beginning, 5–7 by 2.5–3 mm, rather abrupt with the style, the latter ± excentric, glabrous, ± equalling the stamens; stigma subcapitate. *Capsule* subcylindric, 2.5–3 by 0.6–0.7 cm.

Distr. *Malesia*: Sumatra (Tapanuli, East Coast, West Coast).

Ecol. In light jungle or open places, on rim of crater, hills, 1100–1980 m. *Fl.* Jan.-Dec.

222. Rhododendron beccarii SLEUM. Reinwardtia 5 (1960) 192.

Epiphytic, apparently rather small shrub. Branchlets terete, 4–8 mm ø, uppermost internodes with lax substellate, appressed scales, lower parts glabrous, smooth, not rarely pruinose; internodes (5–)7–17 cm. *Leaves* in 5–8-merous pseudowhorls at the upper 2–3 nodes, oblong or lanceolate-oblong, apex gradually long-acuminate (2–3 cm), acute or nearly so, ± broadly attenuate towards the base, very base subtruncate, sessile or more rarely subsessile, coriaceous, stiff, quite glabrous with age, but remaining blackish punctulate above,

rather laxly subpersistently lepidote beneath (scales small, irregularly substellate-dented or -lobed in the marginal zone, centre minutely impressed), finally glabrescent and punctate beneath too, margin slightly revolute, 10–16 by 3–5(–6) cm, midrib thick, 2–3(–4) mm wide and obtusely prominent on both faces below, nerves 10–12 obliquely ascending pairs, faintly interarching before the edge, little raised on both sides, sometimes hardly visible, veins and veinlets subobscure; petiole compressed dorsally, 0–2 by 2–4 mm. *Umbels* 4–6-flowered. Flower buds ovoid-acuminate, 3–3.5 by 1–1.5 cm, outer perulae ovate, acuminate, inner ones oblong-ovate, all subacute, up to 2.5 (rarely up to 3) by *c.* 1 cm, glabrous dorsally, margin initially with caducous scales. Bracteoles filiform, glabrous, up to 2.5 cm by 0.5 mm. Pedicels laxly lepidote, 2–3 cm. *Calyx* much oblique, disk-shaped, obscurely lobed, subglabrous, *c.* 4 mm ø. *Corolla* funnel-shaped, red or orange, (5–)5.5–6.5 cm long in all, glabrous outside, ± densely shortly white-hairy in the lower half of the tube inside, tube 3–3.5 cm long, base thickened, 5-saccate, 5–6 mm ø, subcylindric in the lower, gradually widening in the upper part to 1.5–2 cm, lobes obovate-spathulate, 2–3 by 1.5–2 cm. *Stamens* 10, unequal, the longest nearly as long as the corolla; filaments linear and very densely subpatently white-hairy below, filiform and glabrous distally; anthers oblong, base obtuse, *c.* 4 by 1 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, glabrous or very laxly lepidote, tapering to the style, *c.* 10 by 2.5 mm; style nearly as long as the corolla tube, glabrous; stigma subcapitate. *Capsule* subfusiform, red, slightly curved, glabrous, (4–)4.5–5.5(–6) by 0.6–0.7 cm; pedicel 3–4 cm by 1–1.5 mm.

Distr. *Malesia*: Sumatra (West Coast: Mt Singgalang, Mt Sago).

Ecol. In mountain forest, mossy forest or thickets, 1400–2450 m. *Fl.* Jan.-Aug., *fr.* June-Aug.

223. Rhododendron kemulense J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 448; SLEUM. Reinwardtia 5 (1960) 193.

Small, crumpled tree, trunk *c.* 35 cm ø. Branchlets terete, 3–4 mm ø, red brown, with lax, small, substellate, flat scales at the upper internodes or the very tips, early glabrescent below; internodes 2–8.5 cm. *Leaves* in 5–7-merous pseudowhorls at the upper 1–2 nodes, oblong- to lanceolate-elliptic, apex gradually attenuate or shortly acuminate, subacute or obtuse, base acutely narrowed to the petiole, coriaceous, densely minutely lepidote on both faces when very young, glabrous and ± shining above at maturity, more persistently lepidote beneath (scales minute, marginal zone irregularly dented and early dissolved, dark centre shallowly impressed), finally ± glabrescent beneath too, but remaining conspicuously punctulate there, margin faintly recurved, 7–12 by 2–4 (rarely up to 4.5) cm, midrib narrow and sunk above, as broad as the petiole and obtusely prominent in the lower part beneath, nerves 7–10 pairs, irregular, ascending, obscurely anastomosing, very slightly impressed above, slightly prominent or subinconspicuous beneath, no reticulation; petiole subterete, rugose, grooved above, minutely lepidote or glabrescent, (4–)8–15 by 2–2.5 mm. *Umbels* 7–12-flowered. Bracteoles linear, laxly pubescent, 2–3 cm by 0.5–1 mm. Pedicels laxly lepidote at both ends, otherwise very laxly short-pubescent, ± glabrescent, 2–2.5 cm by nearly 1 mm. *Calyx* suboblique, disk-shaped, obscurely 5-angular, minutely lepidote, 4–5 mm ø. *Corolla* narrow-funnel-shaped, salmon coloured, sparsely minutely lepidote outside, short-pubescent at the lower half of the tube inside, 5–6(–7) cm long in all, limb 3–4 cm ø, tube rather straight, 3–4 cm long, base 3–4(–5) mm ø, *c.* 1 cm ø at apex, lobes broadly oblong-obovate, 2–2.5(–3) by 1.5–2 (–2.5) cm. *Stamens* 10, subequal, 4–5 cm long; filaments linear and densely patently short-hairy in the lower third, narrower to filiform and glabrous distally; anthers oblong, 3–4 by 1 mm, base obtuse. *Disk* puberulous at the upper margin, glabrous for the rest. *Ovary* subcylindric, lepidote especially at the base and apex, early glabrescent, *c.* 6 by 2.5 mm, continuous with the style, the latter nearly as long as the stamens, subdensely lepidote below, more laxly so up to the middle, otherwise glabrous; stigma capitate.

Distr. *Malesia*: Central Borneo (Mt Kemul), in primary forest, said to be common locally, 1800–1850 m. *Fl.* Oct.

224. Rhododendron moultonii RIDL. J. Str. Br. R. As. Soc. *n.* 63 (1912) 61; MERR. En Born. (1921) 462; SLEUM. Reinwardtia 5 (1960) 193.

Small, terrestrial shrub with grey bark, *c.* 3 m. Branchlets 4–7 mm ø, upper internode obtusangular and laxly to very laxly lepidote, lower ones terete and glabrous; internodes 10–20 cm. *Leaves* at the upper 1–2 internodes, 2(or 3) of them ± opposite or in a pseudowhorl, 2 or 3 others scattered along the internode, elliptic to elliptic-oblong, apex shortly (1–2 cm) acuminate or obtusely attenuate, base broad-attenuate to subtruncate rounded, coriaceous, rigid, glabrous above at full age, laxly to rather subdensely lepidote beneath (scales small, irregularly substellate-lobed or -dented in the marginal zone, dark minute centre but shallowly impressed, leaving dark points on the undersurface, edge ± flat, 13–20(–25) by (4–)5–8 cm, midrib a continuation of the very robust petiole in its lower ⅓, *c.* 4 mm wide, rather flat above, much and obtusely raised beneath, nerves (16–)18–20 pairs, narrow and ± parallel, spreading at a wide angle, anastomosing near the edge, prominent on both faces, reticulation rather dense and distinctly raised on both sides; petiole somewhat flattened, initially lepidote, (0.8–)1–1.4 cm by 3–4 mm. *Umbels* 7–9-flowered. Pedicels (very) laxly lepidote to glabrescent, 2–3 (rarely up to 4) cm by 1.5 mm. *Calyx* suboblique, thick, disk-shaped, *c.* 5 mm ø, lobes very short, rounded, often hardly distinguished. *Corolla* funnel-shaped, yellowish orange or yellow, flushed pink outside on the lobes, 4–4.5 cm long in all, 5-lobed to $^2/_5$–$^3/_5$, glabrous outside, equally

laxly short-hairy at the lower part of the tube inside, tube 1.5–2.5 cm long, base 5-pouched, 5–6 mm ø, widened to *c.* 1.5 cm at apex, lobes obovate-spathulate, 1.5–2.5 by *c.* 1.5 cm. *Stamens* 10, *c.* 3 cm; filaments linear and shortly patent-pubescent below, filiform and glabrous towards the top; anthers oblong, slightly curved, 5–6 by 1.2 mm. *Disk* prominent, glabrous. *Ovary* subcylindric-conical, suddenly narrowed to the style, glabrous, finely rugose, *c.* 6 by 2.5 mm; style glabrous, rather thick (*c.* 0.5 mm), *c.* 1.4 cm long; stigma capitate-obconical.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. Growing on the ground in mossy forest, 1220–1525 m. *Fl.* May, Oct.



Fig. 38. *Rhododendron javanicum* (BL.) BENN. Mt Gedeh, W. Java (BRUGGEMAN).

225. Rhododendron javanicum [REINW. Verh. Bat. Gen. 9 (1823) 30, *nom. nud.*; in Bl. Cat. (1823) 72, *nom. nud.*] (BL.) BENN. in Benn. & Br. Pl. Jav. Rar. (1838) 85, *excl.* t. 19, which is *var. teysmannii*; DC. Prod. 7 (1839) 721; HASSK. Cat. Hort. Bog. (1844) 161, *incl. var. citrinum* HASSK. *l.c.*; MORITZI, Syst. Verz. (1846) 42; PAXTON, Mag. Bot. 15 (1849) *n.* 217; PLANCH. Fl. Serres 5 (1849) 477–480; HOUTTE, *ibid.* 6 (1850–51) 135, t. 576; ZOLL. Syst. Verz. 2 (1854) 137; MIQ. Fl. Ind. Bat. 2(1859) 1057; Suppl. 1 (1860) 251, 585; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 42, t. 1 B; BL. Fl. Jav. Pl. inéd. (1863–83) t. 1; HENSLOW, J. R. Hort. Soc. 13 (1891) 262, 281, 282, f. 42 (*fol.*), 43 e (*fl.*); KOORD. Teysmannia 10 (1899) 450; Nat. Tijd. N.I. 60 (1901) 264; WIGMAN, Teysmannia 20 (1909) 112, t.; KOORD. Jungh. Gedenkb. (1910) 184; Exk. Fl. Java 3 (1912) 3, f. 1; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 106; J. J. S. in K. & V. Bijdr. 13 (1914) 96; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 57; MILLAIS, Rhodod. (1917) 196; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 2; SP. MOORE, J. Bot. 63 (1925) Suppl. 57; HOCHR. Candollea 2 (1925) 490, *incl. var. gymnocarpum* HOCHR. *l.c.*; STEEN. Bull. Jard. Bot. Btzg III, 12 (1932) 177; *ibid.* III, 13 (1933) 50; AMSH. in Back. Bekn. Fl. Java (em.ed.) 7 (1948) fam. 162, p. 2; SLEUM. Reinwardtia 5 (1960) 194; STEEN. Endeavour 21 (1962) 189, t. 1; SLEUM. Blumea 12 (1963) 111. — *Vireya javanica* BL. Bijdr. (1826) 854, *incl. var. l.c.* 855; G. DON, Gen. Syst. 3 (1834) 848. — *Azalea javanica* (BL.) O. KTZE, Rev. Gen. Pl. 2 (1891) 386. — **Fig. 38.**

KEY TO THE VARIETIES

1. Ovary very sparsely lepidote and early glabrescent, or glabrous from the beginning.
2. Leaves predominantly in pseudowhorls at or in part inserted a little below the nodes, occasionally some additional scattered ones

in the upper third of the internodes, apex ± acuminate. Anthers (2.5–)3–3.5 (rarely up to 4) mm . . . . . 1. *var.* **javanicum**

2. Leaves exclusively scattered along the internodes, apex ± obtuse. Anthers 5–6(–7) mm. 2. *var.* **schadenbergii**

1. Ovary ± densely pubescent 3. *var.* **teysmannii**

1. *var.* javanicum.

Shrub, 1–2 m, or treelet, 2–3(–5) m, trunk up to 8 cm ø, erect or writhed, terrestrial or epiphytic, generally not much branched; bark ashy. Branchlets 3–5 mm ø, young shoots obtusangular and laxly substellate-lepidote, older parts terete, glabrescent, smooth; internodes 4–15 cm. *Leaves* in (4–)5–7(–8)-merous pseudowhorls at the upper 1–2(–3) nodes, occasionally not strictly so, broadly oblong- to subovate- or subelliptic-oblong (occasionally ovate- or obovate-elliptic), apex mostly acuminate, subacute, more rarely bluntish, base mostly ± acutely and rather shortly attenuate, ± coriaceous, initially ± densely lepidote on both faces, early glabrescent above, laxly to subdensely lepidote beneath for a certain time (scales small, flat, variously lobed or dented at the marginal zone, dark centre but faintly impressed), brownish blackish punctulate beneath after the scales are gone, margin ± flat, 4–15(–20) by (1.8–)2.5–6(occasionally up to 8) cm, midrib ± a continuation of the robust petiole, broad and obtusely prominent to various degree in the lower part on both faces, ± narrowly impressed above, nerves 7–10 pairs, at an angle of *c.* 45°, slightly prominent on both sides, rather indistinctly anastomosing before the edge, veins and veinlets a lax network, faintly raised or often obsolete on both sides; petiole compressed dorsally, not or hardly grooved above, brownish reddish as is often the midrib, initially lepidote, early glabrescent, (0.4–)0.7–2(–2.3) cm by 2–3 mm. *Umbels* 4–7(–12)-flowered. Flower buds ovoid, subacuminate, *c.* 3–3.5 by 1.5–2 cm. Outer perulae broad-ovate, shortly subulate-mucronate, inner ones ovate-elliptic to oblong, obtuse, all membranous, glabrous, margin with minute early caducous scales, up to 3.5 by 2.2 cm. Bracteoles linear, glabrous, up to 3 cm by 0.5–1.5 mm. Pedicels laxly stellate-lepidote especially upwards, epilose, glabrescent, (1.5–)2–4 cm by *c.* 1 mm. *Calyx* oblique, disk-shaped, obtusely 5-angular, *c.* 4 mm ø, glabrous or very laxly lepidote. *Corolla* funnel-shaped, rather fleshy, occasionally yellow or red (even scarlet), mostly ± orange, the tube often reddish or rose inside or with a ring of deep pink round the throat, scentless, (3–)4–5(–5.5, rarely up to 6) cm long and wide in all, ± halfway 5-lobed, glabrous or nearly so outside, short-pubescent to various degree at the tube inside (occasionally glabrous there too), tube (1.7–)2–2.5 cm long, obtusely 5-angular, base 5-saccate, 5–6 mm ø, widened to 1–1.5 cm at apex, lobes slightly unequal, expanded, obovate to subspathulate, 2.5–3.5 by 1.7–2.5 (rarely up to 3) cm. *Stamens* 10, alternately slightly unequal, the longer ones reaching ± half the corolla lobes; filaments purplish, linear, ± densely pubescent in the lower third, more filiform and glabrous towards the top; anthers oblong to broad-oblong, sometimes more obovate-oblong, (2.5–)3–3.5 (rarely up to 4) by *c.* 1.3 mm. *Disk* prominent, puberulous at the upper margin only. *Ovary* obliquely conical-cylindric, 5-angled, glabrous or very sparsely lepidote (and early glabrescent then), 7–9 by *c.* 3 mm, but little abrupt with the style, the latter glabrous, ± as long as the shorter stamens; stigma capitate, *c.* 3 mm ø. *Capsule* elongate-cylindric, shortly attenuate at both ends, 5-angled, glabrous, (3–)3.5–4.5 (rarely up to 5) by 0.7–0.8 (rarely up to 0.9) cm; pedicel up to 5 cm by 1.5–2 mm. *Seeds* including tails 6–7 mm long.

Distr. *Malesia*: Sumatra, Natuna I., Lingga Arch., Java, Bali.

Ecol. Mostly epiphytic and in primary and secondary forest, also near craters, on narrow ridges, in rather dry ground, between rocks, on steep slopes, once found on stony mud-flow in S. Sumatra, (300–)800–2400(–2550) m, locally common. *Fl. fr.* Jan.-Dec., with preference for the dry season.

Vern. *Kĕmbang gĕni, k. kĕpiting, k. sademo, lumpĕni, purwa gĕni, soloko baros, soro sari, tjĕpoko gĕni*, J, *areuj gandarusa, djudjugan, ki badak, loda dindĕr, l. dĕnĕr, songgom tangkal, tjantigi bĕsar, tjawarènĕ sore, tjonkok*, S, *bunga sa rudang, b. tempa barĕn*, M.

2. *var.* schadenbergii (WARB.) SLEUM. Reinwardtia 5 (1960) 195. — *R. schadenbergii* WARB. in Perk. Fragm. Fl. Philip. 3 (Feb. 1905) 172; MERR. Philip. J. Sc. 3 (1908) Bot. 380, *p.p.*; MILLAIS, Rhodod. (1917) 239; MERR. En. Philip. 3 (1923) 245, *p.p.*; COPEL. *f.* Philip. J. Sc. 40 (1929) 170, t. 15, f. 2, t. 16, f. 3–4. — *R. spectabile* MERR. Publ. Gov. Lab. Philip. *n.* 29 (Sept. 1905) 42; Philip. J. Sc. 3 (1908) Bot. 381; ELM. Leafl. Philip. Bot. 3 (1911) 1106; MILLAIS, Rhodod. (1917) 246; MERR. En. Philip. 3 (1923) 245; MILLAIS, Rhodod. ser. 2 (1924) 241; COPEL. *f.* Philip J. Sc. 40 (1929) 168, t. 13, f. 4–5, t. 14. — *R. sarasinorum* WARB. in Sarasin, Reisen in Celebes 2 (1905) 386 (*index*), *cf. ibid.* 1 (1905) 62 (*text*), *nom. nud.* — *R. clementis* MERR. Philip. J. Sc. 3 (1908) Bot. 160, 381; En. Philip. 3 (1923) 243; MILLAIS, Rhodod. ser. 2 (1924) 113; COPEL. *f.* Philip. J. Sc. 40 (1929) 167, t. 12, t. 13, f. 1–3.

Leaves exclusively scattered along the upper internodes, apex ± obtuse. *Corolla* red, orange or salmon pink, very rarely yellow. Anthers 5–6 (–7) mm.

Distr. *Malesia*: NE. Celebes (Menado), Philippines (Luzon; Camiguin de Misamis; Jolo; Mindanao; Palawan).

Ecol. As in *var. javanicum.*

Vern. Philippines: *malagos*, Bag., *lasatan*, Bon., *luhung di kamaduyung*, If.

Uses. Flowers said to be edible.

3. *var.* teysmannii (MIQ.) K. & G. J. As. Soc. Beng. 74, ii (1905) 75; J. J. S. in K. & V. Bijdr. 13 (1914)

99; STEEN. Bull. Jard. Bot. Btzg III, 13 (1933) 50; *ibid.* III, 17 (1948) 388; SLEUM. Reinwardtia 5 (1960) 195; Blumea 12 (1963) 111. — *R. javanicum* (BL.) BENN. in Benn. & Br. Pl. Jav. Rar. (1838) *pro* t. 19; HOOK. Ic. Pl. (1847) t. 4336; LEMAIRE, Fl. Serres 3 (1847) 293, *c. icon.*; BL. Fl. Jav. Pl. inéd. (1863–83) t. 2; HOCHR. Candollea 2 (1925) 490 (*var. typicum*). — *R. teysmannii* MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 251, 585; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 42, t. 1 A; CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 463; HENSLOW, J. Hort. Soc. 13 (1891) 263, f. 42 (*fol.*), 43 f (*fl.*); RIDL. J. Str. Br. R. As. Soc. *n.* 23 (1891) 146; J. Fed. Mal. St. Mus. 4 (1909) 42; *ibid.* 7 (1916) 46; *ibid.* 8 (1917) 58; MILLAIS, Rhodod. (1917) 251; HENDERS. Mal. Nat. J. 6 (1950) 261. — *Azalea teysmannii* (MIQ.) O. KTZE, Rev. Gen. Pl. 2 (1891) 387. — *R. basirotundatum* J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 124, *p.p. typ.*

Differs from *var. javanicum* only by the ± densely pubescent *ovary*. Pedicels nearly always pubescent.

Distr. *Malesia*: Sumatra, Malay Peninsula, Java, Bali.

Ecol. As in *var. javanicum*, apparently occurring rarely together with it on the same spot.

Vern. *Areng marénang, kakuran, kembang tjulang*, S.

Note. Part of the specimens collected in North Sumatra bear capsules 5.8–8 cm long, thus distinctly longer than stated above for *R. javanicum sens. lat.*

In these long capsules they agree with *R. beccarii*, also from Sumatra (East Coast), which, however, has a practically glabrous (or certainly not hairy) ovary.

It is possible that these North Sumatran specimens correspond with *R. basirotundatum* described from Atjeh (Bur ni Telong) without fruits and might represent a fourth variety. Material at hand is not sufficient to decide this question.

R. teysmannii was figured by BLUME and MIQUEL as having yellow flowers. This, I presume, is an error by an omission of the draughtsman, similarly as was made for *R. album*; there is no difference in colour with *R. javanicum*. — ED.

226. Rhododendron perplexum SLEUM. Reinwardtia 5 (1960) 197.

Shrub, probably epiphytic. Branchlets terete, *c.* 4 mm ø, red-brown, glabrous; the one known (upper) internode 10 cm. *Leaves* in a ± 4-merous pseudowhorl, ovate to oblong-ovate, gradually acuminate towards the subacute apex, base rounded to slightly cordate, or a little inequilateral, thick-coriaceous, glabrous, subdensely lepidote beneath (scales minute, irregularly substellate-lobed or -incised in the marginal zone, much darker centre slightly impressed), margin a little revolute, 8.5–13.5 by 4–5.5 cm, broadest slightly below the middle, midrib very stout, striate lengthwise, being a continuation of the thick petiole, obtusely and much prominent in the lower part above, broad and rather flat beneath, nerves 12–15 pairs, at an angle of nearly 90°, ± parallel, obscurely inarching before the edge, very slightly immersed above, not much raised beneath, reticulation lax, subtle on both faces; petiole slightly flattened and grooved dorsally, initially lepidote, 4–6 by *c.* 3 mm. *Umbels* ± 9-flowered. Pedicels rather robust, laxly or very laxly lepidote, more densely so immediately below the calyx, not hairy, 2–2.7 cm. *Calyx* disk-shaped, obscurely lobed or crenate, thick, glabrous, 4–5 mm ø. *Corolla* funnel-shaped, 2.5–2.7 cm long in all, glabrous outside, densely shortly grey-pubescent at the lower ⅔ of the tube inside, tube 1–1.3 cm long, at base *c.* 5 mm ø, widened to *c.* 1 cm at apex, lobes oblong-obovate, 1.3–1.5 by 1–1.3 cm. *Stamens* 10, subequal, nearly as long as the corolla; filaments linear and very densely subpatently white-hairy in the lower half, more filiform and glabrous upwards; anthers broad-oblong, 3.5 by 1.3 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, glabrous, 5–6 by *c.* 2 mm, tapering to the style, the latter columnar, glabrous, *c.* 6 mm; stigma subcapitate.

Distr. *Malesia*: Sumatra (West Coast: Kerintji) at *c.* 1000 m. One collection.

227. Rhododendron crassifolium STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 195; GIBBS, J. Linn. Soc. Bot. 42 (1914) 102; MERR. En. Born. (1921) 460; SLEUM. Reinwardtia 5 (1960) 198; Blumea 11 (1961) 127; *ibid.* 12 (1963) 111; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 19. — *R. crassinervium* RIDL. J. Str. Br. R. As. Soc. *n.* 63 (1912) 61; MERR. En. Born. (1921) 461. — *R. murudense* MERR. Sarawak Mus. J. 3 (1928) 542.

Mostly epiphytic, sometimes terrestrial shrub, (0.5–)1.2–3.5 m; bark fawn, smooth. Branchlets (3–)4–6 mm ø, upper 1–2 internodes dark red-brown, initially scantily lepidote, early glabrescent; internodes (1.5–)3–15 cm. *Leaves* opposite or mostly in 3(–4)-merous pseudowhorls at the upper 1–3 nodes, often not strictly so and internodes often with scars of scattered reduced and very early caducous leaves, elliptic, oblong-elliptic or oblong, occasionally obovate-elliptic, apex in general broadly attenuate and obtuse or rounded, sometimes shortly obtusely acuminate, base rounded or subtruncate, not rarely slightly subauriculate-cordate, very rarely cuneate, thick-coriaceous, stiff, initially lepidote on both faces, glabrous and blackish punctulate with age above, lepidote for a certain time beneath (scales rather lax, small, flat, irregularly dented or lobed in the marginal zone, centre minute, faintly or not sunk), glabrescent with age beneath too, the scales leaving dark points, flat, 8–14(–18) by 4–8(–9) cm, midrib continuing the petiole, mostly much and ± bluntly prominent and hardly grooved above, more flattish and hardly raised, or even a little sunk towards the apex of the lamina beneath, *c.* 3 mm wide at the base, often a little rugose, nerves 8–12 pairs, subparallel at a wide to almost right angle, anastomosing before the edge, distinctly raised on both faces, reticulation rather dense, slightly prominent above, less or obscurely so beneath; petiole somewhat flattened, 1.2–1.8 cm

by 3–4 mm. *Umbels* compact, (8–)10–14 (sometimes up to 20)-flowered. Perulae ovate-acuminate, glabrous, up to 2.5 by 1 cm. Bracteoles linear, glabrous, up to 2 cm. Pedicels ± glabrous, 3–4.5 by 1(–1.5) mm. *Calyx* very oblique, patellar, obtusely and very shortly lobed or crenate, glabrous, 3–4 mm ø. *Corolla* funnelform-subcampanulate, rather fleshy, flame red or scarlet, orange or apricot, salmon or bright shell pink, margin and apex of the lobes not rarely deep rose, (2–)2.5–3 cm long in all, glabrous outside, sparsely hairy inside the tube, tube 1.2–1.5 cm, at base distinctly 5-pouched, 3–4 mm ø, gradually widened to (1–)1.2–1.5 cm at apex, lobes obovate-oblong, (1–)1.2–1.5 by 0.8–1(–1.3) cm. *Stamens* 10, alternately a little unequal, (1.2–)1.4–2 cm; filaments linear and densely subpatently hairy in the lowest $^1/_4$–$^1/_5$, filiform and glabrous for the rest; anthers subelliptic, *c.* 2–2.5 (rarely up to 2.8) by 1.3 mm. *Disk* prominent, glabrous. *Ovary* subcylindrical-conical, glabrous or initially sparsely lepidote, 3–4 by 2 mm, rather abrupt with the style, the latter columnar, glabrous, as long as the ovary; stigma thick, dilated-capitate, 2 mm ø. *Capsule* thick-cylindric, 1.8–2.5 by *c.* 0.5 cm. *Seeds* very narrow, 4–5 mm including the tails.

Distr. *Malesia*: Borneo.

Ecol. In moss forest, also in more open sunny places (landslides), not rare locally, 1220–2135 (–2745) m. *Fl.* Jan.-Dec.

228. Rhododendron rhodopus SLEUM. Reinwardtia 5 (1960) 199.

Shrub, apparently terrestrial. Branchlets terete, 4–5 mm ø, laxly substellate-lepidote at the upper, glabrous and pruinose at the lower internodes (13–15 cm). *Leaves* in ± 5-merous pseudowhorls, some additional reduced ones on the internode, lanceolate, subinequilateral, apex rather long-acuminate, acute, base broadly cuneate, coriaceous, glabrous above with age, laxly lepidote beneath (scales small, flat, variously, mostly shortly dented or lacerate at the marginal zone, minute centre hardly impressed), 9–13(–17) by 2–3.5(–5) cm, midrib above dilated and slightly raised at base, narrowed and impressed upwards, beneath thick and obtusely prominent below, nerves *c.* 8 pairs, at an acute angle, high-ascending, indistinctly anastomosing, slightly depressed above, not much raised beneath, veins subobscure; petiole olivaceous, laxly lepidote, subterete, 1.5–2 cm by 2(–3) mm. *Umbels* 8–9-flowered. Outer perulae broadly ovate-oblong, densely and very shortly substrigose-hirsutulous outside, glabrous inside, *c.* 4 by 2 cm. Bracteoles linear, laxly pubescent towards the apex, *c.* 2 cm by 1 mm. Pedicels laxly lepidote, not hairy, 1.5–2 cm by *c.* 1 mm at anthesis. *Calyx* disk-shaped, wavy, hardly lobed, lepidote dorsally, *c.* 4 mm ø. *Corolla* tubular, lobed in the upper third, white, scented, 6.5–7 cm long in all, glabrous outside or here and there with a solitary (caducous) scale, subdensely pubescent at the tube inside, tube straight, 4–5 cm, at base slightly 5-saccate, *c.* 5 mm ø, dilated to *c.* 8 mm at apex, lobes spreading, suborbicular, 2-2.5 by 1.5–2 cm. *Stamens* 10, subequal, reaching halfway the corolla lobes; filaments linear and subvillous in the lower ⅔, filiform and glabrous for the rest; anthers oblong, 4–5 by *c.* 1.3 mm. *Disk* glabrous. *Ovary* cylindric, yellowish tomentose, minutely lepidote, *c.* 10 by 2.5 mm, gradually narrowed to the style, the latter nearly as long as the corolla tube, yellowish tomentose in the lower ¾, elepidote, glabrous below the capitate stigma. Submature *capsule* thick-cylindric, attenuate at the base, mostly curved, shortly yellowish villous and minutely lepidote, 5–7 cm by 7–8 mm, crowned by the villous style.

Distr. *Malesia*: Central Celebes (Latimodjong Range: Pokapindjang; Luwuk), in Latimodjong at 2800–3000 m. Twice found. *Fl.* June, *fr.* Sept.

229. Rhododendron baenitzianum LAUT. in K. Sch. & Laut. Nachtr. (1905) 337; SCHLTR, Bot. Jahrb. 55 (1918) 156; SLEUM. Reinwardtia 5 (1960) 200; Blumea 12 (1963) 112. — *R. maboroense* SCHLTR, Bot. Jahrb. 55 (1918) 156.

Terrestrial shrub, 1.5–2 m. Branchlets brown, terete, 2–4 mm ø, tips densely red-brown substellately scaly, lower parts glabrescent; internode 3–10 cm. *Leaves* opposite or in 3–5-merous pseudowhorls at the upper 1–2 nodes, erecto-patent, subsessile or shortly petioled, oblong to lanceolate or elliptic-lanceolate, sometimes in part ovate-lanceolate, apex long (3–4 cm) subcaudate-acuminate, acute, base broadly obtusely or subacutely attenuate, rarely rounded, ± inequilateral, subcoriaceous, glabrous above at maturity, laxly lepidote beneath (scales small, flat, irregularly and not too deeply lobed or dented at the marginal zone, centre small, faintly or not impressed), glabrescent finally beneath too leaving minute, dark spots, edge ± flat, 12–17 (–25) by (2.5-)3.5–6.5(–8.5) cm, midrib narrow and impressed above, broader and bluntly prominent beneath, nerves 8–10(–12) pairs, ascending, curved-anastomosing before the edge, slightly impressed or raised above, distinctly prominent beneath, reticulation whether or not finely raised on both faces; petiole semiterete, grooved above, lepidote, (3–)4–7 by 1.5–2 mm. *Umbels* (3–)4–5(–7)-flowered. Outer perulae ovate to obovate, cuspidate or shortly acutely acuminate, laxly caducously lepidote externally and along the margin, moreover very shortly appressed-pubescent in the middle or towards the apex, inner ones subspathulate, acuminate, dorsally laxly lepidote, but not hairy, up to 2.5 by 1 cm. Bracteoles filiform to linear-subspathulate, subglabrous, up to 2 cm. Pedicels laxly lepidote especially at base and apex, ± glabrescent, epilose, (2.5–)3.5–4 cm by 1.5 mm. *Calyx* suboblique, rim-like, *c.* 4 mm ø. *Corolla* funnel-shaped, 7.5–9(–10) cm long in all, tube yellow, orange at lobes, laxly lepidote outside, papillose-pubescent at the tube inside, tube 4–6 cm, at base 5-pouched, 6–8 mm ø (pouches including or covering the calyx), *c.* 2 cm at apex, lobes spreading, broad-

obovate to suborbicular, 3(–4) by 2.5–3 cm. *Stamens* 10, subequal, reaching halfway the corolla lobes; filaments linear, short-patent-hairy in the lower half, glabrous above; anthers oblong, 4 by 1.2 mm. *Disk* pubescent at the upper margin, glabrous below. *Ovary* subcylindric, shortly and densely covered with subappressed forward-directed hairs and with scales, 10–12 by 2–2.5 mm, continuous with the style, the latter equalling the stamens at full anthesis, densely set with subpatent hairs and with scales to near the top; stigma thick-capitate, 5-lobed. *Capsule* elongate-fusiform, somewhat curved, laxly hairy and lepidote, 15–20 cm by 4–5 mm.

Distr. *Malesia*: E. New Guinea (Torricelli Mts; Maboro Range: Waria R. region).

Ecol. Along rivulets or in rocky places, 215–1200 m. *Fl.* April, June, Aug., *fr.* Aug.

Vern. *Tindili*, Orne: Wantipi.

230. Rhododendron englerianum KOORD. Nova Guinea 8 (1909) 186; *ibid.* 8 (1912) 877, t. 152; J.J.S. *ibid.* 12 (1914) 140, *nota sub R. angulatum*; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 478; SLEUM. Reinwardtia 5 (1960) 199. — *R. lowii* (*non* HOOK. *f.*) F.v.M. Trans. R. Soc. Vict. 1 (1889) 22. — *R. megalostigma* F.v.M. *l.c.*, *nom. event.*

Shrub, 1–1.2 m. Branchlets terete, 5–7 mm ø, lepidote at the very tips, early glabrescent; internodes 4–10 cm. *Leaves* in 3–4 merous pseudowhorls at the upper 2(–3) nodes, large, subsessile, oblong or subovate-oblong, apex shortly to rather long-acuminate, acute or subacute, broadly attenuate towards the base (very base truncate-rounded or a little cordate), coriaceous, practically glabrous above at full age, rather laxly lepidote beneath (scales relatively small, marginal zone irregularly and rather shallowly lobed or dented, centre but slightly impressed), edge short-revolute, 12–20(–25) by (4–)5–8.5(–9) cm, midrib a continuation of the petiole, narrow and markedly impressed above, much prominent on the underside below, nerves 8–10(–14) pairs, with additional shorter ones, irregular and ascending, inarching before the edge, slightly raised above, more distinctly so beneath, reticulation lax, but slightly raised on both sides; petiole grooved above, 4–7 (rarely up to 10) by 3–4 mm. *Umbels* (4–) 6–9-flowered. Outer perulae ovate-lanceolate, long-acute, inner ones broad-ovate-acuminate and subacute to oblong-spathulate, all sericeous and lepidote dorsally, glabrous internally, up to 5.5 by 1.5 cm. Bracteoles linear-filiform, lepidote and puberulous, up to 3 cm by *c.* 1 mm. Pedicels erect, laxly lepidote, not hairy at all, (6–)7–11 cm, *c.* 1.5 mm ø. *Calyx* suboblique, patellar, very shortly obtusely 5-lobed, *c.* 5 mm ø, lepidote dorsally. *Corolla* funnel-shaped, orange or reddish to cerise-pink, flushed yellow outside, *c.* 8 cm long in all, laxly stellate-lepidote outside, laxly hairy at the tube inside, tube 2.5–3 cm long, base markedly 5-pouched, 5–6(–8) mm ø, gradually extended to 1.5–2 cm at apex, lobes obovate, much spreading, 5–6 by *c.* 3 cm. *Stamens* 10, reaching halfway the corolla lobes; filaments linear and densely hairy in the lower, more filiform and glabrous in the upper half; anthers linear-oblong, slightly curved, 6–7 by 1 mm. *Disk* much prominent, velutinous in the upper half, glabrous below. *Ovary* subcylindric, greyish velutinous, with numerous minute rusty scales between the hairs, 9–10 by nearly 3 mm, passing gradually into the style which ± equals the stamens and is covered in its lower ½–⅔ with short hairs and well visible scales; stigma thick-capitate, 5-lobed. *Capsule* elongate-cylindric, laxly hairy and lepidote, 6–10 cm by *c.* 5 mm; pedicel 2 mm ø.

Distr. *Malesia*: New Guinea.

Ecol. Epiphytic in *Agathis* forest, or terrestrial in rain-forest, 400–600 m, also reported from rocks near river, 1220–2745 m. *Fl.* March, April, July.

Vern. *Tiriz*, Movoi: Ueli.

231. Rhododendron wentianum KOORD. Nova Guinea 8 (1909) 188; J.J.S. *ibid.* 12 (1917) 508; *ibid.* 12 (1918) t. 199, b-f, 203, a; SCHLTR, Bot. Jahrb. 55 (1917) 143; SLEUM. Reinwardtia 5 (1960) 200; Blumea 11 (1961) 127. — *R. callichilioides* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 95, *incl. var. minor* WERNH. *l.c.* 96. — *R. wollastonii* WERNH. *l.c.* 99.

Epiphytic shrub, 0.5–1.5 m. Branchlets terete, 1.5–3(–4) mm ø, upper internode laxly to densely covered with flat scales; internodes 2–10(–20) cm. *Leaves* mostly 3–4 in a pseudowhorl, occasionally 2 opposite, at the upper 1–2 nodes, ovate to lanceolate-ovate, subsessile, apex gradually and ± elongately acuminate to subcaudate, acute or nearly so, base rounded to subcordate, rarely very broadly attenuate, subcoriaceous to coriaceous, glabrous above at full age, laxly lepidote beneath (scales small, thin, marginal zone irregularly dented or incised, centre slightly immersed), margin slightly or not revolute, (7–)8–13(–16) by (2.5–) 3.5–6.3 cm, midrib slightly impressed above, very prominent beneath, nerves (8–)9–11 pairs, upper ones spreading and ± straight below, curved towards the edge and inarching, but little prominent on both faces, reticulation rather dense, faintly visible on both sides, or only above so; petiole densely lepidote initially, grooved above, 1.5–6 (rarely up to 10) by 1–1.5 mm. *Umbels* (3–)4–6-flowered. Perulae oblong-ovate, acutely acuminate, sericeous and laxly lepidote dorsally, up to 2.5 by *c.* 1 cm. Bracteoles subulate, up to 2 cm. Pedicels slender to rather stoutish, densely to laxly lepidote, not hairy, (2.5–)3–4.2 cm. *Calyx* irregularly 5-lobed or -dented, wavy, densely lepidote, *c.* 4 mm ø. *Corolla* funnelform-campanulate in outline, tubular below, rose-red, tube suffused with light green or yellowish white, (3–)4–4.8 cm long in all, rather sparsely lepidote outside, laxly hairy to glabrous and not rarely yellowish inside, tube 1–1.5 cm, bluntly 5-angular, (3–)4–6 mm ø, manifestly 5-saccate at the base, slightly dilated upwards, lobes ± erecto-patent, somewhat recurved at the apex, broadly obovate,

(2–)3–3.4 by (1.3–)2.5–3.2 cm. *Stamens* 10, subequal, manifestly exserted from the throat; filaments linear, densely patent-pubescent in the lower half, glabrous distally; anthers oblong, 2.5–3 mm. *Disk* glabrous below, pubescent in the upper half. *Ovary* conical, obtusely 5-angular, densely lepidote and velutinous, 4–6 by 1.5–2 mm, gradually tapering to the style, the latter thick, pubescent and lepidote in about the lower half or third, glabrous for the rest; stigma thick-capitate, lobes manifest. *Capsule* slenderly fusiform, laxly lepidote and hairy, 6.5–9 by 0.4–0.5 cm, on slender pedicel 3–4 cm.

Distr. *Malesia*: New Guinea (Main Range, from Mt Carstensz to the Star Mts, and the Upper Sepik R. region).

Ecol. In forest, 600–1500 m, locally not rare. *Fl.* Jan.-Aug., *fr.* July.

232. Rhododendron cuspidellum SLEUM. Reinwardtia 5 (1960) 200.

Terrestrial shrub, *c.* 1.5 m. Branchlets rather robust, terete or sometimes obtusangular, laxly to subdensely substellate-lepidote at the upper internodes, glabrous lower down; internodes 8–17 cm. *Leaves* in 4.5(–7)-merous pseudowhorls at the upper 2 nodes, lanceolate to subovate- or oblong-lanceolate, apex rather long (subcaudate-) acuminate, the acute acumen not rarely somewhat curved, ± broadly attenuate towards the base (very base subtruncate-rounded to subcordate), coriaceous, rather stiff, minutely rugose above and glabrous at full age, laxly lepidote beneath (scales small, irregularly substellate-lobed or -dented in the marginal zone, darker centre slightly impressed, flat, (9–)10–15 by (2.5–)3–5 cm, midrib dilated for the lowest 1–2 cm, becoming very narrow upwards, impressed above, as thick as the petiole, blunt and much prominent beneath, nerves 8–10 pairs, spreading, ± straight below, rather indistinctly curved-anastomosing before the edge, faintly raised on both faces, or not rarely subinconspicuous especially beneath; petiole a little flattened, shallowly grooved above, lepidote, 5–10 by 2–3 mm. *Umbels* 9–12-flowered. Flower buds suborbicular-ovoid, 3.5 by 2.5 cm. Outher perulae ovate, apex very shortly subulate, the subsequent inner ones larger, ovate, nearly blunt, innermost ones spathulate, all laxly substellate-lepidote and very shortly pubescent dorsally and along the margin, up to 3.5 by 2.3 cm. Bracteoles linear to linear-subspathulate, short-pubescent, up to 3 cm by 1–4 mm. Pedicels laxly lepidote, epilose, (2.5–)3.5–6 cm by *c.* 1 mm. *Calyx* disk-like, wavy and obscurely lobed, densely lepidote dorsally, *c.* 3 mm ø. *Corolla* tubular below, much expanded at the limb, orange or orange-yellow, (3.5–)4–4.5 cm long in all, subdensely or more laxly substellate-lepidote outside, sparsely or very sparsely pubescent in the lower part of the tube inside, tube 1.7–2.1 cm, straight, 5-angular, at base much 5-saccate, *c.* 5 mm ø, widened upwards to 1.2–1.5 cm at apex, lobes broadly obovate-spathulate or suborbicular, 2.3–2.7 by 1.5–2.2 cm. *Stamens* 10, subequal, slightly exserted from the throat, *c.* 2.5 cm; filaments linear and densely patently hairy in the lower, more filiform and glabrous in the upper half; anthers oblong, *c.* 4 by 1 mm. *Disk* white-sericeous. *Ovary* subcylindric-conical, white-velutinous and lepidote, 5–6 by *c.* 2.5 mm, rather abrupt with the style, the latter robust, nearly equalling the stamens, hairy and manifestly lepidote in the lower ⅓–⅔; stigma capitate, deeply 5-lobed.

Distr. *Malesia*: New Guinea (Wissel Lakes region).

Ecol. Secondary forest, locally common, 1900 m. *Fl.* March.

Vern. *Warade*, Kapauku.

233. Rhododendron commutatum SLEUM. Reinwardtia 5 (1960) 201. — *R. gracile* (*non* LOW *ex* LINDL.) BECC. Malesia 1 (1878) 203.

Epiphytic or terrestrial shrub growing with dense-packed, slender stems, not rarely subarborescent, 1.5–3 m. Branchlets terete, 2–4 mm ø, densely set with substellate rufous scales at the upper internodes, early glabrescent in the lower ones; internodes (3–)6–12 cm. *Leaves* opposite or in 3(–5)-merous pseudowhorls at the upper 2–3 nodes, lanceolate or oblong-lanceolate, apex ± elongate, sometimes rather abruptly acuminate, subacute, base broadly and acutely attenuate to the petiole (never rounded), subinequilateral, thin-coriaceous lepidote above for a rather long time, finally glabrescent, minutely rugose by inflated epidermis cells and ± persistently laxly to subdensely lepidote beneath (scales minute, the marginal zone substellate-lobed or -incised, centres mall and slightly impressed), edge flat, very sligthly revolute, (8–)10–15(–17) by (2–)3–5(–5.5) cm, midrib very narrow and markedly depressed above, as thick as the petiole, blunt and much prominent beneath, often more densely lepidote than the intervenium, nerves 10–14 pairs, spreading at almost 90°, straight below, curved and obscurely anastomosing before the edge, with additional, less distinct nerves, ± parallel, faintly sunk above, minutely raised or subinconspicuous beneath, reticulation rather dense, visible above only; petiole flattened and grooved dorsally, densely lepidote, 1–1.5 cm by 1.5–2 mm. *Umbels* (3–)4–5-flowered. Outer perulae narrow-ovate-acuminate, extended at the apex into a fine sharp point, lepidote along the dorsal middle line and in the upper part, glabrous at the margin, inner ones much narrower, nearly linear, up to 2 by 0.7 cm. Bracteoles filiform, laxly lepidote, *c.* 1.5 cm. Pedicels laxly substellate-lepidote, not hairy, 1–1.5(–2) cm by *c.* 1 mm. *Calyx* subobliquely disk-shaped, very shortly and bluntly 5-lobed, densely lepidote dorsally, *c.* 4 mm ø. *Corolla* funnel-shaped, bright rose or red with magenta flushed throat, 5-6(–6.5) cm long in all, lobed to about the upper third, laxly minutely substellate-lepidote outside, laxly short-pubescent in the lower half of the tube inside, tube 3–4 cm, base 5-saccate, 4–5 mm ø, gradually dilated to *c.* 1.5 cm at apex, lobes erecto-patent, broadly obovate-spathulate or suborbicular, 2–2.5(–2.7) by (1.5–)1.8–2.4 cm.

Stamens 10, unequal, the longest reaching halfway the corolla lobes; filaments linear, subdensely papillose-puberulous below, papillose in the middle, glabrous in the upper third; anthers oblong, 3–3.5 by 1 mm. *Disk* glabrous below, short-pubescent on the upper margin. *Ovary* subcylindric, greyish velutinous and densely lepidote (scales ± covered by the forward directed hairs), rather abrupt with the style, 7–8 by *c.* 2 mm; style thickish, densely subpatent-hairy to nearly the top, less densely lepidote, nearly as long as the corolla; stigma thick-capitate. *Capsula* narrow-cylindric, curved, laxly hairy and densely lepidote, *c.* 8 cm by 4 mm.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. In swampy jungle or white sand podsols at low elevations. *Fl.* Jan.-Dec.

Vern. *Jemalan*, Iban.

234. Rhododendron subcordatum BECC. Malesia 1 (1878) 203; MERR. En. Born. (1921) 463; SLEUM. Reinwardtia 5 (1960) 202.

Terrestrial shrub. Branchlets terete, 2–3 mm ø, the upper internodes laxly set with flattish scales, no hairs; internodes 3–7 cm. *Leaves* opposite or in 3(–4)-merous pseudowhorls at the upper 1–2 nodes, oblong- to lanceolate-ovate, apex mostly longish, rarely more shortly and rather abruptly acuminate, acute, base rounded to slightly cordate, coriaceous, glabrous above at full age, laxly and ± persistently lepidote beneath (scales very small, narrow marginal zone irregularly substellate-lobed or -dented, early dissolute, dark centre minute, markedly impressed), edge very slightly or not revolute, 9–17 by (3.5–)4–6 cm, midrib broadened at the very base, otherwise narrowly impressed above, as stout as the petiole and obtusely prominent in the lower part, gradually narrowed towards the apex of the lamina beneath, nerves 8–10(–12) much spreading pairs, straight below, curved-in-arching before the edge, faintly sunk above, slightly prominent or sometimes subinconspicuous beneath, reticulation rather obscure on both sides; petiole subterete, not grooved above, rugose, lepidote initially, finally glabrous, 1.5–2.5 cm by 2(–3) mm. *Umbels* 4–6-flowered. Bracteoles subfiliform, laxly lepidote. Pedicels ± densely very shortly pubescent and laxly lepidote, 2–2.8 cm by 0.7 mm. *Calyx* oblique, disk-shaped, very shortly lobed or wavy, *c.* 3 mm ø, lepidote outside. *Corolla* narrow-funnel-shaped, red, 5–5.5(–6) cm long in all, laxly lepidote outside, subdensely short-pubescent at the tube inside, tube 3–3.5 cm, base 5-saccate, 4–5 mm ø, gradually widened upwards to 1–1.5 cm at apex, lobes expanded, obovate-oblong, 2–2.5 by 1.2–1.5 cm. *Stamens* 10, subequal, attaining ± halfway the corolla lobes; filaments linear and densely subpatent-hairy in the lower half, filiform and glabrous for the rest; anthers oblong, 3–4 by 1 mm, base blunt. *Disk* densely pubescent at the upper margin. Ovary subcylindric-conical, velutinous (the short hairs covering minute scales), continuous with the style, the latter nearly 4 cm long in full anthesis, densely covered with short hairs and scales to nearly the top; stigma thick-capitate, 2.5 mm ø.

Distr. *Malesia*: Borneo (Sarawak: Prov. Batan Lupar, Mt Tian Laju), *c.* 1000 m. *Fl.* April, June.

235. Rhododendron vanvuurenii J.J.S. Bull. Jard. Bot. Btzg III, 1 (1920) 399, t. 48; H. J. LAM, Blumea 5 (1945) 577; SLEUM. Reinwardtia 5 (1960) 198. — *R. kjellbergii* J.J.S. in Fedde, Rep. 68 (1937) 202.

Shrub or treelet, terrestrial, often with rather long and flexile branches, 1.2–4 m. Branchlets reddish, terete, 2–4(–5) mm ø, covered with a dense, scurfy, detersile tomentum of deeply stellate and subdendroid, rufescent scales at the upper internodes, early glabrescent below; internodes (3–)5–10(–15) cm. *Leaves* mostly somewhat spaced, 5–9 in the uppermost part of the upper 1–2(–3) internodes, rarely more approximate in a pseudowhorl at the nodes, oblong to lanceolate, rarely elliptic- or ovate-lanceolate, apex short-acuminate, subacute, base ± broadly attenuate, subacute or mostly blunt, subinequilateral, thin-coriaceous, densely stellate-lepidote on both faces, glabrescent above with age, underneath the detersile, loose tomentum consisting of rufous longer persistent scales (these deeply and narrowly stellate-incised in the marginal zone, centre depressed and subdendroid-extended downwards, very slightly impressed), edge very slightly or not revolute, (5–)6.5–12(–14) by (1.5–)2.5–3.7 (rarely up to 5) cm, midrib narrowly impressed above, broader and very prominent beneath, nerves (6–)7–9 pairs, somewhat irregular, spreading, rather straight below, curved-anastomosing before the edge, mostly rather faintly raised, reticulation 0; petiole subterete, rather slender, ± densely lepidote, (4–)6–10 by 1–1.5 mm. *Umbels* (4–)5–10-flowered. Outer perulae ovate, more inner ones ovate-elliptic to broad-oblong, innermost ones oblong-spathulate, all densely very shortly appressed-hairy and lepidote outside, laxly hairy inside, up to 3 by 1.6 cm. Bracteoles filiform to linear-spathulate, laxly hairy, up to 2.2 cm. Pedicels rather stoutish, mostly densely, rarely more laxly subpatent-pubescent and caducously lepidote (especially at both ends), occasionally only laxly to subdensely lepidote and epilose, (0.9-)1.3–2.5 cm. *Calyx* oblique, shortly obtusely 5-lobed or -dented, *c.* 5 mm ø, densely hairy and lepidote. *Corolla* funnel-shaped, (3.7–)4.5–5.5 (sometimes up to 6) cm long in all, orange to yellow, also occasionally white or pink, laxly minutely stellate-lepidote outside, pubescent at the tube inside, tube obtusely 5-angular, 2–3 cm, base manifestly 5-saccate, 5–6 mm ø, gradually dilated to 1–1.3 cm at apex, lobes broadly obovate, 1.5–2.5 (rarely up to 3) by 1–2 cm. *Stamens* 10, subequal, reaching ± halfway the corolla lobes; filaments linear and hairy below, filiform and glabrous in the upper half; anthers oblong, (3–)4–5 mm, base obtuse. *Disk* densely pubescent at the upper margin only. *Ovary* subcylindric, tapering to the style, densely yellowish brownish velutinous and lepidote, (5–)7–9 by 2–2.5 mm; style slender, ± equalling the stamens, densely pubescent and lepidote below,

less so upwards, glabrous for the rest; stigma thick-capitate. *Capsule* subfusiform-cylindric, subdensely hairy and lepidote, 5.5–7 by 0.6–0.7 cm.

Distr. *Malesia*: Central Celebes.

Ecol. In light dry forest, grass and fern scrub vegetation, on rocks or bare slopes, locally common and gregarious, (600–)800–1600 m. *Fl.* June, July.

Note. The showy flowers vary in colour and are used for decoration by the people.

236. Rhododendron leptobrachion SLEUM. Reinwardtia 5 (1960) 203.

Shrub or treelet, up to 3 m. Branchlets terete, 1.5–3 mm ø, very tips laxly lepidote, glabrous otherwise, pruinose in dry specimens; internodes (3.5–)6–12 cm. *Leaves* in ± 5-merous pseudo-whorls at the upper 1–2 nodes, 1(–2) additional on the internode, lanceolote or suboblong-lanceolate, apex shortly subabruptly acuminate, subacute, base acutely attenuate to the petiole, subcoriaceous, ± densely lepidote at both faces when young, glabrescent and minutely blackish punctulate above with age, more persistently and laxly lepidote beneath (scales rather small, relatively wide marginal zone early dissolute, variously substellate-lobed or -dented, minute centre slightly impressed, blackish with age), margin faintly or not revolute, (5.5–)6.5–9 by 1.8–2.8 cm, midrib very narrow and impressed above, much and obtusely prominent beneath, pruinose, nerves 6–8(–10) pairs, irregular, spreading, obscurely inarching, with additional shorter intermediate veins, all minutely sunk or rather obscure above, raised beneath, reticulation rather dense, subinconspicuous above, more distinct beneath; petiole compressed and grooved dorsally, (1–)1.2–1.8(–2) cm by 1.5–1.8 mm. *Umbels* 4–6 (–10)-flowered. Pedicels slender, laxly lepidote, epilose, 0.8–1.4 cm. Outer perulae ovate to ovate-oblong, inner ones spathulate, very densely sericeous-hirsutulous outside, glabrous (the laxly pubescent base excepted) inside, up to 2 by 1 cm. Bracteoles linear, densely hirsutulous, 1.5–2 cm by 0.6 mm. *Calyx* obliquely disk-shaped, faintly 5-lobed, densely lepidote dorsally, 3–4 mm ø. *Corolla* tubular, scarlet to fiery red, 3–3.5(–4) cm long in all, laxly or very laxly lepidote especially towards the base outside, subdensely very shortly pubescent at the tube inside, tube subcylindric, straight, *c.* 2.5 cm, the base manifestly 5-saccate, *c.* 4 mm ø, dilated to 5–6 mm at apex, lobes broadly obovate or suborbicular, erecto-patent at anthesis, 1–1.3 by 0.7–0.9(–1) cm. *Stamens* 10, unequal, the longest reaching ± halfway the corolla lobes; filaments linear, densely subpatently pubescent in the lower ⅔, glabrous above; anthers obovate-oblong, 2 by 1 mm. *Disk* prominent, glabrous. *Ovary* subobovoid-cylindric, densely subpatently hairy and lepidote, 4–6 by 2–2.5 mm, tapering to the style, the latter rather slender, nearly as long as the stamens, subdensely to more laxly hairy in the lower half, sparsely or not lepidote; stigma capitate. *Capsule* obliquely subfusiform-cylindric, slightly curved, subdensely hairy and lepidote, 2.5–3 by 0.5–0.6 cm, on laxly lepidote pedicel 2.2–3 cm by 1 mm.

Distr. *Malesia*: Central Celebes.

Ecol. In mossy forest, 2000–2800(–3000) m, locally common. *Fl.* May-June.

237. Rhododendron schlechteri LAUT. in K. Sch. & Laut. Nachtr. (1905) 338; SCHLTR, Bot. Jahrb. 55 (1918) 158, f. 5; SLEUM. Reinwardtia 5 (1960) 120.

Epiphytic shrub, few-branched, 1–1.5 m. Branchlets terete, glabrous; internodes 6–8(–10) cm. *Leaves* spiral or subverticillate, crowded apically, ± spreading, oblong-elliptic, apex broadly obtusely attenuate, base broadly attenuate to rounded, coriaceous, firm, glabrous above at maturity, rather densely lepidote beneath (scales small, irregularly stellate-dentate or -lacerate in the marginal zone, centre not or very slightly immersed, finally caducous, leaving blackish points beneath), flat, 13–17 by 6–8 cm, midrib nearly flat above, robust and strongly raised below, nerves 8–9 pairs, rather straight or slightly curved, obsoletely anastomosing, slightly raised on both faces, reticulation obscure; petiole subterete, 1.5–2 cm by 2–3 mm. *Umbels* ± 12-flowered. Pedicels densely covered with rusty scales, which are deeply incised to or nearly to the small centre, otherwise laxly hairy immediately below the calyx, 1.2–2 cm by 2.5–3 mm. *Calyx* patelliform, ± oblique, shallowly 5-lobed and wavy, stellate-lepidote outside, glabrous inside, *c.* 6.5 mm ø. *Corolla* tubular below, funnelform distally, snow white, very fragrant, (15–)16(–17) cm long in all, tube cylindric, 10—12 cm long, base manifestly 5-saccate, *c.* 1–1.2 cm ø, gradually dilated to *c.* 1.4 cm in the middle, to 2–2.5 cm at apex, glabrous outside, rather densely hairy and laxly lepidote inside, lobes 5, obliquely and broadly obovate, rounded at the apex, ± spreading, margin wavy, *c.* 5–6(–7) by 3.5–4(–5) cm. *Stamens* 10, manifestly exserted; filaments linear, flat, *c.* 1.5 mm wide below, gradually attenuate and finally filiform distally, densely hairy (the hairs denser and ± retrorse at the margin) glabrescent in the upper third, 11–13.5 cm; anthers elongate-oblong, dorsifix, versatile, 1.6–1.8 cm by 1.8 mm, cells minutely apiculate at the base. *Disk* lobes set with tufts of short hairs. *Ovary* oblong-cylindric, very densely clad with yellowish, ± spreading hairs mixed with stellate scales, and covering them ± completely, *c.* 2.5 by 0.7–0.9 cm, gradually tapering to the very stout cylindrical style, (*c.* 12.5 cm by 3.5 mm), equally covered with yellowish or fulvous subpatent hairs and stellate scales for the lower *c.* 7 cm, becoming almost exclusively lepidote above, and entirely glabrous for 2 cm below the stigma, the latter broadly and shortly turbinate, coarsely 5-crenate.

Distr. *Malesia*: NE. New Guinea (Kani and Bismarck Mts).

Ecol. Rain-forest epiphyte on high trees, 1000–1700 m. *Fl.* Jan., June.

238. Rhododendron leucogigas SLEUM. Blumea 12 (1963) 102; Jahrb. Rhodod. Ges. Bremen (1963) 11, *in text*, f. 7–8; SCHNEIDER, Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 2–4.

Epiphytic lanky shrub, 1–2(–3) m, erect, few-branched. Branchlets densely stellate-lepidote at the new shoots, early glabrescent; upper internodes (3–)6–12(–20) by (0.5–)0.8–1.2 cm. *Leaves* in (3–)5–6(–7)-merous pseudowhorls at the upper 3–4 nodes, spreading, oblong or subelliptic- or subobovate-oblong, apex gradually attenuate to subacuminate, towards the base broadly attenuate to cuneate (base rounded-obtuse or often slightly cordate), coriaceous, young ones stellate-lepidote-tomentellous (scales of two different types, *i.e.* subdendroid much stellate-incised, rufous, early caducous ones, and flattish, minor and paler, less deeply dentate and more longer persistent ones, the impressions of the latter found on the mature leaves beneath), later ± glabrescent, flat, (18–)20–28 (in cultivation –36) by 6–10.5 cm, midrib broadened below, gradually narrower and becoming a little impressed distally above, as thick as the petiole and much prominent at the base, nerves (9–)10–11(–12) pairs, curved-ascending, inarching before the edge, slightly raised (their middle-line often faintly impressed) as is the lax network of the veins and veinlets above, much less prominent beneath; petiole somewhat flattened, 7–18(–20) by (3–)4–5 mm. *Umbels* (5–)6–8-flowered. Flower bud ovoid, of a dull carmine; outer perulae ovate, apiculate, more inner ones obovate to spathulate, covered with a tomentum of short, a little scabrid appressed hairs and scales outside, and by a tomentum of softer and longer hairs inside, 6.5–8 by 2–4 cm. Bracteoles linear, dilutely carmine, glabrous, *c.* 6 cm by 2–3 mm. Pedicels densely lepidote, *c.* 1 by 0.4–0.5 cm. *Calyx* rim-like, sometimes with irregular linear lobes up to 8 by 2 mm. *Corolla* 7-merous, tubular-funnelform, white suffused with pale carmine at angles of lobes with tube, and partly on the tube itself, subdensely stellate-lepidote outside, densely hairy at the tube inside, *c.* 14 cm long in all, strongly carnation-scented, tube straight, slightly dilated distally, 8–9 by 1.5–2 cm, lobes ± spreading, obovate, apex emarginate, edge crenulate, 5–5.5 by 3–4 cm. *Stamens* 14; filaments hairy, exserted for *c.* 1 cm; anthers linear, base obtuse, *c.* 12 by 1.5 mm. *Disk* densely hairy. *Ovary* thick-cylindrical, *c.* 1.5 by 1 cm, tomentose. Style thick, *c.* 7 cm by 2 mm, tomentose in the lower, hairy and lepidote in the upper half, with a short glabrous zone below the stigma. Submature *capsule* obfusiform, densely covered with hairs and scales, 14–16 cm by 1.4–1.8 cm, continuous with the style, the latter 10–11 cm by 2–3 mm, densely hairy and lepidote below, more laxly so upwards in the lower ¾, apparently exclusively lepidote for 5–6 mm, glabrous for the rest; stigma large, 7-lobed.

Distr. *Malesia*: W. New Guinea (Cycloop Mts).

Ecol. On tree trunks in riverine forest or in submossy *Nothofagus* forest at 1200–1350 m, not rare locally. *Fl.* apparently April-May, *fr.* June.

Note. This species has the largest leaves in New Guinea, and, to conclude from the size of the developed ovary *cq.* immature fruit, probably bears the largest flowers in the genus, nearest to *R. schlechteri* LAUT.

It is now in cultivation from cuttings and the description and size of the floral parts are taken from the living plant. The flowers of the latter may be smaller than those of the wild plant.

239. Rhododendron lompohense J.J.S. Bull. Jard. Bot. Btzg III, 1 (1920) 402, t. 50; SLEUM. Reinwardtia 5 (1960) 204.

Shrub. Branchlets terete, 2.5–4 mm ø, rather densely lepidote at the upper internode, elsewhere glabrous; internode 2.8–9 cm, with the scars of several rudimentary, very early caducous leaflets. *Leaves* in 4(–7)-merous pseudowhorls at the upper nodes, oblong-ovate, apex gradually acuminate, nearly acute, base ± rounded, rather stiffly coriaceous, initially densely lepidote on both faces, at maturity glabrescent above, ± persistently and subdensely lepidote beneath (scales flat, small, marginal zone irregularly incised, centre very slightly impressed), the margin faintly or not revolute, 7–10.5 by 2.8–4.4 cm (the upper leaves in the same whorl not rarely smaller), midrib broadened below, ± flat above, strongly raised beneath, nerves (8–)10–12(–14) spreading pairs, straight at the base, curved upwards and inarching distally, a little raised above, more distinctly so beneath, reticulation indistinct above, dense and minutely prominent beneath; petiole 6–12 by 1.5–2 mm. *Umbels* ± 6-flowered. Perulae orbicular to broadly ovate-acuminate, lepidote-fimbriate, lepidote and very shortly pubescent near the base outside, finally glabrescent, remaining faintly verruculose, up to 3 by 1.5 cm. Pedicels stoutish, subdensely lepidote, epilose, 1.2–1.6 cm. *Calyx* inconspicuous, disk-shaped, oblique, *c.* 3 mm ø. *Corolla* tubular below, more funnel-shaped upwards, white, glabrous outside, pubescent at the tube inside, tube subangular-cylindric, 2.6–3.1 cm, at base manifestly 5-gibbous, 4–5 mm ø, slightly dilated towards the apex, lobes obovate, erecto-patent, *c.* 1.5 by 1.2–1.3 cm. *Stamens* 10, somewhat exserted from the throat; filaments linear, rather densely hairy in the lower ⅔, glabrous for the rest; anthers oblong, base obtuse, *c.* 3 by 1 mm. *Disk* glabrous below, set with short white hairs at the upper margin. *Ovary* cylindric-conical, 5-angled, *c.* 9 by 2 mm, appressed-hairy (the hairs covering numerous scales), gradually developed into the style, the latter *c.* 2 cm long, densely hairy and laxly lepidote in the lower ⅔, glabrous above; stigma large, capitate, 5-lobed.

Distr. *Malesia*: Central Celebes (Mt Lompoh), once found. *Fl.* Dec.

240. Rhododendron buruense J.J.S. in Fedde, Rep. 30 (1932) 168; SLEUM. Reinwardtia 5 (1960)

204. — *R. lompohense* J.J.S. *var. grandifolium* J.J.S. in Fedde, Rep. 30 (1932) 169.

Terrestrial shrub, up to 3.5 m. Branchlets terete, 3–4 mm ø, laxly appressed-lepidote at the upper internode which is ± distinctly pruinose; internodes (3–)7–16 cm. *Leaves* in 4–5(–6)-merous, lax pseudowhorls at the upper 1–2 nodes, 1–2 additional ones on the internode which has also scattered spaced scars of reduced, very early caducous leaflets, ovate-oblong to elliptic, apex short-acuminate, rather obtuse, base broadly attenuate, sometimes nearly rounded, coriaceous, glabrous above at full age, laxly ± persistently lepidote beneath (scales small, the early disappearing marginal zone variously lobed or dented, leaving dark spots, centre small, shallowly impressed), edge very slightly or not revolute, (7–)12–16 by (4–)5–7.5 cm, midrib grooved above, obtusely prominent beneath, nerves 8–12 pairs, mostly straight below, curved-anastomosing before the edge, minutely impressed above, distinctly raised beneath, reticulation rather lax and but faintly prominent beneath; petiole subterete or slightly flattened, rugose, often pruinose, 1–2 cm by 1.5–2 mm. *Umbels* 7–10-flowered. Pedicels ± laxly lepidote, laxly to very laxly pubescent, (2–)2.2–3.3 cm by *c.* 1 mm. *Calyx* obliquely disk-shaped, lepidote and with some short hairs dorsally, 4–5 mm ø. *Corolla* broad-funnel-shaped in outline, tubular below, white, 4–4.5(–5) cm long in all, with some very scattered scales, *i.e.* practically glabrous outside, short-pubescent at the tube inside, tube cylindric, straight, 2–2.6 cm, at base manifestly 5-saccate, 5–6 mm ø, slightly widened towards apex, lobes ± expanded, broad-obovate to suborbicular, (1.2–)1.5–2.3 by (1.2–)1.5–2 cm. *Stamens* 10, unequal, the longest reaching halfway the corolla lobes; filaments linear and subdensely patent-hairy in the lower ⅓ to ½, more filiform and glabrous above; anthers oblong, 3–4 by 1 mm, the very base slightly thickened, gland-like. *Disk* prominent, glabrous or short-hairy at the upper margin. *Ovary* subcylindric, densely clothed with subpatent short hairs which cover small scales, 6–7 by 2.5–3 mm, rather abrupt with the style, the latter ± densely hairy and laxly lepidote to the lower ⅔, glabrous for the rest; stigma capitate.

Distr. *Malesia*: Moluccas (Buru).

Ecol. On loamy mouldered limestone, 1290–1900 m. *Fl.* Feb., April.

241. **Rhododendron bloembergenii** SLEUM. Reinwardtia 5 (1960) 204.

Treelet, *c.* 3 m. Branchlets subangular and very sparsely appressed-lepidote at the tips, otherwise terete, glabrous, not rarely pruinose, 4–9 mm ø; internodes 5–20 cm. *Leaves* opposite or in 3-merous pseudowhorls at the upper 1–2(–3) nodes, with 1–2(–3) additional leaves (scattered on internode), broad-oblong, apex shortly and not rarely rather abruptly acuminate, subacute, base broadly attenuate, subinequilateral, firmly coriaceous, sparsely lepidote or entirely glabrescent above with age, subpersistently laxly to subdensely lepidote beneath (scales minute, flat, the rather broad, early dissolved marginal zone irregularly substellate-lobed or -dented, centre very small, hardly impressed), edge very shortly revolute in dry state, (9–)11–19 by (3–)4–8 cm, midrib as wide as the petiole in the lower part, flat or shallowly impressed above, very thick and obtusely prominent beneath, nerves 9–12 pairs, high-ascending at a rather acute angle, curved and anastomosing before the edge, with several intermediate smaller nerves, all ± parallel, faintly impressed or raised above, distinctly prominent beneath, reticulation slightly raised beneath only; petiole flattened, 1–1.5(–2) cm by *c.* 3 mm, lepidote, lengthwise striate as is the midrib. *Umbels* ± 10-flowered. Outer perulae ovate, blunt, 1.5–2 by *c.* 1 cm, initially (especially at the base) sericeous dorsally, early glabrescent, manifestly rough to the touch, inner ones oblong to oblong-spathulate, very densely subsericeous-hirsutulous dorsally, up to 6 by 2.5 cm. Bracteoles linear-subspathulate, ± densely hairy, *c.* 2 cm by 1–1.5 mm. Pedicels subdensely substellate-lepidote at anthesis, 1.2–1.7 cm by *c.* 1.5 mm. *Calyx* disk-like, very short, *c.* 3 mm ø. *Corolla* long-tubular below, expanded at the limb, white, fragrant, glabrous outside, densely shortly pubescent at the tube inside, (6.5–)7–7.5 cm long in all, tube 4.5–5 cm, cylindric, straight, base ± 5-saccate, 5–6 mm ø, hardly dilated to apex, lobes broadly obovate-spathulate or suborbicular, 2–2.5 by 1.5–2 cm. *Stamens* 10, reaching ± halfway the corolla lobes; filaments linear and densely patent-hairy to the lower ⅔, glabrous and filiform above; anthers oblong, 6–7 by *c.* 1.5 mm, each cell protracted in a short basal appendix. *Disk* rather prominent, glabrous, *Ovary* subcylindric, yellowish tomentose (scales not visible), 9–10 by 3–4 mm, continuous with the style, the latter thick, slightly exceeding the stamens, densely hairy below, more subdensely or laxly so and minutely lepidote in the upper part, glabrous for the upper 6–8 mm; stigma thick-capitate, *c.* 3 *mm ø. Capsule* thick-subfusiform-cylindric, laxly shortly hairy, somewhat rugose, slightly curved, 3.5–4 by 0.7–0.8 cm; pedicel 3–3.5 cm by 2 mm.

Distr. *Malesia*: W. and Central SW. Celebes (Mt Ngilalaki, E of Lake Lindu; Latimodjong Mts).

Ecol. Summit vegetation, 2200–2335 m. *Fl.* July, *fr.* Aug.

242. **Rhododendron macgregoriae** F. v. M. J. Bot. 29(1891) 177; J.J.S. Nova Guinea 18 (1936) 97; SLEUM. Reinwardtia 5 (1960) 205; Blumea 11 (1961) 127; *ibid.* 12 (1963) 112; Jahrb. Rhodod. Ges. Bremen (1963) f. 5, 20, 32.—*R. hansemanni* WARB. Bot. Jahrb. 16 (1892) 26; K. SCH. & LAUT. Fl. Schutzgeb. (1901) 487; SCHLTR, Bot. Jahrb. 55 (1917) 141, f. 1; LANE-POOLE, For. Res. Papua (1925) 130; WHITE & FRANCIS, Proc. R. Soc. Queensl. 39 (1928) 68; DIELS, Bot. Jahrb. 62 (1929) 486.—*R. vonroemeri* KOORD. Nova Guinea 8 (1912) 879, t. 155; J.J.S. *ibid.* 12 (1914) 143; GIBBS, Arfak (1917) 170.—*R. lauterbachianum*

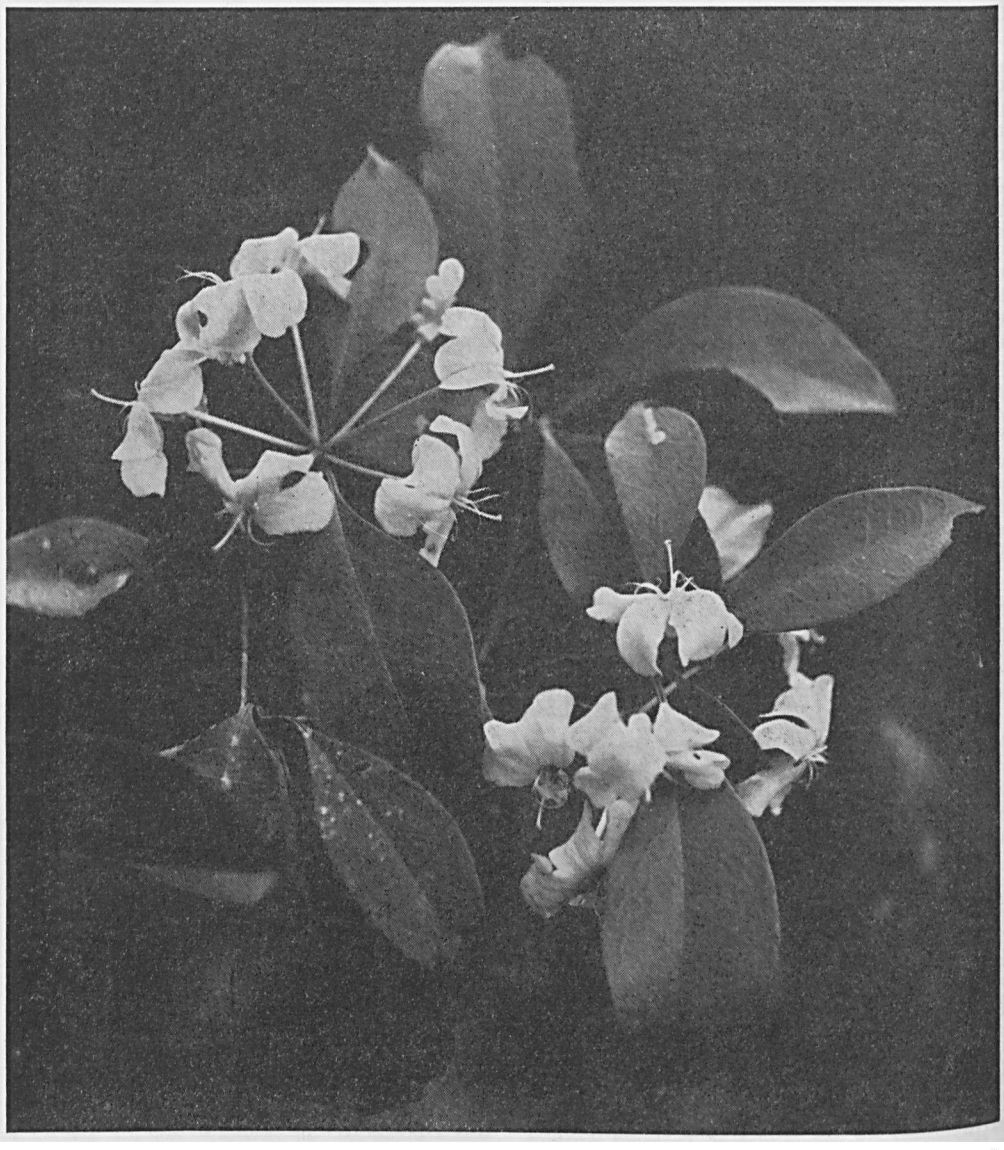

Fig. 39. *Rhododendron macgregoriae* F. v. M. Mt Nettoti, 1750 m, NW. New Guinea (VAN ROYEN & SLEUMER 7415) (SLEUMER, 1961).

FOERSTER in Fedde, Rep. 13 (1914) 224; STONOR, Rhodod. Yearbook 6 (1951) 49, f. 49—*R. calceolarioides* WERNH. Trans. Linn. Soc. II, Bot. 9(1916) 95.—*R. gorumense* SCHLTR, Bot. Jahrb. 55 (1917) 142.—**Fig. 39.**

KEY TO THE VARIETIES

1. Corolla ± densely hairy at the tube inside. **1. *var.* macgregoriae**
1. Corolla glabrous inside.
2. Filaments densely hairy below **2. *var.* mayrii**
2. Filaments very sparsely hairy below, or quite glabrous . . . . . **3. *var.* glabrifilum**

1. *var.* macgregoriae.

Shrub or treelet, 0.5–5 m, rarely tree up to 15 m, terrestrial, rarely epiphytic. Branchlets rather slender, terete, upper internodes sparsely lepidote, lower parts glabrous; internodes (2–)4–10 cm. *Leaves* mostly in 3–5(–7)-merous pseudowhorls, rarely subopposite at the upper 1–3 nodes, ovate-lanceolate to subovate- or sometimes elliptic-oblong, rarely ovate, apex ± shortly acuminate, subacute or more bluntish, base broadly and ± acutely attenuate to the petiole, rarely rounded (then petiole longer than 4 mm), subcoriaceous to rather coriaceous, glabrous above

at maturity, subdensely lepidote beneath (scales brownish, flat, thin, marginal zone irregularly dentate or incised, centre small, shallowly or hardly impressed), ± flat, (4–)5–8 (rarely up to 15) by (1.7–)3.5(–6) cm, midrib a little impressed above, prominent beneath, nerves (6–)8–10 pairs, spreading, ± straight and markedly inarched before the edge, slightly raised above to faintly impressed, somewhat prominent beneath, reticulation very slightly raised on both sides, rather dense and mostly well visible; petiole flattened, grooved above, lepidote, (3–)6–12 mm. Flower buds subglobose. *Umbels* (4–)8–15-flowered. Outer perulae ovate, inner ones obovate to spathulate, all dorsally laxly lepidote and minutely sericeous, ciliate, up to 2 by 1 cm. Bracteoles linear to filiform, subspathulate distally, very laxly hairy or glabrous, up to 1.5 cm. Pedicels slender to rather stoutish, sparsely lepidote, normally epilose, but sometimes laxly set with very fine, short hairs, (1–5.)2.5–3.5(–4.5, rarely up to 7) cm. *Calyx* oblique, patellar, sometimes rudimentary, lobes indistinct, margin ± ciliate. *Corolla* tubular below, generally much (subhorizontally) expanded at the lobes, light yellow to dark orange or yellow at the tube and/or centre, reddish orange at the lobes, variable in size, mostly scentless, (1–1.8–)2–2.8 cm long in all (in natural hybrids with other species of *ser. Javanica* tending towards *R. macgregoriae*, larger, up to 4 cm long with more erect corolla lobes), 5-lobed to $^1/_2$–$^3/_5$, laxly lepidote outside, ± densely set with spreading hairs at the tube inside, tube straight, somewhat 5-angular, with 5 basal rounded-saccate pouches, *c.* 1 cm long, 3–5 mm ø at base, slightly or not dilated upwards, lobes broadly obovate-spathulate, laxly lepidote outside, glabrous inside, 1.2–1.8(–2) by 0.8–1.3(–1.6) cm. *Stamens* 10, unequal, almost as long as the corolla; filaments linear and densely clothed with spreading hairs or subvillous in the lower, glabrous and narrower in the upper half; anthers oblong, 2.5–3.2 by *c.* 1 mm. *Disk* with thick lobes, mostly glabrous, rarely shortly hairy in the upper half. *Ovary* elongate-conical, densely covered with subappressed hairs, which completely cover the scales, *c.* 4 by 1.8 mm, tapering to the style, the latter 1–1.5 cm, densely to laxly hairy and lepidote in its lower, glabrous in upper half; stigma thick-capitate, somewhat deepened in the middle, lobes distinct. *Capsule* cylindric, slightly curved, manifestly 5-ribbed, attenuate at apex and base, hairy and lepidote, 3.5–4.5 by 0.3–0.4 cm, on slender fruit-pedicel 4–5 cm; valves twisting. *Seeds c.* 4 mm including the long tail at both ends.

Distr. *Malesia*: New Guinea.

Ecol. Distributed over the whole of New Guinea, fairly common, locally abundant to such degree, that it can be recognized from a far distance when in flower, both in primary mossy forest, secondary brushes and moderately dry sunny situations, among trees on mountain slopes, in thin canopy shade (*Quercus* forest), also along creeks, on precipitous banks of streams, scattered over open (*Imperata*-, maybe regrowth) grassland, not rarely on landslides and formerly cultivated land, invading artificial clearings (air strips), on sandy or often on peaty soil, also stony clay and limestone ridge, at (120–)500–3000(–3350, perhaps even more) m. *Fl.* Jan.-Dec.

Vern. *Gupou*, Ueli: Movoi (Kunimaipa Valley), *nektamuk*, Dani, *waradé*, Kapauku, *gorogoro*, Guale: Movoi, *tiriz*, Ueli: Movoi (Upper Zevi Valley), *nekaloa*, Andjai, *hongkempa*, Sosomepari, *hakessa*, Asaro: Kefamo, *kibimume*, Chimbu: Masul, *wumbamb*, Wahgi: Minj, *wambu*, Hagen: Togoba, *atikro*, Kebar: Karoon, *ron*, Enga, *xdĕpnàan*, Hattam, *wamp*, Mendi, *favell*, Wapi.

Note. Reported to be poisonous to mules (Edie Creek). Natural hybrids, apparently in the first place with the equally common *R. zoelleri*, not rare locally. Such plants show the general habit and foliage of *R. macgregoriae*, but have larger flowers.

2. *var.* mayrii (J.J.S.) SLEUM. Reinwardtia 5 (1960) 206.—*R. mayrii* J.J.S. Nova Guinea 18 (1936) 97, t. 20, f. 2.

Corolla glabrous inside, light red, otherwise as in *var. macgregoriae*.

Distr. *Malesia*: W. New Guinea (Arfak Mts: Mt Ditschi), at 1100 m, once found.

Vern. *Sangsaia*.

3. *var.* glabrifilum (J.J.S.) SLEUM. Reinwardtia 5 (1960) 206; Blumea 11 (1961) 127; *ibid.* 12 (1963) 112.—*R. glabrifilum* J.J.S. Nova Guinea 12 (1914) 134, t. 31.—*R. torricellense* SCHLTR, Bot. Jahrb. 55 (1917) 142.

Filaments very sparsely hairy below or quite glabrous. *Corolla* glabrous inside (yellow or red), otherwise as in *var. macgregoriae*.

Distr. *Malesia*: New Guinea.

Ecol. Apparently with preference (or exclusively?) epiphytic, 200–1675 m.

Vern. *Munako*, Kamora.

243. Rhododendron rosendahlii SLEUM. Reinwardtia 5 (1960) 207.

Erect shrub, *c.* 1.5 m. Branchlets erect, laxly substellate-lepidote at the upper internodes (1.5–7 cm by 1.5–2 mm), glabrescent at the lower ones (3–10 cm by 2–3 mm). *Leaves* in 3–4(–5)-merous pseudowhorls at the upper 2–3 nodes, ovate to ovate-elliptic, apex longer or shorter and gradually acuminate or attenuate, ± bluntish, more rarely subacute, sometimes almost rounded and minutely emarginate, at base slightly but distinctly cordate, coriaceous, laxly punctate by the remains of scales above, laxly to subdensely and subpersistently lepidote beneath (scales small, variously substellate-lobed or -dented at the early evanescent marginal zone, centre minute, much impressed), margin slightly revolute, (3–)4–6 (–7.5) by (2–)2.5–3.5 cm, midrib narrow and immersed above, a continuation of the thick petiole and obtusely prominent in the lower part beneath, nerves 6–8 pairs, spreading, curved-anastomosing before the edge, slightly impressed above, faintly so beneath or almost inconspicuous,

reticulation ± obscure; petiole subterete, grooved above, 2–4(–5) by 1.5–2 mm. *Umbels* 3–5-flowered. Outer perulae subcoriaceous, ovate, short-acuminate, laxly lepidote and minutely sericeous in the middle line dorsally, 5–6 by *c.* 3 mm, inner ones much thinner, obtuse, oblong to obovate-spathulate, densely and very shortly sericeous, not lepidote, up to 2 by *c.* 0.7 cm. Bracteoles filiform below, subspathulate-dilated distally, pubescent, up to 1.5 cm by *c.* 1 mm. Pedicels densely subpatently pubescent and very laxly or not lepidote, (1.5–)2–2.5(–3.5) cm by *c.* 0.6 mm. *Calyx* disk-shaped, very shortly obtusely 5-dented, shortly pubescent dorsally, *c.* 3 mm ø. *Corolla* tubular-funnel-shaped, slightly oblique, dark red, sparsely substellate-lepidote outside, glabrous inside, 3–3.5 cm long in all, tube (2–)2.5 cm, at base manifestly 5-saccate, *c.* 4 mm ø, dilated to 6–8 mm at apex, lobes broadly spathulate or suborbicular, 1–1.2 by 0.8–1 cm. *Stamens* 10, unequal, the longest reaching ± halfway the corolla lobes; filaments linear, glabrous. *Disk* tomentellous especially at the upper margin. *Ovary* subcylindric, continuous with the style, tomentose, the spreading hairs hiding minute scales, 6–7 by 2.5 mm; style thickish, tomentose in the lower, less densely hairy in the upper part, glabrous for the ultimate 2–3 mm; stigma thick-capitate.

Distr. *Malesia*: New Guinea (Wissel Lakes region).

Ecol. Terrestrial, in peaty swamp, 1380–1800 m. *Fl.* Sept., Jan.

Vern. *Wagadei*, Kapauku.

244. Rhododendron comparabile SLEUM. Reinwardtia 5 (1960) 208.

Erect shrub, up to 2 m. Branchlets (2–)3–4 mm ø, subterete, laxly and caducously substellate-lepidote at the upper internodes, early glabrescent below, not rarely pruinose; internodes 2–8(–11) cm. *Leaves* in 4–5-merous pseudowhorls at the upper 2–3(–5) nodes, elliptic to subobovate-elliptic, apex very broadly attenuate or very shortly subabruptly acuminate, obtuse, sometimes rounded, base broadly attenuate to the petiole, coriaceous, glabrous above at full age, laxly and subpersistently lepidote beneath (scales minute, the marginal zone irregularly substellate-lobed or -dented, centre slightly impressed), edge slightly but distinctly revolute, (3.5–)4.5–8(–9) by 2.5–4(–5) cm, midrib narrowly impressed above, thick and obtusely prominent beneath, nerves (5–)6–9 pairs, spreading, sometimes irregular, or in part divided before the edge, mostly subparallel to each other and distinctly curved-anastomosing, slightly impressed above, somewhat raised beneath, reticulation faintly impressed above in old leaves, not rarely subinconspicuous; petiole subterete, grooved above, (8–)10–18(–23) by 1–2 mm. *Umbels* (8–)9–13-flowered. Outer perulae ovate, subacuminate, or orbicular, lepidote at the median or to the apex dorsally, inner ones obovate to spathulate, early glabrescent dorsally, or glabrous from the beginning, all with marginal scales, up to 2 by 1.5 cm. Bracteoles linear-spathulate, glabrous, *c.* 1.5 cm by 0.5–1.5 mm .Pedicels rather densely substellate-lepidote, 2–2.5(–3) cm by *c.* 1 mm. *Calyx* obliquely disk-shaped, very shortly and bluntly 5-lobed, lepidote dorsally, *c.* 3 mm ø. *Corolla* funnel-shaped, white, fragrant, (4–)4.5(–4.8) cm long in all (5 cm ø at limb when fresh), laxly to subdensely set with minute substellate scales outside, short-pubescent at tube inside, tube straight, subcylindric, *c.* 2.5 cm, at base markedly 5-saccate, 5–6 mm ø, gradually dilated to 8–12 mm at apex, lobes broadly obovate or suborbicular, spreading, (1.5–) 2 cm ø. *Stamens* 10, subequal, exserted; filaments linear and laxly patently hairy in the lower ⅔, more filiform and glabrous apically; anthers narrow-oblong, 3–3.5 by 0.8 mm. *Disk* hardly prominent, glabrous. *Ovary* subcylindric, densely clad with forward directed hairs which ± cover the scales, 5–6 by *c.* 2 mm, rather continuous with the style, the latter slightly shorter than the stamens, densely hairy and lepidote to the lower ¾, lepidote at apex; stigma capitate, deeply 5-lobed. *Capsule* subcylindric, 3–3.5 by 0.5–0.6 cm, on fruit-pedicel 2.5–3 cm by 1.5 mm. *Seeds* very narrow, 4–5 mm including the long tails.

Distr. *Malesia*: E. New Guinea (Milne Bay Distr.: Sudest I., on Mt Riu), 600–800 m, scattered in stiff scrub on summit or on edge of a precipice. *Fl.* Aug.

Note. Much related to *R. lochae* F. v. M. from NE. Queensland (the only *Rhododendron* in Australia), which, however, has red corollas, laxly hairy ovary (the scales thus clearly visible) and 2–5 (rarely up to 7) flowers per umbel.

245. Rhododendron luraluense SLEUM. Notizbl. Berl.-Dahl. 12 (1935) 485; Reinwardtia 5 (1960) 209.

Small, epiphytic shrub or tree, up to 9 m. Branchlets subterete, 2–3(–4) mm ø, laxly lepidote at the upper internode, glabrous below; internodes 3.5–8 cm. *Leaves* in 4–7-merous pseudowhorls at the upper 2–3 nodes, obovate-elliptic to obovate-oblong, apex broadly attenuate, subapiculate or obtuse, rarely rounded, base broadly cuneate to the petiole, coriaceous to subcoriaceous, glabrous above at full age, laxly to very laxly and more persistently lepidote beneath (scales very small, the early dissolved marginal zone irregularly dented, centre dark, slightly impressed), edge somewhat recurved, (3.5–)4–5.5(–6) by 2–2.8(–3.2) cm, midrib broad and impressed in the lower part above, broadly and obtusely prominent beneath, nerves 4–5(–6) irregular pairs, spreading, inconspicuously inarching before the edge, faintly impressed or hardly visible above, slightly prominent beneath, reticulation lax, a little raised beneath only; petiole flattened, grooved above, 3–4(–5) by 1–1.5 mm. *Umbels* (3–)4–5-flowered. Outer perulae ovate-acuminate, inner ones obovate to spathulate, all glabrous or laxly lepidote apically outside, 0.5–1.2 by 0.3–0.6 cm. Bracteoles filiform, glabrous, *c.* 1 cm. Pedicels rather stoutish, laxly substellate-lepidote, more densely so at apex, *c.* 1.3 cm. *Calyx* oblique, disk-shaped, very shortly

5-lobulate, *c.* 3 mm ø. *Corolla* funnel-shaped, (3–)3.5–4(4.5) cm long in all (limb *c.* 5 cm ø when fresh), white, membranous, sparsely lepidote outside, very laxly and shortly pubescent at the tube inside, tube 1.5–2 cm, at base *c.* 4 mm ø, gradually widened to 7–9 mm at apex, lobes obovate-suborbicular, spreading, (1–)1.5 by 1–1.4 cm. *Stamens* 10, reaching ± halfway the corolla lobes; filaments linear and densely hairy below, filiform and glabrous above; anthers oblong, *c.* 2.5 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely white-hairy and lepidote (the hairs ± covering the scales), *c.* 4 by 1.8 mm, rather abrupt with the style, the latter slender, not quite equalling the stamens, subdensely to laxly hairy and lepidote to about the lower ¾; stigma capitate.

Distr. Melanesia: Solomon Is. (Bougainville, Crown Prince Range), twice found.

Ecol. In rain-forest, or stunted vegetation, locally common, at 900–1500 m. *Fl.* Aug., Oct.

Vern. *Kiribut.*

246. Rhododendron flavoviride J.J.S. Med. Rijksherb. *n.* 25 (1915) 4; Nova Guinea 12 (1917) 505; *ibid.* 12 (1918) t. 200 a, 204 b-e; SLEUM. Reinwardtia 5 (1960) 207.

Much-branched, terrestrial shrub, up to 4 m. Branchlets subterete, ± densely lepidote at the upper internodes, glabrescent, 2–4 mm ø; internodes (1.5–)2.5–5(–8) cm. *Leaves* in (4–)6–8-merous pseudowhorls at the upper 1–2 nodes, elliptic or ovate-elliptic, apex obtuse or rounded, base mostly rounded, more rarely broad-attenuate, coriaceous, ± stiff, initially lepidote on both faces, glabrescent leaving dense minute blackish pits above, more persistently and subdensely lepidote beneath (scales rather large, flat, marginal zone wide, shortly substellate-lobed or -dented, minute centre very dark, somewhat impressed), edge much revolute, 2.5–4.5 by (1.5–)2–2.7 cm, midrib narrow and slightly sunk above, as robust as the petiole and much prominent beneath, nerves 6–8 pairs, spreading, rather irregular, anastomosing, slightly depressed above and raised beneath in old leaves, reticulation rather dense, slightly impressed above, faintly to markedly raised beneath; petiole lepidote, subterete, 3–5 by 1–1.5 mm. *Umbels* 3–5-flowered. Outer perulae suborbicular, lepidote dorsally, inner ones obovate to spathulate, glabrous, up to 1.6 by 0.8 cm. Bracteoles linear to linear-spathulate, glabrous or lepidote apically, up to 1.9 cm. Pedicels stoutish, densely substellate-lepidote, epilose, 1–1.7 cm. *Calyx* obliquely disk-shaped, very shortly and obtusely 5-lobed, 4–5 mm ø. *Corolla* tubular in outline, somewhat oblique and curved, yellow-green or pale green, fragrant, (3.5–)4–4.5 cm long in all, laxly substellate-lepidote outside, short-pubescent at the tube inside, tube subcylindric, 2.5–3 cm, at base 5-saccate, 4–5 mm ø, slightly dilated upwards, lobes suborbicular, suberect or somewhat spreading, 1(–1.2) cm ø. *Stamens* 10, ± as long as the corolla; filaments linear below, more filiform distally, subdensely to laxly pubescent to nearly the top; anthers oblong, *c.* 2.5 by 0.8 mm, base obtuse. *Disk* hardly prominent, glabrous. *Ovary* subcylindric-conical, base attenuate, apex somewhat constricted to the style, yellowish velutinous, the straight hairs covering small scales, *c.* 5 by 2 mm; style as long as the stamens, finally a little exserted, hairy and lepidote to the lower ¼–⅓, lepidote and whether or not very laxly hairy up to the middle, glabrous above; stigma capitate.

Distr. *Malesia*: W. New Guinea (Oranje Mts: Kajan Mts and near Lake Habbema).

Ecol. In open, swampy localities, or edge of forest, *c.* 3200 m. *Fl.* Feb., Aug.

247. Rhododendron christianae SLEUM. Reinwardtia 5 (1960) 211; Blumea 11 (1961) 128; CRUTTWELL, J. R. Hort. Soc. 87 (1962) 81, f. 21.

Rather compact terrestrial shrub, up to 3 m. Branches terete, 7–8 mm ø; bark brownish greyish. Branchlets obtusangular and sparsely lepidote at the tips, subterete and glabrous at the older parts; internodes (2–)3.5–11(–13) cm. *Leaves* in 3(–5)-merous pseudowhorls at the upper 1–3(–4) nodes, ± broadly elliptic or subobovate-elliptic, apex rather abruptly and very shortly or more gradually acuminate, blunt, sometimes rounded or sligthly emarginate, terminal gland thick, not emerging, base broadly attenuate into the petiole or more rarely cuneate, coriaceous, juvenile ones laxly lepidote on both faces, mature ones quite glabrous above, laxly to very laxly lepidote for a long time beneath (scales small, marginal zone variously lobed or dented, centre slightly impressed), flat, 4–7.5 by 3–4.5 cm, midrib slightly or faintly sunk above, much and bluntly prominent in the lower part beneath, nerves 5–7 pairs, spreading, divided and curved-anastomosing before the edge, rather obscure above, a little raised beneath, reticulation inconspicuous; petiole subterete, grooved dorsally, somewhat rugose, glabrous, (5–)6–10 by 1–1.5 mm. *Umbels* (2–)3–4(–5)-flowered. Outer perulae ovate to obovate, innermost ones oblong-spathulate, hirsutulous on the dorsal middle line and at the apex, margin with early caducous scales, up to 1.5 by 0.8 cm. Bracteoles linear-subspathulate to filiform, laxly pubescent, *c.* 1.5 cm. Pedicels densely and shortly hairy, laxly lepidote at both ends, 1–1.8(–2.7) cm by *c.* 1 mm. *Calyx* oblique, disk-shaped, shortly obtusely 5-lobed, lepidote and pubescent dorsally, *c.* 4 mm ø. *Corolla* widely tubular-subcampanulate, normally deep yellow shading to glowing orange, or bright orange at the lobes, and yellow at the throat, sometimes salmon or paling almost to yellow and darkening to russet, occasionally red outside and greenish inside, sparsely lepidote outside, laxly hairy at the lower third of the tube inside, tube straight, (2.5–)3–3.5 cm, at base much 5-saccate, 7–8(–10) mm ø, gradually dilated to 1.5–2 cm at apex, lobes broadly obovate or suborbicular, (1.5–)2–2.5 by *c.* 2 cm. *Stamens* 10, very unequal, the longest reaching halfway the corolla lobes, the shortest hardly exserted; filaments linear, *c.* 1 mm wide at the base, densely and very shortly papillose-

pubescent in the lower third, glabrous at apex; anthers narrow-oblong, (3–)4–5 by 1 mm, base very shortly biappendiculate. *Disk* slightly prominent, white-velutinous at the upper margin. *Ovary* subcylindric, rather abrupt with the style, white-tomentose (and lepidote but scales hidden by the hairs), *c.* 6 by 2.5 mm; style 3–4 cm long, ± as long as the corolla tube, densely or upwards more laxly hairy and lepidote to the lower ¾, glabrous for the 5–7 mm below the thick-capitate, manifestly 5-lobed stigma.

Distr. *Malesia*: SE. New Guinea (Milne Bay Distr.: Daga country).

Ecol. On precipitous rock face or cliff edges, overhanging deep gorge or gullies, in full sun. "Locally abundant from 600–1525 m. When in flower (properly about June), it is a mass of orange and a conspicuous sight for miles, even from an aeroplane" (N. E. G. CRUTTWELL, *in litt.*). *Fl.* May-Oct.

248. Rhododendron laetum J.J.S. Nova Guinea 12 (1914) 139, t. 35; in Gibbs, Arfak (1917) 169; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 479; SLEUM. Reinwardtia 5 (1960) 212; Blumea 12 (1963) 112; Jahrb. Rhodod. Ges. Bremen (1963) f. 35.—*R. uliginosum* J.J.S. Nova Guinea 12 (1914) 136, t. 33; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 479.—**Fig. 40.**

Terrestrial shrub, 0.5–1.5(–3) m. Branchlets obtusangular and laxly lepidote at young shoots, 3–5(–6) mm ø, terete and practically glabrous later; internodes (2.5–)3–16 cm. *Leaves* in 4–5(–7)-merous pseudowhorls at the upper 1–2 nodes, broadly elliptic or subovate-elliptic, apex mostly very shortly acuminate or subcuspidate, more rarely broadly attenuate, subacute or bluntish, sometimes rounded, base mostly rounded, rarely very broadly attenuate or subcordate, coriaceous, dark green and glossy above, paler beneath, subdensely lepidote on both faces initially, glabrous above at full age, ± persistently and rather laxly lepidote beneath (scales small, marginal zone irregularly substellate-lobed or -dented, early dissolved, minute centre shallowly impressed), finally glabrescent, but remaining punctate beneath, margin ± flat, (4–)5–9.5 by (2.5–)3–5.3 cm, midrib narrow and grooved above, as stout as the petiole and obtusely prominent at the base beneath, nerves 6–8 pairs, spreading, rather obscurely anastomosing before the edge, faintly impressed, or not rarely inconspicuous above, slightly to dinstinctly raised beneath, reticulation lax, a little prominent beneath, or often ± obsolete; petiole depressed and grooved dorsally, 2–5(–7) by 2–3 mm. *Umbels* (5–)6–8-flowered. Flower buds ovoid, *c.* 4.5 by 2.5 cm. Outer perulae rounded to ovate, apiculate or obtuse, initially dorsally with very short substrigose hairs, glabrescent and ± smooth finally, inner ones ovate-oblong to subspathulate, glabrous or nearly so dorsally, to 3.5–5 by 1.5–2 cm. Bracteoles filiform, subspathulate at apex, very laxly hairy or glabrous, *c.* 4 cm by 0.5–1 mm. Pedicels subdensely stellate-lepidote, moreover puberulous to various degree, 2.5–5.5 by *c.* 1 mm. *Calyx* obliquely disk-shaped, very shortly obtusely 5-lobed, lepidote and puberulous dorsally, wavy, *c.* 4 mm ø. *Corolla* rather broadly funnel-shaped, fleshy and fragrant, of a deep pure yellow first, becoming suffused with red, orange or salmon in later stages, or sometimes dilutely rose-coloured then, laxly stellate-lepidote and may be with some hairs at the base outside, short-pubescent at the tube inside, 6.5–7 cm long and *c.* 5 cm ø at the

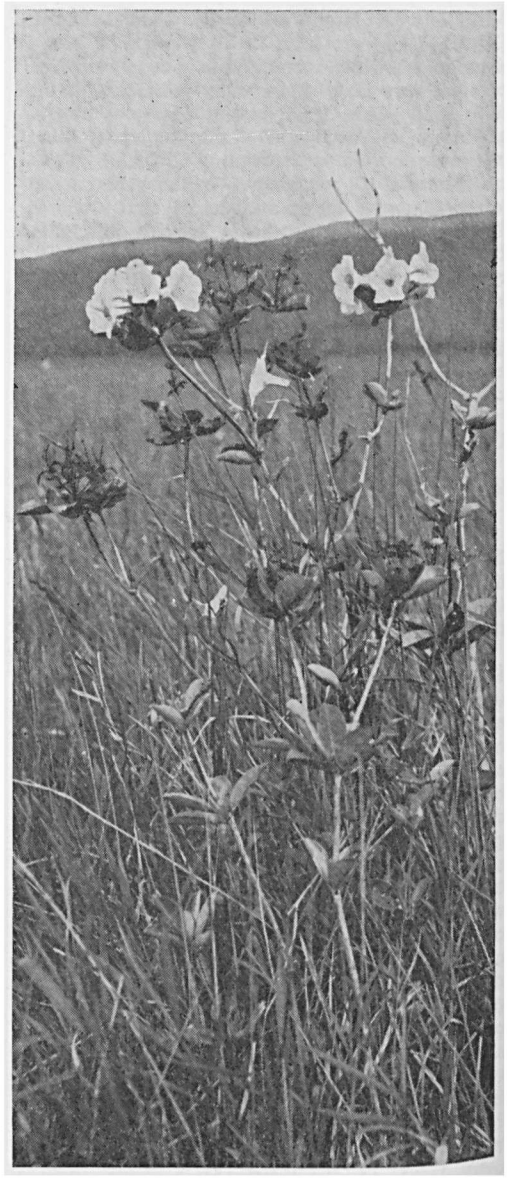

Fig. 40 *Rhododendron laetum* J. J. S. Swamp nea Iray, Anggi Gigi Lake, Arfak Mts, NW. New Guinea, 1900 m (SLEUMER, 1962).

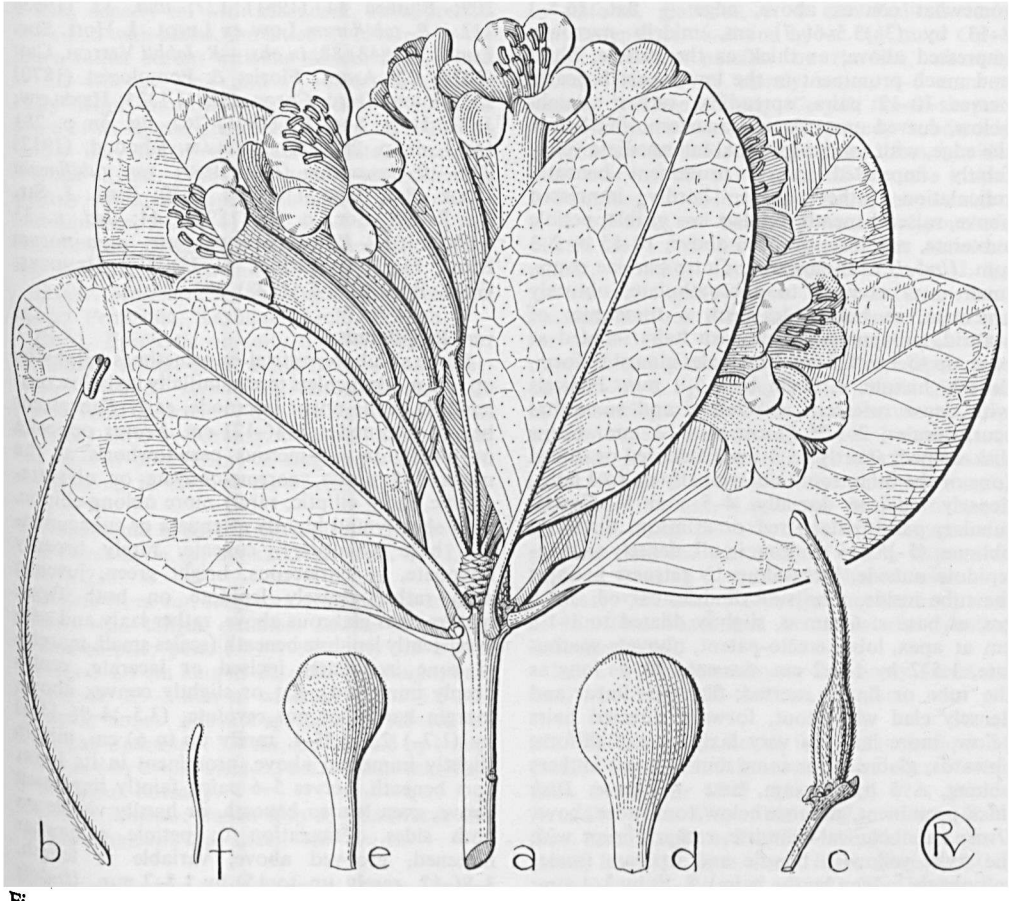

Fig. 41. *Rhododendron scabridibracteum* SLEUM. *a.* Flowering branchlet, × ⅔, *b.* stamen, × 1 ⅓, *c.* ovary and style, × 1 ⅓, *d–e.* two inner perulae from outside, × ⅔, *f.* bracteole, × ⅔ (*a–f* HOOGLAND & PULLEN 5840).

limb (when fresh), (4.5–)5–5.5(–6) cm long in all when dry, tube 3–3.5 cm, straight, very distinctly 5-angular, at base 5-saccate, 0.7–0.8 cm ø (1.2 cm when fresh), dilated to 1.2–2 cm at apex, lobes broadly obovate, 2–2.5(–3) by 1.5–2.2 cm. *Stamens* 10, subequal, slightly exserted; filaments linear and subdensely short-pubescent in the lower, narrower and quite glabrous in the upper half; anthers broad-oblong, base obtuse, 4–5 by 1.5 mm. *Disk* much prominent, glabrous in the lower, tomentose in the upper half. *Ovary* subcylindric, rather abrupt with the style, 6–8 by 2.5–3 mm, white-tomentose (the hairs covering minute scales); style stoutish, tomentose at the base, more laxly hairy above to the lower ½ to ⅔, mostly without trace of scales; stigma thick-capitate. *Capsule* subfusiform-cylindric, curved, densely hairy and lepidote, (3.5–)4–5(–5.5) by *c.* 0.8 cm, on fruit-pedicel 4–5.5 cm by 2 mm. *Seeds* 4–6 mm including the tails.

Distr. *Malesia*: NW. New Guinea (Anggi Lakes area in Arfak Mts).

Ecol. On edge of primary and secondary forest, and in open marsh, often in swamps near lake shore, 1800–2300 m. *Fl.* Jan.-Dec.

Note. Much related to *R. zoelleri.*

249. Rhododendron scabridibracteum SLEUM. Reinwardtia 5 (1960) 215; Blumea 11 (1961) 128; *ibid.* 12 (1963) 112.—**Fig. 41.**

Terrestrial or epiphytic shrub or tree, (1–)3–5 (–12) m, sparsely branched. Branchlets (3–)4–6 mm ø, laxly substellate-lepidote at the upper internodes, early glabrescent; internodes (2–)4–18 cm. *Leaves* in 3–4(–6)-merous pseudowhorls at the upper 1–2 nodes, elliptic-oblong, apex broadly attenuate, obtuse, sometimes rounded or emarginate (apical gland not projecting), broadly attenuate towards the base (very base not rarely subtruncate or very shortly or occasionally broadly rounded), coriaceous, glabrous above at full age, laxly lepidote beneath (scales small, dark chestnut brown, marginal zone variously substellate-lobed or -incised, minute centre slightly impressed),

somewhat convex above, edge ± flat, (6.5–)8–13 by (3–)3.5–6(–7) cm, midrib narrowly impressed above, as thick as the petiole, blunt and much prominent in the lower part beneath, nerves 10–12 pairs, spreading, rather straight below, curved upwards and anastomosing before the edge, with some additional intermediate veins, faintly impressed above, prominent beneath, reticulation rather dense, hardly impressed above, raised beneath, veinlets less visible; petiole subterete, rugulose, grooved above, 10–15 by 2–3 mm. *Umbels* 6–12-flowered. Outer perulae ovate, inner ones obovate to subspathulate, obtusely apiculate, at both sides with a tomentum of scabrid, subappressed yellowish hairs inflated at base, up to 3 by 1.8 cm. Bracteoles almost filiform, densely hirsute, *c.* 2 cm by 0.5–1 mm. Pedicels with dense rufescent, substellate and somewhat scurfy scales, 2–3.2(–5) cm by *c.* 1 mm. *Calyx* disk-shaped, shortly (*c.* 1 mm) 5-dented or -lobed (one or the other tooth occasionally up to 4 mm), densely lepidote dorsally, 4–5 mm ø. *Corolla* tubular, pale to deep red or crimson, distinctly oblique, (5–)5.5–6 cm long in all, densely stellate-lepidote outside, hirsutulous by retrorse hairs at the tube inside, tube subcylindric, curved, 3–4.5 cm, at base *c.* 6 mm ø, slightly dilated to 1–1.5 cm at apex, lobes erecto-patent, obovate-spathulate, 1.5–2 by 1–1.2 cm. *Stamens* 10, as long as the tube or finally exerted; filaments linear and densely clad with stout, forward directed hairs below, more laxly to very laxly so and filiform upwards, glabrous for some mm at apex; anthers oblong, *c.* 5 by 1.3 mm, base ± obtuse. *Disk* thick-prominent, glabrous below, tomentose above. *Ovary* subobconical-cylindric, rather abrupt with the style, yellowish hirsute and lepidote (scales completely hidden by the hairs), 8–10 by 3–4 mm; style thick, densely set with substrigose hairs and minute (here well visible) scales below, more laxly so above to nearly the top; stigma turbinate-capitate, oblique, very thick.

Distr. *Malesia*: New Guinea (Mt Antares and Western, Southern and Eastern Highlands).

Ecol. In lower montane rain-forest or in *Castanopsis-* or *Nothofagus*-forest, not rarely on tree trunks if epiphytic, at 1950–2400 m. *Fl.* April-Sept.

Vern. *Ome, wamp wamp*, Mendi.

250. Rhododendron longiflorum LINDL. J. Hort. Soc. Lond. 3 (1848) 88, fig. on p. 89; PLANCH. Fl. Serres 5 (1849) 477–480, fig.; BECC. Malesia 1 (1878) 205; HENSLOW, J. R. Hort. Soc. 13 (1891) 263, f. 42 (*fol.*), 43 b (*fl.*); K. & G. J. As. Soc. Beng. 74, ii (1905) 77; RIDL. J. Linn. Soc. Bot. 38 (1908) 314, *repr.* J. Fed. Mal. St. Mus. 2 (1908) 120; J. Fed. Mal. St. Mus. 4 (1909) 43; *ibid.* 6 (1915) 158; *ibid.* 7 (1916) 46; MILLAIS, Rhodod. (1917) 203; MERR. En. Born. (1921) 462; RIDL. J. Fed. Mal. St. Mus. 10 (1922) 250; Fl .Mal. Pen. 2 (1923) 219; BURK. & HENDERS. Gard. Bull. S.S. 3 (1928) 280; HOLTTUM, M.A.H. A. Mag. 9 (1939) 34, *phot.*; HENDERS. Mal. Nat. J. 6 (1950) 262; SLEUM. Reinwardtia 5 (1960) 209; Blumea 11 (1961) 127; *ibid.* 12 (1963) 112.—*R. tubiflorum* LOW *ex* LINDL. J. Hort. Soc. Lond. 3 (1848) 88, *in obs.*—*R. lobbii* VEITCH, Cat. (1870) 22; ANON. Florist & Pomologist (1870) 233; ANON. Gard. Chron. (1871) 1323; HENSLOW, J. R. Hort. Soc. 13 (1891) 262, fig. on p. 281 (*fol.*), on p. 282 (*fl.*); MILLAIS, Rhodod. (1917) 203.—*R. javanicum* (BL.) BENN. *var. tubiflorum* HOOK. Bot. Mag. (1885) t. 6850; RIDL. J. Str. Br. R. As. Soc. *n.* 23 (1891) 144; *ibid. n.* 33 (1900) 103.—*R. orion* RIDL. *var. aurantiacum* RIDL. Fl. Mal. Pen. 2 (1923) 217; HENDERS. Gard. Bull. S.S. 4 (1928) 280.

var. **longiflorum.**

Large shrub, terrestrial or sometimes epiphytic, up to 3 m. Branchlets terete, initially laxly fuscous-lepidote at the upper internode, early glabrescent below; internodes 2–8(–12) cm. *Leaves* opposite or mostly in 4–5-merous pseudowhorls at the upper 1–3 nodes, narrow-obovate or obovate-elliptic, or ± elliptic, rarely more oblong-elliptic, apex shortly and bluntly attenuate or subacuminate, base usually ± cuneate, rarely broadly attenuate, ± coriaceous, bright green, juvenile ones rather densely lepidote on both faces, mature ones glabrous above, rather laxly and subpersistently lepidote beneath (scales small, marginal zone irregularly incised or lacerate, centre deeply immersed), flat or slightly convex above, margin hardly or not revolute, (3.5–)4–9(–11.5) by (1.7–) 2.5–3.5(–4, rarely up to 6) cm, midrib slightly immersed above, prominent in its lower part beneath, nerves 5–6 pairs, faintly impressed above, even less so beneath, or hardly visible on both sides, reticulation 0; petiole somewhat flattened, grooved above, variable in length, 3–8(–12, rarely up to 15) by 1.5–2 mm. *Umbels* rather laxly 5–10-flowered. Outer perulae ovate to suborbicular, inner ones broadly spathulate, all laxly lepidote dorsally, sometimes also minutely sericeous there, ± shining, ciliolate, up to 1.2 by 0.8 cm. Bracteoles filiform to linear-spathulate, up to 1.5 cm. Pedicels rather slender, mostly laxly, rarely densely hairy, (1–)1.2–1.8(–3) cm, laxly and ± caducously lepidote. *Calyx* a thin, oblique, very short rim. *Corolla* tubular below, expanded to various degree at the limb, or nearly salver-shaped, mostly a little oblique, 4–5(–6) cm long in all, magenta or coral red to crimson, rarely very dainty orange-scarlet, salmon-pink or pink, very rarely pure white, laxly lepidote outside especially in the lower half, or glabrescent, pubescent in the lower part inside, tube cylindric, mostly markedly curved, (2.5–)3–4 cm, at the distinctly 5-pouched (sometimes yellowish) base 3–5 mm ø, widened to *c.* 7 mm at apex, lobes suberect or ± spreading, obovate to suborbicular, 1.5–2(–2.5) by 1–1.5(–2) cm. *Stamens* 10, exserted for 1–1.5 cm, not rarely exceeding the corolla; filaments linear and subdensely to laxly hairy in the lower, glabrous and nearly filiform in the upper half; anthers oblong, 2.8–3 by 1 mm, base obtuse. *Disk* densely hairy in the upper half, glabrous below. *Ovary* elongate-conical, 5–6 by

2 mm, densely set with ascendent, subappressed hairs and with scales, the latter ± covered by the hairs, rather abrupt with the slender style, which is 3.5–4.8 cm long and ± exserted, densely hairy below, more laxly so upwards to *c.* ¾ or more of its length, glabrous for the last 5–10 mm below the shortly turbinate-capitate, obscurely 5-lobed stigma. *Capsule* elongate-obconical, base slightly attenuate, apex acuminate, laxly hairy and lepidote, 3–3.5(–4) by 0.4–0.5 cm, the 5 ribs conspicuous. *Seeds* very narrow, *c.* 4 mm including the long filiform tail on both ends.

Distr. *Malesia*: Sumatra (incl. Mentawei Is.), Malay Peninsula, Karimata Arch., Borneo.

Ecol. Epiphytic on lofty trees in primary or secondary forest, often along rivers or on mangrove, a woody scrambling terrestrial shrub on rocks, hard quartzite ridge, sandstone pavement or sandy clay, in extreme '*kerangas*' heath forest, but also in poor forest in stagnant water, from sea-level up to *c.* 1500 m. *Fl.* Jan.-Dec.

var. **bancanum** SLEUM. Reinwardtia 5 (1960) 210. —*Rhododendron sp.* KURZ, Nat. Tijd. N. I. 27 (1864) 215.

Differs from *var. longiflorum* mainly by smaller flowers and longer petioles. *Leaves* elliptic or oblong-elliptic; petiole (9–) 12–20 by 1.5–2 mm. *Corolla* 2–2.5 cm long in all, tube ± straight, base 5-gibbous, 2.5–3 mm ø, widened to 3.5–4.5 mm at apex, lobes obovate-spathulate, 1.5–1.6 by 0.8–1 cm. *Stamens c.* 3.5 cm; anthers 2.5 by 1 mm. *Ovary c.* 4 by 2 mm; style 2.3 cm. Perulae manifestly sericeous dorsally.

Distr. *Malesia*: Banka (top of Mts Maras and Menumbing, and Sg. Liat), 425–700 m.

251. Rhododendron polyanthemum SLEUM. Blumea 12 (1963) 111; *ibid.* 12 (1964) 341.

Tree or treelet, 6(–15) m, trunk stoutish or slender, or low epiphytic shrub. Branchlets at tips with a furry tomentum of rufous stellate scales, early glabrescent, subterete; internodes *c.* 11 cm by 5–8 mm. *Leaves* in 5–7-merous pseudowhorls at the upper 2 nodes, elliptic-oblong or elliptic, apex gradually broadly attenuate or subacuminate (tip bluntish) to base broadly attenuate-rounded (very base shortly cordate and complicate), young ones at both sides and on the petiole covered by a similar indumentum (scales subdendroid, narrowly stellate-divided up to the minute centre, fugacious, leaving no pits), mature ones early glabrescent except the midrib, finally quite glabrous, (7–)8–15 by (3–)4–8(–9) cm, midrib *c.* 2 mm wide at base, gradually narrower and slightly impressed upwards above, as thick beneath at base as the petiole, nerves 9–11 pairs, subregular, slightly curved, partly deeply forked, anastomosing before the edge, faintly though even distinctly impressed above, not much raised or inconspicuous beneath, no reticulation; petiole a little depressed, grooved above, 2–4 cm 4–5 mm. *Umbels* (18–)20–24-flowered. Inner perulae thin, ± spathulate, glabrous, caducously lepidote-fimbriate, up to 2.5 by 1.2 cm. Bracteoles linear to filiform, glabrous, *c.* 2 cm. Pedicels laxly stellate-lepidote, 6–8 cm by *c.* 1.5 mm. *Calyx* rather oblique, patellar or rim-like, obtusely shortly 5-lobed or merely wavy, 4–5 mm ø, densely lepidote dorsaly. *Corolla* funnel-shaped, thin, bright scarlet, sweet-scented, subdensely lepidote at the tube, less so at the lobes outside, laxly hairy in the lower part of the tube inside, *c.* 4 cm long in all, limb *c.* 3.5 cm ø, tube straight, *c.* 2 cm long, at base 5–6 mm ø, 5-pouched, dilated to 1.5–2 cm at apex, lobes suberect-patent, broadly obovate-spathulate, *c.* 2 by 1.5–1.8 cm, slightly retuse. *Stamens* 10, unequal, reaching halfway the lobes; filaments linear and for their lower ⅓ subdensely to laxly hairy, narrower and glabrous above; anthers elliptic, base obtuse, 2.7–3 by 1.2 mm. *Disk* thick, glabrous at the much prominent ribs, hairy between. *Ovary* subconical, 5-ribbed, densely clad with a tomentum of white, forward directed hairs which covers the scales, 5–6 by 3 mm, rather abrupt with the style, the latter thickish, 1.6–2 cm, densely to more laxly and rather patently hairy in the lower half, glabrous for the rest; stigma thick, depressed-capitate, bearing 5 short club-shaped lobes.

Distr. *Malesia*: North Borneo (summit area of Mt Trus Madi and Mt Kinabalu: Mesilau East R. Basin).

Ecol. In dense mossy or submossy forest on crest of ridge, 1720–2285 m. *Fl.* Jan.

252. Rhododendron kochii STEIN, Gartenflora 34 (1885) 193, t. 119; Jahresber. Schles. Ges. Vaterl. Cult. f. d. Jahr 1885 (1886) 413, 414; VIDAL, Rev. Pl. Vasc. Filip. (1886) 172; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 41; Philip. J. Sc. 3 (1908) Bot. 380; ELM. Leafl. Philip. Bot. 3 (1911) 1105; MILLAIS, Rhodod. (1917) 199; MERR. En. Philip. 3 (1923) 243; MILLAIS, Rhodod. ser. 2 (1924) 168; COPEL. *f.* Philip. J. Sc. 40 (1929) 160, t. 7, f. 6–7, t. 8, t. 11, f. 1; SLEUM. Reinwardtia 5 (1960) 212; Blumea 11 (1961) 128.—*Rhododendron sp.* (*aff. R. javanicum*) VIDAL, Sinopsis Atl. (1883) 30, t. 60, f. F.—*R. javanicum* [*non* (Bl.) BENN.] F.-VILL. Nov. App. (1883) 353; VIDAL, Rev. Pl. Vasc. Filip. (1886) 170.—*R. schadenbergii* (*non* WARB.) MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 41, *p.p.*

Shrub, sometimes tree-like; stem 3–6(–10) m, 7–15 cm ø. Branchlets subterete, (2–)3–4 mm ø, fugaciously lepidote; internodes (2.5–)5–9 cm. *Leaves* in (3–)4–5-merous pseudowhorls at the upper 1–2 nodes (several other reduced and early caducous ones scattered along the internodes), oblong to ovate-oblong, or subovate-elliptic, apex rather shortly and ± abruptly acuminate, acute, base mostly broadly attenuate to the petiole, rarely subrotundate, subinequilateral, coriaceous, densely lepidote on both sides initially, early glabrescent above, laxly subpersistently lepidote beneath (scales flat, rather small, relatively wide marginal zone variously substellate-lobed or -dented, minute centre shallowly impressed), finally glabrescent beneath too, entire or slightly wavy, very slightly or not revolute at the margin, 8–14

(–18) by (2.5–)3–5 cm, midrib dilated at the base, rather suddenly narrowed and a little impressed above, as thick as the petiole and obtusely prominent in the lower part beneath, nerves 8–10 pairs spreading and ascending, inarching near the edge, slightly impressed or raised above, distinctly prominent beneath, reticulation rather dense, raised to various degree on both faces, or at least underneath; petiole ± flattened, reddish, 1.5–2 cm by *c.* 2 mm. *Umbels* 10–20-flowered. Outer perulae ovate, obtuse, inner ones obovate to spathulate, laxly lepidote apically or glabrous dorsally, often rugose by minute tubercules, margin set with caducous scales, up to 2 by 1.2 cm. Bracteoles filiform to linear-subspathulate, up to 2 cm. Pedicels ± densely clothed with pale substellate scales, no hairs, 2–3(–3.5) cm by 1 mm. *Calyx* obliquely disk-shaped, shortly obtusely 5-lobed, 3–4 mm ø, densely lepidote dorsally. *Corolla* tubular, white, scentless, 3.5–4(–4.5) cm long in all, ± laxly set with substellate scales outside, subdensely short-hairy at the tube inside, tube (2–)2.5(–3) cm, base much 5-saccate, 5–6 mm ø, slightly widened to apex, lobes subhorizontally expanded, obovate-suborbicular, 1.2–1.6 by 1–1.5 cm. *Stamens* 10, subequal, reaching about half the corolla lobes, filaments linear and subdensely patent-pubescent to the lower ½–¾, glabrous and filiform for the rest; anthers obovate-oblong, base shortly though distinctly biappendiculate, (3–)3.5 by 1 mm. *Disk* glabrous. *Ovary* subcylindric, white-velutinous, the hairs covering the also present scales, gradually narrowed to the style, 5–6 by 2.5 mm; style nearly as long as the stamens, subdensely to laxly and exclusively hairy to the lower ½–¾, glabrous below the capitate stigma. *Capsule* subcylindric, laxly lepidote, more densely hairy, (2.5–)3–3.5 by 0.5–0.6 cm, on fruit-pedicel up to 5 cm by 1 mm.

Distr. *Malesia*: Philippines (Luzon, Mindoro, Negros, Mindanao).

Ecol. On ridges in mossy forest, 1000–2300 m. *Fl.* Jan.-Dec.

Vern. *Malagos*, Bag., *hablang*, If.

253. Rhododendron brevipes SLEUM. Reinwardtia 5 (1960) 213.

Shrub, up to 3 m. Branchlets subterete or obtusangular and subdensely clothed with flat, substellate scales in the youngest parts (3–4 mm ø), terete and glabrous in the older ones (*c.* 7 mm ø); internodes 7–10 cm. *Leaves* in ± 5-merous pseudowhorls at the upper 1–2 nodes, oblong to elliptic-oblong, apex shortly acuminate, subacute, broadly attenuate towards the base (very base subtruncate-obtuse), subsessile, coriaceous, upper surface glabrous but densely minutely pitted, undersurface subdensely lepidote (scales flat, thin, rufescent, variously lobed or dented at the marginal zone, rather small centre hardly sunk), flat, *c.* 15 by 5–7 cm, midrib as wide as the petiole at the base, much narrowed upwards and slightly impressed above, much prominent beneath, nerves 8–10 pairs, with additional, less distinct ones between them, all erecto-patent, ± straight at the base, more curved distally, indistinctly anastomosing along the edge, flat or faintly raised above, more distinct and raised beneath, reticulation visible above, nearly obscure beneath; petiole flattened, 1–2(–3) by 3–4 mm. *Umbels* 6–7-flowered. Outer perulae ovate-acuminate, with a distinct sharp point (3–4 mm), very laxly lepidote along the dorsal middle-line or glabrous outside, densely lepidote at the apex inside, up to 2 by 1 cm, inner ones oblong-subspathulate, glabrous, *c.* 2.5 by 0.6 cm, all caducously lepidote along the margin. Bracteoles filiform, subglabrous, *c.* 2 cm by 1 mm. Pedicels dilated at the very apex, laxly lepidote, not hairy, 4–5(–6) cm by *c.* 1.5 mm. *Calyx* oblique, rather obsolete, a wavy rim, hardly 3 mm ø. *Corolla* funnel-shaped, intensely orange at the limb, yellow at the tube, 7.5–8 cm long in all, laxly to very laxly substellate-lepidote outside, short-pubescent at the lower ¾ of the tube inside, tube straight, *c.* 4 cm, at base manifestly 5-saccate, 4–5 mm ø, widened to 1.5 cm at apex, lobes expanded, obovate, *c.* 4 by 2.5 cm. *Stamens* 10, unequal, the longest reaching halfway the corolla lobes; filaments linear and subdensely hairy in the lower, filiform and glabrous in the upper half; anthers oblong, base obtuse, *c.* 4 by 1.2 mm. *Disk* very prominent, whitish tomentellous at the upper margin, glabrous below. *Ovary* cylindric, continuous with the style, very densely lepidote, more laxly and shortly white-hairy, 10–12 by 2–2.5 mm; style *c.* 5.5 cm, ± densely lepidote and short-pubescent in the lower ⅔, more laxly lepidote and epilose to apex; stigma thick-capitate, with 5 distinct, almost club-shaped lobes. *Capsule* cylindric, lepidote and hairy, *c.* 8 cm by 3–4 mm; pedicel 7.5–8 cm by *c.* 2 mm.

Distr. *Malesia*: E. New Guinea (Western Highlands: Karap, Jimmy Valley), *c.* 1725 m. Once found. *Fl. fr.* June.

254. Rhododendron aurigeranum SLEUM. Reinwardtia 5 (1960) 214; Blumea 11 (1961) 128; *ibid.* 12 (1963) 112; Jahrb. Rhodod. Ges. Bremen (1963) f. 16.

Shrub or treelet, (0.5–)1–2.5(–4) m. Youngest internodes 2 mm ø, a little flattened and densely lepidote, the older ones 3–4(–5) mm ø, terete and early glabrescent; internodes 5–15 cm. *Leaves* in ± 5-merous pseudowhorls at the upper 1–2 nodes, oblong, apex short-acuminate, subacute, base cuneately narrowed into the petiole, thin-coriaceous, glabrous above at full age (minutely pitted under the lens), densely lepidote beneath in young, less so in mature leaves (scales rather small, rufescent, scurfy, ± detersile, sessile or very shortly stalked, marginal zone irregularly and ± deeply stellate-incised, centre not rarely deepened and extended into a very short stipe or foot, not or hardly impressed, flat, (7–)8–10 (–13) by 3–4(–5) cm, midrib dilated at the base, narrowed and slightly impressed, thick and prominent beneath, nerves 6–8 pairs, rather straight below, curved and obsoletely anastomosing before the edge, nearly flat above, slightly raised beneath,

reticulation subinconspicuous on both faces; petiole compressed and grooved dorsally, lepidote, 6–8 by 1.5–2 (rarely up to 3) mm. *Umbels* 8–10 (–14)-flowered. Outer perulae ovate-acuminate, apex blunt or very shortly contracted into a sharp point, ± densely lepidote on both sides at the apex, glabrous for the rest, inner ones obovate-oblong to subspathulate, glabrous dorsally, all with caducous scales along margin, 1.5–2 by 0.4–1 cm. Bracteoles linear-subspathulate, 1–1.5 cm by 1–2 mm. Pedicels stoutish, 2–4(–5) cm by 1–1.5 mm, subdensely stellate-lepidote, very laxly though distinctly short-pubescent. *Calyx* disk-shaped, wavy, *c.* 3 mm ø. *Corolla* funnel-shaped, orange or orange-yellow initially, fading to yellow, 6–7(–8) cm long in all, laxly stellate-lepidote outside, laxly pubescent at the lower half of the tube inside, tube straight, rather markedly 5-angular, (3–)3.5–4 cm, at base very distinctly 5-saccate, 4–5 mm ø, gradually widened to 1–1.5 cm at apex, lobes expanded, obovate, 2–3 by 1.8–2.5 cm. *Stamens* 10, subequal, reaching ± halfway the corolla lobes; filaments linear, subdensely hairy in the lower third, glabrous above; anthers broad-oblong, 3.5–4 by *c.* 1.3 mm, base obtuse. *Disk* very prominent, white-tomentellous at the upper margin. *Ovary* subconical-cylindric, tapering to the style, densely and shortly hairy and lepidote, *c.* 10 by 2.5 mm; style robust, densely hairy and lepidote to the lower ¾, densely and exclusively lepidote for the subsequent *c.* 2 mm, glabrous for the upper *c.* 10 mm; stigma thick-capitate and deeply 5-lobed. *Capsule* elongate-subfusiform-cylindric, shortly attenuate at the base, longer so at the apex, hairy and lepidote, ± curved, (6–)8–10 cm by 5(–6) mm; valves much twisted. *Seeds* (7–)8–10(–12) mm including the tails.

Distr. *Malesia*: New Guinea (Morobe Distr.: mainly the Bulolo-Wau area).

Ecol. Occasionally in floating immature peat in forest clearing, generally in rather dry grassy or shrubby hillside together with *Grevillea papuana* Diels or on schistes or steep rock, 915–1740 m, locally common. *Fl.* Feb.-Oct., *fr.* July-Sept.

Note. Worth to be cultivated for its showy flowers.

255. **Rhododendron zoelleri** WARB. Bot. Jahrb. 16 (1892) 15, 24; K. SCH. & LAUT. Fl. Schutzgeb. (1901) 488; SCHLTR, Bot. Jahrb. 55 (1918) 156; SLEUM. Reinwardtia 5 (1960) 216; Blumea 11 (1961) 128; CRUTTWELL, J. R. Hort. Soc. 87 (1962) 85, f. 22; SLEUM. Blumea 12 (1963) 113; Jahrb. Rhodod. Ges. Bremen (1963) f. 33; SCHNEIDER, Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 1.—*R. asparagoides* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 94.—*R. moszkowskii* SCHLTR, Bot. Jahrb. 55 (1918) 161.—*R. oranum* J.J.S. in Fedde, Rep. 30 (1932) 167.—*R. doctersii* J.J.S. Nova Guinea 18 (1936) 98, t. 21, 1, *cf.* DOCTERS VAN LEEUWEN, Trop. Natuur 25 (1926) 182, f. 9—*R. laetum* (*non* J.J.S. 1914) J.J.S. Nova Guinea 18 (1936) 98.—**Fig. 42-43.**

Weak epiphytic or stiffly erect, also subscandent terrestrial shrub respectively treelet, up to 6(–10) m, stem up to 15 cm ø; bark light grey. Branchlets terete, 3–5 mm ø, laxly and ± caducously lepidote at the upper internodes, glabrescent below; internodes (3–)5–10(–14) cm. *Leaves* in 4–5(–6)-merous pseudowhorls at the upper 1–2 nodes, (broadly) elliptic to oblong-elliptic, rarely subovate-elliptic or ovate-oblong, apex short-acuminate, subacute or blunt, base broadly attenuate, sometimes rounded or nearly so, often slightly inequilateral, ± thin-coriaceous, glabrous above at full age, laxly lepidote for a rather long time beneath (scales small, marginal zone variously substellate-lobed or -dented, minute centre ± shallowly impressed), finally glabrescent but remaining punctulate beneath, edge ± flat, 7–14(–17) by (3–)4–7(–9, very rarely up to 10) cm, midrib narrowly grooved above, as stout as the petiole and obtusely prominent at the base beneath, nerves 10–12(–14) pairs, oblique, irregular, often running a little down on the midrib, curved upwards and anastomosing before the edge, mostly but slightly raised (or in very old leaves even somewhat impressed) above, more distinctly prominent beneath, reticulation rather lax, mostly ± distinct, but not much raised on both faces; petiole flattened and grooved dorsally, lepidote initially, (0.5–)1–1.5 cm by 1.5–2 mm. *Umbels* (4–)5–8-flowered. Floral buds oblong-ovoid, 3.5–5 by 2–2.5 cm; outer perulae suborbicular, more inner ones ovate to oblong-obovate or spathulate, all obtuse and covered for a long time by a tomentum of sericeous to substrigose, greyish yellowish rather long hairs, in which the sparse scales are well visible as dark points, ± glabrescent but mostly remaining rough to the touch in later stages, margin with caducous scales, up to 5 by 2.5 cm. Bracteoles linear-subspathulate, short-hairy or hirsutulous, up to 3 cm. Pedicels laxly to subdensely stellate-lepidote, moreover mostly sparsely pubescent in the upper part, sometimes laxly pubescent and lepidote all along, (1.5–)2–2.5(–4) cm by 1–1.5 mm. *Calyx* obliquely disk-shaped, laxly lepidote and hairy outside, obtusely 5-lobed, *c.* 5 mm ø. *Corolla* funnel-shaped, lobed almost halfway, yellow to orange or salmon, or salmon-reddish, or the tube yellow and the lobes suffused with red, very rarely white or greenish white (? hybrid with *R. phaeopeplum*, *cf.* there), often sweet-scented, (5–)6–7.5(–8.5, occasionally up to 10) cm long in all, sometimes with some hairs at the base (within the pouches) and otherwise sparsely lepidote outside, laxly hairy at the lower half of the tube inside, tube straight or nearly so, 3–4(–4.5) cm, base distinctly 5-saccate, 5–8 mm ø, gradually widened to 1.5–2 cm at apex, lobes expanded, obovate-spathulate, 2.5–3.5(–4, rarely up to 4.5) by 2–2.5(–3) cm (up to 7.5 cm ø when fresh). *Stamens* 10, subequal, reaching ± halfway the corolla lobes; filaments linear and ± densely to more laxly set with spreading hairs in the lower ⅓–½, glabrous and filiform for the rest; anthers oblong, somewhat curved, base obtuse or rarely obscurely biappendiculate, (4–)6–8 by 1.5(–2) mm.



Fig. 42. *Rhododendron zoelleri* WARB. *a.* Habit, × ⅔, *b.* stamen, × 1, *c.* ovary and style, × 1, *d.* fruit × ⅔ (*a–d* BW 3058 VERSTEEGH).

Disk prominent, densely hairy to tomentose at least in the upper part. *Ovary* subcylindric, whitish tomentose by rather stiff hairs, which are directed forward and cover minute scales, subabrupt with the style, 9–10(–12) by *c.* 3 mm; style apparently first ± equalling the corolla tube, finally ± equalling the stamens, densely to laxly hairy in the lower ⅔–¾, the scales there absent or present, in the latter case more obvious above the lower half of the style, where the hairs become more lax or even may disappear completely, glabrous for the rest; stigma turbinate-capitate. *Capsule* elongate-cylindric, attenuate at both ends, slightly curved, ±densely hairy and lepidote, 5–7(–8) cm by (5–)6–7(–8) mm, rarely shorter; pedicel 3–4 cm by *c.* 2 mm. *Seeds* 8–10 mm including the long tail at both ends.

Distr. *Malesia*: Moluccas (W. Ceram: Ora Mts) and New Guinea.

Ecol. Epiphyte in high forest, terrestrial in lighter mountain forest of *Castanopsis*; also in secondary growths, in open spots (artificial grassland), hanging over precipices and rivers, in hill scrubs, from sea-level to 1500, rarely up to 2000 m, not rarely gregarious, on poor sandy or clayey soil, but said to occur also on limestone. *Fl. fr.* Jan.-Dec.

Vern. *Krobua, mamba'uk*, Kebar, *atek*, Karoon, *waradè*, Kapauku, *mompera*, Samor, *powida*, Kutubu, *fabeh*, Wapi, *tindili*, Orne.

Note. A form different only by smaller anthers (3–4 mm) apparently limited to SE. New Guinea (Central and Milne Bay Distr.). For natural hybrids with *R. phaeopeplum* see there.

DOCTERS VAN LEEUWEN observed the flowers of *R. zoelleri* visited during daytime by butterflies as *Ornithopthera* and *Papilio* (Trop. Natuur 15, 1926, 182, 185).

256. Rhododendron maxwellii GIBBS, J. Linn. Soc. Bot. 42 (1914) 103; MERR. En. Born. (1921) 462; SLEUM. Reinwardtia 5 (1960) 217; Blumea 11 (1961) 128; *ibid.* 12 (1963) 113; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 17.



Fig. 43. *Rhododendron zoelleri* WARB. Kebar valley, 700 m, with *Gleichenia*, NW. New Guinea (VAN ROYEN & SLEUMER 6850) (SLEUMER, 1961).

Shrub or treelet, occasionally epiphytic. Branchlets terete, 3–4(–5) mm ø, glabrous or practically so; internodes 2–9 cm. *Leaves* in 3–4(–5)-merous pseudowhorls at the upper 1–2(–3) nodes, elliptic to oblong-obovate, sometimes obovate, apex broad-attenuate and obtuse, not rarely rounded, base broadly attenuate to subrotundate, coriaceous, glabrous above at full age, laxly lepidote beneath (scales very small, marginal zone variously lobed or dented, ± early dissolved, centre dark, persistent, ± deeply impressed), margin ± revolute, lamina ± convex above in herb., (4–)5–9.5 by (2–)2.5–5 cm, midrib narrow and deeply impressed above, as thick as the petiole at the base beneath, obtusely prominent and longitudinally wrinkled, nerves 5–6 pairs, spreading and curved-anastomosing, ± deeply impressed above and rather sharply prominent beneath providing a markedly bullate aspect, reticulation lax and subimpressed above, or mostly rather inconspicuous; petiole flattened and grooved dorsally, lepidote initially, rugulose, 5–10 by 2–3(–4) mm. *Umbels* 5–13-flowered. Flower buds ovoid-ellipsoid, 2 by 1.5 cm in a not yet fully developed stage, outer perulae suborbicular, apiculate, inner ones obovate, obtuse, all dorsally laxly lepidote, margin with caducous scales. Pedicels subdensely rufous-stellate-lepidote, besides whether or not laxly puberulous, 2–3.5 cm by 0.8 mm. *Calyx* disk-shaped, obscurely lobed, lepidote dorsally, *c.* 4 mm ø. *Corolla* shortly funnel-shaped, *i.e.* tubular below, much expanded at the limb, lobed from halfway to nearly ⅔, yellow, sometimes deep cream to pink or pale salmon,

with a strong delicate scent, *c.* 2.7 cm long in all, ± densely set with substellate to subentire scales outside, laxly hairy in the lower part of the tube inside, tube straight, 1–1.2 cm, base 4–5 mm ø, widened to 6–8 mm at apex, lobes spreading, oblong-obovate, 1.3–1.8 by 0.9–1.2 cm. *Stamens* 10, subequal, somewhat exserted; filaments linear and with patent hairs in the lower third, more filiform and glabrous apically; anthers oblong, 2.5–3.3 by 0.8 mm. *Disk* hairy at the upper margin. *Ovary* subconical, densely clothed with subpatent, rufescent hairs covering the scales, ± abrupt with the style, *c.* 4 by 2 mm; style slender, patent-hairy at and near the base only; stigma subcapitate. *Capsule* apparently *c.* 1.5 cm long.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In high forest, mossy jungle or open exposed crest of spur among bracken, scrub and grasses, rather rare, 1830–3050 m. *Fl.* Feb.-Aug.

257. Rhododendron nervulosum SLEUM. Bot. Jahrb. 71 (1940) 146; Reinwardtia 5 (1960) 217; Blumea 11 (1961) 128; *ibid.* 12 (1963) 113; Jahrb. Deutsch. Rhodod. Ges. Bremen (1965) f. 20. — **Fig. 44.**

var. **nervulosum.**

Small, few-stemmed shrub, generally terrestrial, rarely epiphytic. Branchlets 1.5–2(–2.5) mm ø, glabrous; internodes 2–10 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 2(–4) nodes (other much reduced fugacious ones scattered along the internodes), narrow-lanceolate, apex (sub)acutely acuminate, cuneate towards the the base to a very short petiole, sessile or nearly so, coriaceous to subcoriaceous, finally glabrous above, laxly lepidote beneath (scales small, marginal zone irregularly, often but shallowly substellate-lobed, early dissolved and marked by a dark halo, centre minute, faintly or not impressed), edge ± flat, (2.7–)5–7.5(–9) by (0.6–)1–1.4 (–1.6, very rarely up to 2) cm, midrib narrow and and slightly impressed above, ± broadened and obtusely prominent beneath, nerves *c.* 5 pairs, at a rather acute angle, steeply ascending, ± straight, obsoletely or not anastomosing, forming a ± dense and slightly prominent network with the veins and veinlets on both faces; petiole 1–2 by 1–2 mm. *Umbels* (1–)2–3-flowered. Perulae membranous, outer ones ovate, inner ones ovate-oblong, all ± long-acuminate, the very apex tapering to a 2–3 mm long sharp point, glabrous dorsally, up to 2.8 by 1 cm. Bracteoles subulate, up to 1.5 cm. Pedicels laxly lepidote, 1–1.3 cm by 1(–1.5) mm. *Calyx* oblique, thick, disk-shaped or more rim-like, obsoletely 5-lobed, subglabrous, *c.* 5 mm ø, *Corolla* subcampanulate, lobed, to ± halfway, rather fleshy, shining, bright scarlet, 3–3.5 cm long in all, glabrous in- and outside, tube 1.7–2.3 cm, straight, base 6–8 mm ø, gradually widened to *c.* 1.5 cm at apex, lobes suberect, obovate-subspathulate to suborbicular, *c.* 1.5 by 1 cm. *Stamens* 10, *c.* 2 cm; filaments linear, dilated and rather laxly hairy in the lower ¼, glabrous and narrower for the rest; anthers



Fig. 44. *Rhododendron nervulosum* SLEUM. var. *nervulosum*. On old log above Mesilau East R., 1950 m, Mt Kinabalu, N. Borneo (SLEUMER 4733) (SLEUMER, 1963).

elongate-oblong, (4.5–)5–6 by 1.5 mm, each cell shortly appendiculate at base. *Disk* prominent, glabrous. *Ovary* conical, tomentose, the hairs covering the scales, 5–6 by 2.5–3 mm, abrupt with the style, the latter slender, glabrous, 8–10 mm; stigma subcapitate. Immature *capsule* ovoid-cylindric, densely hairy and lepidote to judge from the developed ovary (1 by 0.6 cm); pedicel 2.8 cm.

Distr. *Malesia*: N. Borneo (top of Bt Raja (1900 m) and Mt Kinabalu).

Ecol. In mossy forest or more open mossy jungle, on open and sunny boulders or landslides with sparse scrub, not common, (1900–)2440–3050 m. *Fl.* March-Aug., Dec.

var. **exuberans** SLEUM. Blumea 12 (1963) 113.

Epiphyte. *Leaves* (7–)9–11 by (2–)2.5–3.7 cm. *Corolla* scarlet, *c.* 2.5 cm long in all.

Distr. *Malesia*: Borneo (Sarawak: Mt Mulu), mossy forest, 1430 m. Once found. *Fl.* June.

258. Rhododendron salicifolium BECC. Malesia 1 (1878) 202; For. Born. (1902) 147; MERR. En. Born. (1921) 463; SLEUM. Reinwardtia 5 (1960) 217, *non* BL. 1863–83.

Terrestrial shrub, *c.* 60 cm. Branchlets terete,

1.5–2(–3) mm ø, upper 1–3 internodes laxly lepidote; internodes 3–8 cm. *Leaves* in 4–5(–7)-merous pseudowhorls at the upper 2–4 nodes, narrow-lanceolate, apex acuminate and slightly curved, subacute or acute, base cuneate to the petiole, thin-coriaceous, glabrous above at full age, sparsely lepidote beneath (scales flat, small, marginal zone variously, often obtusely and shallowly substellate-lobed, centre minute, hardly or not impressed), edge ± flat, 10–15 by (0.6–) 1–2 cm, midrib narrow and impressed above, prominent beneath, nerves *c.* 10 pairs, high-ascending and joined along the edge, slightly raised above, faintly so or not visible beneath, nerves and veins subdensely reticulate and very slightly raised above only; petiole grooved above, (3–)4–6 by 1–1.5 mm, passing imperceptibly into the lamina. *Umbels* (1–)2–3-flowered; flowers nodding. Bracteoles subulate, glabrous, up to 1 cm. Pedicels lepidote at base and apex, ± glabrous between, 1.2–1.7 cm by 0.8 mm. *Calyx* disk-shaped, obtusely and very shortly 5-lobed, laxly lepidote dorsally, 3–4 mm ø, *Corolla* funnel-shaped, tubular below, 5-lobed from halfway to nearly 3/5, yellow or buff orange, glabrous outside, laxly pubescent at the lower half of the tube inside, 2.8–3.2 cm long in all, tube straight, 1.2–1.5 cm, base 5-saccate, *c.* 4 mm ø, gradually widened to *c.* 1 cm at apex, lobes much spreading, obovate-spathulate, 1.4–1.7 by 1–1.2 cm. *Stamens* 10, unequal, *c.* 2 cm; filaments linear and densely pubescent in the lowest 3–4 mm, glabrous and more filiform for the rest; anthers obovate-oblong, *c.* 2.5 by 0.8 mm, base obtuse. *Disk* prominent, pubescent at the upper margin. *Ovary* ± densly hairy and lepidote, *c.* 4 by 2 mm, subabrupt with the style, the latter equalling the stamens, pubescent at the base only; stigma capitate, becoming disk-shaped and deeply 5-lobed. *Capsule* subfusiform-cylindric, 2.5–3.5 by 0.4 cm.

Distr. *Malesia*: Borneo (Sarawak: on summit rocks of Mt Mattang). *Fl.* Jan.

259. Rhododendron lanceolatum RIDL. J. Str. Br. R. As Soc. *n.* 63 (1912) 60; MERR. En. Born. (1921) 462; SLEUM. Reinwardtia 5 (1960) 217. —*R. partitum* J.J.S. Bull. Jard. Bot. Btzg III, 13 (1935) 453.

Shrub; bark brown. Branchlets 2–3 mm ø, very densely clad with rufescent substellate scales at the upper internodes, glabrescent; internodes 3.5–8 cm. *Leaves* in 3–4-merous pseudowhorls at the upper 1–2 nodes, lanceolate or subovate- or oblong-lanceolate, rarely oblong-ovate, sessile or nearly so, the sometimes slightly curved apex acuminate, acute, base obtuse to rounded, very densely lepidote on both faces when juvenile, with sparse flat scales or finally quite glabrous but pitted above, subdensely lepidote beneath for a long time, especially at the base of the blade (scales rather small, thin and flattish, marginal zone irregularly substellate-lobed or -dented, minute centre shallowly impressed, leaving dark pits), flat, 6.5–11.5 by 2.8–4 cm, midrib stout and obtusely prominent in the lower half, similarly dilated but flat or even slightly impressed beneath, nerves (8–)10–12 pairs, at a nearly right angle, curved and anastomosing before the edge, slightly raised above, obsolete beneath, reticulation, if any, subinconspicuous above only; petiole 0–2 by 2–3 mm. *Umbels* (3–)4–6-flowered. Outer perulae subulate to ovate-acuminate (these then often shortly subulate at the apex), inner ones oblong-obovate to -spathulate, apiculate, all subdensely ± caducously lepidote outside, up to 2 by 1 cm. Bracteoles subsubulate-linear, lepidote, up to 1.5 cm. Pedicels densely lepidote and short-pubescent, 1.5–2.7 cm by 0.7 mm. *Calyx* very oblique, disk-shaped, with distinct, very short blunt lobes, lepidote and pubescent dorsally, *c.* 4 mm ø. *Corolla* subcampanulate, 5-lobed to ± 2/3, *c.* 2 cm long in all, orange-yellow, membranous, ± densely lepidote at the tube and the lower part of the lobes outside, glabrous or slightly puberulous inside, tube up to 7 mm, base 4–5 mm ø, gradually widened to *c.* 1 cm at apex, lobes much expanded, oblong to subobovate, 1.2–1.7 by 0.8–1.2 cm. *Stamens* 10, unequal, 1.6–1.9 cm; filaments linear and woolly in the lower 2/3, narrower and glabrous for the rest; anthers oblong, curved, 3.5–4 by 1 mm, base obtuse or very shortly bilobed. *Disk* thick-prominent, glabrous or somewhat hairy at the upper margin. *Ovary* conical, woolly, obtuse, *i.e.* very abrupt with the style, *c.* 4 by 3 mm; style slenderly columnar, thickened towards the subcapitate stigma, *c.* 7 mm, with some hairs at the base.

Distr. *Malesia*: Borneo (Sarawak: Mt Batu Lawi at Upper Limbang R., and Mt Batu Tiban), 1125–1700 m. *Fl.* Oct.-Dec.

260. Rhododendron sumatranum MERR. Pap. Mich. Ac. Sc. 19 (1933) 182; J.J.S. Bull. Jard. Bot. Btzg III, 13 (1935) 450; SLEUM. Reinwardtia 5 (1960) 217.

Much branched terrestrial shrub, 1.5–3 m. Branchlets terete, (1.5–)2–3 mm ø, subdensely set with flat, substellate scales at the upper internodes, glabrescent; internodes (2–)4–8.5 cm. *Leaves* in 5–7-merous pseudowhorls at the upper 1–2 nodes, unequal, obovate or obovate-elliptic, also oblong-obovate, apex obtuse or ± rounded, not rarely somewhat notched, base cuneate and a little decurrent into petiole, coriaceous, glabrous above at maturity, laxly and ± persistently lepidote beneath (scales small, marginal zone irregularly lobed or dented, dark centre impressed), margin ± flat, (2.5–)3.5–7.5(–8.5) by (1.5–)2–3(–4) cm, midrib narrowly impressed above, nearly as robust as the petiole and obtusely prominent at the base beneath, nerves 4–6 pairs, spreading, ± distinctly impressed above and raised beneath, not rarely subinconspicuous on both faces as is the reticulation; petiole somewhat flattened, grooved above, lepidote initially, 4–7(–10) by *c.* 1.5 mm. *Umbels* (1–)2–3(–5)-flowered. Flower buds ovoid; outer perulae suborbicular, inner ones ovate to oblong-obovate, obtuse, grey-sericeous or appressedly short-tomentose in the upper (free) part, ciliate, up to 0.8 by 0.5 cm. Pedicels rather

slender, densely substellate-lepidote, epilose, 1–1.8 cm. *Calyx* obliquely disk-shaped, very shortly obtusely lobed or dented, 4–5 mm ø. *Corolla* broadly funnel-shaped, ± tubular below, scarlet to purple or orange red, sometimes salmon, 2.3–3 cm long in all, laxly substellate-lepidote outside, glabrous inside, tube straight, 1–1.4 cm, base 3–5 mm ø, gradually widened to *c.* 1 cm at apex, lobes spreading, obovate, (1.3–)1.6–1.8 by 1–1.3 cm. *Stamens* 10, subequal, 1.5–1.7 cm; filaments linear, dilated and patently pubescent for 2–4 mm at base, glabrous and filiform for the rest; anthers obovate-oblong, base subobtuse, 2–2.5 by 1 mm. *Disk* glabrous, not prominent. *Ovary* ovoid-conical, ± patently villous, 4.5 by 3–3.5 mm; style very abrupt, terete, glabrous, 0.8–1 cm; stigma thick-obconical. *Capsule* subcylindric, shortly attenuate at both ends, subdensely set with minute scales and short, rather robust and subpatent hairs, *c.* 2 cm by 4–5 mm; pedicel up to 3 cm.

Distr. *Malesia*: N. Sumatra (Atjeh, Tapanuli, East Coast).

Ecol. Mostly terrestrial in light forests, summit vegetation, ericoid ridge scrub, alpine growth with ferns or grassland, occasionally epiphytic, rather common locally, 1800–2700 m. *Fl.* Jan.-Dec.

Vern. *Kaju hor hor dolok*, Asahan-Toba boundary.

261. Rhododendron arfakianum BECC. Malesia 1 (1878) 201; J.J.S. Nova Guinea 12 (1914) 134, *in text* ('*arfakense*'); SLEUM. Reinwardtia 5 (1960) 218; Blumea 12 (1963) 113.—*R. undulaticalyx* J.J.S. in Gibbs, Arfak (1917) 168.

Epiphytic, more rarely terrestrial shrub, (0.5–)1–2(–2.5) m. Branchlets 2–3 mm ø, sparsely lepidote and papillose-pubescent at the upper 1(–2) internodes, glabrescent; internodes 2–10 cm. *Leaves* in (3–)4–5-merous pseudowhorls at the upper 1–3 nodes, oblong-obovate to obovate-elliptic, apex obtusely attenuate or nearly rounded, base ± cuneate to the petiole, coriaceous, glabrous above at full age, subpersistently and subdensely to rather laxly lepidote beneath (scales small, marginal zone irregularly dented, dark centre minute, slightly impressed, the scale surrounded by a dark halo), moreover very finely punctulate by minute emergences of the epidermis beneath, slightly revolute at the margin in herb., (4–)5–8(–10) by (1.5–)2–3.5 cm, midrib and petiole slightly depressed and with minute, papillose, spreading hairs above, as robust and wrinkled as the petiole and obtusely prominent in the lower part beneath, nerves 6–8(–10) pairs, spreading, ± obscurely inarched at margin, slightly prominent on both faces, reticulation inconspicuous; petiole 6–10(–12) by 1–1.5 mm. *Umbels* (4–)5–7(–10)-flowered. Outer perulae ovate, obtuse, inner ones oblong-obovate, laxly lepidote and minutely papillose dorsally, finally practically glabrous, fimbriate, up to 1.5 by 0.8 cm. Bracteoles filiform below, spathulate-dilated distally, up to 2.3 cm by 0.5–4 mm, papillate. Pedicels slender, laxly to subdensely lepidote and finely patent-puberulous, 0.8–1.2 cm. *Calyx* disk-shaped, membranous, subobtusely and very shortly unequally dented, wavy, spreading to reflexed, glabrous dorsally, manifestly ciliate, *c.* 3 mm ø. *Corolla* tubular below, expanded towards the limb, oblique, (2.5–)3(–3.5) cm long in all, ± deeply pink, glabrous outside, laxly pubescent at the tube inside, tube subcylindric, straight or slightly curved, 1.5–2 cm, base 3–4 mm ø, widened to *c.* 5 mm at apex, lobes suberect, or somewhat spreading, obovate-spathulate, 0.7–1 by 0.5–0.8 cm. *Stamens* 10, unequal, longest ± as long as corolla; filaments linear and laxly pubescent below, filiform and glabrous upwards; anthers obovate, 2 mm. *Disk* puberulous. *Ovary* subcylindric, densely short-pubescent and minutely lepidote (scales covered by the hairs), *c.* 4 by 2 mm, rather abrupt with the style, the latter slender, sometimes with some hairs at the very base, ± equalling the stamens; stigma subclavate-obconical, oblique. Submature capsule fusiform, densely hairy, 2 by 0.4 cm, crowned by the glabrous 2 cm long style.

Distr. *Malesia*: NW. New Guinea (Arfak and Nettoti Mts).

Ecol. In edge of forest, 1200–2135 m, locally common, *Fl.* Jan.-Dec.

Vern. *Krobua*, Kebar.

262. Rhododendron fuchsii SLEUM. Blumea 12 (1964) 341.

Shrub or small tree, 2–4 m. Branchlets robust, reddish and shining when dry, laxly lepidote at apex; internodes 4–8 cm by 3–4 mm. *Leaves* in (5–)6–8-merous pseudowhorls at the 1–2 upper nodes, elliptic-oblong or more rarely oblong, apex shortly attenuate and subobtuse, base almost rounded to truncate, coriaceous, stiff, glabrous above at age, subdensely lepidote beneath (scales brownish, flattish, narrow marginal part variously angled or substellately dented, centre sunk, leaving dark pits), ± flat, 5–8.5 by (2–)2.5–4(–4.5) cm, midrib as thick as the petiole below, narrowly impressed above, obtusely prominent beneath, nerves 6–8(–10) irregular pairs, rather straight in the lower, more curved in the upper part and but obscurely inarching, slightly though markedly impressed above, often rather indistinct on both sides, petiole thick, flattened, (2–)3–5 by 3–4 mm. *Umbels* (6–)8–10(–11)-flowered. Outer perulae ovate, apiculate, *c.* 2 by 1.5 cm, inner ones spathulate and up to 3 by 1–1.5 cm, glabrous, rather shining dorsally. Bracteoles subspathulate-linear, glabrous, 3–3.5 cm. Pedicels stoutish, (2–)2.5–3.5 cm, laxly patently hairy and laxly lepidote, or more densely lepidote only. *Calyx* oblique, shortly 5-lobed and wavy, *c.* 4 mm ø. *Corolla* funnel-shaped, salmon-pink in bud, pinkish-red at anthesis, throat yellowish, (very) laxly lepidote outside, hairy at the base only inside, (4.5–)5–5.5(–6) cm long in all, limb 4(–5) cm ø, tube 2.5–3.5 cm, base 5-saccate and 5–6 mm ø, widened to 1 cm at apex, lobes spathulate-obovate, slightly retuse, 2–2.5 by 1.5–2 cm. *Stamens* 10, ± as long as the corolla

tube; filaments linear, hairy but for the lower ¼ or ⅓; anthers oblong, 4 by 1 mm, each cell with a basal thickened apiculus. *Disk* thickly 10-lobed, glabrous. *Ovary* conical-cylindric, 5-angular or -ribbed, abrupt with the style, densely patently hairy and lepidote, 4–5 by 2.5–3 mm; style thickish, glabrous, *c.* 1.4 cm; stigma subcapitate. *Capsule* thick-cylindrical, 1.2 by 0.6 cm; pedicel thick, glabrous, up to 3.5 cm.

Distr. *Malesia*: Borneo (N. slope of Mt Kinabalu).

Ecol. Apparently rare, in sclerophyllous vegetation or forest border at *c.* 3350 m. *Fl. fr.* Aug.

263. Rhododendron impositum J.J.S. in Fedde, Rep. 68 (1937) 201; SLEUM. Reinwardtia 5 (1960) 218.

Shrub or treelet, 3–4 m. Branchlets subterete, (2–)3–4 mm ø, young parts laxly set with flattish scales, glabrescent. *Leaves* several (up to 12) scattered along the upper internodes (7–18 cm), elliptic or mostly obovate-elliptic to obovate, sometimes subovate-elliptic, apex generally shortly and rather abruptly acutely acuminate, rarely obtuse, base broad-cuneate to rounded, sometimes subcordate, coriaceous, initially very densely lepidote on both faces (scales touching each other), glabrous and remaining minutely pitted above, densely lepidote beneath (scales only partly or not touching each other, dilutely rufescent, small, marginal zone variously angled or dented, minute centre slightly impressed), edge finely crenulate by impressed scales (lens!), margin revolute to various degree, (3.7–)4–8(–10) by (1.8–)2.5–4(–5) cm, midrib nearly as stout as the petiole and much convex-prominent in its lower part, broadened and rather flat, if not impressed in its lower part beneath, nerves 6–9 pairs, at an angle of *c.* 45° and rather high-ascending, curved-anastomosing before the edge, slightly impressed above, a little raised beneath, reticulation mostly obsolete; petiole robust, rugulose, lepidote initially, compressed dorsally or distinctly flattened in the lower leaves, (4–)6–10 by (1.5–)2–4 mm. *Umbels* (6–)10–15-flowered. Bracteoles filiform to linear, almost hirsute, up to 2 cm by 0.5–1.5 mm. Pedicels densely (in part caducously) stellate-lepidote, 2–3.8 cm by *c.* 0.8 mm. *Calyx* obliquely disk-shaped, normally shortly (*c.* 1 mm) dented (or not rarely one to two teeth elongate up to 5 by 1 mm), teeth reflexed, lepidote dorsally, glabrous inside, margin with caducous scales, *c.* 4 mm ø. *Corolla* funnel-shaped, white, pink or red, 5-lobed ± halfway, (3.5–)4–5 cm long in all, sparsely lepidote outside, puberulous in the lower part of the tube inside, tube straight, (1.5–)2 cm, base 4–5 mm ø, ± pouched, gradually dilated to *c.* 1 cm at apex, lobes broadly obovate-spathulate, slightly retuse, 2–2.5(–3) by 1.5–2 cm. *Stamens* 10, a little exserted; filaments linear and laxly hairy below, narrower to filiform and glabrous upwards; anthers oblong, 3–3.5 by 1 mm, base obtuse or minutely apiculate. *Disk* glabrous, or pubescent at upper margin. *Ovary* ovoid-conical or somewhat cylindric-obovoid, abrupt with the style, brownish tomentose (hairs covering the scales), 5–6(–7) by 2.5–3 mm; style rather slender, with some sparse hairs at the very base or glabrous, nearly equalling the stamens; stigma capitate, deeply lobed.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Range).

Ecol. In low forest, 2400–3000 m. *Fl.* June.

264. Rhododendron leytense MERR. Philip. J. Sc. 10 (1915) Bot. 55; En. Philip. 3 (1923) 244; COPEL. *f.* Philip. J. Sc. 40 (1929) 165, t. 11, f. 7–9; SLEUM. Reinwardtia 5 (1960) 218.—*R. flaviflorum* ELM. *ex* MERR. En. Philip. 3 (1923) 244 *in obs. pr. R. leytense.*

var. **leytense.**

Epiphytic shrub. Branchlets terete, reddish brown or greyish, 2–3(–4) mm ø, laxly lepidote at the upper internodes, glabrescent lower; internodes 1.5–5 cm. *Leaves* in 3–5-merous pseudowhorls at the upper 1–3 nodes, oblong or elliptic-oblong, apex shortly and ± bluntly acuminate, base attenuate to somewhat decurrent into petiole, thin coriaceous, laxly substellate-lepidote on both faces when young, finally glabrous above, laxly and subpersistently lepidote beneath (scales small, the marginal zone irregularly lobed or dented, centre shallowly impressed), finally ± glabrescent beneath too, leaving dark points, flat, 4–7(–8) by (1.5–)2–2.7 cm, midrib slightly prominent in the lower, ± impressed in the upper half above, broadened and obtusely prominent below, nerves *c.* 8 pairs, rather straight-ascending, subinconspicuous on both sides, reticulation 0; petiole 0.6–1.8 cm by 1.5 mm, flattened. *Umbels* 4–5-flowered. Perulae oblong, acuminate, glabrous, up to 2.5 by 1 cm. Bracteoles linear. Pedicels puberulous, practically elepidote, stoutish, *c.* 1 cm, twice as long in young fruit. *Calyx* obsolete, rim-like, *c.* 3 mm ø. *Corolla* broadly tubular-funnel-shaped or -subcampanulate, yellow, 3.7–4 cm long in all, 5-lobed about halfway, glabrous outside, very laxly hairy at the lower half of the tube inside, tube *c.* 2 cm, at base 5–6 mm ø, gradually widened to *c.* 1.5 cm at apex, lobes obovate, 1.5–1.8 by 1.2–1.4 cm. *Stamens* 10, unequal, 2.7–3 cm; filaments dilated and patently hairy in the lower third, more linear to filiform and glabrous above, anthers oblong, 2–2.5 mm, base minutely or not biappendiculate. *Disk* pubescent at the upper margin. *Ovary* subcylindric, tapering to style, rather densely short-pubescent and with minute scales ± hidden by the hairs, *c.* 7 by 2 mm; style hairy and lepidote in the lower ¼, glabrous for the rest; stigma obconical, deeply 5-lobed.

Distr. *Malesia*: Philippines (Luzon, Leyte).

Ecol. Mossy forest, probably above 1000 m.

Vern. *Malágos*, Leyte.

var. **loheri** (COPEL. *f.*) SLEUM. Reinwardtia 5 (1960) 218.—*R. loheri* COPEL. *f.* Philip. J. Sc. 40 (1929) 166, t. 11, f. 10–12.

Differs from *var. leytense* by the *corolla* only *c.*

3 cm long in all and anthers biappendiculate at the base.

Distr. *Malesia*: Philippines (Luzon), once found.

Vern. *Salangon.*

265. Rhododendron brachygynum COPEL. *f.* Philip. J. Sc. 40 (1929) 137, 165, t. 11, f. 4–6; SLEUM. Reinwardtia 5 (1960) 219.

"Shrub 1 m. Branchlets red brown. *Leaves* either in pseudowhorls at the end of the branchlets, or scattered and alternate, oval, apex short-acuminate, base obtuse, decurrent into the petiole, shining and minutely blackish punctulate above, sparsely set with pale scales beneath, *c.* 10 by 4.5 cm; petiole 1.5 cm. *Umbels* ± 5-flowered. Pedicels robust, pubescent, *c.* 2 cm. *Corolla* narrowly obconical, yellow, 4 cm long in all, lobes rounded, *c.* 1.5 cm. *Stamens* 10; filaments minutely pubescent in the lower part, *c.* 3 cm; anthers oblong, base minutely biappendiculate, 3 mm. *Disk* hairy, in the upper margin. *Ovary* subcylindric, densely hairy, *c.* 8 by 3 mm; style subabrupt, glabrous, *c.* 9 mm; stigma subcapitate, 2 mm ø."

Distr. *Malesia*: Philippines (Cebu), once found.

Vern. *Mogáng-pudpúd.*

Note. No material seen; description after COPELAND *f.*

266. Rhododendron mindanaense MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 41; Philip. J. Sc. 3 (1908) Bot. 381; ELM. Leafl. Philip. Bot. 3 (1911) 1106; MILLAIS, Rhodod. (1917) 210; MERR. En. Philip. 3 (1923) 244; MILLAIS, Rhodod. ser. 2 (1924) 188; COPEL. *f.* Philip. J. Sc. 40 (1929) 164, t. 7, f. 10–11, t. 11, f. 3; SLEUM. Reinwardtia 5 (1960) 219.

Erect shrub, about 1 m; stems few to several, sparingly branched. Branchlets terete, reddish and sparingly lepidote at the upper internodes, glabrescent and often greyish or pruinose below, 4–5 mm ø; internodes (2–)5–7 cm. *Leaves* in 5–7(–9)-merous pseudowhorls at the upper 1–2 nodes, oblong-obovate, apex obtuse or mostly rounded, not rarely slightly emarginate, narrowed to the cuneate base, coriaceous, ± rigid, dark green above, paler beneath, glabrous above at full age, more persistently and laxly lepidote beneath (scales rather small, marginal zone irregularly lobed or dented, minute dark centre slightly impressed), finally glabrescent beneath with persistent dark points, margin ± flat, 5–7(–8.5) by (2–)2.5–3.5(–4.5) cm, midrib broadened below, slightly grooved above at least in the upper ¾, rather flat and but obtusely raised beneath, nerves 8–10 pairs, at an acute angle, rather high-ascending, anastomosing before the edge, slightly but distinctly impressed above and raised beneath as is the ± marked lax reticulation; petiole flattened, lepidote for a long time, 6–10 by 2–3 mm. *Umbels* (7–)9–12-flowered. Outer perulae ovate, inner ones ovate-oblong, obtuse, subchartaceous, glabrous and shining dorsally, up to 3.5 by 1.5 cm. Bracteoles linear below, subspathulate at the apex, glabrous, up to 4 cm by 1–3 mm. Pedicels laxly lepidote, 2–2.5 cm by 1 mm. *Calyx* obliquely patellar, shortly obtusely 5-lobed, 3.5 mm ø. *Corolla* tubular below, funnelform-expanded above, pure white, very laxly lepidote outside, laxly pubescent in the lower ¾ of the tube inside, 4–4.5 cm long in all, tube cylindric, *c.* 2.5 cm, base pouched, *c.* 5 mm ø, somewhat expanded distally, lobes obovate, 2–2.2 by 1.5–1.8 cm. *Stamens* 10, subequal, 2.5–3 cm; filaments linear, laxly hairy in the lower third, glabrous above; anthers subobovate-oblong, 3.5–4 by 1 mm, base minutely biappendaged. *Disk* slightly prominent, hairy at the upper margin. *Ovary* subovoid-cylindric, densely yellowish-brown-pubescent, the hairs covering numerous, minute scales, 6–7 by 2.5 mm, tapering to the style, the latter sparsely hairy in its lower $^1/_6$–$^1/_3$, ± as long as the stamens; stigma subcapitate. *Capsule* fusiform, slightly curved, warty, subdensely hairy and lepidote, 3–3.5 by *c.* 0.7 cm, with 5 deep longitudinal grooves; pedicel 5 cm.

Distr. *Malesia*: Philippines (Mindanao: Mt Apo).

Ecol. Mossy forest near summit, 2700–2895 m.

Fl. July, Aug.

267. Rhododendron renschianum SLEUM. Bot. Jahrb. 71 (1940) 146; Reinwardtia 5 (1960) 220. —*R. javanicum* [*non* (BL.) BENN.] MALM in Fedde, Rep. 34 (1934) 284.—**Fig. 45.**

Shrub, *c.* 0.5 m. Branchlets 1.5–2(–3) mm ø, tips caducously lepidote, older parts glabrous; internodes 3–4 cm. *Leaves* 4–6 spirally arranged in the upper third of the upper 2–4 internodes, 2 or 3 of these leaves more close together in a kind of pseudowhorl, elliptic or mostly elliptic- or obovate-oblong, apex shortly acuminate, subacute or obtuse, sometimes rounded, base ± cuneate to the petiole, coriaceous, very early glabrescent above, subpersistently and subdensely lepidote beneath (scales small, marginal zone irregularly lobed or dented, centre distinctly impressed, blackish with age), slightly revolute, (3.5–)4.2–5 by 1.5–2.3 cm, midrib impressed above, strongly raised beneath, nerves 4–5 pairs, spreading, obscurely anastomosing, slightly impressed above, mostly obsolete beneath, reticulation 0; petiole lepidote, semiterete, grooved above, 4–6 by 1–1.5 mm. *Umbels* (1–3) 5–8-flowered. Perulae membranous, outer ones ovate-apiculate or -acuminate, inner ones ovate-oblong or obovate and obtuse, glabrous dorsally, margin with caducous scales, up to 1 by 0.6 cm. Bracteoles linear, subspathulate apically, up to 1.2 cm. Pedicels rather slender, laxly to subdensely substellate-lepidote, *c.* 2 cm. *Calyx* obliquely disk-shaped, very shortly dented or lobed, lepidote dorsally, *c.* 3 mm ø. *Corolla* tubular-funnelform, 3–3.5 cm long in all, orange to red, laxly lepidote outside, glabrous or practically so inside, tube cylindric, straight, (1.7–)2(–2.5) cm, base somewhat 5-pouched, 4–5 mm ø, slightly dilated to 6–7 mm at apex, lobes ± spreading, oblong-obovate to obovate, 1–1.5 by 0.8–1.3 cm. *Stamens* 10, ± as long as the corolla tube; filaments linear, hairy for 2 or 3 mm above the base,



Fig. 45. *Rhododendron renschianum* SLEUM. Mt Geli Mutu, E. Flores, 1500–1700 m (RENSCH, 1927).

glabrous for the rest; anthers oblong, *c.* 2 mm. *Disk* prominent, glabrous. *Ovary* subcylindric, densely covered with very short, subpatent, greyish hairs and some (early caducous) scales, 5–7(–9) by *c.* 2 mm, subabrupt or more continuous with the style, the latter with some hairs at the base, ± as long as the stamens; stigma subcapitate, manifestly dilated. *Capsule* oblong, (1.2–)1.5–2 cm by (4–)5–6 mm, subdensely short-pubescent, elepidote; pedicel glabrescent, 2–3.5 cm by 1 mm.

Distr. *Malesia*: Lesser Sunda Is. (Flores: Mts Geli Mutu and Mandaswai).

Ecol. In *Casuarina* forest or in summit vegetation, on slopes or edge of crater, on stony ground, 1500–2300 m. *Fl.* May-Nov.

268. Rhododendron culminicolum F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 23; SLEUM. Reinwardtia 5 (1960) 220; Blumea 11 (1961) 128; *ibid.* 12 (1963) 113.—*R. nodosum* C. H. WRIGHT, Kew Bull. (1899) 103.—*R. keysseri* FOERSTER in Fedde, Rep. 13 (1914) 223; SCHLTR. Bot. Jahrb. 55 (1918) 155; DIELS, *ibid.* 62 (1929) 487; SLEUM. Reinwardtia 5 (1960) 220.—*R. convexum* SLEUM. *l.c.* 220.—*R. gregarium* SLEUM. *l.c.* 221.

KEY TO THE VARIETIES

1. Style hairy in the lower ½–¾ part. Filaments laxly pubescent to practically glabrous. **2. *var.* nubicola**
1. Style mostly with some sparse hairs at base, rarely so up to the lower third. Filaments laxly to subdensely hairy in about the lower half.
2. Corolla 2.5–3.5 cm. Fruit 4(–5) mm ø. **3. *var.* angiense**
2. Corolla 3.5–4.5 (rarely –6) cm. Fruit (5–)6–8(–9) mm ø. . . . . **1. *var.* culminicolum**

1. *var.* culminicolum.

Shrub or small tree, up to 5 m. Branchlets 2–3 (rarely up to 6) mm ø, striate lengthwise, tips lepidote, below early glabrescent; internodes 2–5 (–8, rarely up to 14) cm. *Leaves* in 3–5(rarely up to 7)-merous pseudowhorls at the upper 1–2(–3) nodes, elliptic or broadly oblong or obovate-oblong, more rarely ovate- or obovate-elliptic or obovate, apex shortly, sometimes rather abruptly subacuminate or attenuate, subacute or mostly obtuse, rarely almost rounded, base ± broadly attenuate to the petiole, or rarely rounded or even subcordate, ± coriaceous, when very young densely covered on both faces with flattish, pale scales, completely glabrescent above with age, still laxly lepidote for a while beneath (scales rather small, early whitish or dissolved marginal zone irregularly lobed or dented, dark centre ± impressed), finally laxly brownish-blackish-punctate beneath, edge ± revolute, (2.5–)3.5–6(–8, rarely up to 9) by (1–)2–3(–4.5, rarely up to 7) cm, midrib narrowly sunk above, broadened, wrinkled, and much prominent in the lower part, nerves (4–)6–8(–10) pairs, curved-spreading and rather indistinctly anastomosing before the edge, slightly impressed above, somewhat raised beneath at full age, reticulation subdense, ± obscure above, slightly raised beneath; petiole flattened, grooved above, (2–)4–7(–9, rarely up to 16) by (1–)1.5–2(–3) mm. *Umbels* (1–2–)4–6(rarely up to 9)-flowered. Outer perulae suborbiculate to ovate, sometimes with a short narrow acumen, inner ones ovate to obovate, laxly lepidote and sometimes subsericeous at the base outside, glabrous or mostly laxly to subdensely sericeous inside, up to 2 (rarely up to 2.5) by 1(–1.5) cm. Bracteoles filiform to linear, glabrous, up to 2 by 0.3 cm. Pedicels laxly to subdensely lepidote, moreover whether or (mostly) not hairy, (1–)1.5–2(–2.4) cm by *c.* 0.7 mm. *Calyx* obliquely disk-shaped, wavy, obtusely and shortly lobed, *c.* 4 mm ø, lepidote outside, generally not ciliate. *Corolla* ± obliquely tubular, red to purple, sometimes reddish pink, 3.5–4.5 (rarely up to 6) cm long in all, laxly to subdensely lepidote outside, sparsely to subdensely hairy in the lower part of the tube inside, tube ± curved, 2.5–3.5 (rarely up to 4.5) cm, base 4–5(–6) mm ø, gradually widened to 8–10(–15) mm at apex, lobes broadly obovate to suborbicular, suberect or ± spreading, (0.8–)1.5(–1.8) by 0.8–1.3(–1.5) cm. *Stamens* 10, subequal, ± equalling the corolla; filaments linear, laxly to subdensely hairy in about the lower half, glabrous above; anthers obovate to broad-oblong, base often minutely biappendiculate, (2–)2.5–3(–3.5) by 1–1.5 mm. *Disk* ± prominent, short-pubescent

but at the upper margin. *Ovary* subcylindric, yellowish tomentose, and ± densely lepidote (scales mostly covered by the hairs), subcontinuous with the style, 5–7 by 2–3 mm; style slender, finally exserted, mostly with some sparse hairs and scales at the base, rarely so up to the lower third; stigma subcapitate. *Capsule* subcylindric, attenuate at both ends, laxly to very laxly hairy, more densely lepidote (2.5–)3–4 by (0.5–)0.6–0.8 (–0.9) cm.

Distr. *Malesia*: New Guinea (Main Range, from Mt Carstensz to the Southern and Western Highlands and in the Owen Stanley Range, also in the Mt Saruwaged-Rawlinson Range area).

Ecol. Low mossy forest or subalpine forest-grassland edge with shrubberies, on more open slopes or summit vegetation, also found in alpine pasture, both in primary and secondary communities, not rarely as part of the forest undergrowth, locally plentiful, (2400–)2800–3600(–4000) m. *Fl.* Jan.-Dec.

Vern. *Kibimune*, Chimbu: Masul, *kutengaigai*, Chimbu: Goromagua, *gagum*, *wumbemp*, Wahgi: Minj, *wambu*, Hagen: Togoba, *bit-bit*, Dani.

Note. *R. culminicolum* is conceived here in a broad sense comprising forms with coriaceous, though flexible, distinctly petioled leaves with ± attenuate base, and corollas 3.5–4.5 cm, found in the upper montane forest from on *c.* 2400 m, and forms with smaller, stiff-coriaceous, short-petioled or subsessile leaves with rounded or even subcordate bases, and corollas 4–6 cm, found in the uppermost patches of the mossy forest or forest fringe shrubberies or even in open alpine grassland between 3200 and 4000 m.

It belongs to the small number of rather variable species which are distributed all over the mountainous part of New Guinea, such as are *R. zoelleri*, *R. macgregoriae*, and *R. konori*.

2. *var.* **nubicola** (WERNH.) SLEUM. Reinwardtia 5 (1960) 221; Blumea 12 (1963) 113.—*R. coenenii* J.J.S. Nova Guinea 12 (1914) 132, t. 30 A; *ibid.* 12 (1917) 506; SLEUM. Reinwardtia 5 (1960) 153, *pro syn. sub R. hatamense*.—*R. nubicola* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 98.—*R. acrocline* SLEUM. Reinwardtia 5 (1960) 158. —*R. hatamense* (*non* BECC.) SLEUM. *l.c.* 153, *p.p.*

Differs from *var. culminicolum* by the laxly pubescent to practically glabrous filaments and the style, which is hairy in its lower half to ¾ part. *Leaves* 2–3.5(–4) by (1–)1.5–2(–2.5) cm.

Distr. *Malesia*: W. New Guinea (Wissel Lakes, Mt Carstensz and Oranje Mts).

Ecol. Open places in the subalpine forest or in open alpine vegetation, (2500–)3200–3600 m.

3. *var.* **angiense** (J.J.S.) SLEUM. Blumea 12 (1963) 114.—*R. angiense* J.J.S. Nova Guinea 12 (1914) 133, t. 30 B; in Gibbs, Arfak (1917) 169; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 478; SLEUM. Reinwardtia 5 (1960) 220; Blumea 11 (1961) 128, *pro syn. sub R. culminicolum* F. v. M. *var. culminicolum*.—*R. gibbsiae* J.J.S. in Gibbs, Arfak (1917) 169; SLEUM. Reinwardtia 5 (1960) 153, *pro syn. sub R. hatamense*.

Differs from *var. culminicolum* by corollas 2.5–3.5 cm long in all and smaller fruits, 4(–5) mm ø.

Distr. *Malesia*: NW. Guinea (Vogelkop Peninsula: Arfak, Nettoti, and Tohkiri Mts).

Ecol. In devastated *Nothofagus* forest or forest border and more open summit areas, (900–)1200–2300 m, locally rather common, but often sterile, generally terrestrial. *Fl. fr.* Jan.-Dec.

269. **Rhododendron mollianum** KOORD. Nova Guinea 8 (1909) 187; SLEUM. Reinwardtia 5 (1960) 222.

Terrestrial shrub, 1 m. Branchlets terete, 2–4(–5) mm ø; internodes laxly minutely lepidote, lower ones glabrescent and corticate, 6–9(–15) cm. *Leaves* in 4–5-merous pseudowhorls at the upper nodes, lanceolate or oblong-lanceolate, apex acutely caudate-acuminate, base broadly acutely attenuate, coriaceous, completely glabrous above with age, rather laxly lepidote for some time beneath (scales minute, marginal zone irregularly substellate-lobed, early dissolute, centre shallowly impressed), finally ± glabrescent beneath, margin strongly revolute, 11–15 by 1.5–3 cm, midrib narrow and impressed above the broadened base excepted, much and obtusely prominent beneath, nerves 10–12(–14) pairs, irregular, spreading, obsoletely anastomosing near the edge, slightly impressed above and raised beneath, reticulation obscure above, rather dense and finely prominent beneath; petiole rugose, grooved above, 5–7 by 1–1.5 mm. *Umbels* ± 3-flowered. Pedicels laxly lepidote, epilose, 2.5–3 cm by 0.7 mm. *Calyx* disk-shaped, obsoletely dented, oblique, *c.* 3 mm ø. *Corolla* funnel-shaped, orange, suffused at the limb with red, 6.5–7 cm long in all, sparsely minutely lepidote outside, laxly hairy at the tube inside, tube *c.* 2.5 cm, base markedly pouched, *c.* 5 mm ø, dilated to *c.* 1 cm at apex, lobes ± spreading, obovate-oblong, 4–4.5 by *c.* 2 cm. *Stamens* 10, subequal, reaching halfway the corolla lobes; filaments linear and subdensely to laxly hairy in the lower third, becoming nearly filiform and glabrous above; anthers elongate-oblong, slightly curved, 5 by 1 mm. *Disk* prominent, shortly greyish pubescent. *Ovary* subcylindric, tapering to the style, densely minutely lepidote and short-pubescent (not tomentose), scales well visible between the hairs, *c.* 8 by 2 mm; style in the lower ¼–⅓ short-pubescent and lepidote, or exclusively lepidote above, slender, ± equalling the stamens; stigma dilated-capitate.

Distr. *Malesia*: New Guinea (Noord R.), once found. *Fl.* June.

270. **Rhododendron poremense** J.J.S. Bot. Jahrb. 68 (1937) 203; SLEUM. Reinwardtia 5 (1960) 222.

Epiphytic shrub, *c.* 1 m. Branchlets 1.5–2.5 mm ø, very laxly clothed with appressed scales, early glabrescent; internodes 4–9 cm. *Leaves* opposite or in 3(–6)-merous pseudowhorls at the upper 1–2 nodes, obovate- to oblong-elliptic, apex very shortly acuminate or obtuse, base acutely attenu-

ate, coriaceous, glabrous, densely blackish punctulate above at full age, laxly appressedly lepidote beneath (scales minute, narrow marginal zone irregularly lobed or obtusely dented, centre hardly impressed), finally ± glabrescent beneath, margin very narrowly revolute, (6.5–)8–11 by 2.9–4.6 cm, midrib flattened and slightly or not raised above, obtuse and much prominent at least in the lower half beneath, nerves 7—9 pairs, rather narrow and subparallel, curved-ascending and obscurely anastomosing along the margin, slightly raised on both faces, reticulation ± obsolete; petiole subterete, lepidote, grooved above, 7–9 by *c.* 2 mm. *Umbels* 5–6-flowered. Pedicels stoutish, rather densely substellate-lepidote, epilose, *c.* 1.5 cm. *Calyx* obliquely disk-shaped, crenulate or obtusely lobed, lepidote dorsally, *c.* 4 mm ø. *Corolla* funnel-shaped, carmine, *c.* 4 cm long in all, sparsely substellate-lepidote outside, finely hairy in the lower half of the tube inside, tube *c.* 2 cm, base 5-saccate, *c.* 4 mm ø, gradually dilated to 6–8 mm at apex, lobes obovate-spathulate, often retuse, ± expanded, 1.8–2 by 1.4–1.6 cm. *Stamens* 10, somewhat exserted; filaments linear, rather laxly pubescent in the lower half, glabrous above; anthers oblong, base obtuse, *c.* 4 by 1 mm. *Disk* low, glabrous. *Ovary* subcylindric, attenuate towards the slender style, finely short-pubescent and subdensely set with minute, subentire scales, *c.* 5 by 2 mm; style glabrous, 1.7–2 cm; stigma thick-capitate.

Distr. *Malesia*: SE. Celebes (Mengkoka Mts: B. Porema), at 1400 m. Once found. *Fl.* Oct.

271. Rhododendron stresemannii J.J.S. in Fedde, Rep. 30 (1932) 166; SLEUM. Reinwardtia 5 (1960) 222.

Shrub. Branchlets subterete, 2–3 mm ø, brown, subdensely clad with appressed, small scales at upper internodes (*c.* 10 cm), laxly so in the lower ones. *Leaves* in 3–5-merous pseudowhorls, ovate- or oblong-cordate, apex rather shortly acutely acuminate, base cordate with rounded lobes, glabrescent above with age, but still rather densely set with minute blackish pits for some time, laxly to subdensely lepidote beneath (scales small, marginal zone substellate-lobed or -dented to various degree, centre impressed), finally ± glabrescent beneath too, leaving darker ± pitted spots, flat, 8.5–10 by 4.2–5.3 cm, midrib flattish, dilated at the very base, narrower and slightly impressed for the upper third above, as robust as the petiole in its lower part, obtusely prominent, nerves 7–8 pairs, spreading, inarching before the edge, slightly impressed above and raised beneath, reticulation subinconspicuous; petiole compressed dorsally, lepidote, 5–6 by 2 mm. *Umbels* ± 7-flowered. Pedicels with lax substellate, flat scales and minute white hairs, 2.4–2.7 cm by 1 mm. *Calyx* oblique, disk-shaped, obscurely lobed, rather fleshy, dorsally with some scales and fine short hairs, *c.* 4 mm ø. *Corolla* tubular-funnel-shaped, slightly oblique, dark rose-red, 4–4.5 cm long in all, quite glabrous outside, practically so inside, tube 2–2.3 cm, base dilated and 5-pouched, 5–6 mm ø, then ± narrowed, but upwards again dilated to *c.* 12–15 mm at apex, lobes obovate-spathulate, 2–2.3 by 1.5–1.8 cm. *Stamens* 10, subequal, 2.4–2.8 cm; filaments linear, sparsely set with longish, ± spreading hairs in the lower third, glabrous above; anthers oblong, *c.* 3 by 1 mm. *Disk* low, hairy except the very base. *Ovary* subovoid-cylindric, densely clothed with white, ± forward directed hairs, which cover small scales, 6–7 by 3 mm, rather abrupt with the style, the latter stoutish, *c.* 2 cm, hairy at the base; stigma thick-capitate.

Distr. *Malesia*: Moluccas (W. Ceram).

Ecol. Steep limestone ridge of the Ora Mts, *c.* 1000 m, in *Rhododendron* copse with a few high *Casuarina*. Once found. *Fl.* May.

272. Rhododendron retivenium SLEUM. Reinwardtia 5 (1960) 222; Blumea 12 (1963) 114.—*R. brookeanum* (*non* LOW *ex* LINDL.) STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 196.

Straggling shrub or small tree, up to 6 m, terrestrial or epiphytic. Branchlets terete, (3–)4–5 mm ø, rather laxly set with flat scales at the upper 1–2 internodes, the latter (2–)3–9(–13) cm. *Leaves* partly in 3–4-merous pseudowhorls at the upper 1–2 nodes, partly spiral and spaced in the upper half of the internode, lanceolate to lanceolate-oblong, apex shortly subacutely acuminate, base cuneate to the petiole, not rarely subtruncate at the very base, coriaceous, glabrous and indistinctly impressedly blackish punctulate above at full age, rather laxly and subpersistently lepidote beneath (scales minute, marginal zone lobed or dented, early dissolute, blackish centre faintly impressed), margin ± flat, 14–18(–23) by (2–)2.5–4(–4.5) cm, midrib dilated in the basal part, very narrow and deeply sunk in the upper part above, as thick as the petiole and obtusely prominent in the lower part beneath, nerves 12–18 pairs, spreading, anastomosing along the edge, not much raised on both faces, reticulation dense, fine, but remarkably prominent on both sides; petiole somewhat flattened, wrinkled lengthwise, lepidote, early glabrescent, (6–)8–20 by 2–3(–4) mm. *Umbels* 4–6(–8)-flowered. Outer perulae ovate, more inner ones broadly ovate-oblong, innermost ones spathulate, obtuse, membranous, all glabrous, up to 3 by 1.2 cm. Bracteoles linear, glabrous, *c.* 2 cm by 1 mm. Pedicels robust, laxly lepidote, more densely so at both ends, not hairy at all, 2–2.8 cm by 1–1.5 mm. *Calyx* obliquely disk-shaped, the margin wavy and indistinctly 5-lobulate, glabrous, 4–5 mm ø. *Corolla* funnel-shaped in outline, tubular below, expanded up to 7.5 cm ø at the limb, of a rich pure yellow or orange, sweet-scented, 6–7(–7.5) cm long in all, glabrous outside, laxly pubescent at the lower half of the tube inside, tube rather straight, (3–)3.5–4 cm, base much saccate or inflated and 6–7 mm ø at base (which includes the calyx), slightly dilated upwards, 1.5(–2) cm across the mouth, lobes broadly obovate to suborbicular, 2.5–3 cm ø. *Stamens* 10, unequal, slightly exserted from the

corolla tube; filaments linear (1 mm) and densely patently hairy in the lower third, more filiform and glabrous upwards; anthers oblong, curved, base minutely apiculate, (3.5–)4.5–5 by *c.* 1 mm. *Disk* very thick and prominent, glabrous, or occasionally puberulous at the upper margin. *Ovary* cylindric, continuous with the style, seemingly glabrous, but laxly finely pubescent (lens!), otherwise set with some sparse scales, 8–10 by *c.* 2 mm; style rather slender, nearly as long as the stamens, glabrous; stigma capitate, manifestly 5-lobed. *Capsule* subfusiform, very shortly attenuate at the base, more longish so at the apex, sparsely lepidote, puberulous in the lower third, or quite glabrous all over, (4.5–)5–5.5 by *c.* 0.8 cm; pedicel 2.5–3 cm by 1.5 mm.

Distr. *Malesia*: Borneo (Mt Kinabalu).

Ecol. In jungle ridge or crest, or on wet rocks in light shade, near waterfall, 1220–2985 m. *Fl.* Jan.-Dec.

273. Rhododendron lowii HOOK. *f.* in Hook. Ic. Pl. (1852) t. 883 (*'lowei'*); WALP. Ann. 5 (1858) 447; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 195; GIBBS, J. Linn. Soc. Bot. 42 (1914) 102; MILLAIS, Rhodod. (1917) 204; MERR. En. Born. (1921) 462; SLEUM. Reinwardtia 5 (1960) 223; Blumea 12 (1963) 114, *non* COURTOIS, Mag. d'Horticult. 1 (1833) 105, *n.* 402, *pro var. R. ponticum* L.; LOUDON, Gard. Mag. 11 (1835) 79, 190.

Spreading shrub or small tree, 3–7 (rarely up to 10) m, terrestrial or epiphytic. Branchlets (5–)6–10 mm ø, terete, practically glabrous; upper internodes 4–10 cm (or longer?). *Leaves* 4–6 scattered along the upper 1–2 internodes, 2 or 3 in a ± pronounced pseudowhorl, large, elliptic to subobovate- or oblong-elliptic, rarely obovate, apex broadly attenuate or subacuminate, obtuse, rarely really rounded, broadly attenuate towards the base (very base often ± abruptly truncate), or even rounded or subcordate, stiffly coriaceous, initially very densely lepidote on both sides (the scales ± touching), finally quite glabrous above, but still blackish-impressed-punctulate, subdensely lepidote for a while beneath (scales small, marginal zone variously lobed or shortly dented, minute centre shallowly impressed), gradually glabrescent beneath too, the scales leaving a pale halo in the epidermis, flat, (12–)14–23(–26) by (5–)6–13(–15) cm, midrib wrinkled lengthwise, as stout as the petiole in the basal part, much convex-prominent above, much less so to nearly flat beneath, nerves (10–)16–24 pairs, spreading below, often markedly subparallel, in part deeply forked, indistinctly anastomosing, ± prominent on both faces, reticulation rather dense, mostly finely raised on both sides; petiole flattened, (3–)5–10 (rarely up to 15) by 3–5(–7) mm, rugose, inserted on a thick leaf-cushion. *Umbels* (6–)7–12-flowered. Outer perulae ovate, obtuse, inner ones ovate-oblong to oblong, short-acuminate, innermost ones obovate, obtuse, all stiff-membranous, glabrous and lustrous dorsally, up to 3.5 by 1 cm. Bracteoles linear below, subspathulate-dilated distally, up to 3 cm by 2 mm. Pedicels laxly substellate-lepidote, epilose, 2–3 (rarely up to 5) cm by 1.5 mm. *Calyx* very oblique, rim-like or shortly disk-shaped, obscurely 5-lobed or -angled, fleshy, subglabrous dorsally, 5–6 mm ø. *Corolla* funnel-shaped (wax-like when fresh), canary or golden yellow, orange, salmon red or flushed flame-pink, (5.5–)6–7 cm long in all, limb as wide as the length of the corolla, scentless, glabrous outside, short-pubescent at the tube inside, tube straight, ± 3 cm, base markedly 5-saccate, 5–7 mm ø, gradually widened to 1.5–2 cm at apex, lobes much expanded, broad-obovate to -spathulate, sometimes retuse, (2.5–)3–3.5(–4) by 2–3 cm. *Stamens* 10, unequal, the longest reaching halfway the corolla lobes; filaments linear (2 mm) and villous in the lower third, narrower to subfiliform and glabrous above; anthers obovate-oblong, curved, with minute basal appendages, *c.* 5 by 1.5 mm. *Disk* thick, very prominent, glabrous or puberulous in the upper margin. *Ovary* columnar, ± abrupt with the style, greyish velutinous and ± densely lepidote (most scales hidden by the rather short dense hairs), 7–10 by *c.* 4 mm; style stoutish, glabrous, or with some hairs at the base, (2–)3 cm by 1 mm; stigma large, capitate, *c.* 4 mm ø, obtusely lobed. *Capsule* thick-fusiform, (2.5–)3.5–4(–4.5) by 0.8–1 cm, short-hairy, practically elepidote, finally ± glabrescent, with scattered, minute, elliptic-oblong, lenticel-like warts, valves woody; pedicel 4–5(–7) by 2–2.5 mm. *Seeds c.* 6 mm, long-tailed on both ends, each tail *c.* 2.5 mm.

Distr. *Malesia*: Borneo (Mt Kinabalu and Mt Trus Madi).

Ecol. Undershrub in high, small tree in low mossy forest, on hillside or rocky ridge, (1980–)2440–3350 m. *Fl.* Jan.-Dec.

Note. This beautiful species is very conspicuous on Mt Kinabalu; the flower clusters are reported to measure up to 35 cm ø when fresh.

274. Rhododendron intranervatum SLEUM. Blumea 11 (1961) 129; *ibid.* 12 (1963) 114.

Epiphytic shrub. Branchlets *c.* 4 mm ø at the glabrous tips; internodes 1.5–3 cm. *Leaves* solitary and subopposite at the ultimate 1–2 nodes (leaving subreniform scars 5–6 by 7–9 mm), elliptic-obovate, apex rounded-obtuse, or sometimes very shortly apiculate, broadly subcuneate-rounded towards the base (very base subtruncate-obtuse), or faintly cordate, coriaceous, firm, ± glabrous at full age above, subpersistently lepidote beneath (scales minute, flat, marginal zone variously substellate-dented, centre small, hardly immersed), edge a little revolute, 13–16 (–18) by 8–10 cm, midrib as wide as the petiole and slightly raised below on the upper surface, thick-prominent at the base beneath, nerves 12–14 (–16) pairs, ± at right angles, rather straight and ± parallel, with numerous similar less distinct nerves (or primary veins) between, all ± manifestly prominent on both sides, anastomosing and united into an inner intramarginal nerve, which is connected by numerous transverse veinlets

with an outer, less distinct one, reticulation dense, slightly prominent on both faces, especially beneath; petiole compressed dorsally or subsemiterete, glabrous, *c.* 10 by 5–6 by *c.* 4 mm. *Flowers* in twos. Inner perulae oblong, glabrous, 4–5 by *c.* 1 cm. Bracteoles (or innermost perulae?) elongate-subspathulate, *c.* 4 by 0.5 cm. Pedicels very densely patently short-hairy, elepidote, *c.* 4 cm by 1.5 mm. *Calyx* disk-shaped, wavy, obtusely 5-lobed, *c.* 4 mm ø, glabrous lobes sometimes in form of 5 elongate obtuse laciniae, appressed to the corolla, 4–4.5 by 0.2–0.4 cm. *Corolla* funnel-shaped, light yellow, very shortly hairy for the lowest cm inside, quite glabrous otherwise, 5-lobed halfway, 5–6 cm long in all, base slightly 5-saccate, 0.6–0.8 cm ø, widened to 1.5–2.5 cm at apex, lobes obovate-spathulate, erecto-patent, 2.5–3 by 2–3 cm. *Stamens* 10, *c.* 3 cm; filaments linear and densely hairy or almost villous in the lower half, filiform and glabrous above; anthers narrow-oblong, slightly curved, 7–8 by 1.5 mm, each cell bearing a basal obtuse swelling or gland. *Disk* prominent, thickly 10-lobed, glabrous below, laxly hairy above. *Ovary* subcylindric, *c.* 6 by 2 mm, densely white-hairy or subvillous, apparently elepidote, tapering to the style, the latter rather slender, quite glabrous, 1–1.5 cm at anthesis; stigma thick-turbinate with 5 distinct lobes.

Distr. *Malesia*: Borneo (Mt Palimasan, near Tabang on Belajan R. in W. Kutei; Mt Penrissen and Mt Berumput in Sarawak).

Ecol. In *Agathis* forest on waterlogged, white, acid sands or on granite rock faces, 600–1050 m.

275. Rhododendron toxopei. J.J.S. in Fedde, Rep. 30 (1932) 168; SLEUM. Reinwardtia 5 (1960) 224.

Shrub. Branchlets subterete, 2–3 mm ø, initially lepidote, early glabrescent; internodes 2–4 cm. *Leaves* in ± 4-merous pseudowhorls, oblong-ovate, apex gradually and ± shortly acuminate, subacute, base obliquely rounded, slightly inequilateral, coriaceous, glabrous above (scale vestiges remaining recognizable by numerous minute, blackish pits), laxly subpersistently lepidote beneath (scales small, marginal zone variously and shortly dented or lobed, but later roundish when marginal zone is partly dissolved, centre slightly impressed), edge very narrowly or not revolute, 6.2–10 by 2–4.6 cm, midrib broadened below, wrinkled lengthwise, rather flat or a little impressed above, ± distinctly prominent beneath, nerves 10–12 pairs, curved-spreading, inarching near the edge, well visible impressed above, slightly raised beneath, reticulation dense, finely prominent beneath only; petiole rugose, flattened, 7–11 by 2–2.5 mm. *Umbels* ± 8-flowered. Bracteoles said to be linear, glabrous. Pedicels sparsely lepidote at both ends, 1.7–2.1 cm by 1 mm. *Calyx* oblique, disk-shaped, obtusely angled or very shortly lobed, practically glabrous, 3–4 mm ø. *Corolla* tubular-funnel-shaped, pale rose, 4.5–5 cm long in all, glabrous outside, laxly pubescent in the lower ⅔ of the tube inside, tube 2–2.4 cm, straight, base slightly dilated or pouched, 5–6 mm ø, widened to *c.* 1 cm at apex, lobes oblong-spathulate, ± spreading, 2.3–2.7 by 1–1.6 cm. *Stamens* 10, shortly exserted; filaments linear below (1 mm) and subdensely patent-hairy in the lower, narrower and glabrous in the upper half; anthers oblong, curved, base obtuse, *c.* 4 by 1 mm. *Disk* prominent, short-pubescent. *Ovary* subcylindric, densely pubescent or subvelutinous, with numerous minute scales well visible between the hairs, rather continuous with the style, 6–8 by 2.5 mm; style rather slender, pubescent in the lower ¼–⅓, *c.* 2 cm; stigma capitate, *c.* 2.5 mm ø.

Distr. *Malesia*: Moluccas (Buru, near Kuntu-run), in peatmoor with *Sphagnum*, 1075 m. *Fl.* Feb.

276. Rhododendron brookeanum LOW *ex* LINDL. J. Hort. Soc. Lond. 3 (1848) 82, *c. icon* p. 83; PLANCH. Fl. Serres 5 (1849) 477–480, *c. icon. xyl.*; ANON. Gard. Chron. (1855) 404, *c. icon.*; HOOK. Bot. Mag. (1856) t. 4935; HOUTTE, Fl. Serres II, 2 (1857) 111, t. 1238–39; MIQ. Fl. Ind. Bat. 2 (1859) 1057; BECC. Malesia 1 (1878) 207; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 196; GIBBS, J. Linn. Soc. Bot. 42 (1914) 103; MILLAIS, Rhodod. (1917) 130; MERR. En. Born. (1921) 460; HOLTT. M.A.H.A. Mag. 9 (1939) 35; SLEUM. Reinwardtia 5 (1960) 224; Blumea 11 (1961) 130; *ibid.* 12 (1963) 114.—*Azalea brookeana* (LOW *ex* LINDL.) O. KTZE, Rev. Gen. Pl. 2 (1891) 387.

KEY TO THE VARIETIES

1. Leaves oblong to lanceolate-oblong, ± shortly acuminate, (3–)3.5–8(–9) cm wide.
2. Leaves without hairs . . **1. *var.* brookeanum**
2. Leaves densely short-hairy on both sides along the midrib; branchlets hairy. **2. *var.* cladotrichum**
1. Leaves lanceolate or oblong-lanceolate, longer and/or more acutish acuminate, mostly more slenderly, 6–15 by 1.5–2, rarely up to 3 mm petioled.
3. Leaves lanceolate. Corolla (5–6) cm. **3. *var.* gracile**
3. Leaves oblong-lanceolate. Corolla 4(–5) cm. **4. *var.* extraneum**

1. *var.* brookeanum.

Epiphytic or terrestrial shrub, up to 2(–4) m. Roots large and fleshy. Upper internodes obtusangular or subterete, laxly set with appressed substellate scales, 2–15 cm by 3–4(–6) mm, lower ones terete, glabrescent. *Leaves* more or less clearly in 3–4(–5)-merous pseudowhorls at the upper 1–2 nodes, oblong or lanceolate-oblong, often subsessile, but sometimes also manifestly petioled, apex gradually and mostly rather shortly acuminate, subacute, base cuneate or attenuate to the petiole, or sometimes subtruncate, or even rounded at the very base, ± coriaceous, glabrous, the former scales leaving dense, minute, dark pits, laxly to very laxly lepidote for some time beneath (scales small, marginal zone variously substellate-lobed

or -dented, centre minute, shallowly impressed), finally ± completely glabrescent beneath, margin ± flat, 12–25(–28) by (3–)3.5–8(–9) cm, midrib a prolongation of the robust petiole below, nerves in 14–24 pairs, ± spreading, inarching along the edge, slightly raised on both faces, reticulation rather coarse and not much conspicuous, sometimes dense and more visible raised especially beneath (possibly due to intercrossing with distinctly reticulate-leafed species as *R. retivenium*?). *Umbels* 5–14-flowered. Perulae thin, outer ones ovate-subacuminate, inner ones oblong to spathulate-oblong, glabrous, up to 4(–4.5) by 1.5(–2) cm. Pedicels sparsely lepidote or not, rarely almost glabrous, rarely pubescent, (2–)2.5–4(–5) cm by (1–)1.5–2 mm in anthesis. *Calyx* shortly disk-shaped or merely rim-like, obscurely angled or lobed, glabrous, 4–5 mm ø. *Corolla* funnel-shaped, beautiful orange pink with white or cream centre, or golden (pale) yellow, more rarely of a brick-red colour, throat then mostly yellow, said to become suffused with red or rosy orange outside with age, ± fleshy, often with a delicate lemon-like fragrance, glabrous outside, ± laxly pubescent in the lower part of the tube inside, 5–7.5(–8) cm long in all (length and width of corolla 9 cm when fresh), tube straight, 3–3.5 cm, markedly obtusangular, base 5-pouched, 6–8 mm ø, gradually dilated to 2–2.5 cm at apex, lobes much expanded, broadly obovate or suborbicular, slightly retuse or delicately crisped at the edge, (2.5–)3.5(–4.5) by 2.5–3(–3.5) cm. *Stamens* 10, subequal, reaching halfway the corolla lobes; filaments linear, densely subpatently hairy in the lower third, glabrous above; anthers oblong, curved, base obtuse, (4–)4.5–5(–6, rarely up to 7) by 1–1.3 mm. *Disk* prominent, puberulous at the upper margin. *Ovary* subcylindric, densely greyish hairy or velutinous and lepidote (scales often at least partly hidden by the hairs), ± abrupt with the style, 8–10 by 2–3 mm; style first shorter than, finally ± equalling the stamens, glabrous; stigma turbinate-dilated, deeply lobed. *Capsule* subfusiform-cylindric, lepidote and short-pubescent to various degree, with some elliptic minute warts, (3.5–)4–5 by 0.7–0.8(–1.2) cm; pedicel 3–6 cm by *c.* 2 mm. *Seeds* 7–9 mm including the tails.

Distr. *Malesia*: Borneo.

Ecol. Epiphytic on mangrove or rocks at sea-level, ascending to 1525 m in the mossy forest, with preference for trees along rivers. *Fl.* Jan.-Dec.

Note. Introduced to the lowlands of the Malay Peninsula and flowering freely. Formerly used for crossings, practically out of cultivation by now. Very near to *R. triumphans* YERSIN & CHEV. from S. Annam, which is mainly distinguished by longer and more slender petioles; its fruit is still unknown.

2. *var.* **cladotrichum** SLEUM. Reinwardtia 5 (1960) 224.

Branchlets and midrib of the leaves ± densely clad with fuscescent short and ± spreading hairs. Pedicels ± glabrous, 6–10 by (1–)2(–3) mm.

Distr. *Malesia*: Central E. Borneo (W. Kutei: Long Suh), at 300 m. Once found.

3. *var.* **gracile** (LOW *ex* LINDL.) HENSLOW, J. R. Hort. Soc. 13 (1891) 261, f. 42 (*fol.*), 43 a (*fl.*); MILLAIS, Rhodod. (1917) 130; SLEUM. Reinwardtia 5 (1960) 224; Blumea 11 (1961) 130.—*R. gracile* LOW & *ex* LINDL. J. Hort. Soc. Lond. 3 (1848) 84, fig.; MILLAIS, Rhodod. (1917) 174; MERR. En. Born. (1921) 461, *non* BECC. Malesia 1 (1878) 203 (which is *R. commutatum* SLEUM.).—*R. obscurinervium* MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 109; En. Born. (1921) 462.

Leaves lanceolate, ± long-acuminate, rather slendery petioled, (1–)2–3(–3.5) cm wide only; nerves generally more obscure than in *var. brookeanum*. *Corolla* 5(–6) cm long in all. Branchlets and pedicels besides the scales whether or not patent-puberulous.

Distr. *Malesia*: Borneo (Sarawak; W. and N. Borneo; Brunei).

Ecol. Mostly epiphytic in lowland forest, sometimes terrestrial on vertical rocks, up to 600 m.

Note. Apparently transient to *var. brookeanum*.

4. *var.* **extraneum** SLEUM. Reinwardtia 5 (1960) 225.

Branchlets laxly lepidote, epilose. *Leaves* oblong-lanceolate, 9–18 by (2–)2.5–5 cm; petiole 7–12 by 2–3 mm. Pedicels densely short-pubescent and laxly lepidote, *c.* 15 by 1 mm. *Corolla* funnel-shaped, pale orange, 4(–5) cm long in all; otherwise as in *var. brookeanum*.

Distr. *Malesia*: Sumatra (West Coast: Harau canyon near Pajakumbuh), on sandstone rocks, *c.* 500 m. *Fl.* Nov.-Dec.

2. Subgenus Hymenanthes

(BL.) K. KOCH, Dendrol. 2 (1872) 170 ('*Hymenanthus*'); SLEUM. Blumea Suppl. 4 (1958) 51; Reinwardtia 5 (1960) 225. — *Hymenanthes* BL. Bijdr. (1826) 862; G. DON, Gen. Syst. 3 (1834) 849; D. DIETR. Synops. 3 (1843) 2; COPEL. *f.* Am. Midl. Nat. 30 (1943) 614. — *Rhododendron subg. Eurhododendron* (ENDL. *pr. sect.*) KOEHNE, Deutsch. Dendrol. (1893) 449, *s. str.*; SLEUM. Bot. Jahrb. 74 (1949) 526, 542. — **Fig. 47—49.**

Plants entirely elepidote. *Leaves* evergreen. *Flowers* from terminal buds (several to many); leafy branchlets (new foliate shoots) from separate lateral buds, from the axils of the leaves of the past season.

Distr. Europe, Asia, in *Malesia*: N. Sumatra, Malay Peninsula.

1. Section Hymenanthes

(BL.) ENDL. Gen. (1839) 759; DC. Prod. 7 (1839) 721; SLEUM. Blumea Suppl. 4 (1958) 51; Reinwardtia 5 (1960) 225. — *Rhododendron sect. Eurhododendron* ENDL. Gen. (1839) 759, *p.p. et aut. plurim.*; DC. Prod. 7 (1839) 721, *p.p.* — **Fig. 47—49.**

Same as above.

1. Subsection Irrorata

SLEUM. Bot. Jahrb. 74 (1949) 548; Blumea Suppl. 4 (1958) 52; Reinwardtia 5 (1960) 225.

Leaves densely tomentose or villous by simple hairs initially (new shoots) or in young stages at least beneath, mostly glabrescent at maturity, margin ± cartilaginous characteristically undulated when dry; nerves 12–20, ± parallel.

Distr. SE. Asia, in *Malesia*: N. Sumatra, Malay Peninsula. Fig. 46.

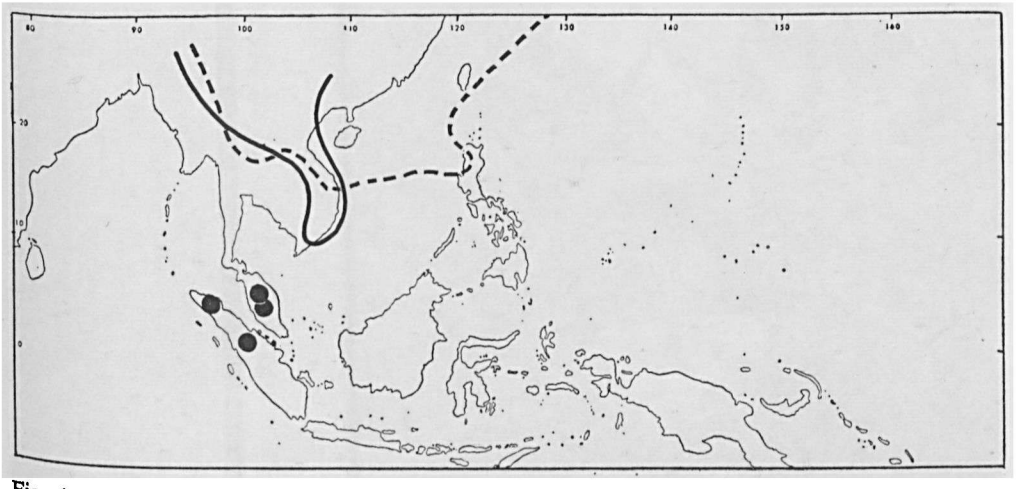

Fig. 46. Distribution of *Rhododendron subg. Hymenanthes subsect. Irrorata* (———— approximate southern limit of area on the Asiatic continent, ● localities in Malesia) and of *subg. Tsutsutsi sect. Tsutsutsi* (– – – – – – approximate southern limit of area in SE. Asia and Malesia).

KEY TO THE SPECIES

1. Ovary densely set with stalked glands, or glandular *and* hairy (strigose). Leaves not wax-coated above, *i.e.* unaltered when heated.
2. Style densely or subdensely glandular to the top. Leaves glabrous at maturity, laxly set with red glandular points underneath . . . . . **277. E. atjehense**
2. Style glabrous or practically so. Leaves clad underneath with a thin, whitish or fawn indumentum of interlaced cobweb hairs for a long time . . . . . **278. R. wrayi**
1. Ovary not glandular at all, otherwise laxly to densely hairy. Leaves wax-coated above, *i.e.* becoming lustrous when heated . . . . . **279. R. korthalsii**

277. Rhododendron atjehense SLEUM. Blumea Suppl. 4 (1958) 53, *in clavi (angl.)*; Reinwardtia 5 (1960) 226.—**Fig. 47-48.**

Large shrub or tree, 5–7 m; trunk *c.* 8 cm ø. Branches and branchlets robust, the latter terete, upper internodes densely and ± persistently set with stalked glands; internodes 1.6–7 cm. *Leaves* in 5–9-merous pseudowhorls at or near the upper 2 nodes, oblong-lanceolate, apex short-acuminate, subacute, base attenuate to the petiole, thin-coriaceous, though firm, brownish lanate when very young, finally quite glabrous, but with lax, reddish glandular points beneath, edge slightly revolute, 7.5–10(–13.5) by (2–)2.5–3.5(–5) cm, midrib impressed above, very prominent beneath, nerves *c.* 15 pairs, curved, not anastomosing, faintly impressed in fully developed leaves above, prominent beneath, reticulation dense, not much raised; petiole glandular initially, glabrescent, grooved above, 1–1.5 cm by 1.5–2 mm. *Racemes* umbel-like, 6–10(–12)-flowered. Flower buds oblong-ovoid, somewhat glutinous, *c.* 3 by 1–1.5 cm. Outer perulae broadly ovate, apiculate, yellowish-or greyish-subsericeous, 0.5–1 by 0.6–



Fig. 47. *Rhododendron atjehense* SLEUM. Mt Goh Lembuh, 3000 m, N. Sumatra (VAN STEENIS 8991) (VAN STEENIS, 1937).

0.8 cm, inner (middle) ones ± obovate, dorsally with stalked, ± appressed glands and ± tomentellous by rufous and yellowish hairs, 1–1.5 by *c.* 1 cm, innermost ones obovate-spathulate, yellowish-tomentose or lanate dorsally, hairy fimbriate, up to 2 by 0.8 cm. Bracteoles linear, hairy, up to 2 cm by *c.* 1 mm. Rachis 0.5–2.5 cm, rather abruptly decrescent in ø, laxly glandular, with a tuft of pale hairs immediately below the insertion of each pedicel, these densely clad with spreading stalked glands, furthermore with rufous fine hairs at the base and immediately below the calyx, rarely all over the whole pedicel, 1–1.5 cm by *c.* 1 mm. *Calyx* thick-membranous, wavy, deeply 5-lobed, lobes ± spreading or erect, short-glandular dorsally, laxly to subdensely glandular-fimbriate and/or with longish substrigose hairs along the margin, 1.5–2.5 mm. *Corolla* funnelform-campanulate, the attenuate base with 5 pouches, thin, glabrous, rose-lilac, (3–)3.5(–4) cm long in all, limb 3–3.5 cm ø, with 5 purplish nectar markings at base inside and darker spots at throat, lobes erecto-patent, broadly oblong to subobovate, slightly retuse, 1.5–2 by 1–1.5(–1.8) cm. *Stamens* 10, very unequal, reaching to ⅓–½ of the corolla; filaments linear and laxly hairy below, filiform and glabrous above; anthers obovate, truncate, 1.5–1.8 mm. *Disk* glabrous. *Ovary* conical, obtuse, all over densely clad with stalked reddish glands, furthermore laxly to subdensely clad with substrigose rufescent stiff hairs in the lower half, 4–5 by 2–3 mm; style abrupt with the ovary, subdensely or densely clothed with stalked glands to the top; stigma subcapitate. *Capsule* cylindric, obtuse, nigrescent, glandular or strigose below, 1.5–1.8 by 0.6–0.7 cm, valves 5, woody, with persistent calyx; pedicel 1.5–2 cm by 1 mm.

Distr. *Malesia*: N. Sumatra (Gajolands: Mt Losir: Putjuk Angasan; Mt Kemiri; Mt Goh Lembuh).

Ecol. In mossy forest or subalpine brushwood, 1800–3000 m, locally common. *Fl.* Jan.-Feb.

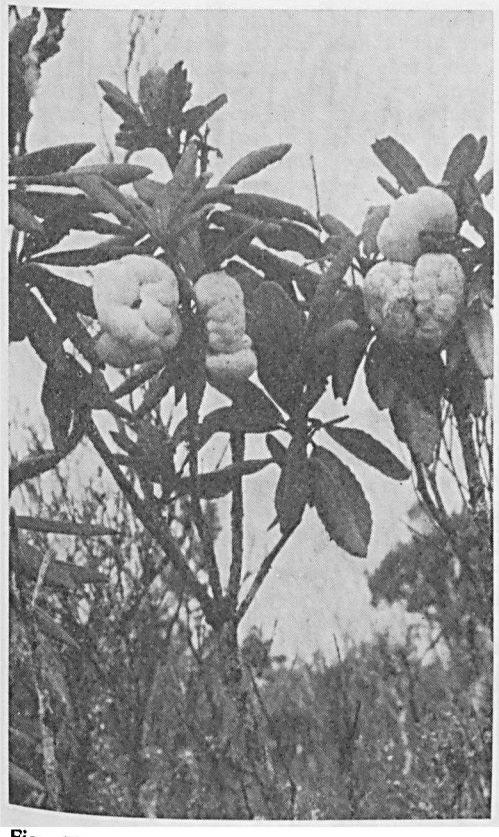

Fig. 48. *Rhododendron atjehense* SLEUM., with white to light pink *Exobasidium* galls, on Mt Goh Lembuh, N. Sumatra (VAN STEENIS, 1937).

Note. Most related to *R. ningyuenense* HAND.-MAZZ. (*R. langbianense* CHEV. *ex* DOP) known from SW. China (SW. Szechuan-E. Yunnan) and Indochina (Annam), distinguished chiefly by much larger calyx lobes, a richer inflorescence, and ± persistently glandular ultimate internodes. Not yet in cultivation, possibly one of the most hardy species of the genus in Malesia.

278. **Rhododendron wrayi** K. & G. J. As. Soc. Beng. 74, ii (1905) 75; RIDL. J. Linn. Soc. Bot. 38 (1908) 314, *repr.* J. Fed. Mal. St. Mus. 2 (1908) 120; J. Fed. Mal. St. Mus. 4 (1909) 42, *incl. var. elliptica* RIDL. *l.c.*; *ibid.* 6 (1915) 49, *incl. var. minor* RIDL. *l.c.* 157; Fl. Mal. Pen. 2 (1923) 217; BURK. & HOLTT. Gard. Bull. S.S. 3 (1923) 57; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256; SYMINGTON, *ibid.* 14 (1936) 355; HENDERS. Mal. Nat. J. 6 (1950) 261; SLEUM. Blumea Suppl. 4 (1958) 53, *in clavi*; Reinwardtia 5 (1960) 227.—*R. dubium* K. & G. J. As. Soc. Beng. 74, ii (1905) 78; RIDL. Fl. Mal. Pen. 2 (1923) 221.—*R. corruscum* RIDL. J. Fed. Mal. St. Mus. 5 (1914) 37; Fl. Mal. Pen. 2 (1923) 217.—**Fig. 49.**

Compact shrub or small, lanky tree, 3–6(–12) m. Branches and branchlets thick, terete, only tips pubescent; internodes 2–4(–8) cm. *Leaves* in 4–5-merous pseudowhorls at the end of the upper 1–2 internodes; besides, much reduced, mostly early caducous leaves scattered along these internodes; oblong to elliptic-oblong or elliptic, rarely somewhat obovate-elliptic, apex short-acuminate (very apex mostly subacute or rather obtuse), base broadly attenuate to rounded, very coriaceous, rusty-floccose-tomentose on both surfaces on young shoots, very early glabrous above, indumentum of undersurface persisting for a long time, thin, greyish, whitish or fawn at flowering time, ± evanescent with age, leaving a very fine detersile greyish tomentum of cobweb hairs in the pits of the intervenium, finally not rarely quite glabrous, becoming silvery-greyish or rather glaucous underneath, edge recurved in dry specimens, (4.5–)6–15(–18) by 2–5(–6) cm, midrib grooved above, bold beneath, nerves 10–14(–18) pairs, rather straight or slightly curved, at an angle of 70–90°, indistinctly anastomosing, ± not impressed above, prominent beneath, reticulation dense, obsolete above, more raised beneath and very distinct with age; petiole glabrous, (1.5–)2–2.5 cm by 2–3 mm, somewhat flattened, grooved above. Umbel-like *racemes* (3–)8–12-flowered. Outer perulae broad-ovate, dorsally clothed with very short hairs and minute subsessile glands, especially the lowest ones ± glutinous, up to 1.2 by 0.9 cm, inner ones larger, ± obovate-spathulate, ± apiculate, silky-tomentose on both faces, up to 2.5 by 1.5 cm. Bracteoles linear-spathulate, ± tomentose, up to 10 by 1–1.5 mm. Rachis 0.5–1 cm, laxly floccose and glandular. Pedicels rather slender, ± densely rusty-floccose and with ± numerous small substipitate glands, the floccae finally ± evanescent, the glands becoming more visible, 1.5–2 cm. *Calyx* mostly very oblique, small, wavy, rusty-floccose-tomentose outside, lobes obtuse, *c.* 1 mm. *Corolla* rather wide-campanulate, (2.5–)3–3.5(–4.5) cm long in all, somewhat translucent, flushed pink in bud, white in full bloom, whether or not tinged with pale pink and red-spotted inside, glabrous, lobes broad oblong to obovate-oblong, ± spreading, 1.2–1.7 by 0.7–1 cm. *Stamens* 10, ± unequal, mostly a little shorter than the corolla; filaments linear and densely patent-hairy in the lower third, filiform and glabrous distally; anthers oblong, orange-red, 3–3.5 by 1 mm. *Disk* glabrous below, densely whitish ciliate at the upper margin. *Ovary* conical, 3–4 by *c.* 2.5 mm, dense rusty tomentulose, with some substipitate glands; style rather abrupt with the ovary, showing some stalked club-shaped glands on its very base, otherwise completely glabrous, rather slender, (1.5–)2–2.5 cm; stigma subcapitate. *Capsule* woody, cylindric, obtuse, slightly ridged, initially rusty-tomentose, finally glabrous, blackish when dry, (1–)1.3–1.6 (–2) by 0.5–0.6 (rarely up to 0.8) cm, on stoutish ± glabrous pedicel (1.5–)2–2.5(–3) cm; valves 5. *Seeds* angular, with very short irregular, often lacerate appendices, no tails, *c.* 2 mm.

Distr. *Malesia*: Malay Peninsula (Main Range

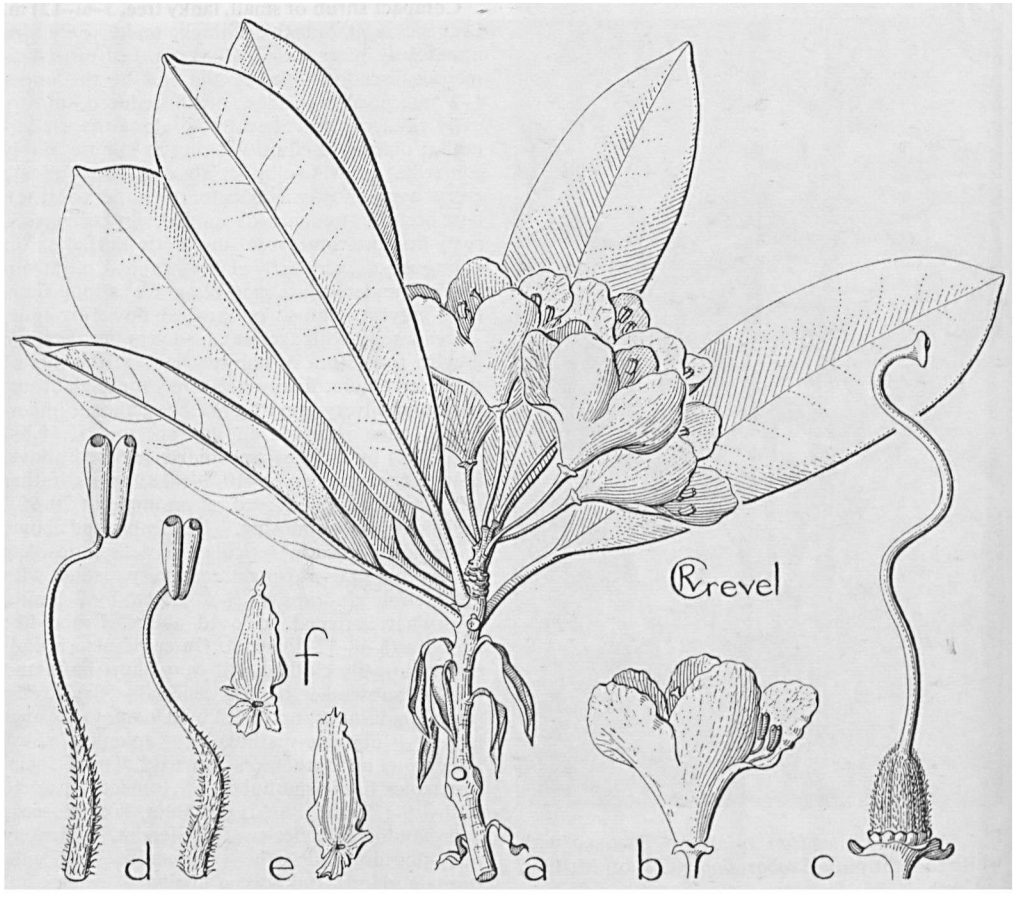

Fig. 49. *Rhododendron wrayi* K. & G. *a.* Branchlet with flowers, × ⅔, *b.* flower, × 1, *c.* ovary and style, × 10/3, *d.* stamen, × 10/3, *e–f.* seed, × 10 (*a–d* SEIMUND 515, *e–f* HOLTTUM *s.n.*).

from Mt Kerbau on the Perak/Pahang/Selangor border to Mt Ulu Kali in Selangor; further on Mts Tahan and Tapis in Pahang).

Ecol. In mossy forest associated with *Dacrydium elatum*, also in dwarf mossy forest or summit vegetation, in *Leptospermum* forest, also in exposed situations on the actual summits, open ridges, quartzite cliffs, (855–)1200–2165 m, locally plentiful (so in the Cameron Highlands sometimes dominant just below the comb of the ridges). *Fl.* Jan.-Dec.

Note. *R. wrayi* is most related to *R. pennivenium* BALF. *f.* & FORR. from Yunnan, with which it shares the glandular-tomentose ovary and the leaves clad underneath with a thin whitish or fawn indumentum of interlaced cobweb-like hairs, which persists for a long time. *R. pennivenium* differs in the rose- to deep-crimson corolla and the leaves which are initially floccose *and* glandular.

279. Rhododendron korthalsii MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 43; MILLAIS, Rhodod. (1917) 199; SLEUM. Blumea Suppl. 4 (1958) 54, *in clavi*; Reinwardtia 5 (1960) 228.

Shrub? Branchlets thick, terete, glabrous. *Leaves* both in 4–5-merous pseudowhorls at the nodes (*c.* 6 cm) and laxly scattered on the internodes, lanceolate, apex short-acuminate, subacute, with a small, not protruding terminal gland, base attenuate to the petiole, coriaceous, ± dull on both faces, wax-coated above (becoming lustrous there when heated), glabrous, rather densely punctulate beneath, 8–10 by (1.5–)1.8–2.6 cm, midrib impressed above, prominent beneath, nerves 6–8 pairs, ± straight below, curved and ± irregular distally, faintly anastomosing, slightly impressed above, somewhat raised beneath, reticulation dense, regular, slightly but well visibly impressed above, rather faint beneath; petiole stoutish, grooved above, glabrous, 0.7–1.2 cm. *Racemes* subumbellate, ± 6-flowered. Rachis elongate-conical, *c.* 2.5 cm, rather densely clad with short-stipitate, reddish glands especially in the upper part. Perulae oblong, glandular and hispid-hairy, *c.* 1 by 0.5 cm. Bracteoles linear-spathulate, hairy,

up to 1 cm. Pedicels stoutish, 1.5–2 cm, densely set with very shortly stalked glands, but no proper hairs. *Calyx* deeply 5-lobed, lobes ovate, rounded-obtuse, *c.* 2 (rarely up to 3) by *c.* 2 mm, membranous, veined, ciliolate, short-glandular (glutinous) at the very base only, glabrous for the rest. *Corolla* wide-campanulate, (white?), *c.* 2.5 cm long in all, thin, glabrous except a pubescent spot at the base of the tube inside, lobes oblong-ovate, 1.5–1.8 by *c.* 1 cm. *Stamens* 10, unequal, 1.2–1.6 cm; filaments linear, glabrous at the very base (1 mm), then densely set with papillose (inflated) spreading whitish blunt hairs for 4–6 mm, glabrous in the upper half or to ⅔; anthers broad-elliptic, ± truncate, 1.5–2 by 1 mm. *Disk* glabrous below, densely whitish ciliate on the upper margin. *Ovary* conical, *c.* 4 by 2 mm, all over with scattered red-brown substrigose hairs but apparently no proper glands; style abrupt with the obtuse ovary, glabrous, 1.5–1.8 cm; stigma short-capitellate.

Distr. *Malesia*: Central Sumatra (possibly Padang Highlands). One collection.

Note. *R. korthalsii* shares the wax-coated surface of the leaves with *R. leptopeplum* BALF. *f.* & FORR. (Yunnan) and *R. lukiangense* FRANCH. (SE. Tibet, SW. Szechuan, NW. Yunnan), but differs from them in many respects. The most related species are probably *R. ombrochares* BALF. *f.* & WARD (NE. Upper Burma), *R. cerochitum* BALF. *f.* & FORR. (W. Yunnan), and *R. araiophyllum* BALF. *f.* & W. W. SM. (W. Yunnan)

3. Subgenus Pentanthera

(G. DON, *pro sect.*) POJARKOVA, Flora U.R.S.S. 18 (1952) 57; SLEUM. Blumea 12 (1964) 345. — *Azalea* (*non* L. *sensu* SALISB.) DESV. J. Bot. Appl. 1 (1813) 35, *p.p.* — *Anthodendron* REICHB. in Moessl. Handb. ed. sec. I (1827) XL, 308. — *Azalea subg. Pentanthera* (G. DON) K. KOCH, Dendrol. 2 (1872) 186. — *Rhododendron subg. Anthodendron* (REICHB.) ENDL. *ex* WILS. & REHD. Monogr. Azaleas (1921) 115.

Plants entirely elepidote. *Leaves* deciduous. *Flowers* (several to many) from a strictly floral terminal bud; leafy shoots from lateral buds below, *i.e.* from the axils of the leaves of the past season.

Distr. N. America, Europe, Asia.

1. Section Pentanthera

G. DON, Gen. Syst. 3 (1834) 846; WILS. & REHD. Monogr. Azaleas (1921) 95, 124; SLEUM. Blumea 12 (1964) 346. — *Rhododendron sect. Anthodendron* (REICHB.) ENDL. Gen. (1839) 759.

Stamens 5. *Corolla* funnel-shaped.

Distr. As above; in *Malesia* but one cultivated species.

280. **Rhododendron molle** (BL.) G. DON, Gen. Syst. 3 (1834) 846, *non* S. & Z. 1846; HASSK. Cat. Hort. Bog. (1844) 161; WILSON in Wils. & Rehd. Monogr. Azaleas (1921) 95; REHD. Spec. Rhodod. ed. 2 (1947) 64.—*Azalea mollis* BL. Cat. (1823) 44; Bijdr. (1826) 853; ZOLL. Syst. Verz. 2 (1854) 137.—*Azalea sinensis* LODD. Bot. Cab. 9 (1824) t. 885.—*R. sinense* (LODD.) SWEET, Br. Fl. Gard. I, 3 (1829) *sub* t. 290.

Sparingly branched shrub, 0.3–1.2 m, with rather stout erect branches, villous when young and often setose. *Leaves* deciduous, oblong to oblong-lanceolate, apex obtuse and mucronulate, base cuneate, ciliate and often revolute at margin, soft-pubescent above at least when young, beneath with a greyish white dense matted pubescence, which becomes glaucous or sometimes confined to the veins in later stages, 6–15 by 1.8–5.5 cm; petiole pubescent, 2–6 mm. Floral buds ovoid, with 9–12 broad-ovate mucronate or acuminate perulae, densely grey-pubescent or velutinous, sometimes glabrescent. *Inflorescence* many-flowered, flowers expanding before the leaves. Pedicels puberulous, with only few or without bristles, 1.2–2.5 cm. *Calyx* lobes small, obtuse, pubescent, ciliate, with few bristles, 1–2 mm. *Corolla* wide-funnel-shaped, 4–5 cm long, 4.5–6 cm across, golden-yellow with a large blotch of greenish dots, tomentulose outside, lobes oval or ovate to broad-oblong, longer than the rather wide tube. *Stamens* 5, as long as the corolla; filaments hairy below the middle; anthers 2 mm. *Disk* hairy. *Ovary* densely white-hairy; style glabrous, exceeding the stamens. *Capsule* cylindric-oblong, 1.8–2.5 cm, finely pubescent and sparingly setose.

Distr. Native in Eastern and Central China, cultivated occasionally in *Malesia* (Java, introduced before 1823).

Note. *Azalea mollis* BL. is based on a plant cultivated in Java.

4. Subgenus Tsutsutsi

(G. DON) POJARKOVA, Flora U.R.S.S. 18 (1952) 55; SLEUM. Blumea 12 (1964) 347. — *Azalea subg. Tsutsutsi* (G. DON, *pro sect.*) K. KOCH, Dendrol. 2 (1872) 171. — *Rhododendron subg.*

Anthodendron (*non* (REICHB.) ENDL. *ex* WILS. & REHD.) SLEUM. Blumea Suppl. 4 (1958) 49; Reinwardtia 5 (1960) 228. — **Fig. 50—51.**

Plants elepidote. *Leaves* persistent or deciduous in the wild state in Asia, persistent in Malesia including the cultivated species introduced from Asia. *Flowers* (1–3, rarely more), from the terminal bud; leafy shoots from the axil of lower perulae of the same bud.

Distr. E. Asia, in *Malesia*: Philippines (Luzon). Fig. 46.

1. Section Tsutsutsi

SWEET, Br. Fl. Gard. I, 5 (1831) *sub* t. 117 ('*Tsutsusi*'); G. DON, Gen. Syst. 3 (1834) 845, *p.p.*; PLANCH. Fl. Serres 9 (1854) 76 ('*Tsutsia*'); MIQ. Fl. Ind. Bat. 2 (1859) 1059 ('*Tsutsugi*'); WILS. & REHD. Monogr. Azaleas (1921) 22; SLEUM. Blumea Suppl. 4 (1958) 49; *ibid.* 12 (1964) 347. — *Rhododendron sect. Anthodendron* SLEUM. Reinwardtia 5 (1960) 228. — **Fig. 50—51.**

Branchlets with appressed, flattened, mostly brown hairs, or with flattened *and* normal (not-flattened) hairs. *Leaves* ± scattered on the branchlets, ± strigose.

Distr. E. Asia, in *Malesia*: Philippines (Luzon, 1 *sp.*). Fig. 46.

KEY TO THE SPECIES

1. Perulae viscid, especially on the inner surface.
 2. Shoots clothed with appressed, flattened, grey-brown strigose hairs which gradually disappear with age. Stamens 10 . . . . . **281. R. scabrum**
 2. Shoots densely clothed with spreading, grey to grey-brown soft (whether or not glandular) hairs, mixed with few to numerous, loosely appressed or spreading flattened bristle-like hairs.
  3. Stamens normally 10 (sometimes 8). Ovary densely setose, glandless . . . . **282. R. mucronatum**
  3. Stamens normally 5 (6–10 in some garden forms). Ovary glandular-setose. **283. R. linearifolium *var.* macrosepalum**

1. Perulae not viscid.
 4. Stamens 5. Leaves crenulate-serrate . . . . . **284. R. indicum**
 4. Stamens (6–)8–10. Leaves entire or nearly so.
  5. Style hairy in its lower 1/4 to 1/3 . . . . . **285. R. subsessile**
  5. Style entirely glabrous . . . . . **286. R. simsii**

281. Rhododendron scabrum G. DON, Gen. Syst. 3 (1834) 846; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 59; REHD. Spec. Rhodod. ed. 2 (1947) 102.

Loosely branched shrub, 1–2 m tall, with rather stout branches; shoots clothed in their first year with appressed flattened grey-brown strigose hairs, glabrescent. *Leaves* dimorphous, persistent, coriaceous; spring leaves elliptic-lanceolate to lanceolate, apex acute to obtuse and mucronate, base broad-cuneate, ciliate and subcrenulate at the ± revolute margin, 3–9.5 by 1.8–3.5 cm, at first with scattered, appressed, straight grey-brown hairs, at maturity glabrescent nerves excepted, nerves impressed above, raised beneath; summer leaves similar, but oblanceolate, smaller and more coriaceous; petiole stout, flattened, clothed with appressed grey-brown hairs, 4–8 mm. Floral winter buds ovoid, acute, outer perulae clothed with strigose rufous hairs, inner ones cinnamon-brown, ciliate, viscid especially on the inner surface, persisting at the base of the pedicels. *Inflorescence* 2–6-flowered. Pedicels densely fulvous-strigose, 8–12 mm. *Calyx* lobes ample, green, normally oval-rounded, *c.* 6 by 5 mm, occasionally all or some lanceolate up to 12 mm long and acuminate, always glandular, ciliate and covered with appressed straight grey hairs. *Corolla* broad-funnel-shaped, *c.* 6 cm across and as long, rose-red to vivid scarlet or rich magenta, with dark dots on the upper 3 lobes, lobed to nearly the middle. *Stamens* 10, shorter than the corolla; filaments short-hairy below the middle. *Ovary* glandular and strigose; style glabrous, longer than the stamens. *Capsule* erect, ovoid, 1–1.2 cm long, sparsely hairy, subtended by the persistent calyx lobes.

Distr. Native in the Riu Kiu Is., in *Malesia* cultivated occasionally in Java.

282. Rhododendron mucronatum (BL.) G. DON, Gen. Syst. 3 (1834) 846; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 68; REHD. Spec. Rhodod. ed. 2 (1947) 92; SLEUM. Blumea Suppl. 4 (1958) 49.—*Azalea rosmarinifolia* BURM. *f.* Fl. Ind. (1768) 43, t. 3, f. 3; BL. Bijdr. (1826) 853, *non R. rosmarinifolium* VIDAL, 1886.—*Azalea mucronata* BL. Cat. (1823) 44; Bijdr. (1826) 853.—*Azalea ledifolia* HOOK. Bot. Mag. (1829) t. 2901.—*R. burmanni* G. DON, Gen. Syst. 3 (1834) 846; HASSK. Cat. Hort. Bog. (1844) 161; MORITZI, Syst. Verz. (1846) 42; ZOLL. Syst. Verz. 2 (1854) 137.—*R. ledifolium* (HOOK.) G. DON, Gen. Syst. 3 (1834) 846; HASSK. Cat. Hort. Bog. (1844) 162; MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 34; MERR. Philip. J. Sc. 19 (1921) 369; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 2; STEEN. Fl. Sch. Indon. (1949) 309.

Much branched, wide-spreading shrub, 0.9–1.8 (–2.5–5) m; shoots in their first year, as well as petioles and pedicels densely clothed with spreading grey to grey-brown soft hairs, mixed with few to many loosely appressed or spreading, flattened, bristle-like hairs, and occasionally with glandular hairs. *Leaves* partly persistent, dimorphous, spring leaves deciduous, membranous, lanceolate to ovate-lanceolate, apex acute or obtuse and mucronulate, base cuneate, on both surfaces with appressed straight and soft grey to rufous hairs, 3–4.5 by 1–2.5 cm; summer leaves persistent, chartaceous, oblong-lanceolate to oblong-oblanceolate, apex obtuse to rounded and mucronate, base cuneate, recurved at margin, pubescent like the spring leaves and often glandular, 1–3.5 by 0.6–1.2 cm; petiole 2–6 mm. Floral winter buds ovoid, outer perulae with strigose hairs along the middle line, inner ones viscid. *Inflorescence* 1–3-flowered. Pedicels 5–20 mm. *Calyx* lobes lanceolate, often slightly erose or serrate, glandular-pubescent, *c.* 12 mm. *Corolla* wide-funnel-shaped, 3.5–5 cm long and wide, fragrant, pure white or white with a yellowish blotch on the upper corolla lobes in the cultivated forms (red or rose coloured in the native form), occasionally a few flowers rose or striped with rose on an odd branch also in cultivated plants, with oval or narrow-oval lobes. *Stamens* 10 (sometimes 8), ± as long as the corolla; filaments glabrous or subglabrous. *Ovary* densely setose, glandless; style glabrous, slightly exceeding the corolla. *Capsule* conic-ovoid, with appressed setose hairs, *c.* 1 cm long, shorter than the persistent calyx lobes.

Distr. A native of Japan (Shikoku) in its form with rose to purple flowers (*R. ripense* MAKINO), the white flowered form much cultivated in Japan and China, early introduced to Java and still cultivated there in various forms, up to 1400 m. *Fl.* Jan.-Dec.

283. Rhododendron linearifolium S. & Z. *var.* macrosepalum (MAXIM.) MAKINO, Bot. Mag. Tokyo 27 (1913) 108; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 74; REHD. Spec. Rhodod. ed. 2 (1947) 87.—*R. macrosepalum* MAXIM. Gartenflora 19 (1870) 258, t. 662; Mém Ac. Imp. Sc. St. Pétersb. VII, 16, *n.* 9 (1870) 31.

Loosely branched and usually low shrub, 0.3–1(–3) m; shoots and pedicels densely clothed with greyish, partly gland-tipped hairs, and a few spreading flattened caducous hairs. *Leaves* mostly deciduous, dimorphous, spring leaves membranous, partly scattered and partly clustered, ovate-elliptic or ovate to lanceolate, apex acute or short-acuminate, mucronate, base cuneate, sparingly glandular-hairy above, slightly rugulose and hispid, beneath with soft spreading grey to grey-brown glandular hairs, 2.5–6 by 0.6–2.5 cm; summer leaves oblanceolate to oblong-oblanceolate, obtuse and mucronulate, of firmer texture; petiole densely hairy ,2–6 mm. Floral winter buds ovoid; outer perulae *c.* 10, densely covered with strigose yellow-brown hairs, inner ones viscid. *Inflorescence* 2–10-flowered. Pedicels 1.2–3(–4) cm. *Calyx* lobes lanceolate, 1.2–3 cm, sometimes longer than the corolla, glandular-pubescent, *Corolla* broad-funnel-shaped, 3.6–5 cm across and as long, rose-pink to red-purple, fragrant, with dark purple dots on the upper lobe, lobes oval to broad-oblong. *Stamens* normally 5 (6–10 in some garden forms), slightly shorter than the corolla; filaments pubescent below the middle. *Ovary* glandular-setose; style glabrous, longer or as long as the corolla. *Capsule* narrow-ovoid, 8–12 mm, glandular-pubescent, subtended by the persistent reflexed calyx lobes.

Distr. Native of Japan, occasionally cultivated in Java at *c.* 1000 m.

284. Rhododendron indicum (L.) SWEET, Br. Fl. Gard. II, 2 (1833) *sub* t. 128; HASSK. Cat. Hort. Bog. (1844) 162, *incl. var. A-E, l.c.*; ZOLL. Syst. Verz. 2 (1854) 137; MIQ. Fl. Ind. Bat. 2 (1859) 1059; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 22; KOORD. Exk. Fl. Java 3 (1923) 7; REHD. Spec. Rhodod. ed. 2 (1947) 84.—*Azalea indica* LINNÉ, Sp. Pl. (1753) 150; BL. Cat. (1823) 44; Bijdr. (1826) 852, *incl. var. spathulata* BL. *l.c.*, *var. angustifolia* BL. *l.c.* 853 *et var. floribunda* BL. *l.c.* 853.—*R. breynii* PLANCH. Rev. Hort. sér. 4, 3 (1854) 46; Fl. Serres 9 (1854) 77 (based on a plant cultivated in Java).

Densely branched shrub, up to 2 m, usually low, sometimes prostrate. Branches slender, but rigid, with flattened, appressed, chestnut-brown hairs. *Leaves* crowded, persistent, narrow-lanceolate to oblanceolate, acute at the ends, with scattered, closely appressed red-brown hairs on both faces, usually remotely crenulate-serrulate and ciliolate, 1.8–3.6 by 0.3–1 cm; petiole densely clothed with appressed chestnut-brown hairs, 1–4 mm. Floral winter buds ovoid, pointed, not viscid; outer perulae ciliate but otherwise glabrous or with a tuft of brown hairs at the apex. *Inflorescence* 1–2-flowered. Pedicels with strigose brown hairs, hidden by the perulae, 3–5 mm. *Calyx* lobes oval or suborbicular, obtuse, densely strigose and ciliate, 2–3 mm. *Corolla* broad-funnel-shaped, 5–6 cm long and wide, bright red to scarlet, sometimes rose-red or salmon, with oval rounded lobes. *Stamens* 5, ± as long as the corolla; filaments glabrous. *Ovary* densely clothed with appressed shining brown hairs; style glabrous, exceeding the stamens. *Capsule* oblong-ovoid, *c.* 6 mm, densely strigose.

Distr. Native of S. Japan, cultivated occasionally in Java, mostly in hybrids. The *Azalea indica* of the trade is not this species, but *R. simsii* (and related forms).

Note. *R. indicum* (L.) SWEET *f. variegatum* (BL.) DC. Prod. 7 (1839) 726; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 26. —*Azalea indica* L. *var. variegata* BL. Bijdr. (1826) 852, is a form with white-and-red-striped and spotted flowers, cultivated in Java in BLUME's time.

285. Rhododendron subsessile RENDLE, J. Bot. 34 (1896) 357; MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 40; Philip. J. Sc. 3 (1908) Bot. 379;

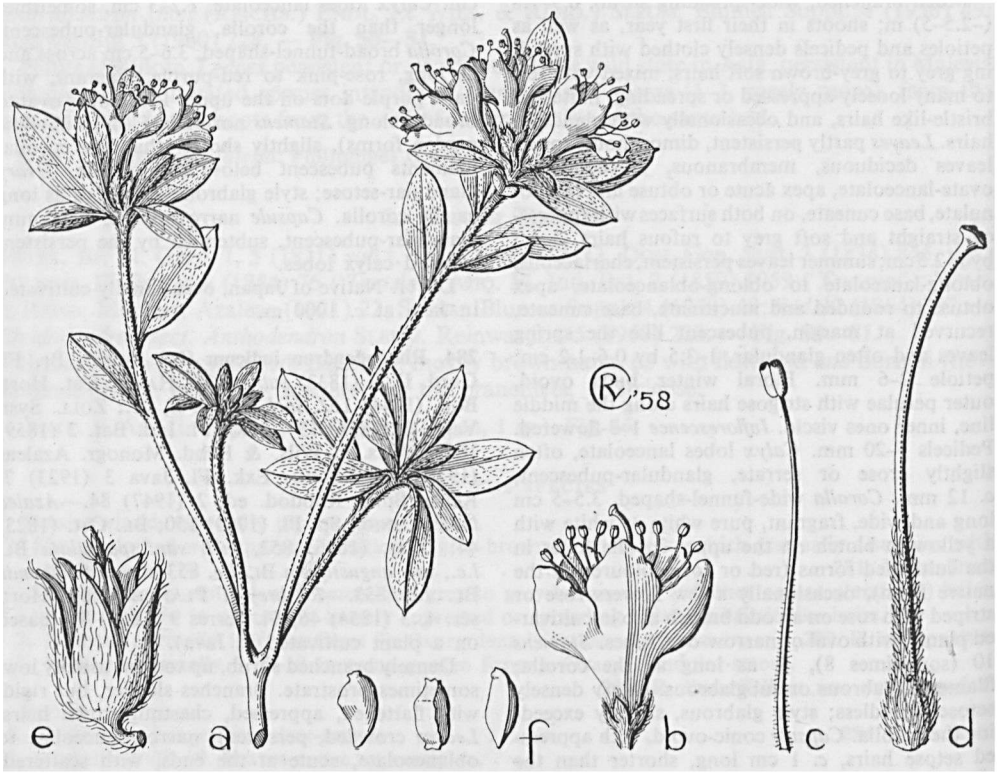

Fig. 50. *Rhododendron subsessile* RENDLE. *a.* Habit, × ⅔, *b.* flower, × 1, *c.* stamen, × 8/3, *d.* ovary and style, × 8/3, *e.* fruit, × 2, *f.* seed, × 10 (*a–d* BARNESS 922, *e–f* WILLIAMS 2001).

ibid. 5 (1910) Bot. 371; MILLAIS, Rhodod. (1917) 249; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 51; MERR. En. Philip. 3 (1923) 245; MILLAIS, Rhodod. ser. 2 (1924) 244; COPEL. *f.* Philip. J. Sc. 40 (1929) 174, t. 16, f. 7–10, *incl. var. baucoense* COPEL. *f. l.c.* 175; REHD. Spec. Rhodod. ed. 2 (1947) 106; SLEUM. Reinwardtia 5 (1960) 228; Blumea 12 (1963) 114; Jahrb. Rhodod. Ges. Bremen (1963) f. 2.—*? R. rubropilosum* HAYATA, J. Coll. Sc. Imp. Un. Tokyo 30, art. 1 (1911) 173; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 52; J. Arn. Arb. 6 (1925) 182; KANEH. Formos. Trees (1936) 547, f. 507; REHD. Spec. Rhodod. ed. 2 (1947) 99.—*?R. caryophyllum* HAYATA, Ic. Pl. Formos. 3 (1913) 130, t. 23.—*Azalea subsessilis* (RENDLE) COPEL. *f.* Am. Midl. Nat. 30 (1943) 597, *in text.*—**Fig. 50-51.**

Much-branched shrub, 1–3(–6) m; shoots densely clothed with appressed, upwardly directed, flattened, bristle-like or strigose chestnut-brown hairs, which in the third season are wearing off. *Leaves* ascending, persistent, scattered along the upper shoots and ± crowded towards their ends, elliptic to lanceolate, short-acuminate, acute and prominently mucronate, base ± broad-attenuate, darker above, firmly chartaceous to subcoriaceous, at first hairy on both faces, at maturity laxly covered with whitish hairs above, underneath densely clad with rufous, later greyish silky long bristle-like or strigose, appressed, ± reddish hairs and thickened at the base, margin slightly to strongly recurved, (1–)2–4(–5) by (0.3–)0.5–1.2 (–1.4–1.8) cm, midrib impressed above, prominent beneath, nerves rather indistinct; petiole strigose-hairy, 3–6(–8) mm. Floral buds ovoid; perulae broad-ovate, abruptly attenuate or mucronate at the apex, up to 9 by 6 mm, outer ones with appressed brown hairs along the midline, ciliate, otherwise glabrous, inner ones appressed strigose toward the apex, not viscid, long persistent. *Inflorescence* (1–)2–4(6–)-flowered. Pedicels stoutish, with appressed rusty hairs, 2–4 mm. *Calyx* lobes broadly oblong or ovate to suborbicular, obtuse, 2–3 mm, densely clad with upright flattened rufescent hairs outside, glabrous inside. *Corolla* mostly light red or lilac to purple-red (magenta), sometimes pink, rarely white, apparently never spotted in the Philippine specimens, campanulate-funnel-shaped, gradually dilated from the base, glabrous, 1.8–2.2 cm long, *c.* 2.5 mm ø, tube 8–9 mm, lobes 1.2–1.4 by 8–9 mm, ovate-oblong, shortly spreading. *Stamens* (6–)8(–10), slightly longer than the corolla; filaments linear, ± sparingly whitish papillose hairy towards the base.



Fig. 51. *Rhododendron subsessile* RENDLE. Mt Data, 2000 m, Luzon, Philippines (VAN ROYEN & SLEUMER 5613) (SLEUMER, 1961).

Ovary subovoid, *c.* 3 mm, densely covered with flattened rufous or rusty, shiny, upwards directed long hairs; style *c.* 2 cm, exserted, clad with the same hairs as occur on the ovary in its lower ¼ to ⅓, glabrous otherwise; stigma small, capitate. *Capsule* conic-ovoid, densely clothed with appressed, rufous hairs, 6–8(–10) by 4–5 mm; pedicel to 9 mm. *Seeds* very shortly or not winged, 1 mm.

Distr. Formosa, in *Malesia*: Philippines (N. Luzon: Mountain and Abra Prov.).

Ecol. In Luzon rather common in the pine region and the pine-oak association below the mossy forest, rare in the mossy forest (Mt Pulog), again on exposed grass-covered slopes above the moss forest, often in clumps or masses, 1300–2400 m (in Formosa only on open slopes, 2135–3300 m). *Fl. fr.* Jan.-Dec.

Vern. *Ausip, ayusip, buga-buga, bugo-gugua, salangon*, Ig.

Note. This is the most southern species of the '*Azalea*' group. Its *var. baucoense* COPEL. *f.* is a microform, connected by intergrades with the larger typical form. As to Formosan *R. rubropilosum* HAYATA see SLEUM. Reinwardtia 5 (1960) 229.

286. Rhododendron simsii PLANCH. Fl. Serres 9 (1854) 78; WILS. in Wils. & Rehd. Monogr. Azaleas (1921) 45; REHD. Spec. Rhodod. ed. 2 (1947) 105; SLEUM. Blumea Suppl. 4 (1958) 51.— *Azalea indica* (*non* L.) SIMS, Bot. Mag. (1812) t. 1480.

A much-branched shrub, usually up to 1.5 m, rarely attaining 2.5 m; shoots densely clothed with appressed, flattened, shining brown hairs. *Leaves* persistent or partly so, and dimorphous in the wild plant, always persistent in specimens cultivated in the tropics and less distinctly dimorphous there; spring-leaves (or early leaves) chartaceous, elliptic, sometimes ovate or oblong-elliptic, 1.8–5 by 0.8–1.8 cm, apex acute or somewhat obtuse, base ± cuneate, sparingly strigose above, more densely so beneath at least on midrib and veins; summer-leaves (or later leaves) obovate to oblanceolate, 0.8–3.6 by 0.4–1.2 cm, more coriaceous; petiole densely strigose, 2–6 mm. Floral winter buds ovoid, not viscid, *c.* 4 cm long or less, with several perulae, these densely strigose along the median and ciliate. *Inflorescences* 2–6-flowered. Pedicels densely strigose, 5–10 mm. *Calyx* lobes ovate to lanceolate, strigose and ciliate, 2–6 mm persistent. *Corolla* broad-funnel-shaped, 3.5–5 cm long and wide, rose-red to bright or dark red, spotted, lobes broad-ovate. *Stamens* (8–9–)10, ± as long as the corolla; filaments pubescent below the middle; anthers purple. *Ovary* strigose; style exceeding the corolla, glabrous. *Capsule* ovoid, *c.* 8 mm long, setose.

Distr. Native in the temperate parts of Thailand, Indochina, China, and S. Formosa, in *Malesia* occasionally cultivated under the commercial name '*Indian Azalea*'.

5. Subgenus Azaleastrum

PLANCH. Fl. Serres 9 (1854) 75 ('*sous-type*'); Rev. Hort. sér. 4, 3 (1854) 43 ('*sous-type*'); *ex* K. KOCH, Dendrol. 2 (1872) 159, *descr. subg.*; DRUDE in E. & P. Pfl. Fam. 4, 1 (1889) 37; SLEUM. Bot. Jahrb. 74 (1949) 528, 552; Blumea Suppl. 4 (1958) 56; Reinwardtia 5 (1960) 230. — *Azaleastrum* (PLANCH.) RYDB. Mem. N.Y. Bot. Gard. 1 (1900) 297

Floral buds, respectively inflorescences, though seemingly terminal, in reality lateral, mostly several together, starting from the axil(s) of the uppermost leaf (or leaves).

Distr. N. America, E. Asia, *Malesia* (Malay Peninsula).

1. Section Choniastrum

FRANCH. Bull. Soc. Bot. Fr. 33 (1886) 229; SLEUM. Bot. Jahrb. 74 (1949) 528, 552; Blumea Suppl. 4 (1958) 56; Reinwardtia 5 (1960) 230. — **Fig. 53.**

Calyx small or obscure. *Stamens* 10. *Seeds* shortly and irregularly winged at both ends.

Distr. E. Asia, *Malesia* (Malay Peninsula). Fig. 52.

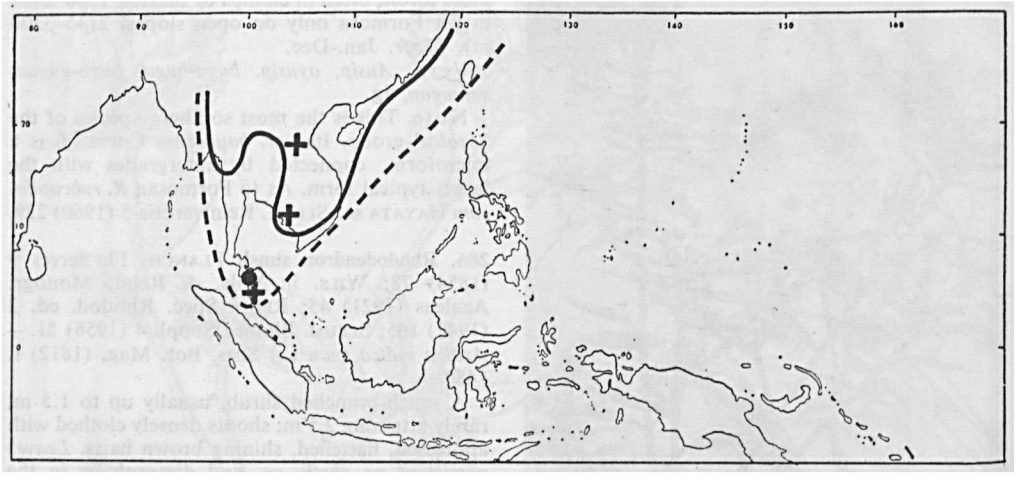

Fig. 52. Distribution of *Rhododendron sect. Choniastrum*: – – – – southern limit of the section; ——— southern limit and ● localities of *Rhododendron moulmainense* HOOK. respectively; + localities of *Rhododendron klossii* RIDL.

KEU TO THE SPECIES

1. Ovary glabrous . . . . . **287. R. moulmainense**
1. Ovary laxly to subdensely hairy . . . . . **288. R. klossii**

287. Rhododendron moulmainense HOOK. Bot. Mag. (1856) t. 4904; KURZ, J. As. Soc. Beng. 46, ii (1877) 216; Fl. Burma 2 (1877) 94; CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 463; BRANDIS, Ind. Tr. (1906) 412; CRAIB, Kew Bull. (1911) 405; RIDL. Fl. Mal. Pen. 2 (1923) 218; DOP, Fl. I.-C. 3 (1930) 734; HUTCH. Spec. Rhodod. (1930) 620, *excl. syn. R. klossii*; in Craib, Fl. Siam. En. 2 (1938) 318; SLEUM. Blumea Suppl. 4 (1958) 58; Reinwardtia 5 (1960) 230.—*R. westlandii* HEMSL. J. Linn. Soc. Bot. 26 (1889) 31; MILLAIS, Rhodod. (1917) 261; HUTCH. Spec. Rhodod. (1930) 626.—*R. oxyphyllum* FRANCH. J. de Bot. 12 (1898) 264; MILLAIS, Rhodod. (1917) 222; HUTCH. Spec. Rhodod. (1930) 621.—*Azalea moulmainensis* (HOOK.) O. KTZE, Rev. Gen. Pl. 2 (1891) 387.—*R. siamense* DIELS in Fedde, Rep. 4 (1907) 289.—*R. leucobotrys* RIDL. J. Fed. Mal. St. Mus. 4 (1909) 43; *ibid.* 7 (1916) 46; Fl. Mal. Pen. 2 (1923) 218; HUTCH. Spec. Rhodod. (1930) 619.—*R. stenaulum* BALF. *f.* & FORR. Not. R. Bot. Gard. Edinb. 10 (1917) 157; HUTCH. Spec. Rhodod. (1930) 624, *excl. syn. R. mackenzianum* FORR.—**Fig. 53.**

Terrestrial shrub, 3–5 m, or small tree, with straight, erect branches. Branchlets glabrous, terete; internodes 2–8 cm. *Leaves* in ± terminal, 2–4-merous pseudowhorls, elliptic or mostly elliptic-lanceolate, rarely obovate-elliptic or oblong-oblanceolate, apex acute, base narrowed, ± coriaceous, glabrous, 6–12(–15) by (2.5–)3–5(–6) cm, midrib impressed above, much raised beneath, nerves 9–12 pairs, straight, spreading and ± parallel, initially slightly prominent or somewhat impressed, more conspicuously inarched in mature leaves above, prominent beneath, veins slightly or not visible; petiole often red in fresh specimens, somewhat winged, (6–)8–12(–15) mm. *Inflorescences* 2–4, each in the axil of one of the upper leaves; inflorescences 2–4-flowered. Floral buds ovoid-oblong, subacute, *c.* 2.5 by 0.8 cm. Outer perulae small and ovate, obtuse, inner ones gradually larger and ovate to ovate-oblong or obovate-oblong, all glabrous or rather faintly sericeous outside especially towards the tip, densely white-ciliate. Bracteoles linear, glabrous, up to 2.5 by 0.1 cm. Pedicels rather slender, glabrous, (1–)1.5–2.5 cm. *Calyx* very small, margin undulately lobed, glabrous. *Corolla* funnel-shaped, deeply 5-lobed, 3.5–4 cm long in all, tube 1–1.5 cm, base 5-saccate, 3–4 mm ø, lobes oblong, subacute, ± spreading, 2–2.5 by 0.5–0.9 cm, glabrous, mostly white with a yellow spot inside on the upper lobe, also rose or of a clear orchid-purple with a ± orange spot, rarely reddish, fragrant. *Stamens* normally 10 (sometimes a few more), ± as long as the corolla; filaments linear, hairy except the very base and upper half, occasionally entirely glabrous; anthers short-oblong, 2.5 by 1 mm. *Disk* glabrous. *Ovary* glabrous, cylindric, slightly 5-ribbed, mostly continuous (rarely abrupt) with the glabrous

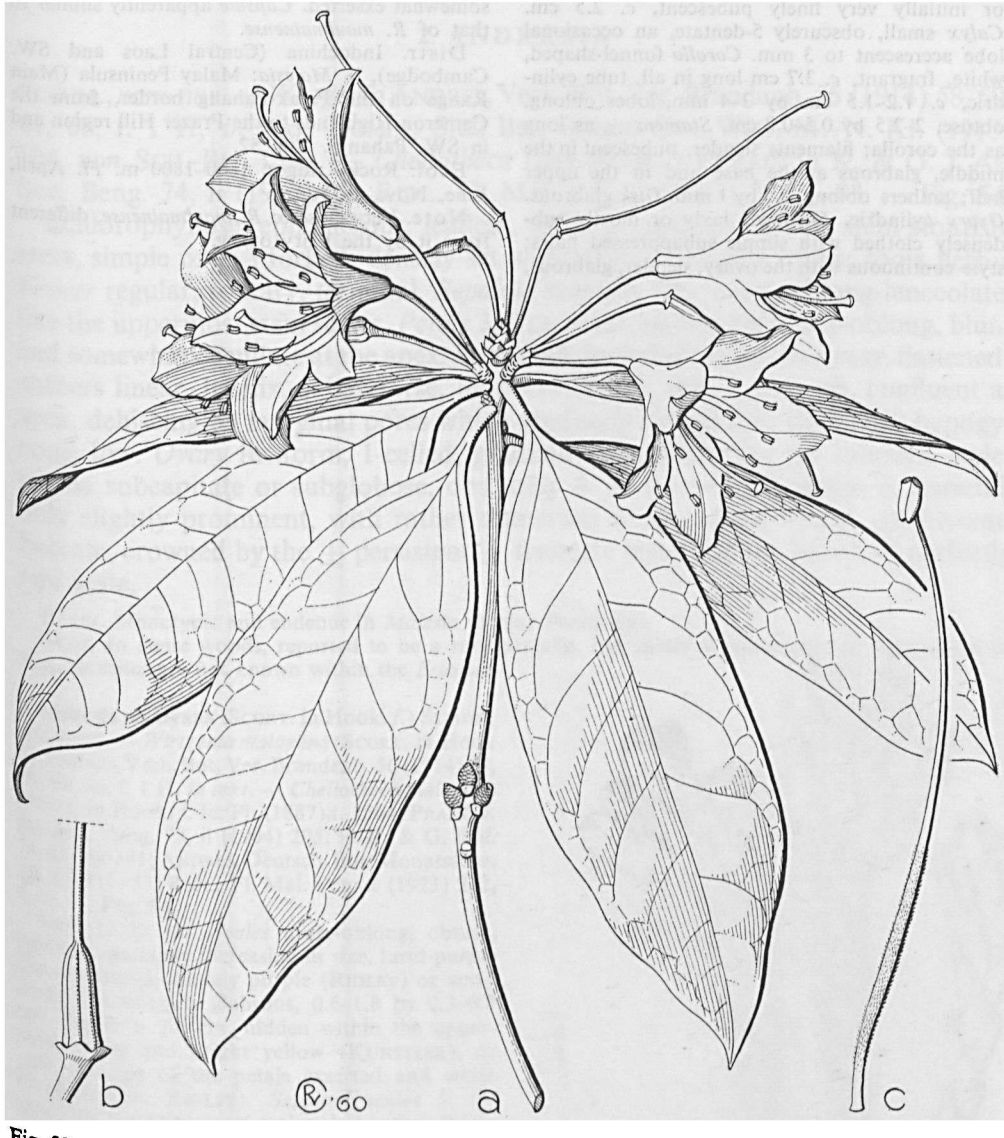

Fig. 53. *Rhododendron moulmainense* HOOK. *a.* Habit, × ⅔, *b.* ovary, × 2, *c.* stamen, × 2 (*a–c* POILANE 28769).

style, *c.* 3 cm long; stigma capitate. *Capsule* ovoid-fusiform, rather deeply 5 grooved, 2–2.5 by *c.* 0.6 cm, beaked by the persistent rest of the style even after the capsule is split into 5 rather thin, not twisted valves. *Seeds* flat, broad-oblong, very shortly and irregularly winged (not tailed) on both ends, *c.* 2 mm.

Distr. Burma, S. China, Indochina, Thailand, in *Malesia*: Malay Peninsula (Kedah Peak: Mt Jerai), 855–1220 m. *Fl.* May-Dec., *fr.* May.

288. Rhododendron klossii RIDL. J. Fed. Mal. St. Mus. 4 (1909) 43; Fl. Mal. Pen. 2 (1923) 218; SLEUM. Blumea Suppl. 4 (1958) 59; Reinwardtia 5 (1960) 231.—*R. laoticum* DOP, Fl. I.-C. 3 (1930) 735.

Shrub or treelet, occasionally a tall tree up to 15 m high. Branchlets glabrous, terete; internodes 2.5–6 cm. *Leaves* mostly lanceolate to oblong-lanceolate, rarely lanceolate-elliptic, (6–)8–13 by (2–)2.5–6 cm, very similar to those of *R. moulmainense*. *Inflorescences* 3–6, seemingly terminal, each with 2 flowers, making an umbel of 6–12 flowers. Flower buds ovoid-oblong, subacute, 2–2.5 by *c.* 0.6 cm. Perulae and bracteoles as in *R. moulmainense*. Pedicels rather slender, glabrous

or initially very finely pubescent, *c.* 2.5 cm. *Calyx* small, obscurely 5-dentate, an occasional lobe accrescent to 3 mm. *Corolla* funnel-shaped, white, fragrant, *c.* 3.7 cm long in all, tube cylindric, *c.* 1.2–1.5 cm by 3–4 mm, lobes oblong, obtuse, 2–2.5 by 0.5–0.8 cm. *Stamens* ± as long as the corolla; filaments slender, pubescent in the middle, glabrous at the base and in the upper half; anthers oblong, 2.5 by 1 mm. *Disk* glabrous. *Ovary* cylindric, 5-ribbed, laxly or mostly subdensely clothed with simple subappressed hairs; style continuous with the ovary, slender, glabrous, somewhat exserted. *Capsule* apparently similar to that of *R. moulmainense*.

Distr. Indochina (Central Laos and SW. Cambodge), in *Malesia*: Malay Peninsula (Main Range on the Perak-Pahang border, from the Cameron Highlands to the Frazer Hill region and in SW. Pahang). Fig. 52.

Ecol. Rocky ridges, 1600–1800 m. *Fl.* April, June, Nov., *fr.* June.

Note. Very close to *R. moulmainense*, different from it by the hairy ovary.

2. ANDRESIA

SLEUM., *nom. nov.* — *Wirtgenia* ANDRES, Verh. Bot. Ver. Brandenb. 56 (1914) 58, 59, 61, 68, f. 1 H, *in text*; DOMIN, Sitz. Ber. Böhm. Ges. Wiss. M.-N. Kl. (1915) 104, *non* SCH.-BIP. 1842. — *Cheilotheca* (*non* HOOK. *f.*) PRAIN in K. & G. J. As. Soc. Beng. 74, ii (1905) 81; RIDL. Fl. Mal. Pen. 2 (1923) 222, f. 93. — **Fig. 54.**

Echlorophyllose, ephemerous, leafless, white or coloured herbs; stem stoutish, erect, simple or 2–3-forked, densely set with large, imbricate scales; roots fleshy. *Flower* regular, solitary, terminal. *Sepaloid scales* 5, free, erect, oblong-lanceolate, like the uppermost stem scales. *Petals* 3, free, erect, imbricate, linear-oblong, blunt and somewhat cucullate at the apex. *Stamens* 6, included; filaments linear, flattened; anthers linear, basifix, subextrorse, hippocrepiform, cells 2, smooth, confluent at apex, dehiscing by marginal pores which gradually extend into slits. *Disk* hypogynous, low. *Ovary* fusiform, 1-celled, gradually narrowed into the cylindric style; stigma subcapitate or subglobose, obscurely 4- or 6-lobed; placentas 6, parietal, only slightly prominent, with rather numerous ovules. *Fruit* fleshy, indehiscent, baccate, crowned by the ± persistent ± truncate style, not yet known in perfectly ripe state.

Distr. Monotypic and endemic in *Malesia* (Malay Peninsula).

Ecol. In dense woods, reported to be a root-parasite, but surely a mycotrophous saprophyte, as true parasites are not known within the *Ericales*.

1. Andresia malayana (SCORT. in Hook. *f.*) SLEUM., *nov. comb.* — *Wirtgenia malayana* (SCORT. in Hook *f.*) ANDRES, Verh. Bot. Ver. Brandenb. 56 (1914) 58, 59, 61, 68, f. 1 H, *in text*. — *Cheilotheca malayana* SCORT. in Hook. *f.* Ic. Pl. (1887) t. 1564; PRAIN, J. As. Soc. Beng. 73, ii (1904) 205; in K. & G. *ibid.* 74, ii (1905) 81; ANDRES, Deutsch. Bot. Monatsschr. 22, 4 (1911) 53; RIDL. Fl. Mal. Pen. 2 (1923) 222, f. 93. — **Fig. 54.**

Stem 15–22 cm. *Scales* ovate-oblong, obtuse, upwards gradually increasing in size, lurid-purple (SCORTECHINI), dilutely purple (RIDLEY) or waxy white (KUNSTLER), glabrous, 0.6–1.8 by 0.3–0.7 cm. *Flower c.* 2.5 cm, hidden within the uppermost scales and bright yellow (KUNSTLER), or with the tips of the petals exserted and white (SCORTECHINI, RIDLEY). *Sepaloid scales* 5, resembling the uppermost scales, but rather larger and all close together, oblong-lanceolate, subacute or obtuse, glabrous, *c.* 1.5–1.8 by 0.5 cm. *Petals* larger and more concave than the sepals, rounded-cucullate at the apex, glabrous outside, rather densely to sparingly short-hairy inside in the upper ⅔, *c.* 2–2.5 by 0.6 cm. Outer filaments somewhat shorter than the inner ones, laxly hairy all the length (SCORTECHINI), or inside near the base only (KUNSTLER), *c.* 1.5 by 0.1 cm; anthers *c.* 2 mm (SCORTECHINI) or *c.* 4 mm

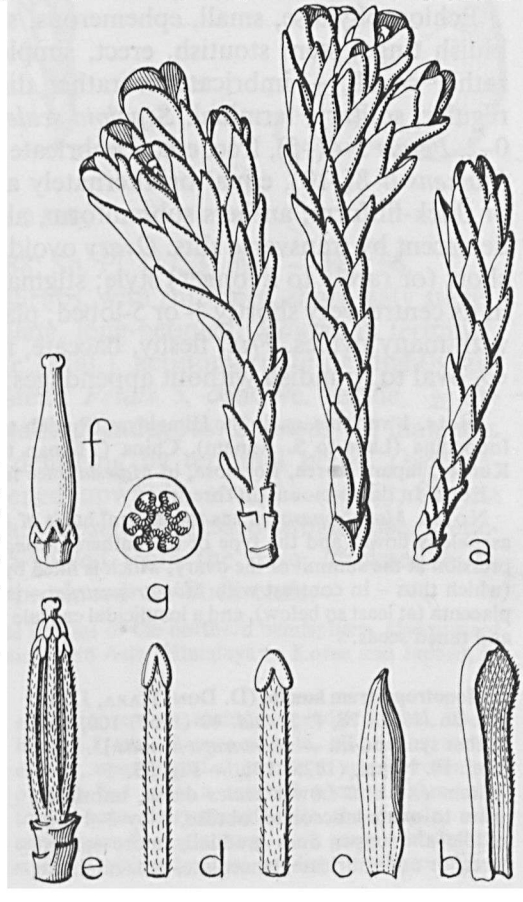

Fig. 54. *Andresia malayana* (SCORT. in Hook. *f.*) SLEUM. *a.* Habit, × ⅔, *b.* sepal, × 1⅓, *c.* petal, × 1⅓, *d.* two stamens, × 2, *e.* flower, the perianth removed, × 1⅓, *f.* ovary and disk, × 1, *g.* transverse section of ovary, × 2 (after Hook. Ic. t. 1564).

(KUNSTLER). *Disk* sinuate. *Ovary* narrow-fusiform, *c.* 2 mm ø, faintly 6-grooved, pistil *c.* 1.7 cm; stigma obscurely 4-lobed (SCORTECHINI) or 6-lobed (KUNSTLER). *Immature berry* white, *c.* 1.8 cm ø.

Distr. *Malesia*: Malay Peninsula, Perak (Larut), discovered both by SCORTECHINI and KUNSTLER between 1882 and 1886, later also found by RIDLEY, whose material was not preserved.

Ecol. Humiculous, in dense jungle (KUNSTLER: 'underneath the rock', *c.* 1065 m), in dense bamboo (RIDLEY in litt.: *c.* 1000–1500 m).

Note. According to the field notes recorded by the collectors, the specimens of SCORTECHINI and KUNSTLER differ in the characters mentioned in the description above. Their essential characters agree, however, and the plants seem to be conspecific. The species has not been refound recently, and new complete material, conserved in alcohol, is urgently needed, to enlarge our knowledge of the plant.

Andresia shares the peculiarities of the petals, anthers, stigma and placentation with *Monotropastrum* ANDRES (from the Himalayas to China and S. Kuriles, Japan, Korea, Formosa and N. Sumatra), *Monotropanthum* ANDRES (India, China, Korea, Formosa) and *Pityopus* SMALL (N. America), but is certainly not congeneric with *Cheilotheca* HOOK. *f.* (Khasia) as assumed by HOOKER *f.*, PRAIN and RIDLEY. In *Cheilotheca* there are only 3–4 sepaloid scales, the petals are flat, the stigma has the form of a pileus or reversed cup, the anthers have parallel cells, with contractions or swellings at intervals, each cell opening by an irregular, longitudinal slit; the placentas are laterally expanded and bear few ovules only.

3. MONOTROPASTRUM

ANDRES, Notizbl. Berl.-Dahl. 12 (1935) 696, f. 8; in Hand.-Mazz. Symb. Sin. 7 (1936) 766, f. 23; Bot. Jahrb. 76 (1953) 103; HARA, J. Jap. Bot. 36 (1961) 78, f. 2; *ibid.* 40 (1965) 100. — **Fig. 55.**

Echlorophyllose, small, ephemerous, saprophytic, leafless herbs, white or with bluish tinge; stem stoutish, erect, simple, laxly to subdensely set with large or rather small, ± imbricate or rather distant spiral scales; roots fleshy. *Flower* regular, solitary, terminal. *Sepaloid scales* inserted immediately below the petals, 0–2. *Petals* 3–4(–5), free, erect, imbricate, forming a kind of campanulate corolla. *Stamens* 6–8(–10), equal or alternately a little longer; filaments linear, flattened, or thick-filiform; anthers subreniform, almost basifix, cells parallel to each other, dehiscent by transverse slits. *Ovary* ovoid to pear-shaped, gradually narrowed to a short (or rarely to a longer) style; stigma thick, cushion-like, somewhat deepened in its centre, very shortly 4- or 5-lobed; placentas 6–13, parietal, slightly prominent, with many ovules. *Fruit* fleshy, baccate, remaining reflexed as is the flower. *Seeds* ∽, oval to roundish without appendages; testa ± reticulate.

Distr. 1 variable *sp.* in the Himalayas (Punjab to Bhutan), S. Tibet, Assam, Manipur, N. Burma, Indochina (Laos to S. Annam), China (Yunnan to Hunan and Hupeh), S. Ussuri, S. Saghalin, S. Kuriles, Japan, Korea, Formosa, in *Malesia* once found in N. Sumatra.

Ecol. In dense mountain forest.

Notes. *Monotropastrum* has the general habit of *Monotropa* (*M. uniflora* L.), with which it shares the asepalous flower and the type of the anthers. *Monotropa*, however, has a distinct shallow circular depression at the summit of the ovary, which is filled by the base of the short, stout, slightly obconical style (which thus – in contrast with *Monotropastrum* – is set off markedly from the proper ovary), an axile placenta (at least so below), and a loculicidal capsule which becomes erect and is filled with small elongate and tailed seeds.

1. Monotropastrum humile (D. DON) HARA, J. Jap. Bot. 36 (1961) 78, f. 2; *ibid.* 40 (1965) 100, with further syn. and lit. — *Monotropa humilis* D. DON, Prod. Fl. Nepal. (1825) 151. — **Fig. 55.**

Stem *c.* 9 cm. Lower *scales* dense, imbricate, ovate to ovate-lanceolate, obtuse, 8 by 3–4 mm, middle and upper ones gradually more spaced, partly or not imbricate, lanceolate, subacuminate, 12–15 by 4 mm, of a greyish bluish tinge when fresh, turning black when dry, especially the lower part inside covered with rather long, cobweb-like, brown or rufous hairs, which are also found on the stem, ± glabrous elsewhere. *Flower* reflexed. *Petals* broad oblong, apex ± truncate, saccate at the base inside, either irregularly clothed with longish, brown, woolly hairs on both faces, or

partly glabrescent, *c.* 13 by 5–6 mm. *Stamens* 8; filaments thick-filiform, with sparse hairs or ± glabrous. *Disk* lobes apparently 8, short-cylindrical, alternating with the stamens. *Ovary c.* 9 mm long, 2.5 mm ø in the lower ⅓, gradually attenuate to a very broad and short style *c.* $^1/_5$ as long as the ovary.

Distr. East Asia, in *Malesia*: N. Sumatra (Tapanuli), once found in forest near Lae Pondom, E. of Sidikalang, at *c.* 1500 m, by H. SURBECK. *Fl.* Apr.

Note. Though the Sumatran material is scanty and no fruit was collected, I refer this to *M. humile* seen the enormous variability of this species indicated by HARA.

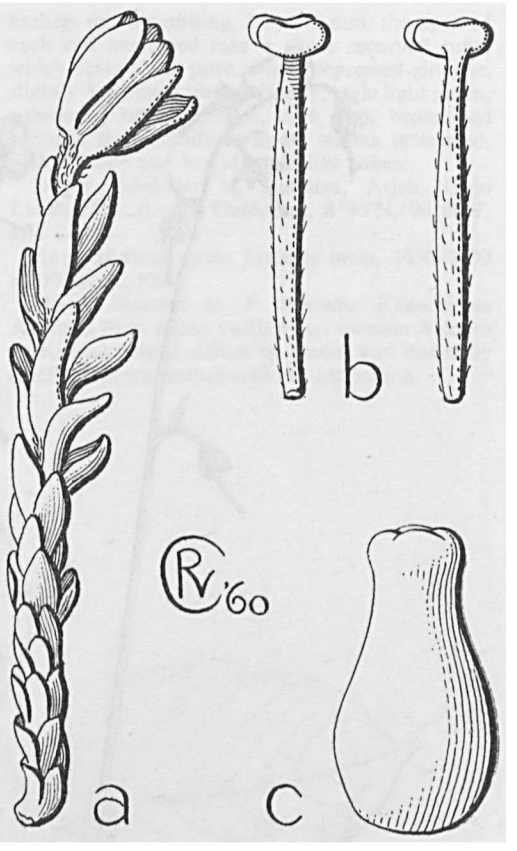

Fig. 55. *Monotropastrum humile* (D. DON) HARA. *a.* Habit, × 1, *b.* stamens, × 3, *c.* ovary, × 3 (SURBECK *s.n.*).

4. PYROLA

TOURN. *ex* LINNÉ, Gen. Pl. ed. 5 (1754) 188; Sp. Pl. (1753) 396. — **Fig. 56.**

Perennial glabrous herbs or small half-shrubs, with rhizomes, short leafy stems. *Leaves* spiral, persistent, entire or denticulate, long-petioled. *Flowers* in terminal, simple, bracteate racemes, nodding, white (Mal.), actinomorphic or slightly zygomorphic. *Calyx* deeply 5-lobed, persistent. *Petals* 5, concave, sessile, ± arranged in form of a bell or somewhat spreading, caducous. *Stamens* 10; filaments subulate; anthers incompletely 4-celled, dehiscing by terminal pores. *Ovary* 5-celled; ovules ∞; style columnar, thickened upwards, straight (Mal.); stigma truncate or with a shortly 5-lobed stigma. *Capsule* depressed-subglobose, somewhat pentagonal, 5-celled, loculicidally 5-valved from the base, crowned by a persistent style. *Seeds* minute; testa lax, produced on both ends.

Distr. About 35 *spp.* mostly in cold and temperate regions of the northern hemisphere, also present in the temperate zone of tropical America (S. to Mexico) and Asia (Himalaya to Korea and Japan), in *Malesia* 1 *sp.* in N. Sumatra.

1. Pyrola sumatrana ANDRES, Bull. Jard. Bot. Btzg III, 14 (1936) 5, f. 1. — *P. japonica* (*non* KLENZE *ex* ALEFELD) STEEN. *ibid.* III, 13 (1934) 206. — **Fig. 56.**

Plant 12–35 cm, with stoutish, creeping stem, normal leaves in a lax to subdense rosette, other upper and reduced ones numerous, scale-like, subulate, remote, entire, somewhat keeled, 10–15 by 1–1.5 mm. *Leaves* remote, elliptic or ovate-elliptic, apex broad-attenuate to nearly rounded, obtuse, but with a marked terminal glandular tooth, base short-cuneate into the petiole, subcoriaceous, firm, glabrous, dark green and slightly suffused with red above, reddish to purple-brown

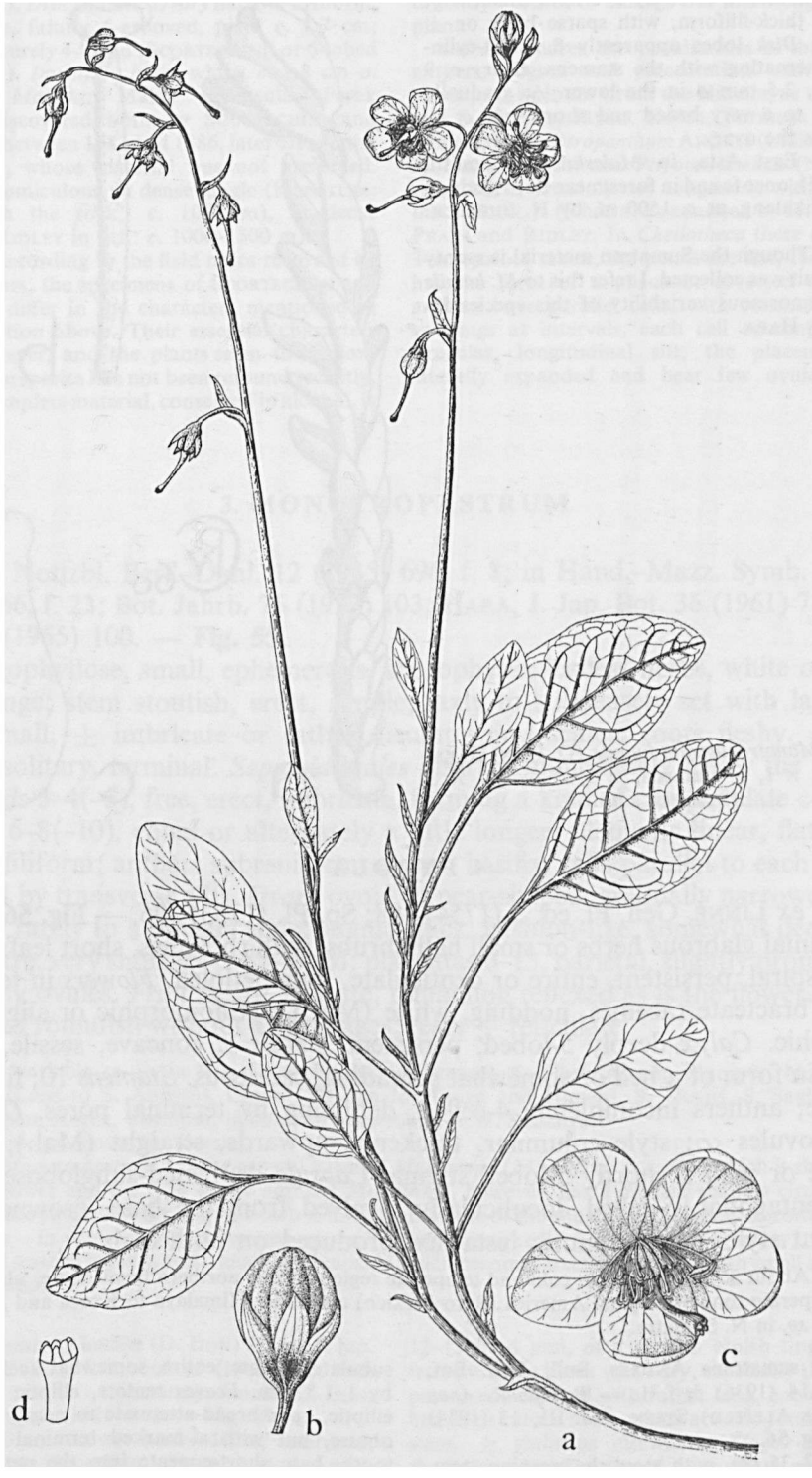

Fig. 56. *Pyrola sumatrana* ANDRES. *a.* Habit, × ½, *b.* flower bud, × 1½, *c.* flower, × 1½, *d.* end of style with stigma, × 5 (VAN STEENIS 6492).

beneath, a little shining above, paler beneath, margin somewhat thickened, minutely remotely denticulate by the protruding veins, sometimes nearly entire, (4–)5–7 by 2–3.5 cm, midrib stoutish, somewhat raised beneath, nerves (3–)4–5 pairs, curved-anastomosing, veins very lax, rather little conspicuous; petiole 4–6.5 cm. *Scape* 17–25 cm, terete, purplish, with several narrow foliar scales below. *Raceme* lax, 3–6-flowered. *Flowers* shortly and broadly campanulate, up to 2.5 cm ø. Pedicels slender, 0.8–1.2 cm; bract subamplectent, linear, ± as long as the pedicel. *Calyx* light green, lobes subovate-lanceolate to lanceolate, subacute, *c.* 5–6 by 2 mm. *Petals* white, elliptic to broad-elliptic or subobovate-elliptic, 9–11 by *c.* 6 mm. *Stamens* 10; filaments flat, linear, 5–6 mm; anthers narrow-oblong, 3 by 1.2 mm, the apex of each cell narrowed into a short recurved tube, which bears a fine pore. *Ovary* depressed-globose, slightly 5-grooved longitudinally; style light green, columnar, rather slender, *c.* 6 mm, broadened towards the patelliform apex; stigma immersed, with 5 large and broad tooth-like lobes.

Distr. *Malesia*: N. Sumatra, Atjeh, Gajo Lands (Mts Bur ni Geredong, 4°80′N, 96°80′E, and Losir).

Ecol. In ridge scrub, forming mats, 2650–2800 m. *Fl.* Sept., Jan.

Note. Nearest to *P. japonica* KLENZE *ex* ALEFELD from Japan (with a *ssp. coreana* ANDRES in Korea), which differs by cream and distinctly smaller flowers, anther-cells but 2 mm long.

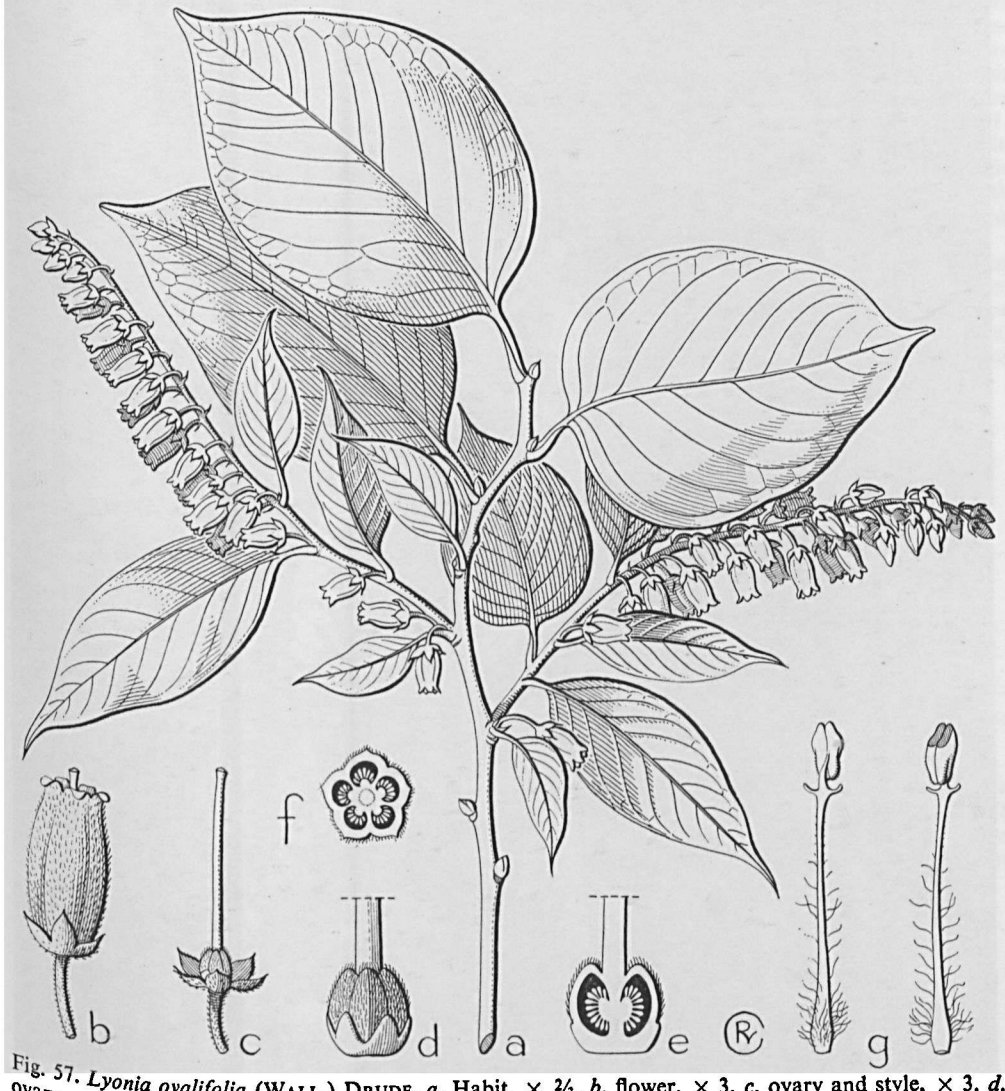

Fig. 57. *Lyonia ovalifolia* (WALL.) DRUDE. *a.* Habit, × ⅔, *b.* flower, × 3, *c.* ovary and style, × 3, *d.* ovary, × 7, *e.* longitudinal section of ovary, × 7, *f.* cross section of ovary, × 7, *g.* stamen, × 7 (KEP 71940 WYATT-SMITH).

5. LYONIA

NUTT. Gen. N. Am. Pl. 1 (1818) 266, *nom. cons.* — *Pieris* (*non* D. DON, 1834, *s. str.*) CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 460; K. & G. J. As. Soc. Beng. 74, ii (1905) 72; RIDL. Fl. Mal. Pen. 2 (1923) 215. — *Xolisma* RAF. Am. Monthly Mag. 4 (1819) 193, *nom. rejic.* — **Fig. 57–59.**

Evergreen or deciduous shrubs or rarely small trees. *Leaves* spirally arranged, short-petioled, entire (Mal.). *Flowers* 5-merous; racemes axillary or at the end of short lateral branches (Mal.). *Calyx* deeply (rarely 4–8-)lobed, lobes valvate. *Corolla* urceolate (Mal.), with short recurved lobes. *Stamens* 10 (rarely 8–16),

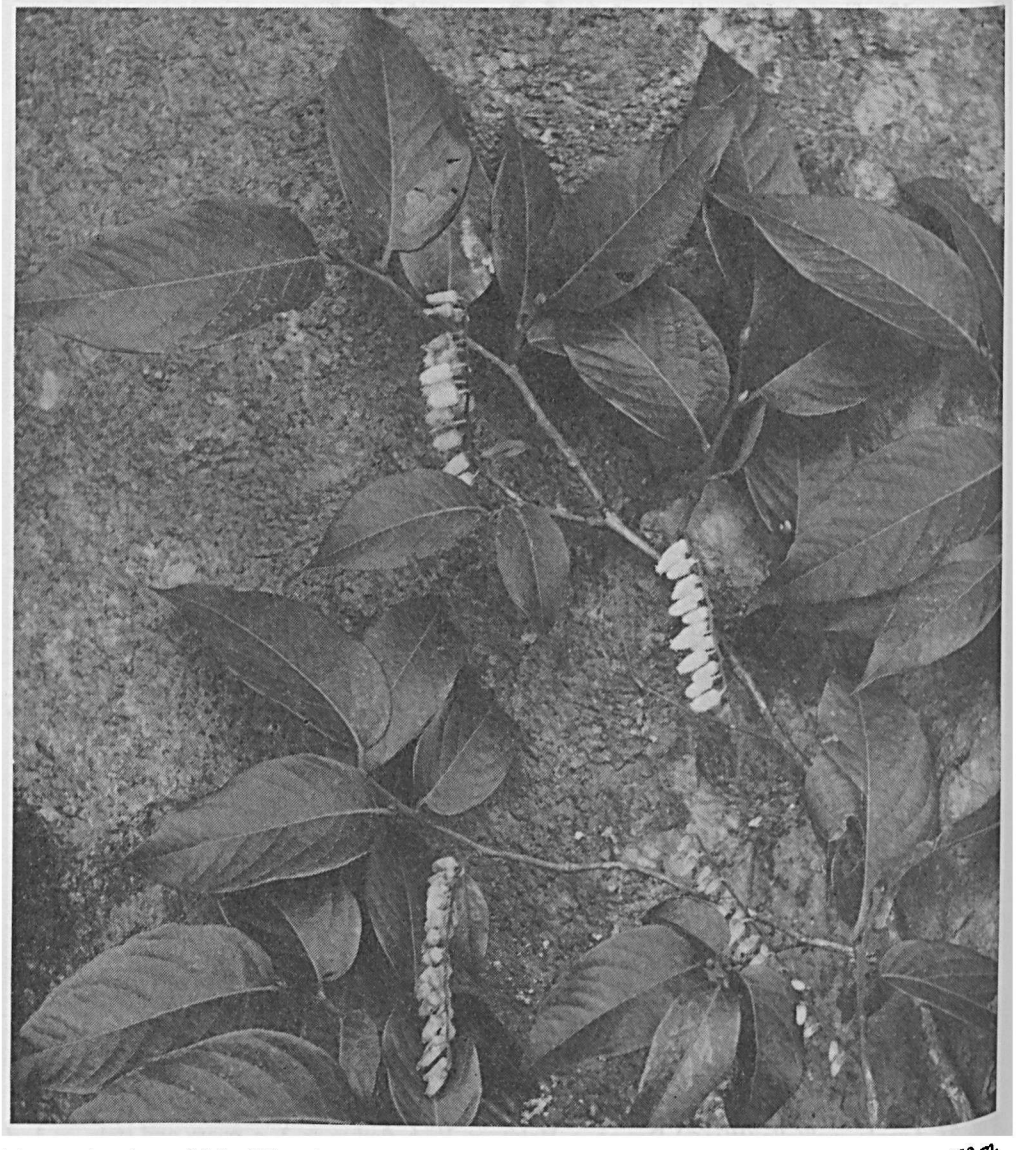

Fig. 58. *Lyonia ovalifolia* (WALL.) DRUDE. Flowering branch from tree on top of Robinson Falls, 1450 m, Cameron Highlands, Malaya (SLEUMER 4662) (SLEUMER, 1963).

included; filaments flat, dilated near the base, with a pair of appendages near the apex (Mal.); anthers ovoid, obtuse, dorsifix, awnless, opening by apical pores. *Ovary* 4–6-celled, globose or depressed; style columnar; stigma truncate. *Disk* (5–)8–12-lobed. *Capsule* loculicidal, dry, sutures thickened and appearing before the dehiscence as 5 rounded longitudinal ribs. *Seeds* ∽, small, linear-oblong, falcate, not winged, albuminous; testa loose.

Distr. About 40 *spp.*, chiefly in the eastern and southeastern States of North America and the West Indies, *c.* 7 *spp.* described from E. and SE. Asia, of which one extends to *Malesia* (Malay Peninsula only).
Ecol. In Malesia in montane forest.

1. Lyonia ovalifolia (WALL.) DRUDE in E. & P. Pfl. Fam. 4, 1 (1889) 44. — *Andromeda ovalifolia* WALL. As. Res. As. Soc. Beng. 13 (1820) 391, fig.; Cat. (1829) *n.* 763. — *Pieris ovalifolia* (WALL.) D. DON, Edinb. Phil. J. 17 (1834) 159; CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 460; K. & G. J. As. Soc. Beng. 74, ii (1905) 73; RIDL. J. Linn. Soc. Bot. 38 (1908) 313, reimpr. J. Fed. Mal. St. Mus. 2 (1908) 120; *ibid.* 6 (1915) 49, 157; Fl. Mal. Pen. 2 (1923) 215; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256; DOP, in Fl. Gén. I.-C. 3 (1930) 725; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 206; KANJILAL, DAS, *c.s.* Fl. Assam 3 (1939) 150. — *Xolisma ovalifolia* (WALL.) REHD. J. Arn. Arb. 5 (1924) 52; KANEH. Formos. Tr. (1936) 556, f. 517; FLETCH. in Fl. Siam. En. 2 (1938) 315. — **Fig. 57–59.**

Small, often crooked tree 4–6(–8) m high, trunk up to 10 cm ø, or bushy spreading shrub, occasionally epiphytic, with blackish brown or grey, deeply longitudinally fissured fibrous bark. Young branches terete, at first whitish puberulous, afterwards becoming glabrous and blackish. *Leaves* (in Mal.) evergreen, ovate, rather variable and sometimes ovate-elliptic or ovate-oblong (Mal.), apex short-acuminate, ± acute, base broad-attenuate or mostly rounded, sometimes subcordate, thinly coriaceous, firm, dark glossy green and glabrous above except the midrib, rusty-pubescent at least initially beneath at the midrib and nerves, glabrescent, edge very slightly recurved, (5–)6–10(–15) by (3–)4–5.5(–7) cm, midrib flat above, prominent beneath, nerves (8–)10–15 pairs, spreading, ± parallel, slightly curved upwards near the edge, sharply prominent beneath, veins ± transverse, reticulation dense, minutely or hardly prominent on both faces; petiole puberulous, 3–10(–12) mm. *Racemes* by suppression or early fall of the leaves sometimes forming a terminal false panicle, (5–)6–15(–20) cm long, ± pubescent. *Flowers* close together, secund, drooping. Bract linear or lanceolate, acute, caducous, 2.5–4 mm. Bracteoles small, linear-oblong. Pedicels slender, pubescent, 2–3 mm. *Calyx* lobes triangular-lanceolate or ovate, ± acute, ± pubescent, *c.* 2 mm. *Corolla* early caducous, narrowly elongate-ovoid to urceolate-cylindric, white to very pale cream, pubescent outside, puberulous within, 13 by 5 mm in fresh, (5–)7–9 mm in dry specimens. *Stamens* half as long as the corolla; filaments white, woolly at the broad base, with 2 divaricate setaceous appendices near the apex; anthers ovoid, 1–1.5 mm. *Disk* lobes thick, deltoid, obtuse, alternating with the 5 faint ribs of the ovary. *Ovary* subglobose, pubescent; style cylindric, ± as long as the corolla. *Capsule* globose, 4–5 mm ø, glabrous, supported by the persistent calyx.

Distr. Temperate Himalayas from Kashmir to Bhotan, Sikkim, Assam, Burma, Indochina, N. Siam, S. and SE. China, Formosa and Japan (*var.*), in *Malesia*: Malay Peninsula (Kedah: Kedah Peak; Perak: Mt Kerbau, Cameron Highlands; Pahang: Mt Tahan). Fig. 59.

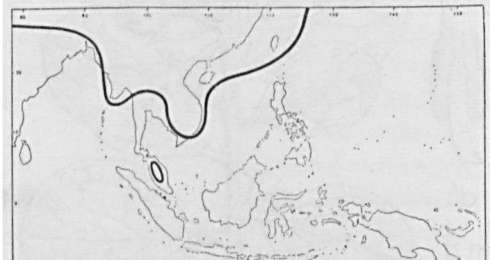

Fig. 59. Distribution of *Lyonia ovalifolia* (WALL.) DRUDE in SE. Asia and Malesia.

Ecol. In flattish or hilly mountain localities („padangs"), often from 915 m up, from other places recorded from 1220–2135 m. *Fl.* March–Aug., *fr.* May–Sept. Leafless for a short time in March in the Cameron Highlands.

6. PERNETTYOPSIS

K. & G. J. As. Soc. Beng. 74, ii (1905) 79; RIDL. Fl. Mal. Pen. 2 (1923) 221. — **Fig. 60.**

Small, rigid, epiphytic or terrestrial shrubs. *Leaves* spirally arranged, shortly petioled, coriaceous, minutely subserrate-crenulate, persistent. *Flowers* axillary,

solitary or in twos, rarely 3 or 4 in a fascicle. Pedicels stout, with several basal small bracts. Bracteoles 2 (rarely 3), rather large, inserted immediately below the calyx, forming a kind of involucral cup. *Calyx* as long as or mostly a little longer than the corolla, very deeply 5-partite, persistent, unchanged in fruit, lobes ± spreading. *Corolla* short-urceolate to ovoid-subglobular, throat slightly constricted and with 5 short reflexed lobes. *Stamens* 10, equal, included; filaments linear, slightly attached to the bottom of the corolla, or inserted outside the disk lobes; anthers rather short, exappendiculate, apically prolonged into 2 porously dehiscing tubules. *Disk* lobes 10, scale-like and attached to the ovary. *Ovary* free, subglobose, 5-celled; style columnar; stigma simple; placentas on the inner angle of the loculi, many-ovuled. *Berry* globose, 5-celled, with a thin wall and but scanty pulp. *Seeds* ∽, minute, compressed, angled, filling the cells nearly completely; testa crustaceous.

Distr. Monotypic in *Malesia* (Malay Peninsula).

1. Pernettyopsis malayana K. & G. J. As. Soc. Beng. 74, ii (1905) 79; RIDL., J. Fed. Mal. St. Mus. 4 (1909) 44; *ibid.* 5 (1914) 39; *ibid.* 6 (1915) 49; Fl. Mal. Pen. 2 (1923) 221. — *P. subglabra* K. & G. J. As. Soc. Beng. 74, ii (1905) 80; RIDL. Fl. Mal. Pen. 2 (1923) 221. — *Diplycosia breviflora* RIDL. J. Fed. Mal. St. Mus. 6 (1915) 158. — *P. breviflora* (RIDL.) RIDL. Fl. Mal. Pen. 2 (1923) 222; HENDERS. J. Fed. Mal. St. Mus. 13 (1927) 5. — Fig. 60.

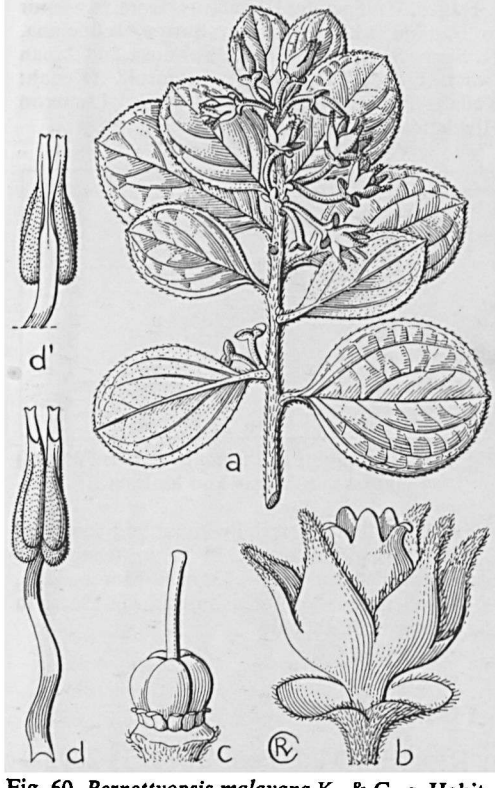

Fig. 60. *Pernettyopsis malayana* K. & G. *a.* Habit, × ⅔, *b.* flower, × 3, *c.* ovary and disk, × 3, *d.* stamen, front, × 6, *d'.* anther dorsally, × 6 (For. Dep. F. M. S. 25943).

Epiphytic or terrestrial shrub, 25–60 cm, not rarely trailing over moss cushions. Branches terete, blackish, younger parts brown, glabrous, bark very thin, branchlets sparsely to subdensely clothed with flat, manifestly appressed bristles (1–2 mm). *Leaves* 2–4, ± close to the end of the shoots, elliptic to obovate-elliptic, more rarely obovate or subrotund, apex very broadly attenuate to rounded, obtuse, the terminal gland thick, ± sharply prominent, base broadly narrowed into the petiole, dark green and ± shining above, paler (sometimes more reddish brown) and rather dull beneath, glabrous above, laxly short-setulose beneath, the bristles longer persistent on the midrib and in the lower half of the blade, otherwise early caducous, their bases leaving brownish blackish subglandular pits, margin ± flat, the crenulations ending in short, ± caducous, appressed bristles, (2–)3–5 by (1.8–)2–4 cm, midrib and nerves mostly ± deeply depressed above, less so beneath, nerves (2–)3–4 pairs, the lowest 1–2 pair(s) from the base of the lamina, curving upwards and inwards and inarching, reticulation lax, slightly impressed above, almost obscure beneath; petiole thick, with appressed bristles, 2–5 by 1–1.5 mm. *Flowers* both in foliate and defoliate axils. Pedicels at anthesis 4–10 by 1–1.5 mm, accrescent, densely rusty-tomentose and recurved when young, erect and less woolly with age, the basal bracts ovate, *c.* 1.5 mm. Bracteoles red, thick, broad-ovate, obtuse, rusty-tomentose outside, glabrous inside, 2(–3) mm. *Calyx* green or red, lobes subovate-lanceolate and somewhat spreading subacute, 5–8(–12) mm long, 2–4 mm wide at the base, with a dense rusty ± easily detersile woolly tomentum outside initially, early glabrescent from the base upwards, at anthesis mostly only the tips short-tomentose, similarly inside, where the lower half is glabrous from the beginning. *Corolla* rather thin, glabrous, reported to be green, white with purplish marks, pink, or mostly red when fresh, 4–7 mm, lobes 1 mm; filaments rather flattened and wavy, glabrous,

3–4 mm; cells subovate-oblong, cordate at the base, granular, *c.* 2 mm, the apex prolonged into 2 white rather slender tubules (1 mm) with oblique apical pores. *Ovary* laxly caducously tomentose initially or glabrous; style slightly grooved, 3–4 mm; stigma obtuse. *Berry* subglobular, *c.* 5 mm, said to be pale blue or violet when ripe. *Seeds* red, *c.* 0.7 mm.

Distr. *Malesia*: Malay Peninsula (Kedah/Perak border: Mt Bintang; Perak: Mts Kerbau, Bubu, and Batu Puteh; Pahang: Cameron Highlands, Mts Benom and Tahan; Selangor: Mt Mengkuang Lebak).

Ecol. In submossy light forest or summit scrub, 1525–2135 m. *Fl.* Jan.–Sept.

Note. As the woolly indumentum of the calyx lobes is apparently detersile and early gone and the length of the pedicels varies, the recognition of several *spp.* based chiefly on these characters has been abandoned in favour of accepting only one species.

7. GAULTHERIA

KALM *ex* LINNÉ, Gen. Pl. ed. 5 (1754) 187; Sp. Pl. 1 (1753) 395; SLEUM. Reinwardtia 4 (1957) 163–188; Blumea 11 (1961) 1; *ibid.* 12 (1963) 114; *ibid.* 12 (1964) 342. — **Fig. 61–68.**

Evergreen shrubs or half-shrubs, mostly terrestrial, rarely epiphytic, erect or rarely procumbent, prostrate or creeping. *Leaves* spirally arranged or very rarely opposite, mostly serrate. *Racemes* simple or compound, *i.e.* forming panicles, whether or not leafy, perulate (*i.e.* with basal bracts) or practically eperulate, axillary or terminal, sometimes reduced to few-flowered fascicles or a solitary flower. *Flowers* rather small. Pedicel sustained by a large basal bract and 2(–3) higher inserted, mostly small bracteoles. *Calyx* 5-partite to various degree, lobes ± imbricate, persistent, becoming enlarged and swollen (and succulent) in fruit, finally rarely white or pinkish, mostly dark purple or almost blackish. *Corolla* campanulate or urceolate, shortly 5-lobed, lobes spreading or recurved, ± imbricate. *Stamens* 10 (in a few extra-Mal. *spp.* 8), included, attached around the disk to the base of the corolla; filaments mostly dilated at or above the base; anthers dorsifix, introrse, each cell produced at the apex into a very short and often broad tubule which opens by an apical ± oblique pore or slit, and whose back wall mostly is bidentate or biaristate apically. *Disk* ± 10-lobed, glabrous. *Ovary* superior or semi-inferior, 5-ribbed, 5-celled, with thick, bilobed axile, ∞-ovuled placentas; style simple, columnar; stigma small, ± obtuse. *Capsule* thin- to thick-walled, 5-celled, ± globose, dry, mostly rather completely included by the enlarged and ± succulent calyx, loculicidally dehiscent from the apex into 5 valves. *Seeds* ∞, minute, subglobose, angled; testa reticulate; albumen carnose; embryo cylindric.

Distr. About 150 *spp.*, of which 5 are found in North America, *c.* 32 in eastern Asia including also Japan, *c.* 10 in Australia including also Tasmania and New Zealand, *c.* 85 in Central and South America, in *Malesia* 24 *spp.*. Fig. 61.

Ecol. The genus is nearly exclusively terrestrial, much in contrast to the predominantly epiphytic genus *Diplycosia*. Most *spp.* occur as a substage in mountain forests, or in open country scrub, especially on mountain tops.

Dispersal. The fruits are devoured by smaller animals as birds (DOCTERS VAN LEEUWEN, *l.c.*), rodents (CLEMENS *in sched.*) and hens (VAN DER PIJL, personal information), and dispersal is probable this way.

Uses. Many species contain in all their parts a volatile oil of peculiar odour, the so-called „winter-green-oil" (methyl-salicylate), which is greatly in repute against rheumatism. The smell becomes apparent or stronger after crushing the leaves or flowers. From the Malesian species *G. punctata* is used in the first place, known as „*gondopuro*" or „*gandapura*" to the Javanese. Less used are *G. leucocarpa* or *G. nummularioides*; from several other species in Malesia a strong smell has been stated by the collectors, but no use has been reported. The leaves are chewed occasionally together with „*sirih*", or used as a medicinal tea. The fruits are edible, but apparently not eaten by man.

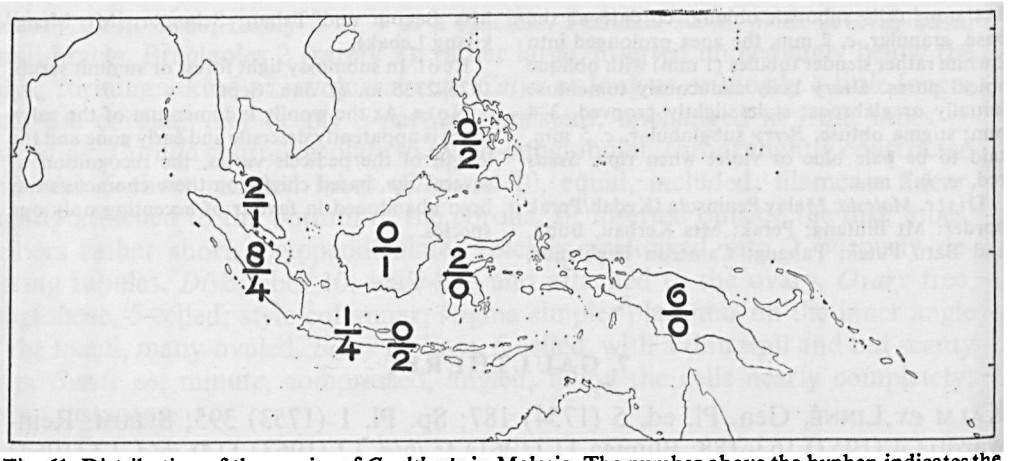

Fig. 61. Distribution of the species of *Gaultheria* in Malesia. The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

KEY TO THE SPECIES

1. Bracteoles at flowering time at a marked distance from the calyx, or, in case of very short and condensed inflorescences or solitary subsessile flowers, bracteoles anyway not strictly opposite.
2. Inflorescences in terminal and/or axillary, simple or compound racemes, *i.e.* each flower in the axil of a small, subpersistent bract.
3. Racemes generally rather short and few-flowered. Leaves 0.8–2.5 (very rarely in part in the same specimen up to 4) by 0.3–1.6 cm.
4. Leaves obovate-oblong or oblanceolate, sometimes elliptic-oblong, (0.8–)1–2 (very rarely up to 4) by 0.3–0.7 (very rarely up to 1.2) cm. Branchlets minutely pubescent . . . . . **1. G. borneensis**
4. Leaves ovate, (1–)1.2–1.8(–2.5) by 0.7–1.4(–1.6) cm. Branchlets finely pubescent *and* setulose, or setulose only.
5. Rachis and pedicels finely pubescent only. (Corolla shortly 5-lobed. Filaments villous their entire length.) . . . . . **2. G. atjehensis**
5. Rachis setulose only, not pubescent. Pedicels glabrous.
6. Corolla shortly 5-lobed, densely short-hairy inside. Filaments laxly subpatently hairy in their middle, glabrous at base and apex . . . . . **3. G. solitaria**
6. Corolla deeply 5-cleft, completely glabrous inside. Filaments papillose . . . **4. G. dialypetala**
3. Racemes ± elongate, generally many-flowered. Leaves at least 3 by 2 cm, mostly much larger.
7. Branchlets with scattered sessile glands, otherwise glabrous. Pedicels short-hairy, not glandular-hairy, mostly glabrescent upwards or almost glabrous immediately below the calyx. **5. G. acroleia**
7. Branchlets (and inflorescences) finely pubescent *and* subdensely to more laxly set with slender, ± spreading glandular bristles. Pedicels hairy, with a ring of dense, patent, glandular setulose hairs immediately below the calyx . . . . . **6. G. barbulata**
2. Flowers in axillary fascicles, or solitary in the axil of a ± normal leaf (in the latter case sometimes forming a leafy *terminal* raceme, when present in the axils of all upper decrescent leaves).
8. Flowers in few-flowered fascicles.
9. Branchlets glabrous or practically so. Reticulation not impressed on the leaf-surface.
10. Leaves ovate, rounded at the base, 5.5–9.5(–10.5) by 3.5–5.5(–6) cm . . . . **7. G. kemiriensis**
10. Leaves elliptic to broadly ovate-lanceolate, acute at the base, 3.5–4.5 by 1.8–2.5 cm. **8. G. losirensis**
9. Branchlets rather densely clothed with ± longish bristles. Reticulation ± distinctly impressed on the leaf-surface . . . . . **9. G. abbreviata**
8. Flowers solitary or in a terminal leafy raceme.
11. Stem weak, creeping. Each leaf tooth ending in a fine longish ± persistent bristle. **10. G. nummularioides**
11. Stem stiff. Each leaf tooth thickly and obtusely gland-tipped . . . . . **11. G. mundula**
1. Bracteoles at flowering time strictly opposite and inserted on the pedicel immediately below the calyx (may be very shortly distant from the calyx in fruiting stage).
12. Flowers in racemes or panicles.

13. Flowers in terminal panicles, or flowers both in terminal panicles and solitary axillary (only upper) racemes, *i.e.* the upper 3–4 racemes forming a panicle in which here or there an occasional ± reduced leaf may be found.
14. Branchlets permanently glandular-setulose or setulose.
15. Panicles ± coarctate, rather short.
16. Rachis (and pedicels) in part hirtellous *and* glandular-setulose . . . . . **12. G. celebica**
16. Rachis and pedicels exclusively hairy. . . . . **13. G. berberidifolia**
15. Panicles slender, ± elongate . . . . . **14. G. gracilescens**
14. Branchlets finely pubescent or glabrous.
17. Branchlets ± sharply trigonous or winged by the decurrent petioles. Panicles exclusively terminal . . . . . **15. G. punctata**
17. Branchlets terete or nearly so, petioles not properly decurrent. Both terminal panicles and solitary (upper) racemes present in the same specimen.
18. Leaves cordate at base . . . . . **16. G. arfakana**
18. Leaves broadly cuneate to rounded at base.
19. Leaves elliptic to suborbicular, or broadly obovate-, rarely oblong-elliptic, obtusely attenuate to rounded at apex, laxly to rather densely blackish punctulate beneath . **17. G. malayana**
19. Leaves oblong-ovate, gradually acuminate at apex, not punctulate underneath. **18. G. intermedia**
13. Flowers exclusively in solitary racemes in the axils of normal leaves, the uppermost raceme often seemingly terminal.
20. Leaves pubescent beneath. Corolla pubescent.
21. Leaves (laxly) longish glandular-pubescent, especially beneath and along the margin, teeth minute, ending in a longish, glandular, bristle-like hair. . . . . **19. G. hirta**
21. Leaves glabrous above, rather densely, shortly, non-glandular-hairy beneath, teeth ± coarse, ending in a very short thick glandular point. . . . . **22. G. leucocarpa *var.* hirta**
20. Leaves and corolla glabrous.
22. Leaves short-acuminate at the apex.
23. Leaves ovate-oblong or -lanceolate, cuneate at base, very laxly or not punctate beneath. Corolla subcampanulate, 3.5–4 by 3(–4) mm . . . . . **20. G. viridiflora**
23. Leaves ovate to ovate-elliptic, rarely elliptic-oblong, broadly attenuate to rounded or even subcordate at base, generally manifestly laxly punctate beneath. Corolla cylindric-urceolate, 5–7 by *c.* 3 mm . . . . . **21. G. pullei**
22. Leaves ± subcaudate- or elongate-acuminate at the apex (± ovate, base rounded to cordate, rarely broad-attenuate) . . . . . **22. G. leucocarpa**
12. Flowers solitary in the axils of the upper leaves.
24. Flowers successive, *i.e.* in the axils of all upper (manifestly decrescent) leaves, thus in a leafy raceme. Branchlets somewhat winged at the tips, glabrous or minutely pubescent. **23. G. novaguineensis**
24. Flowers remote, *i.e.* in the axils of some and not successive upper (slightly or not decrescent) leaves. Branchlets terete, setulose . . . . . **24. G. pernettyoides**

1. **Gaultheria borneensis** STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 190, t. 15, f. C 4–6; RENDLE, J. Bot. 34 (1896) 355; MERR. Philip. J. Sc. 3 (1908) Bot. 378; HAYATA, Mat. Fl. Formosa (1911) 169; GIBBS, J. Linn. Soc. Bot. 42 (1914) 101; MERR. En. Born. (1921) 465; En. Philip. 3 (1923) 246; KANEH. Formos. Tr. (1936) 533, f. 492, *incl. G. itoana* HAYATA, Fl. Mont. Formosa (1908) 150, t. 25; SLEUM. Bot. Jahrb. 71 (1940) 141, *in text*; Reinwardtia 4 (1957) 167; Blumea 12 (1963) 114. — *G. benguetensis* COPEL. *f.* Philip. J. Sc. 47 (1932) 58, pl. 1, f. 4 & 5; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205. — **Fig. 62a.**

Shrub, sometimes in form of ± dense cushions, 15–50(–60, very rarely up to 120) cm; branches prostrate or erect, generally slender, virgate, youngest parts reddish brown, subterete, minutely greyish pubescent, older parts greyish corticate. *Leaves* with a distinct „wintergreen-oil" fragrance, obovate-oblong or oblanceolate, sometimes elliptic-oblong, apex subobtuse, base cuneate, subcoriaceous, rather dull, glabrous, though laxly punctate beneath, regularly glandular-crenate, (0.8–)1–2(–4) by 0.3–0.6(–1.2) cm, midrib slightly impressed above, prominent beneath, nerves in 3–4 ascendent pairs somewhat sunken above, slightly raised beneath, reticulation lax and not much conspicuous; petiole 0.5–1.5(–2) mm. *Raceme* in specimens from Luzon and the summit area of Mt Kinabalu from the uppermost axil (pseudoterminal) and 2–4-flowered, in specimens from lower places on Mt Kinabalu also with racemes from each of the upper 2–3(–5) axils and thus forming a panicle. Rachis (1–)1.5–2.5(–4) cm, finely pubescent, with several small basal bracts. Pedicels 3–5 mm, with some stalked glands in the upper part, otherwise finely pubescent or glabrous. Bract ovate-elliptic, small. Bracteoles broad-lanceolate, inserted at some distance from the calyx, whether or not ciliolate and glandular-fimbriate, suffused with red. *Calyx* obconical, glabrous, greenish or pink, 2.5 mm, lobes ovate-triangular, obtuse, whether or not ciliolate, *c.* 1.5 mm. *Corolla* ovoid-urceolate, *c.* 5 by 3.5 mm, glabrous, fragrant, white or cream with purple limb, or pink. *Filaments* papillose, 2 mm; anthers

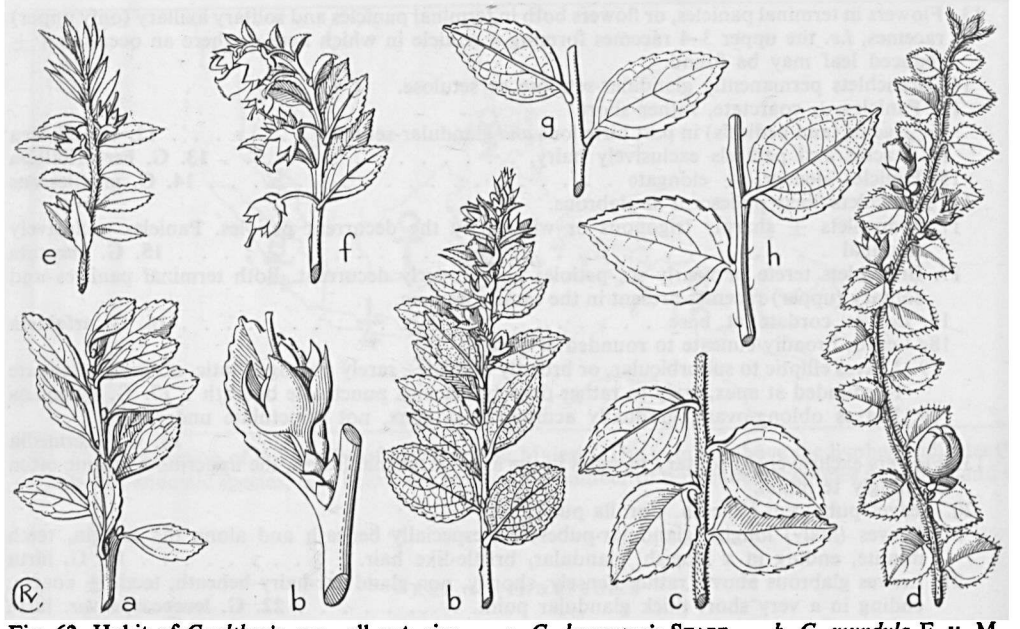

Fig. 62. Habit of *Gaultheria spp.*, all nat. size. — *a. G. borneensis* STAPF. — *b. G. mundula* F. v. M., *b'. ditto*, detail, × 8/3. — *c. G. dialypetala* SLEUM. — *d. G. nummularioides* D. DON. — *e. G. pernettyoides* SLEUM. — *f. G. novaguineensis* J. J. S. — *g. G. atjehensis* J. J. S. — *h. G. solitaria* SLEUM. (*a* CLEMENS 51405, *b–b'* BRASS 4745, *c* BÜNNEMEIJER 978, *d* SCHIFFNER 2355, *e* VAN STEENIS 8648, *f* BRASS & MEIJER DREES 10114, *g* FREY-WYSSLING 27, *h* BREMEKAMP *s.n.*).

c. 15. mm, the cells divergently biaristate (0.8 mm). *Disk* dark green, rather obscure. *Ovary* pubescent; style pale green, glabrous, 3 mm. *Fruit* 5–9(–10) by 6–9 mm, white or pink, rarely purple, berry-like, the fleshy sepals including a small, thin-coriaceous, white or brownish capsule. *Seeds* brownish, 0.7 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu) and Philippines (Luzon, in a very limited region in the central part of the Mountain Prov.).

Ecol. On Mt Kinabalu a low shrub in subsummit low forest, becoming dwarfish in crevices and among wind swept granite rocks on the summit plateau, from 3350–4000 m, a more stiff and erect shrub (up to 1.2 m) with larger leaves (1.5–4 by 0.7–1.2 cm) and richer inflorescences (from more numerous upper axils) and purple fruits on exposed crest among bracken and grasses of the east slope at 2440–2750 m; in Luzon a prostrate, not rarely cushion-like low shrublet in ± open places along pine-forest edges, or on bogs, not rarely on artificial talud along road, 1800–2900 m. *Fl. fr.* Jan.–Dec.

Note. Certainly very near to *G. itoana* HAYATA from Formosa (Mt Arisan), which, however, differs by a shorter, distinctly globose-suburceolate corolla.

2. Gaultheria atjehensis J. J. S. in Fedde, Rep. 35 (1934) 293; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; AIRY SHAW, Kew Bull. 1940 (1941) 313; *ibid.* (1948) 158, f. 3; SLEUM. Reinwardtia 4 (1957) 167. — Fig. 62g.

Small shrub with apparently ± prostrate stems. Branchlets minutely pubescent and rather long and finely setose, or setose only. *Leaves* ovate, apex broad-attenuate and provided with a rather thick, somewhat protracted terminal gland, base ± rounded, subcoriaceous to coriaceous, glabrous above, subdensely caducously setulose or finally punctate beneath, densely serrate, the teeth setose-ciliate, hardly 0.5 mm and 1–1.5 mm spaced, 1.3–2.4 by 0.7–1.6 cm, midrib impressed above, rather strongly prominent beneath, nerves *c.* 3 pairs, curved-ascendent, lower ones ± from or from above the base, slightly impressed above, raised beneath, reticulation rather lax, somewhat impressed above, slightly prominent beneath; petiole setulose, 1–3 mm. *Racemes* from the upper 2–4 axils, 4–6-flowered. Rachis 1.5–2 cm, rather densely short-pubescent, with several small basal perulae. Pedicels subdensely short-pubescent, 6–10 mm. Bract ovate, obtuse, ciliolate. Bracteoles lanceolate, inserted in the lower third of the pedicel. *Calyx* glabrous outside, puberulous inside, *c.* 5 mm, deeply 5-lobed, lobes acute, ciliate. *Corolla* conical-urceolate, white, glabrous outside, pubescent inside, *c.* 6 mm, lobes 1 mm. *Filaments* subferrugineous-villous their entire length; anther-cells ovate-oblong, *c.* 1.3 mm, each very short tubule with 2 divergent and ± reflexed horns. *Ovary* subferrugineous-hirsute; style hairy at the base only, *c.* 3 mm.

Distr. *Malesia*: N. Sumatra (Atjeh, Gajo Lands: Bur ni Telong, Mt Kemiri, Mt Losir).

Ecol. In ridge forest, ridge scrub or table land,

near edge of crater among rocks, 2500–3500 m. *Fl.* Febr., March, June.

Note. *G. atjehensis* is remarkably near to *G. notabilis* ANTHONY (figured in Kew Bull. 1948, 160, f. 2) from Yunnan, which differs by larger leaves, a more campanulate corolla, and glabrous corolla and filaments.

3. Gaultheria solitaria SLEUM. Reinwardtia 4 (1957) 167. — **Fig. 62h.**

Shrublet. Branchlets slender (2 mm), apparently prostrate, terete, laxly caducously setulose or punctate by the persistent bases of the bristles, furthermore short-pubescent towards the tips. *Leaves* ovate, apex short-acuminate, the terminal gland thick and prominent, base rounded, ± coriaceous, rather shining on both faces, glabrous above, sparsely very shortly setulose or punctate beneath, ± regularly serrate, teeth glandular, 0.3–0.5 mm, 1–2 mm spaced, not ciliate, 1.8–2.5 by 1.2–1.5 cm, midrib sunken above, raised beneath, nerves 3 pairs, high-ascending from the base and the lower third of the midrib, very slightly or not impressed above, prominent beneath, veins ± transverse, impressed above, reticulation rather distinct underneath; petiole stoutish, setulose, *c.* 2 mm. *Racemes* solitary, in the rather poor type specimen (where the top is destroyed) coming from the upper 2 axils, 2–3 cm, 6–8-flowered, with several small perulae. Rachis stoutish, laxly setulose only. Pedicels glabrous, 3–5 mm, the lowest coming from the axil of a rather small foliaceous bract, (3–6 by 2–3 mm), the upper ones from the axils of less distinctly foliaceous, decrescent ones. Bracteoles inserted above the base or nearly in the middle of the pedicels, subopposite, ovate-oblong, one higher additional bracteole inserted at a short distance from the calyx. *Calyx* 3 mm, lobes ovate-acuminate, *c.* 2 mm, glabrous outside, puberulous inside, ciliolate. *Corolla* urceolate, *c.* 5.5 mm, glabrous outside, manifestly puberulous inside at least in the lower half, lobes 1–1.5 mm. *Filaments* laxly ± patently hairy in the middle third; anther-cells not well developed. *Ovary* glabrous or very sparsely hairy; style glabrous, 2.5 mm.

Distr. *Malesia*: E. Java (Mt Ardjuno: Kembar summit), once collected by BREMEKAMP.

Ecol. In "Vaccinietum", at 2900 m. *Fl.* July.

Note. Similar in habit as *G. atjehensis* and certainly allied to it.

4. Gaultheria dialypetala SLEUM. Reinwardtia 4 (1957) 168. — **Fig. 62c.**

Prostrate shrublet, much branched below, 30–40 cm, branches from a thick tuber-like base. Branchlets slender (1–2 mm), subterete, rather densely foliate, rather densely covered with rufous, ± spreading, bristle-like, eglandular hairs (*c.* 1.5 mm). *Leaves* ovate, apex short-acuminate, the terminal gland thickish and prominent, base rounded or very broadly attenuate, coriaceous, ± shining on both faces, glabrous above, laxly, very shortly and caducously setulose or punctate beneath, ± regularly serrate, teeth caducously setulose-ciliate, 1–2 mm spaced, hardly 0.5 mm high, margin slightly revolute, (1–)1.2–1.8(–2) by 0.8–1.3 cm, midrib slightly sunken above, distinctly prominent beneath, nerves 3(–4) pairs, high curved-ascending, ± raised above, more distinctly so beneath, reticulation rather lax, somewhat prominent especially beneath; petiole laxly setulose, thickish, 1–2 mm. *Racemes* from the upper 3–5 axils, lower ones 3–5-flowered, upper ones 2-flowered or reduced to a single flower. Rachis 0.5–1 cm, glabrous, with 2–3 small perulae. Pedicels glabrous, 1–2(–3) mm. Bract oblong, ciliolate, *c.* 2 mm. Bracteoles ovate, alternate, inserted on the pedicel at a short, but marked distance from the calyx. *Calyx* 4 mm, lobes ovate-acuminate, acutish, ciliolate, glabrous outside, puberulous along the mediane inside, *c.* 2.5 mm. *Corolla* urceolate, white, somewhat 5-angular, glabrous in- and outside, 4 mm, at full anthesis 5-partite to ¾. *Stamens* not well developed; filaments (possibly not normal) narrow-subulate, papillose; anther-cells not seen. *Ovary* rather densely yellowish hairy; style clothed with some spreading hairs, 3 mm.

Distr. *Malesia*: Central West Sumatra (Mt Talakmau = Mt Ophir), once found on summit, said to be common on the boulder plain at 2900 m. *Fl.* June.

Note. The anomalities noticed in the description of the corolla and stamens may be due to insects.

5. Gaultheria acroleia SLEUM. Reinwardtia 4 (1957) 169; Blumea 11 (1961) 1. — **Fig. 63c.**

Shrub. Branchlets flattened or subangular at the tips, subterete below, with sparse sessile glands (*i.e.* the persistent bases of caducous bristles), otherwise glabrous. *Leaves* subovate-elliptic or -oblong, apex gradually rather shortly acuminate, the terminal gland thick, base broad-cuneate or sometimes nearly rounded, subcoriaceous to coriaceous, rather stiff, regularly serrulate, teeth *c.* 1 mm high and 1.5–2(–3) mm spaced, caducously setular-ciliate, rather blunt, glabrous above, laxly to subdensely glandular-punctate beneath, (3–)4–7(–8) by (2–)2.2–3(–3.5) cm, midrib, nerves and veins ± distinctly impressed above, midrib very prominent beneath, nerves 5(–6) pairs, curved and high ascending, anastomosing near the edge, prominent beneath, veins ± transverse, slightly raised beneath, veinlets subobscure; petiole grooved above, glabrous, 7–9 mm. *Racemes* solitary from the upper axils, (3–)3.5–5 cm, ± obliquely spreading, rather many-flowered, provided at the base with 2 ovate or ovate-oblong, acutish, subcoriaceous rather early caducous perulae. Rachis rather stiff, *c.* 1.5 mm ø at base, very densely and exclusively clad with fine, crisped whitish yellowish, minutely gland-tipped hairs. Pedicels rather slender, pubescent below, quite glabrous below the calyx, 6–8 mm at anthesis, elongate in fruit. Bract ovate-oblong, pubescent, 2–3 by 1.5–2 mm. Bracteoles inserted at ⅓ to ½ on the pedicel, subopposite, pubescent, *c.* 2 by 1 mm. *Calyx* 2.5 mm, lobes ovate, subacute, glabrous dorsally,

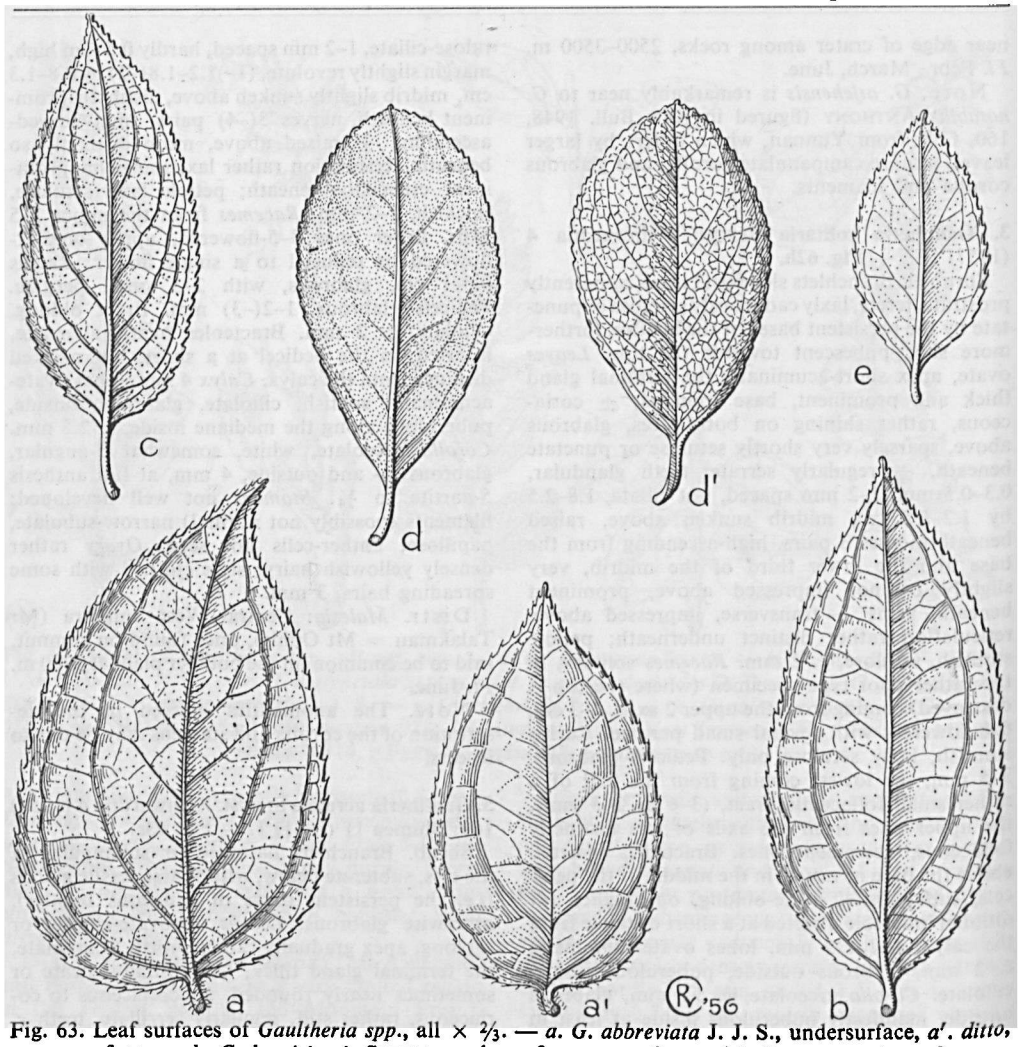

Fig. 63. Leaf surfaces of *Gaultheria spp.*, all × ⅔. — *a. G. abbreviata* J. J. S., undersurface, *a'. ditto*, upper surface. — *b. G. kemiriensis* SLEUM., undersurface. — *c. G. acroleia* SLEUM., undersurface. — *d. G. malayana* AIRY SHAW, undersurface, *d'. ditto*, upper surface. — *e. G. losirensis* SLEUM., undersurface (*a* BÜNNEMEIJER 963, *a'* LEEFMANS 46, *b* VAN STEENIS 9654, *c* VAN STEENIS 9644, *d–d'* HANCOCK *s.n.*, *e* VAN STEENIS 8568).

slightly pubescent internally, ciliate. *Corolla* urceolate, white or pink, glabrous outside, laxly pubescent inside, *c.* 5 by 2.5 mm, only slightly contracted at the limb, very shortly 5-lobed. *Stamens* half as long as the corolla; filaments papillose, moreover laxly hairy below; anther-cells ovate-oblong, the very short tubules biaristate (0.7 mm). *Ovary* densely pubescent; style pubescent below only, 2.5 mm. *Fruit c.* 6 mm ø, blackish at full maturity.

Distr. *Malesia*: Sumatra (Atjeh, Gajo Lands: Mt Kemiri, Mt Losir and Putjuk Angasan).

Ecol. Apparently not rare in the subalpine zone of the Losir massif, in ridge forest or ridge scrub, 2250–3500 m. *Fl. fr.* Jan.–March.

6. Gaultheria barbulata SLEUM. Reinwardtia 4 (1957) 170.

Shrub. Branchlets rather flattened at the tips, rather densely clothed with very short, whitish hairs and longish, subpatent, glandular bristle-like hairs, dark brown red when dry. *Leaves* ovate or oblong-ovate, apex shortly rather abruptly acuminate, subacute, the terminal gland small, base contracted into the petiole, subtruncate-rounded or -subcordate, firmly subcoriaceous, very shortly pubescent along the midrib and nerves on both sides, otherwise glabrous above, but initially rather densely clad with short bristle-like hairs all over beneath especially on the midrib and nerves, finally punctate beneath, regularly serrulate, the teeth caducously glandular-ciliate, 0.5 mm high and *c.* 1 mm spaced, (3–)3.5–6 by (2–) 2.5–3.5 cm, midrib rather deeply sunken above, robust and prominent beneath, nerves 4–5, long curved-ascendent pairs, slightly immersed above

as are the veins, ± raised beneath, veins conspicuous beneath, veinlets less so; petiole setulose, 3–6 mm. *Racemes* solitary, axillary, rather slender, 4–8(–10) cm, many-flowered. Rachis densely clad with very short whitish or yellowish ± spreading hairs and laxly glandular-setulose (1–1.5 mm), perulae few, early caducous, inflorescence practically eperulate at full anthesis. Pedicels rather slender, 6–8 mm, densely very shortly pubescent and laxly glandular-setulose, with a ring of very dense glandular hairs below the calyx. Bract ovate-lanceolate, acute, pubescent, 2–2.5 mm. Bracteoles inserted at or slightly above the middle of the pedicels, distinctly alternate, at least 1 mm remote from the calyx. *Calyx* 2 mm, lobes ovate, subappressed-pubescent on both sides. *Corolla* urceolate-cylindric, glabrous outside, patently hairy inside, *c.* 6 by 3.5 mm, very shortly 5-lobed. *Filaments* very laxly hairy below, papillate elsewhere, 2.5 mm; anther-cells broad-oblong, curved, *c.* 1 mm, tubules very short, each ending with a pair of longish (1 mm) horns. *Ovary* densely clad with whitish erect hairs; style rather densely pubescent, but glabrous on the very top, *c.* 3 mm.

Distr. *Malesia*: Sumatra (Atjeh, Gajo Lands: Mt Losir, Putjuk Angasan) in ridge forest at 2500 m, one collection. *Fl.* Jan.

7. **Gaultheria kemiriensis** SLEUM. Reinwardtia 4 (1957) 171; Blumea 11 (1961) 1. — **Fig. 63b.**

Shrub. Branchlets slender, subangular, glabrous. *Leaves* ovate, apex short-acuminate, subacute, the terminal gland thick, but not much protruding, base ± rounded, coriaceous, glabrous above, rather densely punctulate beneath otherwise glabrous, appressed-serrulate, the teeth thickish glandular, barely 0.2–0.4 mm high, 1.5–3 mm distant from each other, each ending in a fine caducous bristle, 5.5–9.5(–10.5) by 3.5–5.5(–6) cm, midrib slightly impressed above, thick-prominent beneath, nerves 2(–3) pairs, lowest pair from the base, upper ones from the midrib, all high curved-ascending, anastomosing near the top, slightly impressed above, prominent beneath, veins transverse, prominent beneath only, reticulation fine, lax and not very conspicuous; petiole 4–5 mm. *Fascicles* axillary, 3–7-flowered, many-bracteate at the base. Pedicels rather slender, 3–4 mm at anthesis, up to 7 mm in fruit, somewhat above the base with 2 ovate-acuminate bracteoles. *Calyx* 5-partite halfway, 2.5–3 mm, glabrous, lobes acute. *Corolla* shortly urceolate, green, glabrous, *c.* 4 by 3 mm, shortly 5-lobed. *Stamens* not well developed in the specimens at hand; filaments papillose; anther-cells reduced in size, each bialistate. *Ovary* densely yellowish hairy; style glabrous, 3 mm.

Distr. *Malesia*: Sumatra (Atjeh, Gajo Lands: Mt Losir, Mt Kemiri; Pang-Mog).

Ecol. In scrub forest or summit scrub, 2200–3314 m. *Fl.* March. Vern. *Kétimiel.*

8. **Gaultheria losirensis** SLEUM. Reinwardtia 4 (1957) 171. — **Fig. 63e.**

Shrub. Branchlets subangular, glabrous, dark red brown when dry. *Leaves* elliptic or broadly ovate-lanceolate, apex acuminate, subacute, the terminal gland thick and blunt, base cuneate into the petiole, coriaceous, glabrous above, laxly to subdensely blackish punctulate beneath, rather sharply serrulate, the teeth ending in caducous bristles, *c.* 0.5 mm high, 2–3 mm distant from each other, 3.5–4.5 by 1.8–2.5 cm, midrib impressed above, prominent beneath, nerves in 2 pairs, the outer pair from the base of the lamina and excurrent near the edge, the inner and upper one properly from the midrib, curved-ascendent to the top, all nerves slightly sunken above, raised beneath, veins ± transverse, forming with the veinlets a lax net, which is rather inconspicuous on both faces; petiole robust, 3–4 by *c.* 1.5 mm. *Fascicles* axillary, 6–8-flowered, with numerous basal ovate-acuminate ciliolate bracts and bracteoles. Pedicels stoutish, glabrous, 6–8 mm. *Calyx* deeply 5-lobed, glabrous, *c.* 2.5 mm, lobes acute, ciliolate towards the apex. *Corolla* and *stamens* not seen. *Ovary* rather densely yellowish-pubescent; style glabrous, *c.* 3 mm.

Distr. *Malesia*: Sumatra (Atjeh, Gajo Lands: central summit of Mt Losir), 3300–3460 m, one collection. *Fl.* Febr.

9. **Gaultheria abbreviata** J. J. S. in Fedde, Rep. 35 (1934) 292; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 204; AIRY SHAW, Kew Bull. 1940 (1941) 311; *ibid.* (1948) 158, f. 1; SLEUM. Reinwardtia 4 (1957) 172; Blumea 11 (1961) 1. — **Fig. 63a-a'.**

Shrub, 1–3 m. Branchlets terete, rather densely clothed with long (*c.* 2 mm) ± spreading bristles. *Leaves* ovate, apex short-acuminate, the terminal gland thickish, but not protracted, base rounded to subcordate, coriaceous, glabrous above, the undersurface initially rather densely set with numerous short ± caducous bristles, finally punctate by the persistent bases of these bristles, regularly serrulate, teeth thick-glandular, caducously setose-ciliate, 0.3–1 mm high, 1.5–3 mm spaced, 3.4–9.2 by 2.2–5.8 cm, 5-plinerved, main nerves oriented from and from somewhat above the base of the lamina, curved-ascending to the top, all ± deeply impressed above as is the midrib, or prominent beneath, numerous other nerves or veins ± transverse, forming a very lax net together with the veins or veinlets, all these slightly impressed above or raised beneath, or sometimes rather obscure; petiole stout, setose, 2–5 mm. *Fascicles* in many upper axils, each 7–12-flowered, provided with numerous ovate-acuminate ciliolate bracts and bracteoles at and near the base. Pedicels glabrous, rather slender, 3–6 mm. *Calyx* glabrous, 3–4 mm, deeply 5-partite, lobes acute. *Corolla* broadly subglobose-urceolate, glabrous, sordid-whitish or greenish with red, 4–5 mm, shortly 5-lobed. *Stamens* nearly 3 mm; filaments ciliolate; anther-cells oblong, each cell with 2 subulate divergent horns distally. *Ovary* pubescent; style glabrous, 2.5 mm. *Fruit c.* 5–6 mm ø, blackish red when ripe, fruit-pedicel 6–8 mm.

Distr. *Malesia*: North and Central Sumatra (Eastcoast Res.: Mt Pinto; Tapanuli: S. of Sidi

Kalang; Westcoast Res.: Mt Talakmau = Mt Ophir and Mt Singalang).

Ecol. In subalpine forest or summit scrub, on lava boulders or stony ground, 1800–2800 m. *Fl. fr.* Jan.–July.

10. Gaultheria nummularioides D. DON, Prod. Fl. Nepal. (1825) 150; WALL. Cat. (1829) *n.* 1524; G. DON, Gen. Syst. 3 (1834) 839; ROYLE, Ill. (1835) 260, t. 63, f. 2 a–e; CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 457; HALL. *f.* Med. Rijksherb. *n.* 12 (1912) 28; KOORD. Exk. Fl. Java 3 (1912) 10; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 108; J. J. S. in K. & V. Bijdr. 13 (1914) 114; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 57; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 6; DOCTERS VAN LEEUWEN, Trop. Natuur 13 (1924) 99, fig.; SP. MOORE, J. Bot. 63 (1925) Suppl. 57; HOCHR. Candollea 2 (1925) 496; HEYNE, Nutt. Pl. (1927) 1218; DOCTERS VAN LEEUWEN, Pangrango (1933) 202, f. 45; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 127; KANJILAL, DAS, *c.s.* Fl. Assam 3 (1939) 148; AIRY SHAW, Kew Bull. 1940 (1941) 314; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 5; SLEUM. Reinwardtia 4 (1957) 172; Blumea 11 (1961) 2. — *G. repens* BL. Bijdr. (1826) 857, *non* RAFIN. 1828; G. DON, Gen. Syst. 3 (1834) 839; DC. Prod. 7 (1839) 593; HASSK. Cat. Hort. Bog. (1844) 160; ZOLL. Nat. Geneesk. Arch. N.I. 2 (1845) 9; MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 41; BL. Fl. Jav. Pl. inéd. (1863–83) t. 15. — *Pernettya repens* (BL.) ZOLL. & MOR. Syst. Verz. (1846) 42; ZOLL. Syst. Verz. 2 (1854) 138; MIQ. Fl. Ind. Bat. 2 (1859) 1054. — *G. trichophylla* (*non* ROYLE in DC.) HASSK. Retzia ed. 1 (1855) 108; Nat. Tijd. N.I. 10 (1856) 108; Retzia ed. nov. 1 (1858) 148; MIQ. Fl. Ind. Bat. 2 (1859) 1056; KOORD. Nat. Tijd. N. I. 60 (1901) 265, — *Brossaea nummularioides* (D. DON) O. KTZE, Rev. Gen. P. 2 (1891) 388, *incl.* α *normalis et* β *glauca* O. KTZE. — **Fig. 62d.**

Shrublet, prostrate or creeping, forming mats, 5–10(–20) cm long. Branchlets elongate, ramose, rooting at the nodes, terete, densely ± longish brownish setulose, reddish when fresh. *Leaves* alternate (subdistichous), ovate, sometimes oblong, ovate or nearly rounded, apex obtusely acuminate, base rounded or subcordate, ± coriaceous, dark green above, much paler beneath, glabrous above, ± laxly setulose beneath, serrulate, each tooth ending in a longish fine subpersistent bristle, sometimes subentire, margin slightly recurved, (4–) 6–13 by (3–)5–9 mm, midrib a little impressed above, prominent beneath, nerves 2(–4) pairs from and somewhat from above the base, inarched and high ascendent towards the edge, subinconspicuous above, raised beneath, transverse veins visible beneath only; petiole setulose, 1–2.5 mm. *Flowers* solitary in most, but not all upper axils. Pedicels 1–2 mm, provided with 6–7 small triangular-ovate acute ciliolate bracts and bracteoles at and somewhat above the base. *Calyx c.* 3 mm, deeply 5-partite, whitish green to reddish, lobes ± triangular, acute. *Corolla* ovoid-urceolate, white or pink, 5–7 by 2.5–5 mm, widest in the lower third, shortly 5-lobed. *Filaments* linear, slightly hairy, 2 mm; anther-cells oblong, the very short tubules shortly biaristate. *Ovary* glabrous; style *c.* 2.5 mm. *Fruit* blue-blackish or blackish purplish when ripe, succulent, 8–9 mm ø, ± completely including the depressed-globose capsule, which is *c.* 5 mm ø. *Seeds* subglobose, apiculate, very small.

Distr. Himalayas to SE. Tibet and W. Szechuan, Assam and Upper Burma, in *Malesia*: Sumatra, Java and Bali.

Ecol. In the upper mountain zone, terrestrial on open sunny, rocky places and volcanic debris, on steep crater slopes, not rarely covering the rocks, rarely in ravines within the upper limit of the forest or in ericoid shrub vegetation, occasionally epiphytically there in the moss at the base of the trees, 1300–3500 m, mostly above 2000 m. Rather frequent in Java. Said to be a pioneer plant, holding the loose soil together. *Fl. fr.* Jan.–Dec.

Vern. *Girinting kawak*, S, *grinting dieng*, J, *krakap gunung*, M (Korinchi).

Uses. The fruits are sweet, but somewhat acid to the taste, and edible. The aromatic leaves contain wintergreen-oil and are occasionally used internally as a medicine.

Pollination. After DOCTERS VAN LEEUWEN "the stigma projects slightly beyond the anthers. The latter are still white in the old buds, but the pores are already open while the stigma is still dry. In that stage the flowers are therefore male. As soon as the flowers open, the anthers shrivel, and the stigma becomes receptive. After one day the corolla falls off, and the anthers slip across the stigma. In consequence of the position of the flowers, especially when they are hidden in the moss, visiting by insects is rendered very difficult; no visitor on the flowers has been noticed. Fruits, however, are regularly set by means of autogamy".

Dispersal. The fruits are probably eaten by birds and rodents.

11. Gaultheria mundula F. v. M. Trans. R. Soc. Vict. n. s. 1, 2 (1889) 21; DIELS, Bot. Jahrb. 62 (1929) 487; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; SLEUM. Bot. Jahrb. 72 (1942) 214; Reinwardtia 4 (1957) 173; HOOGL. Blumea Suppl. 4 (1958) 232; SLEUM. Blumea 11 (1961) 2; *ibid.* 12 (1963) 115; *ibid.* 12 (1964) 342. — *Diplycosia mundula* (F. v. M.) SCHLTR, Bot. Jahrb. 55 (1918) 162; LANE-POOLE, For. Res. Papua (1925) 130; WHITE & FRANCIS, Proc. R. Soc. Queensl. 39 (1928) 68. — **Fig. 62 b–b′, 64.**

KEY TO THE VARIETIES

1. Leaves lanceolate- to elliptic-ovate, cuneate to rounded at the base. Fruit calyx ± red-purplish at maturity . . . . **1.** *var.* **mundula**
1. Leaves ovate, ± distinctly cordate at the base. Fruit calyx white at maturity.
2. Leaves not or very slightly setose at the midrib beneath only . . . . . **2.** *var.* **tanythrix**
2. Leaves laxly setose all over the undersurface. **3.** *var.* **setifolia**

var. **mundula. — Fig. 64.**

Compact, stiff, sometimes rather flat-topped shrub, (0.1–)0.3–0.6(–1.2) m, usually terrestrial, rarely epiphytic. Branchlets terete, rather densely clothed with scattered ± appressed setular brownish hairs, moreover minutely pubescent at the youngest red parts. *Leaves* dense, lanceolate- to elliptic-ovate, apex short-acuminate, bluntish, base broad-attenuate to rounded, rarely part of the leaves in the same specimen subcordate, firmly subcoriaceous, glabrous, glossy on both faces, regularly crenulate-serrulate, each tooth obtusely glandular, ending in an early caducous bristle-like hair, 0.8–2 by 0.5–1.3 cm, midrib subimpressed above, raised beneath, nerves 2–3 pairs, long ascending, often reddish, anastomosing with the rather dense reticulation, which is conspicuously raised beneath; petiole red, *c.* 1 mm. *Flowers* solitary in the axils of all or nearly all upper decrescent leaves, thus in a leafy raceme. Pedicels stoutish, red, glabrous or finely pubescent, mostly with some stalked glands, 2–3 mm, with several ± blunt bracts and bracteoles inserted at or slightly above the base. *Calyx c.* 2.5 mm, deeply 5-cleft, glabrous, lobes triangular, subacute, red when fresh. *Corolla* cylindric-urceolate, *c.* 4.5 by 2–3 mm, somewhat fleshy, white or pink when fresh, glabrous at both sides, shortly 5-lobed. *Stamens* ½–⅓ as long as the corolla; filaments papillate; anthers ovate, 0.6 mm, obliquely truncate, muticous, or each cell ending with 2 very short horns. *Ovary* glabrous; style 1.5–2 mm. *Fruit* 6–8(–9) mm ø, the calyx lobes first white, later pink to red-purple, or reddish from the beginning.

Distr. *Malesia*: East New Guinea (Saruwaged Mts, Kubor Ra., Hagen Ra., Bismarck Mts, Mt Michael, Mt Piora, Wharton Ra., Owen Stanley Ra. and Maneau Ra.).

Ecol. In upper montane or subalpine forest borders, or in alpine open grassland, on exposed ridges or near summits, on stony or peaty soil, mostly scattered, rarely growing socially, locally common, 2000–3600(–c.4050) m. *Fl. fr.* Jan.–Dec.

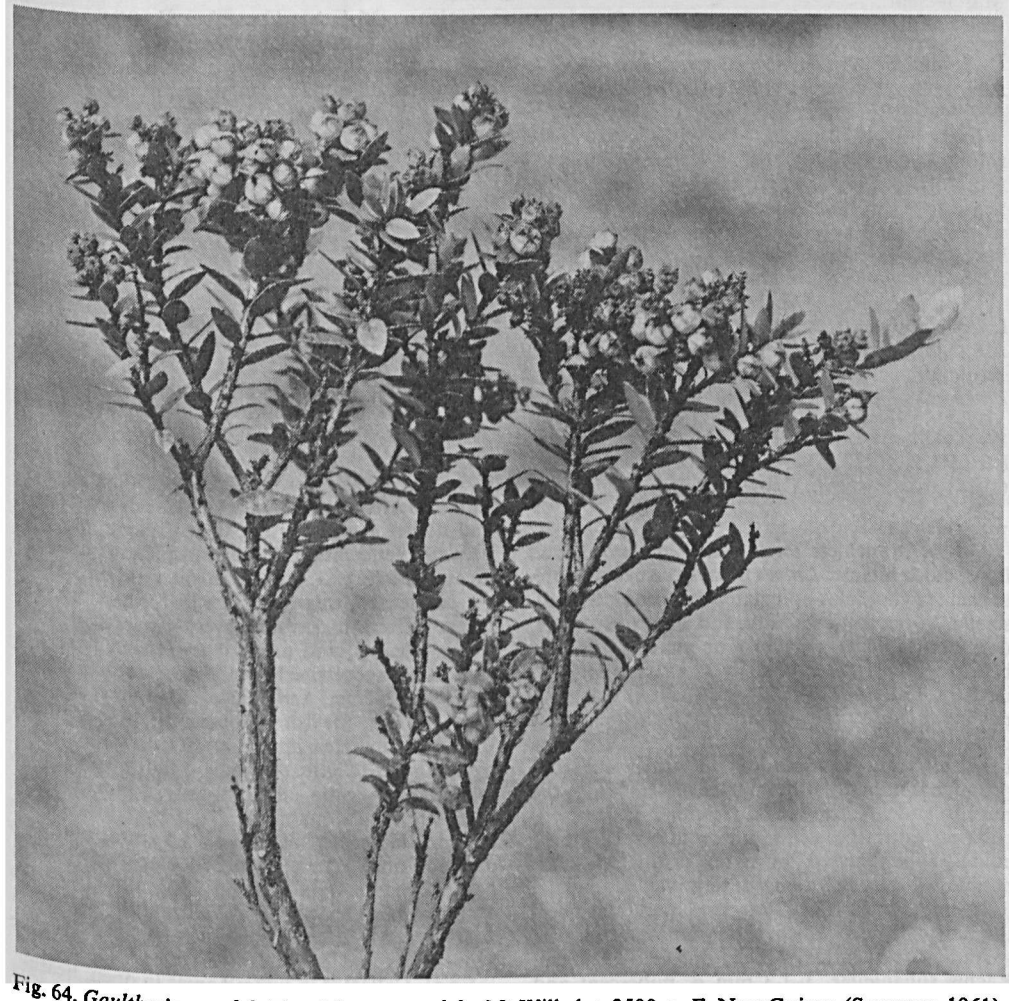

Fig. 64. *Gaultheria mundula* F. v. M. *var. mundula*. Mt Wilhelm, 3500 m, E. New Guinea (SLEUMER, 1961).

Vern. *Mukefifa*, Dunantina, *hineh ku hais*, Asaro: Kefamo, *muasopu*, Chimbu: Masul, *kiberu*, Hagen: Togoba, *nehmengeh*, Mairi: Mondo, *wamengare*, *wamangali*, Enga: Poio, *wambwampso*, Mendi.

var. **tanythrix** (SLEUM.) SLEUM. Blumea 11 (1961) 2. — *G. tanythrix* SLEUM. Bot. Jahrb. 72 (1942) 214; Reinwardtia 4 (1957) 173.

Shrub, 0.3–0.5 m, stiff, much branched; branchlets terete, red, densely clothed with ± spreading rufous bristle-like hairs. *Leaves* dense, ovate, apex subobtuse, base ± distinctly cordate, in other respects like *var. mundula*, but with scattered bristles underneath on the midrib and on the petiole. *Fruit* subglobose, apparently permanently white, *c.* 5 mm ø, fruit-pedicel 1–2 mm.

Distr. *Malesia*: New Guinea (Orange Mts: Mt Wilhelmina, twice found at 3750–3800 m; Eastern Highlands: Mt Kerigomna and Mt Wilhelm at 3000 and 3700 m), in edges of subalpine forest and on open rocky mountain slope. *Fl.* March–Sept.

var. **setifolia** (SLEUM.) SLEUM. Blumea 11 (1961) 2. — *G. tanythrix* SLEUM. *var. setifolia* SLEUM. Bot. Jahrb. 72 (1942) 215; Reinwardtia 4 (1957) 173.

Erect shrub, 1–2 m, densely clothed with rufous, ± spreading bristles. *Leaves* similar to those of *var. tanythrix*, but laxly setulose all over beneath. Pedicels laxly setulose, 1.5 mm, provided with several minute bracts and bracteoles at the base. *Calyx* 3.5 mm, deeply 5-partite, glabrous, lobes including ⅔ of the corolla.

Distr. *Malesia*: New Guinea (Oranje Mts: Lake Habbema; Star Mts: Sirius plateau) twice collected, 3000–3225 m, in alpine grassland shrubberies and in forest marginal communities. *Fl.* Apr., Aug.

12. Gaultheria celebica J. J. S. Bull. Jard. Bot. Btzg III, 1 (1920) 404, t. 52; STEEN. *ibid.* III, 13 (1934) 205; SLEUM. Reinwardtia 4 (1957) 173.

var. **celebica.**

Shrub. Branchlets terete, finely pubescent and long setose-hirsute. *Leaves* ovate, apex acuminate, subacute, glandular-apiculate, base cordate, subsessile, coriaceous, shining and glabrous above, dull and ± densely setulose or punctate all over beneath, regularly serrulate, teeth strigose-setulose initially, (3.5–)4–6.5(–7.6) by 2–3.7(–4) cm, midrib flat above, strongly prominent beneath, nerves *c.* 3 pairs from and somewhat from above the base, high curved-ascending to nearly the top, prominent beneath, other nerves or veins from the midrib and ± transverse, forming a lax reticulation with the veins and veinlets, all these equally subimpressed above, less distinct beneath; petiole 1–2 mm. *Inflorescence* terminal, paniculate, 6–10 cm, formed by 2–7 racemes, each raceme in the axil of a leaf which is very reduced in size, spreading, rather laxly many-flowered, 3–5 cm. Rachis subangular, 1–1.3 mm ø, pubescent and laxly setulose. Pedicels stoutish, densely pubescent and more laxly glandular-setulose, 4–5 mm. Bract broadly ovate-triangular, acuminate, ciliolate, ± setulose. Bracteoles opposite, semi-orbiculate-triangular, concave, ciliolate, inserted immediately below the calyx. *Calyx* deeply 5-partite, glabrous, *c.* 4 mm, lobes ovate, acute, ciliolate. *Corolla* said to be red when fresh, subglobose-urceolate, glabrous, 6–7 by *c.* 5 mm. *Stamens c.* ⅓ as long as the corolla; filaments papillose; anthers ovate, each cell obliquely truncate and shortly biaristate apically. *Ovary* yellowish villous; style glabrous, *c.* 4 mm. *Fruit c.* 6 mm ø; colour unknown.

Distr. *Malesia*: Central Celebes (Quarles Mts: top of Mt Sinadji), one collection. *Fl.* Nov.

var. **petiolata** J. J. S. in Fedde, Rep. 30 (1932) 171; Bot. Jahrb. 68 (1937) 204; SLEUM. Reinwardtia 4 (1957) 174.

Shrub 1–3 m; indumentum as in *var. celebica*. *Leaves* distinctly petioled (5–10 mm), ± rounded at the base. *Corolla* white or pink. *Fruit* blackish blue.

Distr. *Malesia*: Central and SW. Celebes (Quarles and Latimodjong Mts; Peak of Bonthain).

Ecol. In low forest or ridge forest, in open grass-fern and shrub vegetation, locally common, 1000–3000 m. *Fl.* May–July.

13. Gaultheria berberidifolia SLEUM. Blumea 12 (1963) 115. — **Fig. 65.**

Shrub with pendent or almost prostrate, 0.5–0.8 m long, densely leaved branches, which are few-branched distally and clothed with numerous longish spreading, gland-bearing bristles except the tips and the floral region, where a tomentum of short fine crisped hairs is found exclusively. *Leaves* ovate, apex ± acuminate, base cordate, subsessile, coriaceous, dull, mature ones dark green, young ones glaucescent, very shortly hairy at the petiole and midrib, otherwise glabrous above, laxly set with glandular bristles or finally blackish red points below, (2–)2.5–3.5 by (1.5–)2–3 cm, narrowly serrate, each tooth ending in a rather persistent long glandular bristle, midrib and nerves slightly or not raised above, more so beneath, reticulation dense, conspicuous on both faces; petiole *c.* 1 mm. *Panicles* terminal, erect, ± condensed, many-flowered, formed by the racemes from the axils of several uppermost, very reduced leaves, and additional racemes from the axils of 1–3 successive lower, almost normal leaves. Rachises (2–5 cm) and pedicels (2–3 mm) covered with a fine greyish pubescence; no bristles. Bracteoles inserted immediately below the calyx, ovate-acute, ciliate, 2 mm. *Calyx* glabrous, lobes narrow-ovate, ciliate distally, 2 mm. *Corolla* urceolate, white, glabrous, *c.* 4.5 by 2 mm, lobes 1 mm. *Filaments* papillose, 1.5 mm; anthers ovate-oblong, 1 mm, each cell biaristate. *Ovary* densely hairy; style glabrous, 2.5 mm. *Fruit c.* 4 mm ø, blackish bluish at full maturity.

Distr. *Malesia*: New Guinea (Arfak Mts: Mt Sensenemés and Mt Gwamongga).

Ecol. Collected in summit areas in open, heath-like ridge vegetation, 2500–2600 m. *Fl. fr.* Jan.

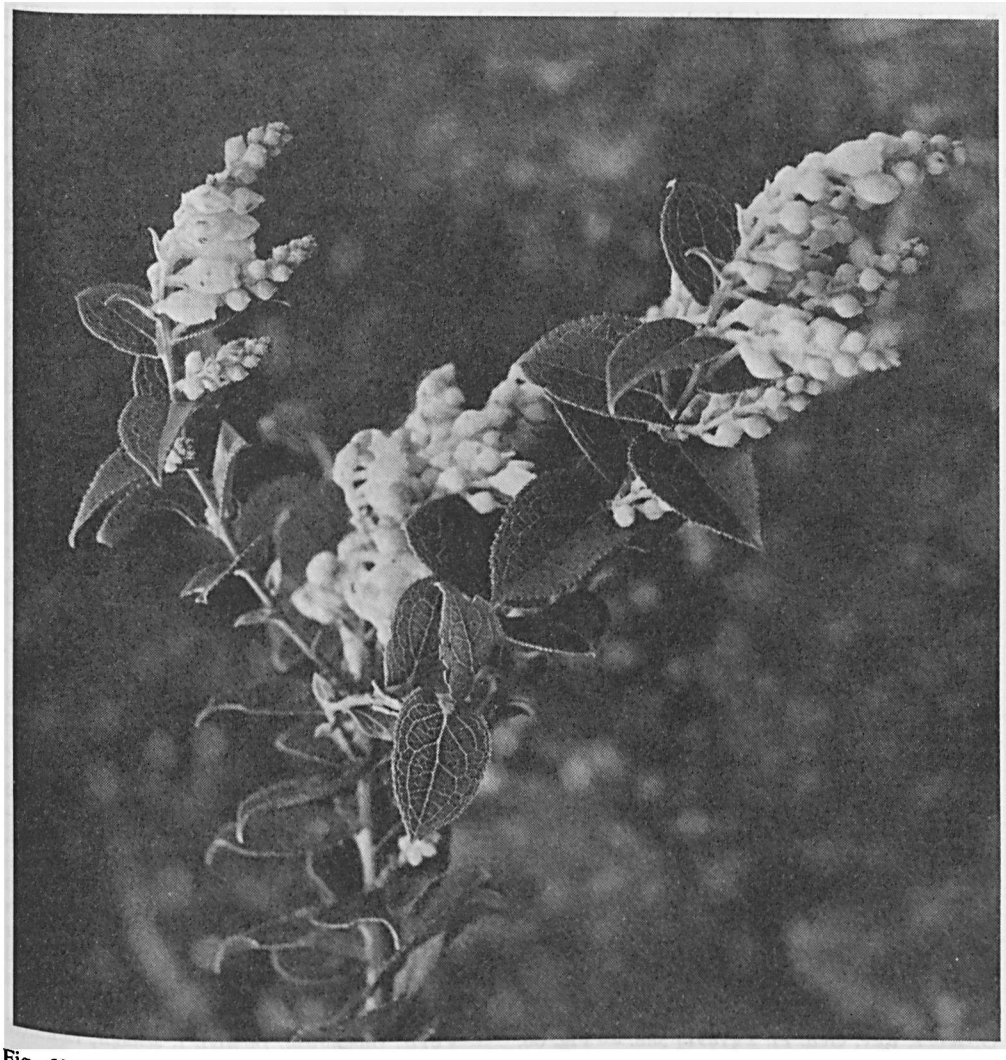

Fig. 65. *Gaultheria berberidifolia* SLEUM. Mt Gwamongga, 2500 m, Arfak Mts, NW. New Guinea (SLEUMER, 1962).

Note. Recently introduced into several botanic gardens.

14. Gaultheria gracilescens SLEUM. Reinwardtia 4 (1957) 174.

Shrub. Branchlets rather densely very shortly pubescent and patent-setulose, terete, brown-red when dry. *Leaves* ovate or oblong-ovate, apex shortly subacutely acuminate, the terminal gland small, base subcordate, subcoriaceous, glabrous above, the puberulous midrib excepted, rather densely short-setulose, finally punctate beneath, regularly serrulate, the teeth close, *c.* 0.5 mm, each ending in a fine caducous bristle, (2–)2.5–4.5 (–5) by (1.5–)1.8–2.5(–2.8) cm, midrib and nerves very slightly impressed above or rather obscure, distinct beneath, midrib thick-prominent beneath, nerves 2–3 pairs, high curved-ascending and anastomosing, the lowest 1–2 pairs from, the upper ones from above the base of the lamina, other nerves or veins ± transverse from the midrib, forming with the veinlets a lax reticulation which is a little raised beneath; petiole pubescent, laxly setulose, rather flattened, 1.5–2 by 1–1.5 mm. *Panicles* terminal, formed by racemes which come from the axils of the upper, rather abruptly decrescent leaves, sometimes with additional racemes from the axils from lower and normal leaves, all racemes ± spreading, rather dense-flowered, slender, (4–)5–12 cm. Rachis 0.5–0.7 mm ø, densely shortly yellowish pubescent and laxly setulose especially in its lower part. Pedicels exclusively densely yellowish pubescent, *c.* 3 mm. Bract ovate, subacuminate, pubescent, 2–3 mm.

Bracteoles subovate-semiorbiculate, pubescent, *c.* 1.5 mm, inserted immediately below the calyx. *Calyx* rather deeply 5-partite, 2.5 mm, short-pubescent dorsally, lobes ovate-acute, densely ciliate. *Corolla* subcylindric-urceolate, 4.5–5 by *c.* 2.5 mm, somewhat contracted at the mouth, glabrous. *Stamens c.* 2.5 mm; filaments papillose; anthers ovate-oblong, the very short tubules biaristate (*c.* 0.7 mm). *Ovary* whitish yellowish hirsute; style glabrous, 3 mm.

Distr. *Malesia*: West New Guinea (Wissel Lakes region), twice found, 1750 m. *Fl.* Jan., May–June.

15. Gaultheria punctata BL. Bijdr. (1826) 856, *non* HOOK. & ARN. 1834; G. DON, Gen. Syst. 3 (1834) 840; DC. Prod. 7 (1839) 593; HASSK. Cat. Hort. Bog. (1844) 160; ZOLL. Nat. Geneesk. Arch. N. I. 2 (1845) 9; Syst. Verz. 2 (1854) 138; MIQ. Fl. Ind. Bat. 2 (1859) 1055; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 41; BL. Fl. Jav. Pl. inéd. (1863–83) t. 13; BOERL. in Veth, Midden Sumatra (1884) 22; GRESH. Schets. (1894) 33, fig.; KOORD. Teysmannia 10 (1899) 454; SP. MOORE, J. Bot. 63 (1925) Suppl. 57; SLEUM. Reinwardtia 4 (1957) 175, *non* KURZ, J. As. Soc. Beng. 46, ii (1877) 215 & For. Fl. Burma 2 (1877) 92. — *G. fragrantissima non* WALL.) MOR. Syst. Verz. (1846) 42; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 107; KOORD. Exk. Fl. Java 3 (1912) 10; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 57; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 5; FREY-WYSSLING, Trop. Natuur 22 (1933) 7, f. 10; DE VOOGD, *ibid.* 23 (1934) 82, 83, f. 1 (phot.); STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; MERR. Not. Nat. Ac. Nat. Sc. Philad. 47 (1940) 2. — *G. fragrantissima var. punctata* (BL.) J. J. S. in K. & V. Bijdr. 13 (1914) 121; HOCHR. Candollea 2 (1925) 495; HEYNE, Nutt. Pl. (1927) 1217; DOCTERS VAN LEEUWEN, Pangrango (1933) 198, f. 42; J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 127; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 5. — *Brossaea fragrantissima* (*non* WALL.) O. KTZE, Rev. Gen. Pl. 2 (1891) 388. — **Fig. 66.**

Treelet or mostly large shrub, (0.25–)1–2(–5) m, erect or ± decumbent-scandent. Branchlets stout, glabrous or very laxly glandular-punctate, generally ± sharply triquetrous, *i.e.* winged by the decurrent petioles, less so in specimens which have apparently grown in shady situations. *Leaves* ± erect, elliptic-oblong, sometimes more elliptic-lanceolate or elliptic, apex gradually acuminate, obtuse by a callous terminal gland, base cuneate, often ± decurrent into the petiole, subcoriaceous to coriaceous, dark green and glossy above, greenish whitish and ± dull beneath, aromatic, glabrous above, ± minutely rather densely glandular-punctate beneath, regularly and coarsely glandular-serrate, the teeth rather blunt, *c.* 1 mm high and 2–3(–4) mm spaced, (2–)4.5–8.5 (–10) by 0.8–3(–4) cm, midrib rather flat or somewhat sunken above, reddish and prominent beneath, nerves (3–)4–6(–7) pairs, high ascendent and joined near the edge, slightly impressed above in fresh, ± raised in dry specimens, more distinctly prominent beneath, veins ± transverse, visible on both faces, reticulation rather obscure; petiole flattened, grooved above, red, 1.5–8 mm. *Panicles* composed of numerous ± erect simple racemes from the axils of several decrescent upper leaves, (5–)7–10(–12.5) cm long, 3–7 cm wide at the base. Rachis greenish when fresh, manifestly trigonous, glabrous or nearly so, laxly glandular-punctate. Pedicels white or pink, very laxly minutely pubescent as is the ovate-acuminate subtending bract, secund, (2–)4–7(–9) mm. Bracteoles inserted immediately below the calyx, opposite, ovate-acute, pubescent inside, ciliolate, 1.5 mm. *Calyx* deeply 5-lobed, glabrous or nearly so, 3–3.5 mm, tube white, lobes ovate-acute, reddish, pubescent inside, ciliate. *Corolla* subovate-urceolate, somewhat 5-angular, with 5 recurved broadly triangular lobes, white, or whitish pinkish, or tipped pale carmine, 5–7 by 4–5 mm, glabrous. *Stamens c.* 3 mm; filaments white at the base, purplish at the top, papillose, ciliolate, *c.* 2 mm; anther-cells orange, ovate-oblong, the tubules very short, rather long biaristate. *Ovary* light green, densely coarse-pubescent; style glabrous except the very base, *c.* 2.5 mm. *Fruit* 8–10 mm ø, dull red to dark red or blackish purplish. *Seeds* obliquely obovoid-triangular, *c.* 0.5 mm.

Distr. *Malesia*: Sumatra, Java (especially W. Java), Lesser Sunda Is. (Bali).

Ecol. In the upper part of the mountains, rarely in forests, mostly in open country, in mountain shrub, on rocky or stony ground or volcanic soil, on stony mud-flow, not rarely in the neighbourhood of active craters and exposed to volcanic gasses. Locally common. In Sumatra from 1000–3700 m, in Java from 1400–3100 m. *Fl.* Jan.–Dec.

Pollination. DOCTERS VAN LEEUWEN mentioned that the anthers are already open as soon as the flowers begin to expand, and the pollen may easily drop on the stigma, which as a matter of fact is very soon covered with it. In fact all flowers produce fruits. Practically no pollinators have been observed.

Vern. *Gandarasa, tjantigi, t. sĕnugit, t. wangi*, S, *gandapura, gondapura, gondopuro, g. maiso, purwu* (*purwa*) *djambu*, J, *sarik mĕndjari, s. mudjari* (Korintji), *talimu jari* (Merapi, West-coast), *sirih gunung* (Padang Highlands), M.

Uses. Both leaves and flowers have a characteristic odour, especially when crushed; they contain *c.* 1 % of a volatile substance, "winter-green-oil", which mainly consists of methyl-salicylate, bound as a glucoside, a strong antiseptic. The oil is distilled in Java from the wilted leaves, and is used both internally and externally for treatment of rheumatism, as hair oil and to perfume sarongs. The leaves are sometimes chewed together with "*sirih*". The fruits are sweet, with a bitter aftertaste, edible, but apparently eaten by animals (birds, rodents, hens) only.

Note. *G. punctata* has been regarded previously as belonging to *G. fragrantissima* WALL. or being a mere variety of it. *G. fragrantissima*, however, has exclusively short, ± recurved racemes in the axil of a few spaced upper leaves, a densely hairy



Fig. 66. *Gaultheria punctata* BL. *a*. Twig with inflorescence, × ⅔, *b*. flower bud, × 4, *c*. flower, × 4, *d*. ovary and style, × 5, *e*. stamen, front view, × 9, *f*. thecae, front view, × 15, *g*. *ditto* from the back, × 15, *h*. *ditto* from the side, × 15, *i*. infructescence, × ⅔, *j*. seeds, × 10 (*a–i* after BLUME, Fl. Javae, pl. inéd. t. 13, *j* FREY-WYSSLING 28).

rachis, much smaller flowers and is restricted to the East Himalayas and Khasia Hills.

16. **Gaultheria arfakana** SLEUM. Bot. Jahrb. 72 (1942) 215; Reinwardtia 4 (1957) 176; Blumea 12 (1963) 115. — *G. leucocarpa* BL. *var. papuana* BECC. Malesia 1 (1878) 213.

Slender shrub, (0.5–)1–2(–3) m. Branchlets terete below, somewhat obtusely angular towards the tips, glabrous but with some scattered sessile glands. *Leaves* ovate, apex gradually acuminate, subacute, the terminal gland distinct, base manifestly cordate, subcoriaceous to coriaceous, dark green above, pale beneath, glabrous and a little shining on both faces, scantily punctate beneath, obtusely serrate, the teeth 0.5–0.75 mm high, 2–4

mm spaced, ending in very early caducous short bristles, (4–)5–8 by 2.5–4.5(–5.5) cm, midrib and nerves yellowish in fresh specimens, midrib prominent beneath only, nerves *c.* 5 pairs, the lower 2 from the base, all curved-ascending and anastomosing, somewhat raised on both faces, reticulation coarse, slightly prominent on both sides; petiole 3–5 mm. *Racemes* from the upper 3–4 axils of very reduced leaves, forming a terminal, few- to many-branched panicle 6–12(–15) cm long, other shorter racemes in the axils of subsequent lower normal 2–3 leaves also present, practically eperulate at anthesis; rachises slender, rather densely clothed with short greyish, ± crisped hairs, (3–)5–10 cm, few- to many-flowered. Pedicels rather slender, 4–6 mm. Bract ovate-subulate, 3 mm. Bracteoles inserted immediately below the calyx at anthesis, a little distant from the calyx in fruit, ovate-acuminate, ciliate, 1.5 mm. *Calyx* greenish, deeply 5-partite, lobes deltoid, subacute, ciliate, 2 mm. *Corolla* urceolate-cylindric, 5.5 by 2.5 mm, pure white, or more rarely cream with pink spots, glabrous, shortly (1 mm) 5-lobed. *Filaments* papillose, *c.* 2 mm; anther-cells ovate-elliptic, nearly 2 mm including the tubules, the latter short, each ending in 2 hornlets or bristles (1 mm). *Ovary* densely pubescent; style glabrous, *c.* 3 mm. *Fruit* pubescent on top, 5–6 mm ø, finally purplish blackish.

Distr. *Malesia*: NW. New Guinea (Vogelkop Peninsula: Nettoti and Arfak Mts).

Ecol. In open ridge scrub, on landslide with fern regrowth, edge of (mossy) forest, steep rocky slope, at 1900–2000 m. *Fl. fr.* July, Oct.–Jan.

Note. The whole plant has a fine smell of wintergreen-oil.

17. Gaultheria malayana AIRY SHAW, Kew Bull. 1940 (1941) 304; HENDERS. Mal. Nat. J. 6 (1950) 263, f. 246, A, B; SLEUM. Reinwardtia 4 (1957) 176. — *G. fragrantissima* (*non* WALL.) K. & G. J. As. Soc. Beng. 74, ii (1905) 69; RIDL. J. Fed. Mal. St. Mus. 6 (1915) 49; Fl. Mal. Pen. 2 (1923) 212; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256. — **Fig. 63d–d'.**

Shrub or treelet. Branchlets terete or slightly obtusangular, glabrous or nearly so. *Leaves* aromatic, elliptic, broad elliptic-obovate or suborbicular-obovate, rarely oblong-elliptic, apex obtuse, the terminal gland rather obscure, forming a short apiculus with a ± apical teeth, base broadly attenuate to rounded, thick-coriaceous, rigid, dull, dark green above, whitish green beneath with reddish midrib, glabrous above, laxly to subdensely blackish punctulate beneath, somewhat irregularly and ± obtusely serrate-crenate, the teeth *c.* 0.5 mm high, 1–3 mm spaced, 3.5–6.5 by 1.5–4.7 cm, midrib slightly impressed above, much raised beneath, nerves 5(–7) pairs, rather steeply curved-ascending, the lowest 1–2 pairs from or a little from above the base, all slightly impressed above, prominent beneath, as is the distinct but rather lax reticulation; petiole subterete, slightly grooved above, glabrous, 5–10 mm. *Racemes* from the uppermost axils forming a terminal nearly aphyllous panicle, those from the lower axils of normal leaves solitary, the single racemes 10–16-flowered, mostly suberect, 2.5–5.5 (–7) cm, with several small ± caducous perulae, pinkish red at rachis, pedicels and calyces. Rachis slender, minutely pubescent. Pedicels slender, 4–5 mm, puberulous. Bract ovate, ciliolate. Bracteoles inserted immediately below the calyx, broadly ovate, ciliate, 1 mm. *Calyx c.* 3 mm, glabrous outside, short-pubescent inside, lobes ovate, acute, ciliolate, 2 mm. *Corolla* ovoid-urceolate, *c.* 4 by 3 mm, white or pink, glabrous, shortly 5-lobed. *Stamens* 10; filaments densely papillose, long-ciliate; anther-cells oblong-ovate, 1 mm; tubules nearly 1 mm, biaristate. *Ovary* pubescent; style puberulous at the base, glabrescent towards the apex, *c.* 2 mm. *Fruit* 4–5 mm ø, purple-blackish, fruit-pedicel 6–7 mm.

Distr. *Malesia*: Malay Peninsula (Perak, Main Range between Mt Kerbau and Mt Batu Putih; not rare in the Cameron Highlands).

Ecol. On forest edges or ridges of summits, on peaty soils locally abundant, 1370–2030 m. *Fl.* Nov.–June.

Note. The leaves have a strong smell of wintergreen-oil when crushed.

18. Gaultheria intermedia J. J. S. Med. Rijksherb. *n.* 30 (1916) 1, f. 1 & pl.; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; SLEUM. Reinwardtia 4 (1957) 176.

Shrub. Branchlets subterete, glabrous. *Leaves* oblong-ovate, apex gradually acuminate, obtusely glandular-apiculate, base rounded, very shortly contracted into the petiole, subcoriaceous, glabrous, somewhat shining above, dull beneath, densely crenate-serrate, 5–9.7 by (1.7–)2–3.7 cm, midrib slightly sunken above, prominent beneath, nerves 3–4 pairs curved-ascendent, anastomosing, higher inserted ones shorter and more straight to the edge, all slightly but distinctly raised on both faces, reticulation rather dense and prominent; petiole glabrous, 3–8 mm. *Panicles* terminal, laxly divaricate, eperulate at anthesis, consisting of simple or rarely racemosely arranged racemes, some of these in the axils of the upper ± normal leaves, most of them from upper practically aphyllous axils, 4–10 cm, *c.* 20-flowered. Rachis slender, subangular, densely short-pubescent. Pedicels 4–6 mm, short-pubescent. Bract ovate-triangular, ciliate, puberulous. Bracteoles inserted immediately below the calyx, broad-ovate, ciliate, puberulous inside, 2 mm. *Calyx c.* 2.5 mm, deeply 5-laciniate, lobes acute, ciliolate, puberulous inside. *Corolla* urceolate, somewhat 5-angular, glabrous, *c.* 5 by 2.5 mm, probably white. *Stamens c.* 2.5 mm; filaments papillose; anther-cells oblong; tubules short, manifestly biaristate. *Ovary* sericeous; style glabrous, *c.* 3 mm.

Distr. *Malesia*: Java (Merapi) or Sumatra (Lower Tapanuli), once found by JUNGHUHN; his specimens are not adequately labelled.

Note. J. J. SMITH discussed the possibility that *G. intermedia* might be a hybrid between *G. punctata* and *G. leucocarpa*, having the terminal

panicles of the first, the epunctate leaves of the latter. As *G. intermedia* has not been recollected, and actual hybrids between the above-mentioned supposed parents (which in many places occur together in Java and Sumatra) have not yet been observed, the true nature of *G. intermedia* remains uncertain.

19. Gaultheria hirta RIDL. J. Fed. Mal. St. Mus. 6 (1915) 49; Fl. Mal. Pen. 2 (1923) 213; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; SLEUM. Reinwardtia 4 (1957) 176.

Scandent shrub. Branchlets slender, flexuous, densely covered with fine, spreading, whitish hairs and larger, red, bristle-like, gland-clubbed hairs. *Leaves* ovate, apex subcaudate-acuminate, the terminal gland small, base rounded to subcordate, subcoriaceous, initially laxly clothed with short eglandular and longer (1–2 mm), slender, gland-tipped, reddish hairs above, more densely so beneath, glabrescent with age, but remaining pubescent on midrib and nerves beneath, obsoletely serrate, the teeth indicated by long (*c.* 2 mm), slender, bristle-like and gland-tipped hairs which are persistent for a rather long time, 5–7(–11) by (1.5–)2–5(–7) cm, midrib and nerves slightly prominent above, more distinctly so beneath, nerves 4(–5) pairs, ascending, anastomosing, the lowest 1–2 pair(s) from the base of the lamina, veins ± transverse, slightly raised on both faces, forming a lax reticulation with the veinlets; petiole 3–5(–7) mm, glandular-setulose. *Racemes* axillary, practically eperulate at anthesis, laxflowered, the supporting leaves sometimes early caducous so that a very lax terminal panicle is formed. Rachis slender, 2.5–5.6(–8) cm, as the pedicels with similar indument as the branchlets. Pedicels stoutish, (4–)6–8 mm. Bract ovate-acute, 1.5 mm. Bracteoles inserted immediately below the calyx, ovate-apiculate, hairy, 1.5 mm. *Calyx* 2.5 mm, densely non-glandular hairy outside especially at the tips as are the bracteoles, lobes ovate, *c.* 2 mm. *Corolla* subcylindric-urceolate, 5–6 by 3.5 mm, shortly 5-lobed, said to be light red, subdensely eglandular-pubescent outside especially in the upper half, glabrous inside. *Filaments* glabrous, papillose, 2 mm; anther-cells oblong-ovate, granular, each biaristate apically. *Ovary* densely hairy; style glabrous, 3 mm.

Distr. *Malesia*: Malay Peninsula (Perak: top of Mt Kerbau), twice found, 1370–1525 m. *Fl.* March, May.

Note. *G. hirta* approaches *G. crenulata* KURZ (Yunnan) by the same type of the gland-tipped pubescence both on the leaves and the inflorescence; in *G. crenulata*, however, the pedicels and calyces are glabrous, and the leaves are distinctly crenulate.

20. Gaultheria viridiflora SLEUM. Reinwardtia 4 (1957) 176; Blumea 11 (1961) 3.

Shrub, *c.* 1 m. Branchlets subterete, glabrous, dark brown red when dry. *Leaves* ovate-oblong or -lanceolate, apex gradually acuminate, the terminal gland rather small, base cuneate, subcoriaceous, olivaceous or brown above when dry, paler beneath, dull, glabrous, very laxly or not punctate beneath, ± regularly serrate, the teeth glandular, obtuse, *c.* 1 mm high and 2–3 mm spaced, 4–5.5(–6) by (1.7–)2–3 cm, midrib flat or slightly sunken above, reddish when dry, prominent beneath, nerves *c.* 4 pairs high curved-ascending and anastomosing, rather inconspicuous above, raised beneath, veins and veinlets forming a rather dense reticulation which is distinctly prominent beneath only; petiole thick, glabrous, 2–3(–4) by 1 mm. *Racemes* simple, mostly axillary, sometimes the uppermost pseudoterminal, slender, ± erect, 8–12-flowered, practically eperulate at anthesis. Rachis *c.* 0.5 mm ø, rather densely clothed with short spreading hairs as are the pedicels, these 3–5 mm long. Bract lanceolate, ciliate, 2–3 mm. Bracteoles inserted immediately below the calyx, ovate, ciliate, 2 mm. *Calyx* reddish, 2.5 mm, glabrous, lobes ovate ciliolate. *Corolla* subcampanulate, green-white with reddish base, 3.5–4 by 3(–4) mm, 5-partite nearly halfway, glabrous. *Filaments* papillose, 1 mm; anthers ovate-oblong, *c.* 1.5 mm, the very short tubules biaristate. *Ovary* yellowish hairy; style glabrous, 2 mm. *Fruit* apparently blackish purple when ripe, *c.* 6 mm ø.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Mts).

Ecol. In open arid country, on sandy ridges, locally not rare, 2700–3300 m. *Fl.* June.

21. Gaultheria pullei J. J. S. Med. Rijksherb. *n.* 25 (1915) 7; Nova Guinea 12 (1917) 513; *ibid.* (1918) t. 207; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; SLEUM. Bot. Jahrb. 72 (1942) 214; Reinwardtia 4 (1957) 177; Blumea 11 (1961) 2; *ibid.* 12 (1963) 116; *ibid.* 12 (1964) 342. — *G. calyculata* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 93; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205. — *G. fragrantissima var. papuana* J. J. S. Nova Guinea 12 (1914) 143; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205.

var. **pullei.**

Aromatic shrub, 0.3–0.5(–1.5) m. Branches spreading or scandent. Branchlets reddish, mostly obtusely trigonous, glabrous or minutely patent-pubescent at the tips, terete and completely glabrous below. *Leaves* ovate to oblong- or elliptic-ovate, apex shortly acuminate, the terminal gland thick, base mostly rounded, rarely subcordate or broadly cuneate, subcoriaceous, serrate, the teeth ending in ± caducous bristles, glabrous above, laxly glandular-punctate beneath, ± dull, (1.7–)2.5–5(–7) by (1.2–)1.5–2.5(–3.5) cm, midrib and nerves slightly impressed above, prominent beneath, nerves 3–4 pairs curved upwards, high ascendent and anastomosing, reticulation lax, rather obscure above, raised beneath; petiole reddish, thick, 2–5(–7) mm, glabrescent. *Racemes* in the axils both of the upper and lower leaves, the leaves not or slightly decrescent in size towards the tips of the branchlets, the uppermost leaf sometimes excepted, never forming a distinct terminal panicle,

(1.5–)3–7 cm; flowers rather numerous and ± laxly set on the shortly pubescent rachis, with 2–3 small basal bracts. Pedicels rather stoutish, 4–6 mm, pubescent. Bract ovate, glabrous, ciliate, *c.* 2 mm. Bracteoles inserted immediately below the calyx, glabrous, ciliate, *c.* 1.5 mm. *Calyx* 2.5–3 mm, glabrous, lobes ovate, ciliate. *Corolla* cylindric-urceolate, white, or rarely pale pink, glabrous at both sides, 5–7 by *c.* 3 mm. *Filaments* papillose; anthers subovate-oblong, tubules rather conspicuous, manifestly biaristate. *Ovary* densely pubescent; style glabrous, 4 mm. *Fruit* blackish blue or purple, (6–)8(–10) mm ø.

Distr. *Malesia*: New Guinea (Main Range from Mt Carstensz through the Western and Eastern Highlands to the Wharton Ra., also on Mt Saruwaged, and on Mt Manamau, Milne Bay Distr.).

Ecol. In forest edge shrubberies or (open) moss forest, also in open subalpine or alpine country among grasses and ferns, on open ground of old mine workings or cleared summits, on wet peaty or clayey soil, locally common, 2060–3450 m. *Fl. fr.* Jan.–Dec.

Vern. *Porowata*, Mendi.

var. **leiotheca** (SLEUM.) SLEUM. Reinwardtia 4 (1957) 177. — *G. leiotheca* SLEUM. Bot. Jahrb. 72 (1942) 213.

Shrub 1–1.5 m. *Ovary* glabrous or nearly so.

Distr. *Malesia*: E. New Guinea (Morobe Distr.: Rawlinson Ra.; Central Distr.: Mt Ganeve), open hill side, 2135–3655 m.

22. Gaultheria leucocarpa BL. Bijdr. (1826) 856; G. DON, Gen. Syst. 3 (1834) 840; DC. Prod. 7 (1839) 593; HASSK. Cat. Hort. Bog. (1844) 160; ZOLL. Nat. Geneesk. Arch. N. I. 2 (1845) 9; MOR. Syst. Verz. (1846) 42; ZOLL. Syst. Verz. 2 (1854) 138; MIQ. Fl. Ind. Bat. 2 (1859) 1056; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 41; BL. Fl. Jav. Pl. inéd. (1863–83) t. 14; KOORD. Nat. Tijd. N. I. 60 (1901) 264; *ibid.* 63 (1904) 41; K. & G. J. As. Soc. Beng. 74, ii (1905) 70; RIDL. J. Fed. Mal. St. Mus. 4 (1909) 44; KOORD. Exk. Fl. Java 3 (1912) 9; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 107; BACK. Bull. Jard. Bot. Btzg II, 12 (1913) 16; J. J. S. in K. & V. Bijdr. 13 (1914) 117, *incl. f. glabra, nom. nud.*; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 6; RIDL. J. Mal. Br. R. As. Soc. *n.* 87 (1923) 75; Fl. Mal. Pen. 2 (1923) 212; SP. MOORE, J. Bot. 63 (1925) Suppl. 57; HOCHR. Candollea 2 (1925) 494; HEYNE, Nutt. Pl. (1927) 1218; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256; STEEN. Arch. Hydrobiol. Suppl. 11 (1932) 317, f. 25 (*veg.*); DOCTERS VAN LEEUWEN, Pangrango (1933) 200, f. 43, t. 26; J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 127; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 5; STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 388; HENDERS. Mal. Nat. J. 6 (1950) 264, f. 246 C (*leaf*); SLEUM. Reinwardtia 4 (1957) 178; Blumea 11 (1961) 1. — *Brossaea leucocarpa* (BL.) O. KTZE, Rev. Gen. Pl. 2 (1891) 388. — **Fig. 67, 68.**

KEY TO INFRASPECIFIC TAXA

1. Leaves pubescent beneath. Corolla pubescent. **2. *var.* hirta**
1. Leaves and corolla glabrous.
2. Ovary densely pubescent or hirsute. **1. *var.* leucocarpa**
2. Ovary glabrous or practically so.
3. Inflorescence glabrous or practically so.
4. Fruit white or rose tinged at maturity. **a. *f.* leucocarpa**
4. Fruit deep-red or purple to blackish at maturity . . . . . **b. *f.* cumingiana**
3. Inflorescence densely short-pubescent.
5. Fruit white or rose tinged at maturity. **c. *f.* scandens**
5. Fruit blackish purple at maturity. **d. *f.* melanocarpa**

1. *var.* leucocarpa.

a. *f.* leucocarpa. — Fig. 68.

Slender shrub, 0.25–2(–3) m, climbing or sometimes somewhat decumbent; branches flexuous, often pendulous. Branchlets reddish or purplish, tips subobtusangular, elsewhere terete, glabrous in adult specimens, sometimes sparsely pubescent and setulose in juvenile plants. *Leaves* aromatic, ovate to lanceolate-ovate, apex ± long-acuminate to subcaudate, the terminal gland small, base mostly subcordate, rarely rounded or very broadly attenuate, firmly subcoriaceous, dull, dark green above, paler beneath when fresh, ± brown when dry, a little shining above, normally glabrous and epunctate, occasionally provided with short scattered bristles underneath in juvenile specimens, regularly obtusely crenate-serrate, teeth glandular, orange coloured in the living plant, fine or rather coarse, mostly dense, 3.5–14 by (1.5–)2–6.5 cm, upper leaves generally smaller, midrib slightly sunken above, prominent beneath, nerves 3–4 pairs much curved and ascendent, anastomosing, the lowest from or a little from above the base, flat or slightly impressed above, raised beneath, reticulation mostly rather dense, subinconspicuous above, distinct beneath; petiole purplish, grooved, glabrous, 3–9 mm. *Racemes* simple, rarely branched, axillary, the uppermost raceme seemingly terminal, practically eperulate at flowering time, lax, many-flowered, completely glabrous, up to 10 cm. Rachis mostly rather slender, flexuous, zig-zag, red when fresh. Pedicels recurved, rather stoutish, glabrous, 3–10 mm. Bract ovate-lanceolate, ciliate. Bracteoles ovate-triangular, inserted immediately below the calyx, ciliate, *c.* 1.5 mm. *Calyx c.* 2.5 mm, deeply 5-partite, glabrous at both sides, or puberulous inside only, lobes pale green or red, ovate, ciliate. *Corolla* campanulate, glabrous, white or yellowish white to greenish white, sometimes pinkish at margin, ± fragrant, 3.5–4 by 3–4(–5) mm, shortly 5-lobed. *Filaments* curved, much dilated in the middle, papillose; anthers ovate-oblong; tubules short, recurved, biaristate. *Ovary* densely pubescent;



Fig. 67. *Gaultheria leucocarpa* BL. Branch with flowers and fruits, × ⅔ (after BLUME, Fl. Javae, pl. inéd. t. 14).

style glabrous, 2.5 mm. *Fruit* white or rose tinged, (6–)9–11 by 6–9 mm, villous on top. *Seeds* brown, triangular-obovoid, 0.5 mm.

Distr. *Malesia*: Sumatra (apparently rare), Java.

Ecol. Both in mountain forest and open, ± sunny, exposed places among montane brushwood or scrub, 1300–3300 m, rather common, often on the margin of craters, steep slopes, on stony ground, rocks, volcanic or occasionally peaty and generally poor soil, mostly terrestrial, occasionally epiphytic. *Fl.* Jan.–Dec.

Pollination. According to DOCTERS VAN LEEUWEN the anthers open by two extrorse pores; the pollen is sticky. The stigma projects for about 1.5 mm above the anthers. Some flowers are protandrous with the stamens ripening on the first day, and the stigma attaining maturity on the next day. On the same plant, however, homogamous flowers can be found. The flowers remain unchanged for up to 5 days. They are but seldom visited by insects, especially *Bombus rufipes*. The pollen may easily drop on the stigmas because the latter protrude beyond the anthers, and because the flowers are pendulous. When the corolla falls off, the anthers shove therefore along the stigma. In young flowers, opened but one day, the stigma is already thickly covered with germinating pollen. All flowers set fruit. Selfpollination seems to be the rule. Flowering alternates more or less with fruiting, that is while a plant is abundantly fruiting, it generally bears but few flowers.

Dispersal. The fruits are eaten by birds.

Vern. *Kĕring, tjantigi bodas, t. wangi*, S, *gondopuro, kapirosok, purworoko, purwosada, sanglir, tandjang, tĕmigi, t. kasar*, J; M: *sae sae*, Toba, *sae sae angur*, Tapanuli, *sal-sal*, Eastcoast, *sirih gunung*, Padang Highlands, *kalintjajak*, Karo Highland.

Uses. *G. leucocarpa* and its varieties or forms are used in the same manner as *G. punctata*, although the plant yields much less wintergreen-oil.

Notes. *G. leucocarpa* in a broad sense is a species widely distributed beyond Malesia into East Asia. In this immense area, several varieties or forms can be distinguished, based on certain characters of the indument and the colour of the fruit; each of these varieties or forms, as far as can be seen from the material at hand, has its peculiar geographical range. Thus *f. leucocarpa*, with glabrous inflorescences and leaves, white or rose tinged fruits and a pubescent ovary, seems to be restricted to Sumatra and Java, at least is not known with certainty from other parts of Malesia.

It is remarkable that in Java *f. leucocarpa* and *f. scandens* seem to exclude each other in most places. However, to verify this, the present herbarium material, which too often bears neither ripe fruits nor complete collector's notes, is insufficient; in future collectors of *Gaultheria* should always note the fruit colour.

b. *f.* cumingiana (VIDAL) SLEUM. Reinwardtia 4 (1957) 179; Blumea 11 (1961) 1. — *G. cumingiana* VIDAL, Phan. Cuming. Philip. (1885) 184; Rev. Pl. Vasc. Filip. (1886) 170; HAYATA, Bot. Mag. Tokyo 20 (1906) 72; MERR. Philip. J. Sc. 2 (1907) Bot. 292 *p.p.*; *ibid.* 3 (1908) Bot. 378; HAYATA, Fl. Mont. Formosa (1908) 150; Icon. 2 (1912) 118, t. 13; KANEH. Formos. Tr. (1917) 315; *ibid.* rev. ed. (1936) 533, f. 493; MERR. En. Philip. 3 (1923) 246 *p.p.*; Lingn. Agr. Rev. 4 (1927) 132; COPEL. *f.* Philip. J. Sc. 47 (1932) 61, t. 1, f. 2. — *G. laxiflora* DIELS, Bot. Jahrb. 29 (1900) 515. — *G. yunnanensis* (FRANCH.) REHD. J. Arn. Arb. 15 (1934) 282, *et syn. alt.* — *G. crenulata* (*non* KURZ) J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 127; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; FLETCH. in Fl. Siam. En. 2 (1938) 315.

Inflorescence glabrous. *Ovary* densely pubescent. *Fruit* dark red to purplish blackish.

Distr. Upper Burma, SW. and S. China, Siam, Indochina, Formosa, in *Malesia*: Malay Peninsula, Sumatra, E. Java, Philippines (Luzon).

c. *f.* scandens HOCHR. Candollea 2 (1925) 494; SLEUM. Reinwardtia 4 (1957) 180; Blumea 11 (1961) 2. — ? *G. bandongensis* ZOLL. Syst. Verz. 2 (1854) 138, *nom. nud.*; ZOLL. *ex* MIQ. Fl. Ind. Bat. 2 (1859) 1056, *descr.* — ? *G. leucocarpa var. seminuda* J. J. S. Bull. Jard. Bot. Btzg III, 13

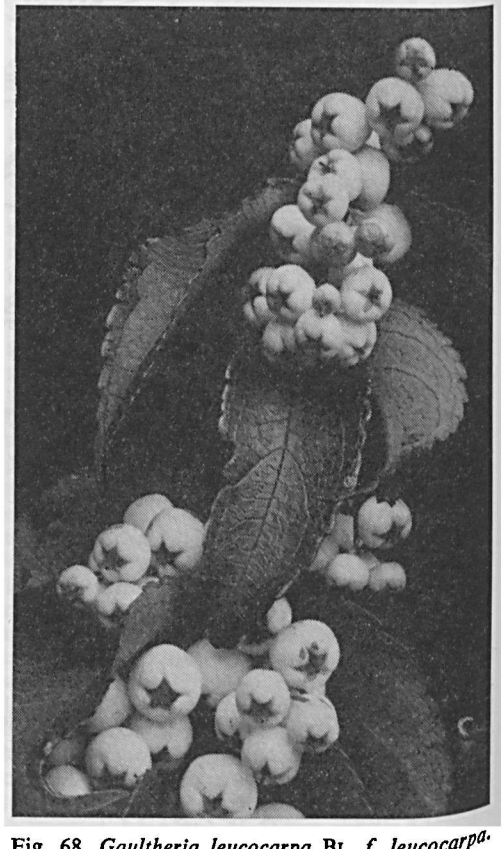

Fig. 68. *Gaultheria leucocarpa* BL. *f. leucocarpa*. Twig with fully mature white fruits, Mt Pangrango (DOCTERS VAN LEEUWEN, 1924).

(1935) 455. — *G. leucocarpa f. pubescens* J. J. S. in K. & V. Bijdr. 13 (1914) 119, *nom. nud.* — ? *Brossaea bandongensis* (ZOLL. *ex* MIQ.) O. KTZE, Rev. Gen. Pl. 2 (1891) 388.

Inflorescence densely rather yellowish short-pubescent. *Ovary* densely pubescent. *Fruit* white or with pink hue.

Distr. *Malesia*: Sumatra (apparently rare), Java (apparently the most common form there).

Vern. *Litjajo, litjaujo*, Karo, *tjojo*, Keling.

d. *f.* **melanocarpa** J. J. S. *ex* AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 5; SLEUM. Reinwardtia 4 (1957) 182. — *G. leucocarpa var. melanocarpa* J. J. S. *ex* STEEN. Bull. Jard. Bot. Btzg III, 17 (1948) 388; Arch. Hydrobiol. Suppl. 11 (1932) 317 ('*melanocephala*'). — ? *G. bandongensis* ZOLL. Syst. Verz. 2 (1854) 138, *nom. nud.*; ZOLL. *ex* MIQ. Fl. Ind. Bat. 2 (1859) 1056, *descr.* — ? *Brossaea bandongensis* (ZOLL. *ex* MIQ.) O. KTZE, Rev. Gen. Pl. 2 (1891) 388.

Inflorescence rather densely yellowish short-pubescent. *Ovary* densely pubescent. *Fruit* dark red to purplish blackish.

Distr. *Malesia*: Mal. Peninsula, Sumatra, E. Java.

Ecol. Mentioned by DE VOOGD (Trop. Natuur 23, 1934, 82) from the stony mud-flow (*lahar*) of Beriti volcano in S. Sumatra, *i.e.* from an extremely dry, treeless locality on acid soil.

2. *var.* **hirta** VAL. *ex* J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 454; SLEUM. Reinwardtia 4 (1957) 179.

Branchlets ± patently and rather densely glandular-setose and finely pubescent. *Leaves* clothed with soft non-glandular hairs all over the undersurface. *Inflorescence* densely finely patent-pubescent; occasionally some scattered longish gland-tipped bristle-like hairs are also present. *Corolla* laxly non-glandular pubescent.

Distr. *Malesia*: North Sumatra (Tapanuli: Toba Batak near Kuta Lekole), once found.

3. *var.* **psilocarpa** (COPEL. *f.*) SLEUM. Reinwardtia 4 (1957) 183. — *G. psilocarpa* COPEL. *f.* Philip. J. Sc. 47 (1932) 62, t. 1, f. 3. — *G. cumingiana* (*non* VIDAL) MERR. Philip. J. Sc. 2 (1907) Bot. 292 *p.p.*; ELM. Leafl. Philip. Bot. 3 (1911) 1091; MERR. En. Philip. 3 (1923) 246 *p.p.*

Inflorescence glabrous. *Ovary* practically glabrous. *Fruit* dark red to purplish blackish.

Distr. *Malesia*: Philippines (Mindanao, Negros; once found in S. Luzon).

Vern. *Logauwoy*, Bag.

23. **Gaultheria novaguineensis** J. J. S. Med. Rijksherb. *n.* 25 (1915) 5; Nova Guinea 12 (1917) 512; *ibid.* (1918) t. 206; STEEN. Bull. Jard. Bot. Btzg III, 13 (1934) 205; SLEUM. Bot. Jahrb. 72 (1942) 213; Reinwardtia 4 (1957) 183; Blumea 11 (1961) 2. — **Fig. 62f.**

var. **novaguineensis.**

Stiff, glaucous shrub, 0.8–1 m. Branchlets manifestly trigonous in the youngest parts by the decurrent petioles, terete below, glabrous or minutely pubescent. *Leaves* ovate or ovate-elliptic, apex attenuate, tip obtuse by a callous gland, base obtuse, broadly attenuate to rounded, coriaceous, rather rigid, shining above, ± dull beneath, glabrous, not punctate beneath, crenate-serrate, teeth glandular, somewhat curved, margin revolute, 1.1–1.5(–2.1) by 0.5–0.9(–1.3) cm, midrib and nerves slightly impressed above, prominent beneath, nerves 2–3(–4) pairs, high curved-ascending and joined near the edge, reticulation ± obscure on both faces; petiole red, blackish when dry, glabrous, thick, 1–3 mm. *Flowers* solitary in the axils of all upper leaves, thus forming a leafy terminal raceme, leaves decrescent towards the top of the branchlets. Pedicels reddish, stoutish, finely pubescent or glabrous, recurved, 3–4(–6) mm. Bract absent. Bracteoles 2, apical, ovate, acute, ciliolate, 1.5 mm. *Calyx* 3–3.5 mm, deeply 5-partite, lobes triangular-ovate, ciliate. *Corolla* urceolate, white or light cream, 5–6 by *c.* 3 mm, shortly 5-lobed, glabrous. *Stamens c.* 3.2 mm; filaments papillose, *c.* 2 mm; anther-cells oblong-ovate, granular; tubules shortly biaristate. *Ovary* glabrous at least on the apex; style 3.5 mm. *Fruit* blue-blackish, 6–7 mm ø, pedicel 3–6 mm.

Distr. *Malesia*: West New Guinea (Oranje and Star Mts).

Ecol. On shrubby banks of stream, or on swampy localities, apparently rare, 3000–4000 m. *Fl.* Febr., July, Sept.

var. **pascua** SLEUM. Reinwardtia 4 (1957) 183; Blumea 11 (1961) 2.

Ovary subdensely short-pubescent. Rachis and pedicels rather densely short-pubescent. *Fruit*-pedicel (7–)8–10 mm.

Distr. *Malesia*: West New Guinea (Mt Carstensz), twice collected in meadow-like vegetation at 3700–4000 m. *Fr.* Nov.–Dec.

24. **Gaultheria pernettyoides** SLEUM. Reinwardtia 4 (1957) 184; Blumea 11 (1961) 3. — **Fig. 62e.**

Shrub, probably prostrate. Branchlets slender (1 mm), terete, densely subappressed-setulose. *Leaves* lanceolate, rarely subelliptic-lanceolate, slightly minor towards the tips of the branchlets and subsessile there, apex attenuate, subacute, base attenuate, subcoriaceous, dark brown above when dry, paler beneath, regularly serrulate, teeth caducously ciliate, 0.2–0.3 mm high, *c.* 1 mm spaced, 0.8–1.3 cm by (2–)3.5 mm, puberulous above on the lower part of the midrib, with solitary scattered short bristles beneath, midrib very slightly sunken above, ± prominent beneath, nerves 2 pairs, high-ascending, very slightly impressed above, ± raised beneath, reticulation ± obscure; petiole glabrous, *c.* 1 mm. *Flowers* solitary, remote *i.e.* not in successive axils. Pedicels recurved, glabrous, stoutish, *c.* 2 mm. Bract absent. Bracteoles 2, opposite, immediately below the calyx, ovate-acuminate, *c.* 2 mm. *Calyx* 2.5 mm, deeply 5-partite, glabrous outside, lobes ovate, abruptly acuminate, puberulous inside, ciliate at the tip. *Ovary* puberulous; style glabrous, 2 mm. *Fruit*

calyx moderately accrescent, subcarnose at the base, chartaceous at the tip, including the glabrous capsule.

Distr. *Malesia*: Sumatra (Atjeh, Gajo Lands: summit of Mt Losir), in mountain heath at 2950–3500 m, two collections. *Fl.* Febr.

8. DIPLYCOSIA

BL. Bijdr. (1826) 857; SLEUM. Reinwardtia 4 (1957) 119–161; Blumea 11 (1961) 4; *ibid.* 12 (1963) 116; *ibid.* 12 (1964) 342. — *Gaultheria sect. Amphicalyx* ENDL. Gen. (1839) 756. — **Fig. 69–80.**

Shrubs, not rarely epiphytic, often with thick roots and/or swollen base. *Leaves* spiral, persistent, entire or ciliate-serrate or -crenate; axillary buds sometimes reduced to stipule-like perulae. *Flowers* axillary or from defoliate axils, solitary or in fascicles, small. Pedicels bracteolate at the base, with 2 apical persistent bracteoles ± connate into a calyculus. *Calyx* deeply 5(rarely 4)-toothed or -lobed, free or half-inferior, persistent, becoming ± fleshy and accrescent in later stages, mostly completely including the capsule at maturity, rarely incompletely so. *Corolla* campanulate to urceolate, rarely cylindric or subglobose, not rarely rather fleshy, with 5 (rarely 4) slightly imbricate, erect or recurved lobes, early caducous. *Stamens* 10 (rarely 8), mostly as long as the corolla or slightly exserted, rarely shorter than the corolla, inserted at the base of the corolla. Anthers introrse, dorsifix, anther-cells oblong to ovate, with 2 deep longitudinal grooves, irregularly 4-lobed at the base, mostly very granular, produced at the apex into 2 short (and rather broad) or mostly elongate (and slender) straight tubules, dehiscing by ± oblique short or prolonged slits; neither apical nor dorsal appendages. Filaments mostly linear, flat, sometimes disk-like dilated above the base and S-curved. *Disk* cupular, 10(–8)-lobed, pressed against the ovary. *Ovary* superior or half-inferior, 5(–4)-celled, with numerous ovules on the thick placentas. Style filiform; stigma simple. *Capsule* thin-walled, opening late, regularly or somewhat irregularly, completely filled with the seeds, included to various degree by the accrescent ± succulent calyx. *Seeds* minute, cuneate irregularly; testa laxly reticulate; albumen fleshy; embryo axile, cylindric.

Distr. In all 97 *spp.*, of which 1 endemic in S. Annam, 3 (1 endemic) in Peninsular Siam, the rest in *Malesia*. All species of the genus described from the East Himalaya and Upper Burma have now been transferred to the genus *Gaultheria*. Fig. 69.

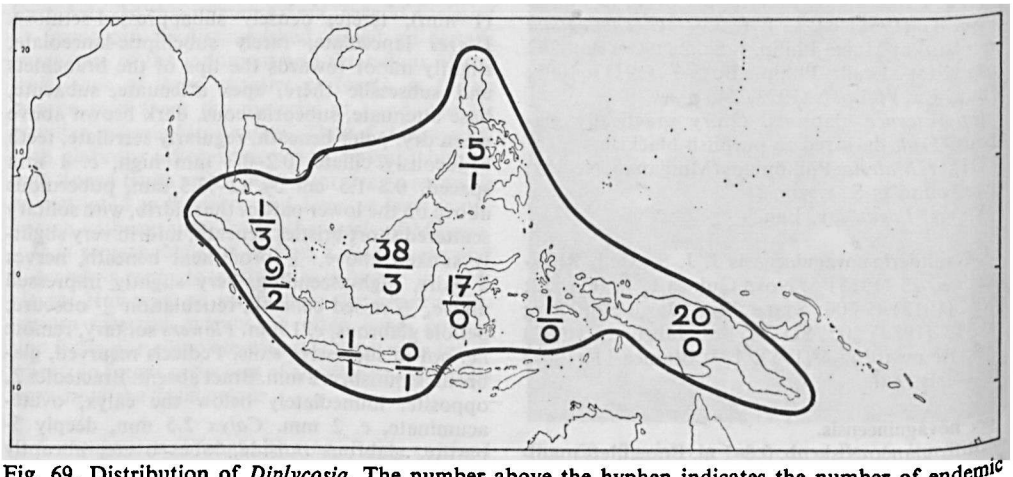

Fig. 69. Distribution of *Diplycosia*. The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

Almost half of all Malesian species occur in Borneo, and many of these are only known from Mt Kinabalu. In New Guinea, the Vogelkop Peninsula seems to be richer in *Diplycosia* than the rest of the island. Many species occupy a very restricted area or have only been collected once.

Ecol. Most species are found in the montane forest, especially in the mossy forest and in summit scrub. A few live in open rocky places above the timber line, and attain 3960 m close to the summit of Mt Kinabalu, and 3650 m in New Guinea (Hagen Mts).

Uses. No use is known, though several species have a peculiar smell and apparently contain wintergreen-oil similar as *Gaultheria*.

Note. In the key to the species, which is in many respects artificial, various indument types and their occurrence on certain organs are used in the first place. It is therefore necessary to investigate the material thoroughly as to the different types of hairs, bristles or glands, and to use a lens to make sure, that no fine puberulence is overlooked, especially on the branchlets. The occurrence of a certain indument type or the combination of such types is apparently constant enough to characterize a species or variety to a high degree. Complete lack of indument, however, is much less significant, and for that reason all species of which a gradual decay of the indument has been observed in later stages, figure in the key under different positions.

KEY TO THE SPECIES

1. Branchlets (young shoots) laxly to very densely setose or setulose, otherwise whether or not patent-puberulous.
2. Branchlets (young shoots) exclusively setose or setulose. (Sometimes greyish or blackish fungi may wrongly suggest the presence of a fine patent pubescence!)
3. Calyx dorsally densely and ± longish setose or setulose.
4. Pedicels, if any, stoutish. Bristles on the calyx all or for their greater number ± appressed or obliquely suberect, 2.5–5 mm.
5. Leaves underneath with ± coarse, patent bristles.
6. Nerves 1–3 pairs, slightly distinct or ± inconspicuous.
7. Corolla ± shortly setulose-hairy in its upper part.
8. Leaves subcaudate-acuminate (coriaceous, shining above, strongly revolute at the margin), 3–5(–7) cm long . . . . . **1. D. rufa**
8. Leaves short-acuminate, 1–3 cm long.
9. Leaves coriaceous, slightly revolute at the margin, shining above, (1–)1.5–2(–3) by 0.7–1.2 cm. Ovary laxly hairy . . . . . **2. D. chrysothrix**
9. Leaves subcoriaceous, quite flat, dull above, 2–3 by 1.2–1.9 cm. Ovary glabrous. **3. D. carrii**
7. Corolla entirely glabrous.
10. Leaves 0.6–1(–1.5) by 0.3–0.6 cm . . . . . **4. D. abscondita**
10. Leaves surpassing 2 by 1.5 cm.
11. Leaves ovate or elliptic-ovate, apex acuminate, 2–4.5 by 1.5–2.6 cm; petiole 1–2 by 1–1.5 mm. . . . . **5. D. barbigera**
11. Leaves broad-elliptic, sometimes subrotundate, apex broadly obtusely attenuate to almost rounded, 4–6.5 by 2.5–5 cm; petiole (4–)5–7 by 2–3 mm . . . . . **6. D. schramii**
6. Nerves (5–)6–7 pairs, ± distinct.
12. Pedicels 3–5(–7) mm. Calyx lobes 1.5–2 mm . . . . . **7. D. saurauioides**
12. Pedicels (8–)10–13 mm. Calyx lobes *c.* 3.5 mm . . . . . **8. D. clementium**
5. Leaves underneath with fine and manifestly appressed bristles . . . . . **9. D. aurea**
4. Pedicels slender. Bristles on the calyx spreading in all directions, (1–)1.5–2.5 mm.
13. Bristles manifestly gland-tipped. Pedicels exclusively setose, 5–8 mm. . . . **10. D. lilianae**
13. Bristles eglandular. Pedicels besides the bristles rather densely covered with fine whitish hairs, 10–25 mm . . . . . **11. D. loheri**
3. Calyx dorsally rather laxly and shortly (0.5–1 mm), generally crisped- or manifestly appressed-setulose, or puberulous, or muriculate, or glabrous.
14. Style ± densely shortly patent-pubescent . . . . . **12. D. aperta**
14. Style completely glabrous.
15. Corolla ± densely pubescent, at least in the upper half. (Ovary densely hairy.)
16. Branchlets densely setose. Corolla longish crisped-hairy in the upper half. **13. D. pubivertex**
16. Branchlets very laxly setulose (finally glabrous). Corolla nearly entirely covered with straight, ± appressed hairs . . . . . **14. D. atjehensis**
15. Corolla glabrous or practically so (some glandular hairs occasionally present in 26. *D. tetramera*). (Ovary pubescent or glabrous.)
17. Flowers 1 or 2 per axil (occasionally also 3 in other axils of the same specimen).
18. Leaves over 11 cm long. Pedicels (2–)2.5–3.5 cm . . . . . **15. D. penduliflora**
18. Leaves not longer than 11 cm. Pedicels rarely up to 2 cm.
19. Leaves ± lanceolate, up to 7 mm wide.

20. Leaves very densely arranged, partly covering each other, on very densely setose branchlets. Ovary hirsute . . . . . **16. D. ciliolata**
20. Leaves subdensely to laxly arranged, not partly covering each other, on laxly to subdensely setose branchlets. Ovary glabrous.
21. Pedicels at anthesis 3–7 mm.
22. Pedicels slender, laxly setulose at anthesis. Corolla red . . . . . **17. D. filipes**
22. Pedicels rather stoutish, subdensely setulose at anthesis. Corolla white, with pink tinge. **32. D. morobeensis *var.* morobeensis**
21. Pedicels at anthesis 1–2 mm (stoutish, muriculate and finely hairy. Corolla pale green). **34. D. pendens**
19. Leaves, if lanceolate, wider than 7 mm, or leaves of other shape.
23. Pedicels laxly or mostly rather densely longish (1.5–2 mm) and ± patently setulose, longer than 3 mm. (Ovary glabrous.)
24. Calyx dorsally glabrous or practically so.
25. Corolla subglobose-urceolate, 5 mm. Leaves narrowly oblong-elliptic, (2–)2.5–5 by 0.8–1.7(–2) cm . . . . . **18. D. rufescens**
25. Corolla subcampanulate, 4 mm. Leaves elliptic to ovate, 0.9–1.7(–1.9) by 0.5–1 cm. **19. D. triangulanthera**
24. Calyx dorsally ± laxly clad with ± appressed and ± crisped, stoutish, bristle-like or glandular hairs.
26. Leaves ovate or elliptic, ± abruptly acuminate at apex, the terminal gland small.
27. Corolla 6.5 mm . . . . . **20. D. kjellbergii**
27. Corolla 1–1.1 cm . . . . . **21. D. hirsuta**
26. Leaves elliptic or subobovate-elliptic, broadly attenuate or ± rounded at apex, the terminal gland thick and protruding beyond the leaf margin.
28. Pedicels with fine, gland-tipped bristle-like hairs. (Corolla (5–)6 by 2.5 mm.) **22. D. rosea**
28. Pedicels with ± coarse, eglandular bristles or bristly hairs.
29. Corolla 7–9 by 3.5 mm. Pedicels 1.2–2 cm . . . . . **23. D. setosa**
29. Corolla 5(–6) by 2.5–3 mm. Pedicels 6–7 mm . . . . . **24. D. kosteri**
23. Pedicels laxly to subdensely short- and crisped-, or, if the bristles are longer, appressed-setulose, or muriculate, or pubescent, or glabrous, or pedicels up to 3 mm long. (Ovary pubescent or glabrous.)
30. Ovary sparsely to densely pubescent.
31. Leaves up to 3.5 cm long, but for the greater part shorter than 2.8 cm in the same specimen.
32. Leaves ovate or elliptic-ovate . . . . . **25. D. pseudorufescens *var.* pseudorufescens**
32. Leaves lanceolate or (broadly) elliptic to elliptic-oblong or subovate-elliptic, rarely subovate-elliptic.
33. Style 5–6 mm. (Stamens 8.) . . . . . **26. D. tetramera**
33. Style up to 3 mm. (Stamens 8 or 10.)
34. Bristles on the branchlets ± spreading, very dense. **25. D. pseudorufescens *var.* elliptifolia**
34. Bristles on the branchlets ± appressed, lax to subdense.
35. Stamens 8 . . . . . **27. D. parvifolia**
35. Stamens 10.
36. Leaves ± elliptic, 0.9–2(–2.5) cm wide . . . . . **28. D. soror**
36. Leaves ± lanceolate, 0.5–0.8(–1) cm wide . . . . . **34. D. pendens**
31. Leaves at least in part in the same specimen longer than 2.8 cm.
37. Leaves ovate or elliptic-ovate, ± persistently rufous-setulose beneath. **29. D. glauciflora**
37. Leaves (broadly) elliptic or elliptic-oblong or obovate, caducously setulose, respectively punctate underneath or entirely glabrous in later stages.
38. Corolla ovoid . . . . . **30. D. ledermannii**
38. Corolla campanulate . . . . . **31. D. brachyantha**
30. Ovary entirely glabrous.
39. Flowers 4-merous. Stamens 8.
40. Corolla *c.* 2.5 mm. Style 2 mm . . . . . **27. D. parvifolia**
40. Corolla 6–7 mm. Style 5–6 mm . . . . . **26. D. tetramera**
39. Flowers 5-merous. Stamens 10.
41. Leaves small, (0.8–)1.3–2.2 by 0.4–0.8, very rarely in part up to 1 cm.
42. Calyx lobes with a distinct paler, almost translucent margin, which is densely ciliate over the whole length. Corolla at least 4 mm. Pedicels 3–6 mm.
43. Corolla 4 mm. Style 3.5 mm . . . . . **32. D. morobeensis**
43. Corolla (7–)8–10 mm. Style 5–6 mm . . . . . **33. D. rupicola**

42. Calyx lobes showing no paler margin, the latter ciliate distally only. Corolla 3 mm. Pedicels 1–2 mm at anthesis. (Leaves ± lanceolate.) . . . . . **34. D. pendens**
41. Leaves larger for the greater part in the same specimen, the smallest ones at least 1.3 by 0.9 cm.
44. Corolla 8–9 mm.
45. Leaves triplinerved . . . . . **35. D. schultzei**
45. Leaves sub-5- or 7-plinerved from and from above the base.
46. Leaves obovate to obovate-elliptic, loosing the marginal bristles completely towards maturity. . . . . **36. D. stellaris**
46. Leaves suborbicular to elliptic, the marginal bristles ± persistent into maturity.
47. Pedicels 8–10(–12) mm at anthesis. . . . . **37. D. undata**
47. Pedicels (3–)4–5 mm at anthesis. . . . . **38. D. varians**
44. Corolla up to 6 mm.
48. Corolla 5–6 mm. Pedicels (5–)7–12 mm. Style 4–5 mm . . . . . **89. D. edulis**
48. Corolla up to 4 mm. Pedicels 2–4(–7) mm. Style up to 3.5 mm.
49. Corolla subglobular, 2 mm . . . . . **39. D. subglobularis**
49. Corolla urceolate or subcampanulate, 3–4 mm.
50. Leaves entire or practically so. Young shoots densely and ± patently setose.
51. Petiole 3 mm. Pedicels setose and pubescent . . . . . **40. D. apoensis**
51. Petiole (4–)5–6 mm. Pedicels glabrous . . . . . **41. D. muscicola**
50. Leaves crenulate, especially in the upper half. Young shoots subdensely or laxly and more appressedly setose.
52. Pedicels with sparse, rather appressed bristle-like hairs, 6–7 mm. **42. D. amboinensis**
52. Pedicels sparsely muriculate or glandular-hairy, glabrescent, up to 4 mm. **28. D. soror**
17. Flowers 3–6(–9) in all or at least in the lower axils, the uppermost axil(s) sometimes bearing only 2, or very rarely but 1 flower in the same specimen.
53. Leaves narrow-lanceolate, 3–6 mm wide . . . . . **43. D. kalmiifolia**
53. Leaves various in shape, wider than 7 mm.
54. Corolla (9–)10–11 mm. Leaves with ± persistent longish marginal bristles. **44. D. kinabaluensis**
54. Corolla up to 8 mm. Leaves with ± early caducous marginal bristles.
55. Calyx lobes *c.* 4 mm. Ovary laxly to densely pubescent.
56. Corolla campanulate . . . . . **31. D. brachyantha**
56. Corolla subcylindric-urceolate . . . . . **45. D. sumatrensis**
55. Calyx lobes 1.5–2(–3) mm. Ovary completely glabrous.
57. Perulae very numerous, ovate-acuminate to lanceolate, 2–4 mm. Bracteoles (2–)2.5–3 mm.
58. Pedicels densely crisped-rusty-pubescent . . . . . **46. D. crassiramea**
58. Pedicels densely patently glandular-setulose . . . **81. D. pittosporifolia *var.* punctiloba**
57. Perulae mostly few, rarely rather numerous, ± ovate, obtuse, up to 1.5 mm. Bracteoles 1–1.5 mm.
59. Leaves 3–5-plinerved from and from above the base (lower half of the midrib), upper lateral nerves, if any, much less distinct.
60. Anthers linear-oblong, tubules as or nearly as long as the anther-cells. Corolla short-cylindric to subcampanulate . . . . . **47. D. trinervia**
60. Anthers oblong to ovate-oblong, tubules much shorter than the anther-cells.
61. Leaves rigidly coriaceous, ± concave when dry . . . . . **48. D. lamii**
61. Leaves subcoriaceous to coriaceous, ± flat when dry.
62. Leaves (10–)12–17 by 3.5–5.5 cm . . . . . **49. D. orophila**
62. Leaves smaller, (2–)3–6 (rarely partly in the same specimen up to 10) cm long. **50. D. luzonica**
59. Leaves penninerved or practically so, *i.e.* basal and upper nerves equally distinct, the latter also from the upper half of the midrib.
63. Calyx tube markedly funnel-shaped attenuate (2 mm), almost stipitate in later stages (3 mm). (Pedicels laxly subpatently hairy. Bristles, if any, glandular at the tip of the branchlets) . . . . . **51. D. caryophylloides**
63. Calyx tube gradually attenuate or shortly (up to 1 mm) contracted at the base.
64. Pedicels stoutish, 3–8 mm, their hairs or bristles ± appressed and non-glandular.
65. Pedicels ± densely rusty-setulose and furfuraceous as are the tips of the branchlets. **52. D. scabrida**
65. Pedicels densely rusty-tomentose. Tips of the branchlets very laxly setose (finally glabrous) . . . . . **53. D. capitata**
64. Pedicels slender, 1–1.3 cm, their hairs glandular and horizontally spreading. **54. D. fimbriata**

2. Branchlets (young shoots) both very laxly to densely setose or setulose and patent-puberulous, or distinctly patent-puberulous only.
66. Stipule-like axillary perulae ± persistent, well recognizable at least at the uppermost leaves, subulate, as long as or slightly longer than the petiole. (Anthers sagittate.)
67. Margin of the calyx lobes set with longish (*c.* 1.5 mm) and coarse, non-glandular bristles. **55. D. sagittanthera**
67. Margin of the calyx lobes ciliolate, or very shortly glandular-muriculate or -fimbriate.
68. Leaves (ovate) subcaudate-acuminate and ± acutish at the apex . . . . . **56. D. acuminata**
68. Leaves (ovate to elliptic or subrotundate) short-attenuate and obtuse to rounded at the apex.
69. Corolla 6–6.5 by *c.* 4 mm. Leaves ovate to subrotundate, all slightly though distinctly cordate at base . . . . . **57. D. crenulata**
69. Corolla 4–5 by 2.5–3 mm. Leaves ovate to elliptic, broadly cuneate to rounded (rarely in part also subcordate) at the base . . . . . **58. D. elliptica**
66. Stipule-like axillary perulae absent (or not well recognizable, being too small or very early caducous).
70. Anthers manifestly sagittate.
71. Ovary glabrous.
72. Leaves elliptic-oblong or elliptic, 4–7 mm wide . . . . . **59. D. microphylla**
72. Leaves lanceolate or elliptic-oblong, *c.* 2 mm wide . . . . . **60. D. kostermansii**
71. Ovary subdensely hairy. (Leaves ovate-elliptic or elliptic.) . . . . . **61. D. consobrina**
70. Anthers hardly or not sagittate.
73. Margin of the calyx lobes set with coarse, longish (0.6–0.8 mm), non-glandular bristles, or bristle-like glandular hairs.
74. Leaves manifestly crenate, apex almost tridentate, 0.7–1.4 by (0.4–)0.5–0.7 cm. Corolla red. **62. D. cinnabarina**
74. Leaves subentire, apex acuminate-attenuate, 1.5–2.5(–3) by 0.8–1.5(–1.8) cm. Corolla light green . . . . . **63. D. setiloba**
73. Margin of the calyx lobes ciliolate or glandular-fimbriate.
75. Leaves linear, *i.e.* equally wide (up to 2.5 mm) over their entire length, proper apex and base excepted.
76. Leaves (1–)1.5–2 cm by 0.5–0.8 mm. Ovary glabrous . . . . . **64. D. piceifolia**
76. Leaves (3–)4.5–5.5(–8) by 1.5–2(–3) mm.
77. Calyx lobes fimbriate by fine hairs in the upper part. Ovary laxly pubescent . **65. D. pinifolia**
77. Calyx lobes laxly fimbriate by rather coarse glandular hairs in the upper part. Ovary quite glabrous . . . . . **66. D. lavandulifolia**
75. Leaves not linear, and wider than 3 mm.
78. Leaves narrow-lanceolate or narrowly elliptic-oblong, or elliptic, 4–6(–7) mm wide.
79. Leaves (2–)2.3–3.5 cm long . . . . . **67. D. stenophylla**
79. Leaves (0.8–)1.2–1.4(–1.7) cm long.
80. Leaves narrowly elliptic-oblong . . . . . **68. D. myrtillus**
80. Leaves elliptic . . . . . **25. D. pseudorufescens *var.* elliptifolia**
78. Leaves of various shape, wider than 7 mm.
81. Branchlets besides the spreading puberulence manifestly setose. Leaves ± persistently setose beneath, at least laxly so in the lower half and/or along the midrib.
82. Leaves up to 1.7 cm long . . . . . **25. D. pseudorufescens**
82. Leaves at least 3 cm long.
83. Bristles on the branchlets short (1–2 mm), subdense. Leaf base ± attenuate or cuneate.
84. Pedicels glabrous. Corolla red . . . . . **69. D. rubella**
84. Pedicels glandular-setulose. Corolla greenish . . . . . **70. D. lancifolia**
83. Bristles on the branchlets longish (2–3 mm), dense. Leaf base rounded or mostly so. (Pedicels ± densely crisped-setulose. Corolla light yellow or greenish.) . . . **71. D. pilosa**
81. Branchlets besides the spreading puberulence very laxly or mostly not setose or setulose. Leaves early glabrescent, whether or not punctate beneath.
85. Leaves ± abruptly caudate or subcaudate-acuminate at apex.
86. Leaves lanceolate-ovate, up to 2.1 cm wide. Flowers mostly solitary, rarely in twos. Pedicels *c.* 2 mm . . . . . **72. D. caudatifolia**
86. Leaves ovate-elliptic, all or at least partly 2.5–4 cm wide in the same specimen. Flowers generally 3–4(–6) per fascicle. Pedicels (3–)4–6 mm . . . . . **73. D. memecyloides**
85. Leaves gradually and ± broadly attenuate-acuminate, or obtuse to rounded at apex.
87. Corolla *c.* 1 cm, campanulate. (Pedicels very slender, 1.2–2.6 cm.) . . . **74. D. gracilipes**
87. Corolla up to 7 mm, (broadly) tubular, urceolate, subglobose-urceolate or subcampanulate.
88. Corolla 6.5–7 mm. (Ovary glabrous.)
89. Pedicels 1.5–3 mm, rather stoutish. Corolla white . . . . . **75. D. celebensis**
89. Pedicels 6–8(–10) mm, slender. Corolla blood red . . . . . **76. D. haemantha**
88. Corolla 3–3.5 mm.

90. Ovary hairy. Leaves subdensely punctate beneath . . . . . **77. D. minutiflora**
90. Ovary glabrous. Leaves very laxly or not punctate . . . . . **78. D. kemulensis**

1. Branchlets (young shoots) completely glabrous, *i.e.* bearing no trace of hairs or bristles besides maybe some glandular points.
91. Leaves (mostly obtuse at the apex) markedly apiculate by a thick gland, which protrudes beyond the leaf margin.
92. Leaves linear, *i.e.* equally wide over their entire length, (3–)5–7.5 cm by (1.5–)1.8–3 mm. **79. D. rosmarinifolia**
92. Leaves not linear, all or at least most of them wider than 4 mm in the same specimen.
93. Flower tetramerous . . . . . **78. D. kemulensis**
93. Flowers pentamerous.
94. Corolla ± densely appressedly hairy outside . . . . . **14. D. atjehensis**
94. Corolla glabrous outside or practically so.
95. Ovary laxly to densely hairy.
96. Corolla (± tubular) (9–)10–11 by 5 mm . . . . . **80. D. apiculifera**
96. Corolla up to 7 mm long.
97. Corolla (widely) campanulate. Calyx lobes 4 mm . . . . . **31. D. brachyantha**
97. Corolla ovoid, 7 mm. Calyx lobes *c.* 2 mm . . . . . **30. D. ledermannii**
95. Ovary entirely glabrous.
98. Pedicels laxly to subdensely longish (1–1.3 mm) and ± patently glandular-setulose. **81. D. pittosporifolia *var.* pittosporifolia**
98. Pedicels very shortly (whether or not glandular-)subsetulose or muriculate and/or short-pubescent, or glabrous.
99. Corolla longer than 9 mm.
100. Corolla (9–)10–11 mm. Pedicels glabrous.
101. Leaves (6–)7–12 by (3–)4–6 cm . . . . . **44. D. kinabaluensis**
101. Leaves 3–4 by 1.5–2 cm . . . . . **82. D. retusa**
100. Corolla 13–15 mm long. Pedicels densely hirtellous . . . . . **83. D. sanguinolenta**
99. Corolla up to 8 mm long.
102. Leaves elongate-spathulate (apex rounded-obtuse and ± retuse) . . **84. D. sphenophylla**
102. Leaf-shape otherwise.
103. Pedicels ± densely clad with short, rufescent, eglandular, subappressed or spreading, permanent hairs, besides maybe some muriculate hairs.
104. Petiole 3–5 mm . . . . . **85. D. rubidiflora**
104. Petiole 10–13 mm.
105. Leaves 3–4-penninerved . . . . . **46. D. crassiramea**
105. Leaves 5(–9)-plinerved . . . . . **86. D. urceolata**
103. Pedicels ± laxly clad with fine hairs and/or bristle-like, rather thickish glandular or muriculate hairs, mostly ± glabrescent during anthesis.
106. Pedicels (1–)2–3 mm at anthesis, up to 4 mm in fruit.
107. Leaves (3.5–)4–6(–7) by (0.8–)1–2(–3) cm.
108. Flowers solitary, rarely in twos . . . . . **87. D. lysolepis**
108. Flowers 3–4 per fascicle . . . . . **88. D. commutata**
107. Leaves (1.5–)2–2.8(–4.5) by (0.9–)1–1.6(–2.8) cm. (Flowers solitary, rarely in twos.) **28. D. soror *var.* nuda**
106. Pedicels 4–8 mm at anthesis, up to 15 mm in fruit.
109. Leaves broadly subrotundate- or obovate-elliptic to obovate.
110. Pedicels laxly and persistently set with rather coarse glandular or muriculate hairs. **89. D. edulis**
110. Pedicels laxly and exclusively set with short hairs initially, early glabrescent. **90. D. lorentzii**
109. Leaves ovate to elliptic, sometimes lanceolate- to oblong-elliptic.
111. Leaves markedly crenulate. An alpine form of . . . . . **89. D. edulis**
111. Leaves glandular punctate beneath only, subcrenulate to entire.
112. Corolla subglobose-urceolate . . . . . **50. D. luzonica**
112. Corolla narrowly (or subtubular-)campanulate . **96. D. heterophylla *var.* latifolia**

91. Leaves (mostly acuminate or acute at the apex) not or not manifestly apiculate, the apical gland being small and within the margin of the lamina, or if, more conspicuous, found on the (obtuse) apex underneath.
113. Pedicel very slender, (2–)2.5–3.5 cm . . . . . **15. D. penduliflora**
113. Pedicel rather slender or mostly ± stoutish, generally up to 1, rarely up to 2 cm long.
114. Leaves manifestly penninerved; nerves 8–10, strongly inarching, the lowest pair short and straight to the margin . . . . . **91. D. punctulata**
114. Leaves pli- or pli- *and* penninerved, the lowest pair of nerves always curved and ± high ascending, the upper nerves not or not manifestly inarching.

115. Leaves long-attenuate to ± caudate-acuminate at apex.
116. Leaves ± shortly attenuate, or rounded to subcordate at base.
117. Leaves 1 to 4(–5) times longer than wide, oblong-ovate or ovate.
118. Calyx lobes rufous-tomentulose dorsally . . . . . **49. D. orophila**
118. Calyx lobes very laxly muriculate or glabrous dorsally . . . . . **92. D. cinnamomifolia**
117. Leaves (6–)8–10 times longer than wide, ensiform . . . . . **93. D. ensifolia**
116. Leaves ± long attenuate-acuminate at base . . . . . **94. D. salicifolia**
115. Leaves ± shortly attenuate or acuminate at apex, mostly broadly attenuate, rarely subrotundate at base.
119. Leaves lanceolate to subovate-oblong-lanceolate (very coriaceous), trinerved from the very base . . . . . **95. D. viridiflora**
119. Leaves subovate-oblong, or oblong, or elliptic (sometimes almost ovate or obovate), 3–5-plinerved from and from above the base, moreover with ± pinnate upper nerves.
120. Pedicels and bracteoles (dorsally) rusty-tomentose . . . . . **53. D. capitata**
120. Pedicels ± laxly hirtellous, moreover whether or not laxly set with short, thickish glandular hairs. Bracteoles ± glabrous dorsally . . . . . **96. D. heterophylla**

1. Diplycosia rufa STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 191, t. 14, f. D 8–9; MERR. En. Born. (1921) 465 *p.p.*; SLEUM. Reinwardtia 4 (1957) 129; Blumea 12 (1963) 116.

Shrub, epiphytic or terrestrial and rambling amongst dense shrubs, with pendent branches, up to 2.5 m. Branchlets densely patently and longish (2–3 mm) brown-setulose in the younger, greyish and glabrescent in the older parts. *Leaves* ovate, apex caudate-acuminate, acute, the apical gland small, base rounded to subcordate, coriaceous, dark green and glossy above, glabrous (except the midrib) and shining above, densely brownish patent-setulose (1–2 mm, especially on the midrib and nerves) and rather dull beneath, margin entire, ± revolute, (3–)3.5–5(–7) by 1.6–2.8(–3) cm, midrib impressed above, prominent beneath, nerves 2–3 pairs from and from above the base of the lamina, curved-ascending, very slightly impressed above, the basal pair ± raised beneath; petiole stout, 1–2 mm, densely setulose. *Flowers* axillary, solitary or in few-flowered fascicles, all over longish rusty- to rufous-setulose except the inside of the bracteoles, the inner basal part of the calyx lobes and the corolla at the commissures and its very base. Pedicels stoutish, 4–6 by 1–1.5 mm, basal bracts small. Bracteoles broad-ovate, 2–2.5 mm. *Calyx* 6–7(–8) mm, deeply 5-lobed, lobes ovate-lanceolate, 5–6(–7) by 1.5–2 mm (at the base). *Corolla* ± open campanulate, angular, pink red to purple, hairy outside, rather fleshy, 7–8 mm, 5-lobed in the upper $^2/_5$. *Filaments* slender, glabrous, *c.* 2.5 mm; anther-cells ovate, granular, 2 mm; tubules straight, nearly 2 mm. *Ovary* hirtellous; style 4 mm. *Fruit* pale violet when ripe.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In low mossy forest or ridge forest, 2130–3050 m. *Fl. fr.* May–Nov.

Vern. *Akar.*

2. Diplycosia chrysothrix STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 191, t. 14, f. E 10–14; MERR. En. Born. (1921) 463; SLEUM. Reinwardtia 4 (1957) 129; Blumea 12 (1963) 116.

Low, epiphytic shrub, (0.3–)1–2 m. Branches pendent, slender, greyish, laxly setose. Branchlets very slender, densely clothed with long (2–3 mm) ± appressed golden-brown or rusty bristles. *Leaves* ± ovate or oblong-ovate, rather densely arranged, apex short-acuminate, subacute, the terminal gland small, slightly protracted, base rounded or sometimes broadly attenuate, ± coriaceous, rather stiff and concave when dry, dark green and shining above, juvenile ones laxly setulose above, becoming soon glabrous, but remaining somewhat rough to the touch, undersurface persistently laxly to subdensely covered with long (1–2 mm) ± obliquely patent brown bristles, more densely so along the revolute margin and the petiole, (1–)1.5–2.5(–3) by (0.6–)0.8–1.5 cm, midrib impressed above, slightly prominent beneath, nerves 1–2 pairs, high-ascending, very slightly impressed above, or indistinct on both faces; petiole 1–2.5 mm. *Flowers* solitary in the upper axils, sometimes also in twos, densely longish rufous-setulose on the pedicels, the bracteoles and the back of the calyx. Pedicels stoutish, (2–)3–5(–6) mm, basal bracts minute and glabrous. Bracteoles ovate, glabrous inside, 2 mm. *Calyx* 5–6(–7) mm, 5-lobed to nearly its base, lobes ovate-acuminate, minutely adpressed-hairy or nearly glabrous inside. *Corolla* cupular-campanulate, white to pale violet, also cream-green, 0.8 by 1–1.2 cm in fresh, 5–8 mm in dry specimens, lobes 5 broad-ovate *c.* 3 mm, outside laxly to subdensely hairy in the upper half especially at the lobes, glabrous along the commissures and the lower half as well as inside. *Filaments* subulate, glabrous, 2.5–3 mm; anther-cells ovate-oblong to ovate, slightly granular, 1 mm; tubules slender, 1–1.5 mm. *Ovary* laxly yellowish hairy; style green, 4–5 mm. *Fruit* said to be blue-black.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy forest or crest jungle, 1525–3100 m, locally plentiful. *Fl.* March–Nov.

3. Diplycosia carrii SLEUM. Reinwardtia 4 (1957) 129; Blumea 12 (1964) 342.

Epiphytic shrub, slender, with pendent branches, 30–50 cm. Branchlets very slender, very densely clothed with rather fine rufous-brown patent bristles (3–4 mm) only. *Leaves* ovate, apex short acuminate, ± obtuse, the apical gland small and not very prominent, base ± rounded, subcoriaceous, glabrescent above the midrib and base of

the blade excepted, densely and apparently ± persistently patent-setulose (2–3 mm) beneath and along the margin, entire, remaining flat when dry, not revolute, 2–3 by (1.2–)1.3–1.9 cm, midrib slightly grooved above, prominent beneath, nerves 2–3 distant pairs, curved-ascending, very slightly impressed above or mostly as ± obscure as beneath; petiole slender, 2–3 mm, densely setulose. *Flowers* axillary, solitary. Pedicels rather slender, 4–5 mm at flowering time, finally up to 7 mm, densely patently rufous-setulose, basal bract minute. Bracteoles ovate, setulose dorsally, 1 mm. *Calyx* 3 mm, densely and very patently rufous-setulose (*c.* 4 mm), lobes ovate, subacute, *c.* 2 mm. *Corolla* white, shortly and broadly subcylindric-campanulate or depressedly urceolate, 5 by 6(–8) mm, rather densely clothed in the upper ⅔ with appressed rufous bristle-like hairs, which are crisped at the tips, glabrous towards the base, lobes deltoid, obtuse, erect, with two purple spots when fresh, *c.* 1.5 mm. *Filaments* linear, somewhat broadened above the base, *c.* 2 mm; anther-cells ovate-oblong, minutely echinulate, 1.3 mm; tubules rather narrow, *c.* 0.7 mm. *Ovary* glabrous; style 3 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu, eastern slope), twice found.

Ecol. Swampy forest, 1465–1500 m. *Fl.* April, July.

4. Diplycosia abscondita SLEUM. Blumea 11 (1961) 4; *ibid.* 12 (1963) 116; *ibid.* 12 (1964) 342.

Terrestrial shrublet, semidecumbent or erect up to 45 cm. Branchlets ± curved-ascending, brown red when fresh, densely set with subappressed, red brown or finally greyish, *c.* 2 mm long bristles. *Leaves* condensed at the upper part of the branchlets, subimbricate at the tips, elliptic-oblong, apex subacuminate, subacute, with a thickish terminal gland, base broadly attenuate, subcoriaceous, somewhat shining above, ± dull beneath, glabrous above, subdensely set underneath and along the margin with redbrown bristles, 1–2(–2.5) mm long and with a thickened base, tardily glabrescent, 6–10(–13) by 3–5(–6) mm, edge subserrate-crenulate (the teeth ending in a bristle), midrib a little impressed or inconspicuous above, slightly raised beneath, nerves and veins obscure; petiole setulose, 1–1.5 mm. *Flowers* solitary in distant upper axils. Pedicels stoutish, bent downwards, 3–4 mm at anthesis, setulose, with 2 or 3 ovate glabrous basal bracteoles (1–1.5 mm), and 2 bracteoles below the calyx. *Calyx* campanulate, *c.* 5 mm long in all, 5-partite to almost the base, subdensely rufous-setulose dorsally, lobes elongate-subovate, subacute. *Corolla* subcampanulate-cylindric, white, membranous, quite glabrous, 7–8 by 3–4 mm, lobes subacute, *c.* 2.5 mm, finally reflexed distally. *Filaments* filiform, glabrous, white, 4.5 mm; cells 1.7 mm, brownish, ovate-oblong, echinulate; tubules as long as, but much narrower than the anther-cells, filiform-cylindric, very shortly biaristate at the apex. *Ovary* laxly hairy, pale green when fresh; style white, glabrous, slender, 7 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. On bare rock on ridge, 2440–3200 m, apparently rare. *Fl.* July, Oct.

5. Diplycosia barbigera SLEUM. Bot. Jahrb. 71 (1940) 149; Reinwardtia 4 (1957) 130.

Climbing shrub, 3–4 m. Branchlets densely covered with dark rufous ± appressed bristles (*c.* 3 mm) at the tips, less densely so or scabrous by the remaining bases of the bristles in the older parts, dark brown when dry. *Leaves* ovate or elliptic-ovate, gradually acuminate towards the apex, acute, the apical gland small, base rounded or nearly so, coriaceous, stiff, shining especially above, mature ones entirely glabrescent above, laxly to subdensely set with curved, ± patent, dark rufous bristle-like hairs, or ultimately their bases below, more densely so at the somewhat revolute margin, (2–)2.5–4(–4.5) by 1.5–2.3(–2.6) cm, midrib impressed above, slightly prominent beneath, nerves 1–2 pairs from or somewhat above the base of the lamina, curved and high-ascending, very slightly impressed above, obsolete beneath; petiole stout, 1–2 mm. *Flowers* 1–2 in each of the upper axils, densely covered with long (3–4 mm) rather fine rufous bristles on the pedicels, and the external sides of both the bracteoles and the calyx lobes. Pedicels stoutish, *c.* 3(–4) mm, basal bracts subulate, minute. Bracteoles ovate, 1.2 mm. *Calyx* campanulate, lobes narrow-ovate, acuminate, 2 mm. *Corolla* urceolate, white or cream when fresh, rather thin, glabrous, 5 mm, lobes 2 mm. *Filaments* linear, glabrous, 2 mm; anther-cells 1.4 mm; tubules narrow, 1.2 mm. *Ovary* densely whitish hairy; style 4 mm. *Fruit* pale bluish.

Distr. *Malesia*: Borneo (Sarawak: Mt Lumut, Mt Dulit), thrice found.

Ecol. In open moss forest on exposed peak, 950–1300 m. *Fl.* Sept.

6. Diplycosia schramii SLEUM. Blumea 12 (1963) 116.

Epiphytic, few-stemmed shrub. Branches pendent, 1–2 m, few-branched distally. Branchlets 4–5 mm ø, young shoots very densely, older parts densely covered both with shorter, slender and ± crisped, and with longer and more robust, erect, 2–4 mm long, rusty, subappressed bristles. *Leaves* laxly arranged, broadly elliptic to almost rounded, apex shortly attenuate to subrotundate-obtuse, the terminal gland thick and protruding, base broadly attenuate into the petiole, more rarely almost rounded, coriaceous, dark green above, paler beneath, initially rather densely set on both faces with soft rusty subappressed bristles, glabrescent with age above only, entire, edge slightly revolute, (4–)4.5–6.5 by (2.5–)3–4.5(–5) cm, midrib and nerves narrowly impressed above, obtusely prominent beneath, nerves 2(–3) pairs high curved-ascending, the lowest pair coming from the base of the lamina, the other(s) from the midrib *c.* 1 cm above the base, shorter and less conspicuous than the basal pair; petiole (4–)5–8 by 2–3 mm. *Flowers* solitary, rarely in twos, very

rarely in threes in the upper axils, all over covered with the indumentum found on the branchlets and leaves, except the glabrous corolla. Pedicels stout, 5 mm at anthesis, up to 1 cm in fruit. Bracteoles ovate, *c.* 2 mm. *Calyx* cup-shaped, tube very short, lobes ovate-deltoid, *c.* 2.5 mm. *Corolla* urceolate-campanulate, thin, white, *c.* 4 mm. *Ovary* glabrous; style thickish, glabrous, 2.5 mm. *Fruit* first white-greenish, turning light bluish-purplish with maturity, 5–6 mm ø.

Distr. *Malesia*: NW. New Guinea (Vogelkop Peninsula: from the crest of Mt Nettoti).

Ecol. In dense mossy forest, 1850–1950 m, apparently rare. *Fl. fr.* Nov.–Dec.

7. Diplycosia saurauioides J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 456; SLEUM. Reinwardtia 4 (1957) 130.

Epiphytic shrub. Branchlets longish and coarsely setose in the older, very densely lanate-setose in the younger parts, the bristles rufous, ± crisped and ± patent. *Leaves* ovate to elliptic-ovate, apex mostly shortly abrupt-acuminate, the terminal gland distinct, base ± rounded, subcoriaceous, firm, entire, juvenile ones densely rusty lanate-setose on both faces, mature ones glabrescent above except the midrib, but rather densely persistently and coarsely setose underneath, the bristles ± erecto-patent, with thickened bases, rather short all over the proper undersurface, longer and more patent at the midrib beneath, 7.5–14 by 4.5–7.8 cm, midrib impressed above, strongly prominent beneath, nerves 5–6 pairs (with some more shorter and less distinct ones between them) curved-ascending, obscurely anastomosing, slightly impressed above, raised beneath, reticulation faint above, obsolete beneath; petiole stout, densely long-setose, 4–11 mm. *Fascicles* axillary, 4–5-flowered, patent- and crisped-setose in all parts, the corolla excepted. Pedicels rather slender, (3–)4–5(–7) mm. Bracteoles nearly reniform, covering each other at the base, glabrous inside, 1.5–2 mm. *Calyx* ± patent, 3 mm, lobes triangular, ± acute, inflexed, 1.5–2 mm. *Corolla* campanulate, suffused reddish violet, *c.* 6.5 mm, glabrous, lobes recurved, 2 mm. *Filaments* narrow, wavy, glabrous, 3 mm; anther-cells oblong, granular, *c.* 1.5 mm; tubules straight, 1 mm. *Ovary* glabrous; style 5 mm.

Distr. *Malesia*: Central East Borneo (summit of Mt Kemul), once found.

Ecol. Primary forest at 1850 m. *Fl.* Oct.

8. Diplycosia clementium SLEUM. Bot. Jahrb. 71 (1940) 151; Reinwardtia 4 (1957) 130; Blumea 12 (1963) 116. — **Fig. 70.**

Epiphytic, climbing or decumbent shrub, *c.* 2 m. Branchlets greyish corticate, glabrescent, young shoots very densely clad with rufous, patent, bristle-like hairs (2–3 mm). *Leaves* ovate to sub-oblong-ovate, apex gradually acuminate, subacute, slightly curved, the terminal gland small, base rounded to subcordate, or sometimes nearly truncate, firmly subcoriaceous, the very young ones longish rufous- or golden-brown-hairy on both faces, glabrescent and becoming scabrous with age, finally glabrous above, rather densely ± patently long-setulose beneath, especially on the midrib and along the margin, entire or subdenticulate by the persistent bases of the marginal bristles, 5–9(–10) by (2.3–)3–4.5(–5.5) cm, midrib and nerves impressed above, the first markedly, the latter less distinctly prominent beneath, nerves 6–7 pairs curved-ascending and inarching in some distance from the edge; petiole patent-rufous-setose, stoutish, 4–6 mm. *Flowers* axillary, 2–4 per fascicle, or rarely solitary. Pedicels slender, densely covered with (2–)3–4(–5) mm long bristle-like rufous hairs as are the bracteoles and the calyx outside, (8–)10–13 mm, basal bracts small, scariose. Bracteoles ovate, 1 mm. *Calyx* campanulate, 3.5–4 mm, lobes triangular, subacute, *c.* 2 mm. *Corolla* narrow-campanulate, cream, pale green or mostly slate blue to brownish purple, lobes pink to purplish, inner base greenish, somewhat fleshy, very densely covered outside with longish ferrugineous and ± crisped, not setose hairs, glabrous inside, 6–7 mm, lobes acutish, 2.5 mm. *Filaments* subulate, glabrous, 3.5 mm; anther-cells very granular, 2.8 mm; tubules rigid, 1.2 mm. *Ovary* glabrous; style 5 mm. *Fruit* greenish purplish, *c.* 3.5 mm ø.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In low jungle and jungle ridge, occasionally also in moss forest, 1370–2900 m, once reported from 3650 m, not rare. *Fl.* Jan.–Dec.

9. Diplycosia aurea SLEUM. Bot. Jahrb. 71 (1940) 148; Reinwardtia 4 (1957) 131. — *D. rufa* (*non* STAPF) MERR. En. Born. (1921) 465 *p.p.*

Epiphytic shrub or small recumbent tree. Branchlets densely clothed with fine, golden, manifestly appressed subsetulose hairs in the young parts, glabrescent and greyish in the older ones. *Leaves* ovate to oblong-ovate, apex gradually or rather abruptly acuminate, acute, not rarely somewhat curved, the terminal gland small, base rounded to subcordate, subcoriaceous or coriaceous, very young ones subdensely covered with long appressed dilutely golden setose hairs on both faces, mature ones entirely glabrescent and shining above, but ± permanently hairy beneath, especially along the margin, the hairs finally caducous, the undersurface becoming punctate then, margin ciliate-serrulate, 5–8(–11) by 2.5–3.5(–4.5) cm, midrib impressed above, prominent beneath, nerves 3–4 pairs, curved-ascending and anastomosing, slightly impressed above, obsolete beneath; petiole densely rufous-setulose, 2–3(–4) mm. *Flowers* axillary, solitary or mostly 2 or 3 in a fascicle, very densely hirsute by long, rufous-golden, bristle-like, ± appressed hairs in all parts, the corolla excepted. Pedicels stout, 7–8(–10) by 1–1.5 mm, basal bracts minute. Bracteoles ovate-acuminate, *c.* 4 mm, glabrous inside. *Calyx c.* 6 mm, 5-lobed to nearly the base, lobes glabrous at the base only, ± including the corolla. *Corolla* urceolate, fleshy, glabrous, greenish or brownish creamy, 6–7 mm, lobes short-reflexed, purplish. *Filaments* glabrous, linear,

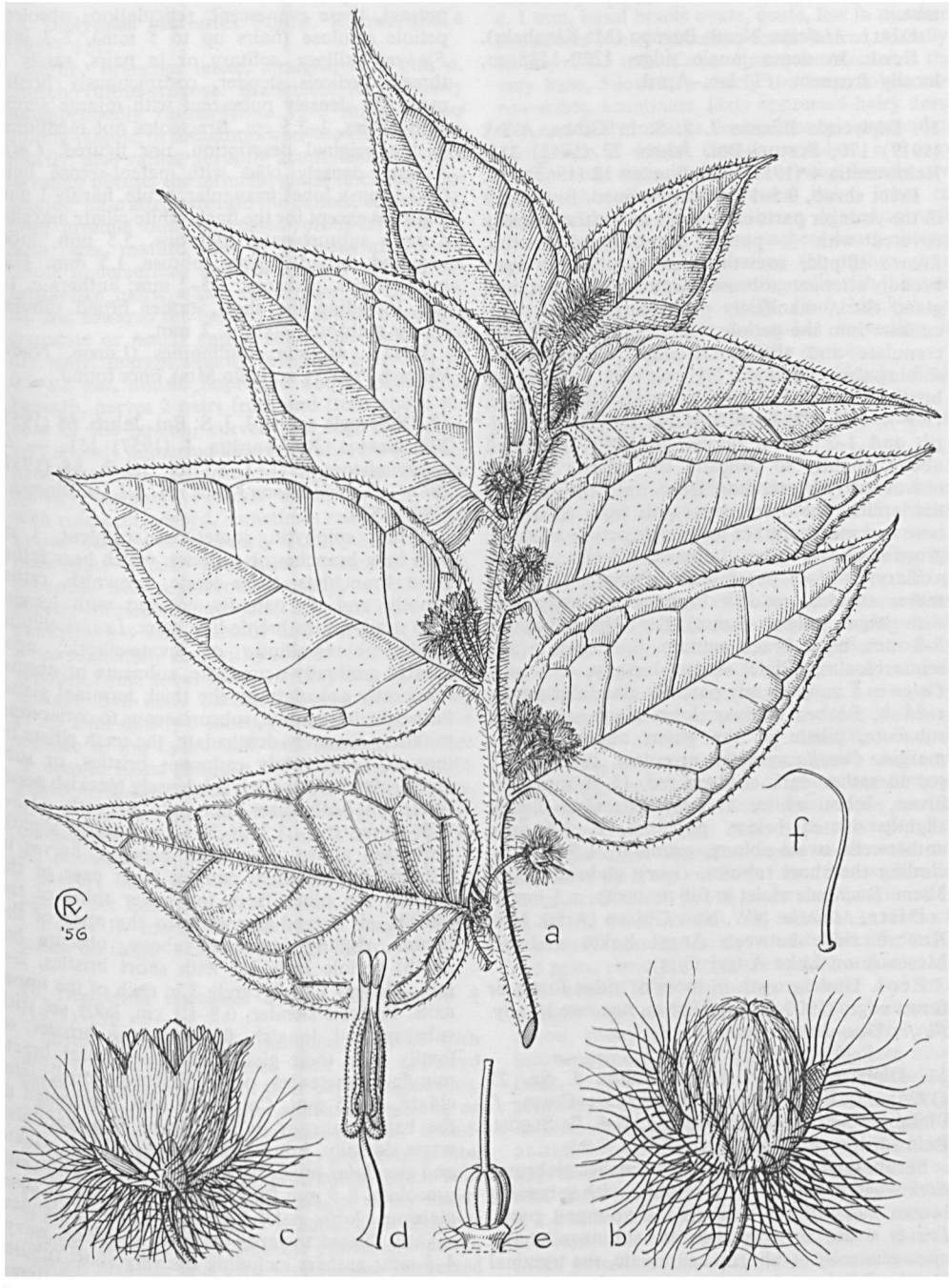

Fig. 70. *Diplycosia clementium* SLEUM. *a.* Habit, × ⅔, *b.* flower bud, × 3, *c.* flower, × 3, *d.* stamen, front view, × 6, *e.* ovary and style, × 3, *f.* bristle, × 14 (*a–f* CLEMENS 33132).

3.5 mm; anther-cells granular, 2 mm; tubules narrow, slender, 1.6 mm. *Ovary* glabrous; style 4 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In dense jungle ridge, 1220–1525 m, locally frequent. *Fl.* Jan.–April.

10. Diplycosia lilianae J. J. S. in Gibbs, Arfak (1917) 170; SLEUM. Bot. Jahrb. 72 (1942) 211; Reinwardtia 4 (1957) 131; Blumea 12 (1963) 117.

Erect shrub, 0.5–1 m, few-stemmed. Branchlets in the younger parts exclusively and rather densely covered with ± patent, gland-tipped bristles. *Leaves* elliptic, sometimes more obovate, apex broadly attenuate, obtuse or rounded, the terminal gland thick, manifestly protruding, base broad-cuneate into the petiole, coriaceous, margin subcrenulate and slightly revolute, glabrous and shining above, dull and laxly set with ± caducous bristles beneath as are the margin and the petiole, (1.5–)2–3.5(–4.3) by (0.9–)1.2–2.5(–3.5) cm, midrib and 1–2 lateral nerves markedly impressed above, slightly so beneath, the inferior pair of nerves curved-ascending from near the base of the lamina, the other upper pair from above the base and mostly rather indistinct; petiole thickish, grooved above, rather flattened, 3–5 mm. *Flowers* axillary, 2–3(–4) per fascicle. Pedicels recurved, rather slender, reddish brownish, densely clad with patent, longish (2 mm), gland-tipped bristles, 5–8 mm, basal bracts minute. Bracteoles ovate-semiorbicular, ciliate, setose dorsally, *c.* 1 mm. *Calyx c.* 5 mm, densely patently glandular-setose, reddish, 5-lobed halfway, lobes ovate-acuminate, subacute, ciliate at the paler, almost whitish margin. *Corolla* cylindric-urceolate, bright brick red to rather dark crimson red, (5–)6 mm, glabrous, lobes white, 1 mm. *Filaments* linear, slightly dilated below, papillose, *c.* 3.5 mm; anther-cells ovate-oblong, granular, 1.5 mm including the short tubules. *Ovary* glabrous; style 3 mm. *Fruit* pale violet at full maturity, *c.* 5 mm ø.

Distr. *Malesia*: NW. New Guinea (Arfak Mts: Koëbré ridge between Anggi Lakes and Mt Mesenuk on Lake Anggi Gita).

Ecol. Undergrowth in moss or ridge forest or forest edge, (1900–)2150–2300 m, not rare locally. *Fl. fr.* Dec.–Jan.

11. Diplycosia loheri MERR. Philip. J. Sc. 27 (1925) 44; En. Philip. 4 (1925) 253; COPEL. *f.* Philip. J. Sc. 47 (1932) 67, t. 1, f. 6, 7; SLEUM. Reinwardtia 4 (1957) 131.

Shrub, apparently scandent. Branches glabrous, dark when dry. Branchlets setulose with spreading brown hairs (0.5–3 mm) in the youngest parts. *Leaves* ovate or elliptic-ovate, subinequilateral, apex gradually ± shortly acuminate, the terminal gland slightly or not prominent, base broad-attenuate to rounded, subcoriaceous with scattered rufous bristle-like hairs (1–2 mm) on both faces and along the margin, later ± glabrescent above, the hairs in part caducous beneath, leaving dark glandular points, 2.5–4 by 1.5–2.5 cm, midrib impressed above, somewhat raised beneath, nerves obscure, frequently only a subbasal curved-ascendent pair visible, never more than 2 pairs present, these evanescent, reticulations obsolete; petiole setulose (hairs up to 5 mm), 2–3 mm. *Flowers* axillary, solitary or in pairs, rarely in threes. Pedicels slender, conspicuously bristly, moreover densely pubescent with minute simple white hairs, 1–2.5 cm. Bracteoles not mentioned in the original description, nor figured. *Calyx* 3 mm, densely clad with patent-setose hairs (1–2.5 mm), lobes triangular, acute, hardly 1 mm, glabrous except for the finely white-ciliate margins. *Corolla* subturbinate, glabrous, 5.5 mm, lobes recurved, broadly ovate, obtuse, 1.5 mm. *Filaments* linear, glabrous, 1.5–2 mm; anthers *c.* 1.4 mm including the short, rather broad tubules. *Ovary* glabrous; style *c.* 2 mm.

Distr. *Malesia*: Philippines (Luzon, Nueva Vizcaya Prov.: Caraballo Mts), once found.

12. Diplycosia aperta J. J. S. Bot. Jahrb. 68 (1937) 208; SLEUM. Reinwardtia 4 (1957) 131. — *D. pokapindjangensis* J. J. S. Bot. Jahrb. 68 (1937) 204. — *D. undata* (*non* J. J. S.) H. J. LAM, Blumea 5 (1945) 574.

Shrub, epiphytic, sometimes scandent, 1 m, with long branches or stolones, which bear rather short branchlets, these terete, brownish, rather densely and ± patently covered with longish (2–3 mm) rufous bristle-like hairs. *Leaves* elliptic, rarely oblong-elliptic or ovate-elliptic, apex shortly gradually acuminate, subacute or obtuse, manifestly apiculate by the thick terminal gland, base broad-attenuate, subcoriaceous to coriaceous, minutely remotely denticulate, the teeth ciliate by longish, rather early caducous bristles, or subentire, glabrous, though subdensely blackish punctulate on both faces especially beneath, (1.2–)2–3(–4) by (0.7–)1.3–2(–2.5) cm, midrib slightly impressed above, prominent beneath, nerves in 2 pairs, one of them coming from base of the lamina, the other from the lower third of the midrib, all curved-ascending to the apex of the lamina, slightly impressed above, obscure beneath; petiole laxly set with short bristles, 2–4 mm. *Flowers* 1 or 2, rarely 3 in each of the upper axils. Pedicels slender, 0.8–1.1 cm, laxly set with subappressed, longish, fine caducous bristles, or finally with their gland-like bases, basal bracts minute. Bracteoles ovate, obtuse, muriculate-ciliate, *c.* 1.5 mm. *Calyx c.* 3 mm, contracted at the base, glabrous or with some fine glandular warts dorsally, lobes ovate, rather obtuse, ciliate and glandular-muriculate, 2 mm. *Corolla* elongate-urceolate, 8–9 mm long, *c.* 2.5 mm ø, red or rose, glabrous, lobes pale, 1.5 mm. *Filaments* slender, slightly dilated towards the base, glabrous, wavy, 4–5 mm; anthers including the very short tubules *c.* 2.8 mm. *Ovary* glabrous or with some scattered hairs; style *c.* 4 mm, completely or at least in its upper ⅔ shortly patent-pubescent. *Fruit* said to be blue.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Ra.: Mt Pokapindjang and its spurs Mt Mambuliling, N of Mamasa).

Ecol. In ridge forest and subalpine thickets, 2400–3000 m, locally not rare. *Fl.* June, Aug., Nov.

13. Diplycosia pubivertex SLEUM. Reinwardtia 4 (1957) 131.

Shrub. Branches terete, straight, *c.* 3 mm ø, densely rufous-strigose. Branchlets very densely subappressedly rufous-setose (2–3 mm). *Leaves* oblong-elliptic, or sometimes obovate-elliptic, apex shortly, also rather abruptly acuminate, subacute to rather obtuse, the terminal gland thick and protruding, base attenuate into the petiole, coriaceous, firm, juvenile ones appressed-rufous-setulose on both faces, mature ones ± glabrous above, the whole undersurface and the margin with rufous bristle-like hairs, which are longer on the midrib and towards the base of the lamina, obscurely crenulate or nearly entire, somewhat concave in dry state, margin slightly revolute, 2–3(–3.5) by 0.9–1.5 cm, midrib impressed above, prominent beneath, nerves 2 pairs from and from above the base of the lamina, curved and high-ascendent, very slightly immersed above, ± obscure beneath; petiole stoutish, setulose, 3–4 by 1 mm. *Flowers* axillary, solitary. Pedicels stout, densely clad with rufescent crisped, sometimes minutely gland-tipped hairs, 4–5 by nearly 1 mm, basal bracts numerous, small. Bracteoles ovate-acuminate, subacute, nearly glabrous dorsally, margin very shortly muriculate-fimbriate, 2 mm. *Calyx* campanulate, 8–9 mm, dorsally and especially at the lobes subdensely clad with rufescent rather crisped setulose hairs, lobes narrow-triangular, subacute, upright, 5–6 mm. *Corolla* subcylindric, 8–9 by *c.* 2.5 mm, shortly 5-lobed, rather densely clothed outside in the upper half with longish rufescent ± crisped hairs, glabrous below as well as inside. *Filaments* linear, dilated towards the base, glabrous, *c.* 4.5 mm; anthers subovate-oblong, 3 mm including the tubules (1 mm). *Ovary* densely yellowish pubescent; style 7 mm.

Distr. *Malesia*: N. Sumatra (Atjeh, Gajo Lands: Mt Losir), two collections.

Ecol. In mountain scrub and burned vegetation on ridge, 2950–3500 m. *Fl.* Febr.

14. Diplycosia atjehensis SLEUM. Reinwardtia 4 (1957) 132.

Shrub. Branchlets obtusangular, covered with greyish cork, tips brownish with some scattered short caducous bristles, or their bases, or glabrous. *Leaves* elliptic to obovate, sometimes oblong or broad-elliptic to nearly rounded, apex broad-attenuate, obtuse or rounded, also emarginate, apiculate by a thick dark protruding gland, base broadly cuneate into the petiole, or rarely nearly rounded, stiff-coriaceous, shining and glabrous above, dull and laxly blackish punctate beneath, margin revolute and with very minute impressed crenulations, (2.5–)4–5 by 1.5–2.5(–3) cm, midrib impressed above, thick and prominent beneath, nerves 2–3 pairs, rather inconspicuous on both faces; petiole stout, rugulose, glabrous or sometimes with some short bristles on the uppermost leaves, 4–6 by 1.5–2 mm. *Flowers* 1–2, rarely 3 per axil. Pedicels clothed with short rufescent rough hairs with some short thick glandular hairs between, glabrescent in later stages, 4–6 by *c.* 1 mm, basal bracts ovate, acute, few in number. Bracteoles ovate, apiculate, rough-haired dorsally, ciliate, *c.* 1.5 mm. *Calyx* 5 mm, contracted at the very base, 5-lobed to nearly the base, lobes narrow-ovate, acuminate, laxly appressed-hairy dorsally, especially towards the tips, margin muriculate and ciliate, *c.* 4 mm. *Corolla* urceolate, *c.* 6 mm, glabrous on the very base, otherwise densely covered with yellowish appressed hairs, lobes reflexed, *c.* 1 mm. *Filaments* linear, dilated towards the base, papillose, 2.8 mm; anthers ovate-oblong, echinulate, 2.5 mm including the rather short tubules. *Ovary* rather densely yellowish hirsute; style as long as the corolla. *Fruit* blackish, *c.* 5 mm ø, calyx lobes somewhat spreading in their upper half; capsule hirsute on top.

Distr. *Malesia*: N. Sumatra (Atjeh, Gajo Lands: Mt Losir and Putjuk Angasan).

Ecol. In ridge forest or scrub, 2500–3500 m. *Fl.* Jan.–Febr.

15. Diplycosia penduliflora STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 193, t. 14, f. C 7; MERR. En. Born. (1921) 465; SLEUM. Reinwardtia 4 (1957) 133; Blumea 12 (1963) 117. — Fig. 78c.

Shrub, *c.* 1 m, lax, decumbent, terrestrial or epiphyte, sometimes climbing. Branches terete, greyish corticate. Branchlets subangular, brownish, with some scattered long and ± appressed bristles in the youngest parts, which bear not yet fully developed leaves, otherwise glabrous. *Leaves* elliptic or ovate-elliptic, sometimes ± ovate or oblong, apex rather shortly and ± abruptly caudate-acuminate, acute, the terminal gland small, not protruding, base rounded or broad-cuneate, occasionally slightly cordate, coriaceous at full maturity, very young ones with scattered very short glandular appressed hairs underneath, mature ones glabrous on both faces, but with rather indistinct blackish points underneath, entire, (11–)12–18 by (4–)5–9(–12) cm, midrib ± distinctly impressed above, thickly raised beneath, nerves 4–5 pairs, remote, curved-ascendent and inarching with several less distinct or shorter and more straight ones between them, slightly immersed above, prominent beneath, veins mostly rather inconspicuous; petiole thick, canaliculate above, thick, 4–5 by 1.5–2 mm. *Flowers* mostly solitary, sometimes in twos, from the axils of the inferior defoliate part of the branchlets. Pedicels filiform, at anthesis (2–)2.5–3.5 cm, laxly set with longish appressed early caducous bristle-like hairs. Bracteoles narrow-ovate, subacute, glabrous, ciliolate, 1–1.5 mm. *Calyx* pear- or funnel-shaped, rugulose, 3–4 mm, only slightly accrescent in fruit, glabrous, lobes patent, ovate, acute, glandular-ciliate, 1–1.5 mm. *Corolla* pale green, short-urceolate, rounded at the base, the mouth broadly open, 4 mm, glabrous, shortly 5-lobed, lobes rather straight, 1.5 mm. *Filaments* linear, glabrous, 1.5 mm; anther-cells ovate-oblong, granular, 1.3 mm; tubules 0.7 mm. *Ovary* glabrous; style 2–2.5 mm. *Fruit*

blue or purplish, finally blackish.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In wet (*Tristania*-)forest, 1070–1525 m. *Fl.* Jan., Aug.

16. Diplycosia ciliolata HOOK. *f.* Ic. Pl. (1852) t. 894; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 192; GIBBS, J. Linn. Soc. Bot. 42 (1914) 101; MERR. En. Born. (1921) 463; COX, Am. Midl. Nat. 40 (1948) 499 (*anat.*); SLEUM. Reinwardtia 4 (1957) 133; Blumea 12 (1963) 117. — *Gaultheria ciliolata* (HOOK. *f.*) F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 21, *in text.* — Fig. 77f.

Treelet or shrub, 1–2(–3, sometimes up to 4) m. Branches erect and ± spreading, terete, glabrous, blackish when dry. Branchlets densely subappressed rufous-setose in the young parts, greyish so in the older ones. *Leaves* very dense, ± patent, narrow-elliptic-lanceolate, apex acuminate, subacute, the terminal gland small, but well visible, base attenuate, subcoriaceous, reddish when very young, margin subcartilaginous, crenate-serrulate, the teeth minute and ± long, but caducously ciliate, glabrous above, laxly caducously setulose or punctate beneath, 8–14 by (1.8–)3–4.5 mm, midrib impressed above, poorly visible beneath, nerves inconspicuous; petiole *c.* 1 mm. *Flowers* axillary, solitary. Pedicels rather stoutish, short-hairy, 2–3 mm, basal bracts minute. Bracteoles ovate, acuminate, glabrous dorsally, ciliate, 1 mm. *Calyx* 3 mm, deeply 5-lobed, green with purple tinge, glabrous, lobes narrow-ovate, acuminate, shortly glandular-fimbriate, 2.5 mm. *Corolla* urceolate-cylindric, white or pink, sometimes cream-green, glabrous, 5–6 by 2.5(–3.5) mm, lobes suberect, 1.5 mm. *Filaments* linear, glabrous, 3.5 mm; anther-cells ovate-oblong, very granular, including tubules 2.5 mm. *Ovary* yellowish hirsute; style 4.5 mm. *Fruit* blackish blue, somewhat shining, *c.* 4 mm ø.

Distr. *Malesia*: North Borneo (Mt Kinabalu and Mt Trus Madi).

Ecol. In mossy forest, dwarf forest, on exposed ridge crest, rather common in open places on the granite core of Mt Kinabalu, 1830–3500 (–3650) m. *Fl. fr.* Jan.–Oct.

17. Diplycosia filipes SLEUM. Reinwardtia 4 (1957) 133. — Fig. 77j.

Epiphytic shrublet. Branchlets subterete, slender, greyish corticate in the older parts, rather densely and longish (1.5–2 mm) clothed with appressed rufescent fine bristles in the younger ones. *Leaves* lanceolate or oblong-lanceolate, apex gradually short-acuminate, subacute, the terminal gland small and only slightly protruding, base attenuate into the petiole, acute, subcoriaceous, glabrous above, sparsely blackish punctate beneath, regularly minutely crenulate-denticulate, the teeth in the young leaves passing into a rather long, early caducous bristle-like hair, 12–20 by 4–6 mm, midrib impressed above, slightly prominent beneath, nerves obscure; petiole setulose, *c.* 1.5 mm. *Flowers* axillary, solitary. Pedicels slender, laxly and shortly ± appressed-setulose initially, finally glabrous, (5–)6–7 mm, basal bracts minute. Bracteoles small, ovate-obtuse, glabrous. *Calyx* 2.5–3 mm, glabrous, 5-lobed halfway, lobes ovate, acutish, glandular-fimbriate. *Corolla* not seen in a fully developed state, apparently urceolate and, to conclude from the length of the style, *c.* 4 mm long, glabrous, said to be red. *Stamens* not yet known in a fully developed state. *Ovary* glabrous; style 3.5 mm. Immature *fruit* contracted at the base, *c.* 3 mm ø.

Distr. *Malesia*: Central Celebes (between Kambuno and Tomadu), one collection.

Ecol. In rather light forest, near rockery, 2550–2800 m. *Fl.* July.

18. Diplycosia rufescens SCHLTR, Bot. Jahrb. 55 (1918) 163, f. 7 A–G; SLEUM. *ibid.* 72 (1942) 211; Reinwardtia 4 (1957) 134.

Erect shrub, *c.* 1 m, epiphytic. Branches and branchlets terete, the latter densely subappressed-rufous-setose (*c.* 1.5 mm), laxly leaved. *Leaves* rather narrowly oblong-elliptic, apex gradually acuminate, subacute, the terminal gland small, only slightly protracted, base ± broadly attenuate, firmly subcoriaceous, glabrous above at maturity, laxly to subdensely covered with stiff rather coarse and ± appressed rufous bristles (2–3 mm) beneath, which partly go, partly persist for a long time especially on the midrib, finally only brownish punctate underneath, entire or indistinctly denticulate, (2–)2.5–4(–5) by (0.8–)1–1.7 (–2) cm, midrib impressed above, slightly raised beneath, nerves 2(–3) pairs high curved-ascending, indistinctly anastomosing, mostly hardly visible above, rather obscurely raised beneath; petiole stoutish, setulose, 2–3 mm. *Flowers* solitary or in twos in the upper axils. Pedicels recurved, densely and ± patently (subglandular-)setulose, (5–)6–8 mm at anthesis, up to 10 mm in later stages, basal bracts scariose, minute. Bracteoles ovate, glabrous, ciliolate, 1 mm. *Calyx c.* 3 mm, glabrous, lobes ovate, ciliolate, *c.* 2 mm. *Corolla* subglobose-urceolate, glabrous, whitish or rose when fresh, *c.* 5 mm ø, very shortly 5-lobed. *Filaments* filiform, glabrous, 2.5 mm; anther-cells oblong-ovate, very granular, *c.* 2 mm including the very short tubules. *Ovary* glabrous; style 3.5 mm. *Fruit* red, *c.* 7 mm ø.

Distr. *Malesia*: NE. New Guinea (Sepik region).

Ecol. In dense mountain forest, 850–1500 m. *Fl. fr.* July-Oct.

19. Diplycosia triangulanthera J. J. S. Bot. Jahrb. 68 (1937) 207; SLEUM. Reinwardtia 4 (1957) 134.

Shrub, whether or not epiphytic, 0.5 m. Branches elongate, divergent, slender. Branchlets densely and rather patently rufous-setulose (*c.* 1.5 mm) in the young, gradually glabrescent in the older parts. *Leaves* elliptic to ovate, apex broad-acuminate, the terminal gland rather thick and protruding, base broadly attenuate to rounded, young ones laxly clothed with longish ± patent setulose hairs on both faces and the margin, glabrescent with age, the marginal bristles ±

permanent, the undersurface finally dotted with blackish points, margin superficially denticulate, (0.9–)1.2–1.7(–1.9) by (0.5–)0.6–1 cm, midrib slightly impressed above, other nervation obscure; petiole setulose, 1–2 mm. *Flowers* 1–2(–3) in the upper axils. Pedicels slender, shortly patent-setulose, (6–)8–10 mm, basal bracts several, very small. Bracteoles broad-ovate, subglandular-ciliolate, 1 mm. *Calyx* 2.5 mm, contracted at the base, glabrous, lobes broad-ovate, 1.4 mm, margin very shortly glandular-muriculate and ciliolate. *Corolla* broadly campanulate-urceolate, slightly constricted at the mouth, glabrous, white, *c.* 4 mm long and wide, lobes short, recurved. *Filaments* linear, inflexed, glabrous, 1.5 mm; anthers triangular-ovate, granular, *c.* 1 mm including the very short tubules. *Ovary* glabrous; style 2 mm. *Fruit* blackish blue, *c.* 5 mm ø.

Distr. *Malesia*: Central Celebes (Todjambu near Palopo; Puna near Poso).

Ecol. In open primary rain-forest, on quartzite, peaty soil, 1000–1800 m. *Fl. fr.* June.

20. Diplycosia kjellbergii J. J. S. Bot. Jahrb. 68 (1937) 206; SLEUM. Reinwardtia 4 (1957) 122, *in clavi*; Blumea 11 (1961) 6.

Epiphytic, scandent shrub. Branches slender, laxly setulose or glabrescent. Branchlets densely, their angular tips even more densely and ± patently setulose (1.5–2 mm). *Leaves* elliptic, apex shortly or subabruptly acuminate, the apical gland rather small, base cuneate, subcoriaceous to chartaceous, very laxly setulose on both faces when young, glabrescent with age above, minutely denticulate, each tooth passing into a long ± persistent bristle, (1.4–)2–3.2 by (0.8–)1.2–1.7 cm, midrib slightly impressed above, prominent beneath, nerves 2 pairs, one pair low, the other higher from the midrib, ± faintly visible beneath as are the mayor veins; petiole setulose, 1.5–2 mm. *Flowers* axillary, solitary. Pedicels slender, subdensely and ± patently longish setulose, (3–)4(–5) mm. Bracteoles ovate-suborbicular, very laxly setulose dorsally, ciliate, *c.* 1.2 mm. *Calyx* 4 mm, all over subdensely and ± patently covered with longish (2 mm), ± crisped, rufescent hairs, lobes ovate-triangular, subacute, 2.5 mm. *Corolla* urceolate, glabrous or with some solitary scattered hairs at the lobes, red, 6.5 by 2.5 mm, lobes 1 mm. *Filaments* linear, very slightly dilated towards the base, glabrous, 3 mm; anthers 1.8 mm including the very short and broad tubules. *Ovary* glabrous; style nearly 3 mm. *Fruit* dark blue, laxly set with rufescent setose hairs, *c.* 5 mm ø.

Distr. *Malesia*: SE. Celebes (Porema S of Malili), 1500 m. One collection. *Fl. fr.* Oct.

21. Diplycosia hirsuta SLEUM. Bot. Jahrb. 71 (1940) 154; Reinwardtia 4 (1957) 135.

Shrub, terrestrial or epiphytic. Branchlets greyish and laxly patently setose in the older, reddish brown and very densely setose (2–3 mm) in the recent parts. *Leaves* ovate, shortly, sometimes ± abruptly acuminate, acute, the terminal gland small, base rounded to slightly cordate, subcoriaceous, entire, soft-setulose along the midrib and nerves above, densely and patently so (0.5–1.5 mm) all over the undersurface especially on the midrib, longish setulose-ciliate along the margin, 3.5–6 by (2–)2.5–3.5 cm, midrib impressed above, prominent beneath, nerves 2 pairs from and somewhat from above the base of the lamina, curved-ascending, other nerves from the midrib in 1–2 less distinct pairs, all slightly impressed above, ± raised beneath, reticulation only visible on the upperside of old leaves; petiole stout, densely setose, 2–3(–4) by 1.5 mm. *Flowers* axillary, solitary or in twos. Pedicels very slender, nearly filiform, rather laxly set with patent bristle-like hairs, 0.8–1.3 cm, accrescent in fruit up to 2 cm. Bracteoles broad-ovate, glabrous, ciliate, *c.* 1 mm. *Calyx* *c.* 3 mm, with some bristle-like hairs dorsally and at the lobes, glabrous otherwise, lobes ovate, obtuse, shortly glandular-fimbriate, 1.5 mm. *Corolla* urceolate, glabrous, deeply red, 1–1.1 cm long, 4–5 mm ø (*c.* 6 mm at base), shortly 5-lobed. *Filaments* linear, glabrous, 4–5 mm; anthers inflexed at base, oblong, echinulate, 2.5 mm including the rather short tubules. *Ovary* glabrous; style 6–7 mm. *Fruit* black when dry, bluish when fresh, glabrous, 6–7 mm ø.

Distr. *Malesia*: Central Celebes (Mt Ponáa and the Kambuno massif).

Ecol. Margin of a quartzite peaty plateau, 1500–1700 m. *Fl.* Aug.-Sept.

22. Diplycosia rosea SLEUM. Reinwardtia 4 (1957) 135; Blumea 12 (1963) 117. — **Fig. 71.**

Epiphytic or mostly terrestrial, few-stemmed shrub, 0.5–1(–2) m. Branchlets elongate, terete, rather densely and ± patently greyish setose in the older parts, very densely clothed with patent, rufous bristles on young shoots. *Leaves* elliptic, broadly attenuate to ± rounded at the apex, the terminal gland thick and prominent, base rounded or rarely cuneate, coriaceous and stiff at maturity, somewhat convex, dark olive green above, lighter green below, young ones clad with scattered brownish bristle-like appressed hairs (1.5–2 mm), when full-grown blackish punctulate above, more persistently and ± patently rufous-setulose beneath, minutely crenulate or obscurely denticulate, setose-ciliate, (1.5–)2–3(–5) by 1.2–1.6(–2) cm, midrib impressed above, indistinct beneath, nerves 1–2 pairs from and from above the base and curved upwards to the apex of the lamina, very slightly impressed above, other nerves in 2–3 pairs higher from the midrib, less visible or nearly obscure; petiole setose, (2–)3–4 by 1 mm. *Flowers* axillary, solitary or in twos, rarely in threes. Pedicels slender, nodding, ± densely clad with subpatent ± crisped and minutely gland-tipped setose hairs, 6–10(–12) mm. Bracteoles ovate-acuminate, glabrous dorsally, glandular-muriculate and ciliolate at the margin, 1 mm. *Calyx* pinkish red, 3 mm, covered ± densely, especially towards the darker base, with short, stoutish and ± crisped glandular hairs except the lobes, the latter ovate obtuse, glandular-muriculate and ciliolate along the margin, 2 mm. *Corolla* urceolate-cylindric, rather fleshy, glabrous,

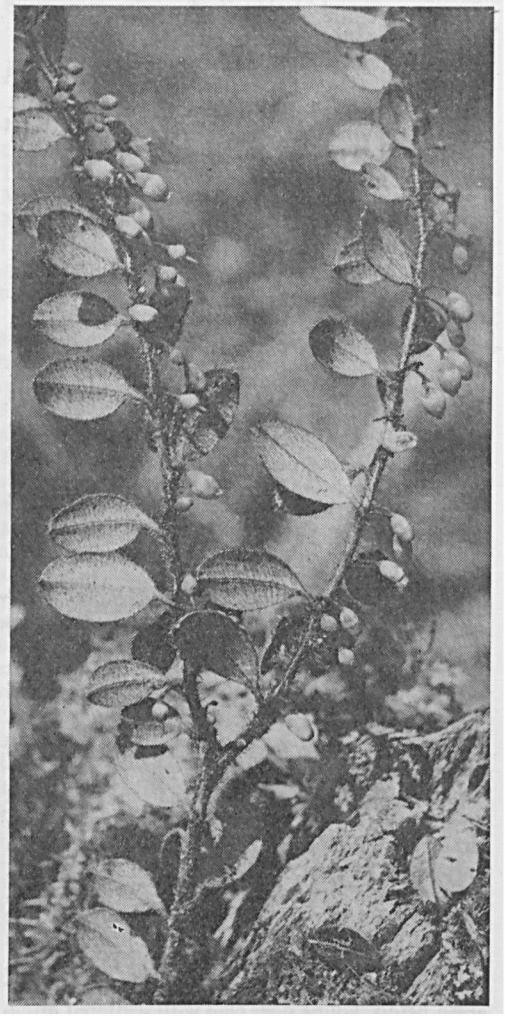

Fig. 71. *Diplycosia rosea* SLEUM. Mt Nettoti, 1900 m, NW. New Guinea (VAN ROYEN & SLEUMER 7438 (SLEUMER, 1961).

deep pink, tips whitish, (5–)6 by 2.5 mm. *Filaments* linear, somewhat dilated towards the base, glabrous, 4 mm; anthers oblong, 2 mm including the rather short and broad tubules. *Ovary* glabrous; style 3 mm. *Fruit* dark purple, *c.* 5 mm ø.

Distr. *Malesia*: NW. New Guinea (Vogelkop Peninsula: Nettoti Ra.).

Ecol. Mossy *Nothofagus-*, *Xanthomyrtus-*, and *Podocarpus*-forest and in more open heath vegetation, common, 1750–2100 m. *Fl. fr.* Oct.–Dec.

23. Diplycosia setosa J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 51; Nova Guinea 12 (1914) 145, t. 37 B; *ibid.* 18 (1936) 99; SLEUM. Bot. Jahrb. 72 (1942) 211; Reinwardtia 4 (1957) 135; Blumea 12 (1963) 117.

Shrub up to 1 m, terrestrial or mostly epiphytic, creeping or climbing on tree trunks. Branchlets lobes narrow-triangular, acute, erecto-patent, ciliolate, 2.5–3 mm. *Corolla* urceolate, 6 mm long, stout, terete, tips exclusively and densely subappressed-setose. *Leaves* elliptic to subovate-elliptic, apex obtuse or broadly attenuate, the terminal gland callous and protruding, base cuneate, coriaceous, dark green above, greyish or light green below, when young appressedly rufous-setose on both faces, mature ones glabrous and rather shining above, dull beneath, ± densely set with short (0.5–1 mm) subappressed bristles, these rather early caducous except the bases which remain as blackish, glandular points, margin subrevolute, entire or almost so, 3–5(–6.5) by (1.3–)2.5–3.5(–4.5) cm, midrib markedly impressed above, raised beneath, nerves 2–3 pairs, 1 or 2 of them ± basal, the other from the midrib, all curved and high-ascending, slightly impressed above, somewhat raised beneath, or ± obscure; petiole grooved above, rufous-setose initially, glabrescent, (3–)4–8 by 1.5–2(–3) mm. *Flowers* 1–2 per axil. Pedicels rather stoutish, especially in later stages, densely subappressed- or crisped-setulose (1.5–2 mm), 1.2–1.8(–2) cm. Bracteoles ovate-subacuminate, dorsally shortly subappressed or ± crisped-setulose, *c.* 2 mm. *Calyx c.* 4.5 mm, glabrous at the very base, otherwise ± densely and shortly setulose (at least in the upper part of the lobes), lobes spreading, triangular, subacute, *c.* 3 mm. *Corolla* urceolate, pale to dark pink, lobes paler to almost white, fleshy, glabrous, 7–9 by 3.5 mm, lobes obtuse, ± spreading, 1.3 mm. *Filaments* linear, wavy, glabrous, 3 mm; anthers ovate-oblong, papillose, 2 mm including the very short tubules. *Ovary* glabrous; style 5–6 mm. *Fruit* greenish-purplish, *c.* 6 mm ø.

Distr. *Malesia*: N. New Guinea (Cycloop Mts).

Ecol. In ridge forest, 1400–1880 m. *Fl. fr.* June–Sept.

24. Diplycosia kosteri SLEUM. Blumea 12 (1963) 117.

Scandent, epiphytic, divaricately branched shrub. Branchlets rather slender, tips densely set with forward-directed, rufescent or paler bristles (2 mm), early glabrescent and covered with fissured cork below, laxly leaved. *Leaves* elliptic, rarely subobovate-elliptic, apex broadly attenuate to rounded, apiculate by a thick, protruding gland, base broadly cuneate, rarely almost rounded, coriaceous, glabrous and shining above, densely set with short suberect setular hairs with dark thickened base beneath, edge somewhat revolute and densely crenulate, (2.5–)2.8–4.5 (–5.5) by (1.5–)2–3(–3.2) cm, 5-plinerved, midrib and nerves narrowly impressed above, obtusely raised beneath, nerves not rarely almost obscure; petiole 3–5(–6) by 1.5(–2) mm. *Flowers* axillary, solitary or in twos. Pedicels rather slender, densely clad with strigose or setular, crisp or subpatent, eglandular hairs (*c.* 1.5 mm), 6–7 mm. Bracteoles ovate, *c.* 1 mm, margin fimbriate by a few short glandular and numerous finer eglandular hairs. *Calyx* cup-shaped, much contracted at the base and glabrous there, otherwise provided with appressed setular hairs up to the lobes, tube 2 mm,

2 mm ø at the attenuate base, 3 mm ø at the limb, thin, glabrous, red to pink, sometimes yellowish, lobes reflexed, 1 mm. *Filaments* filiform, glabrous, 3.5 mm; anthers narrow-oblong, 1.8 mm including the tubules. *Ovary* glabrous; style slender, glabrous, 4 mm. Submature *fruit* reddish.

Distr. *Malesia*: W. New Guinea (Wondiwoi Mts, Wandammen Peninsula).

Ecol. In primary forest, 800–1800 m. *Fl. fr.* March.

25. Diplycosia pseudorufescens SLEUM. Bot. Jahrb. 71 (1940) 157; Reinwardtia 4 (1957) 135.

var. **pseudorufescens.**

Treelet or shrub, up to 6 m. Branches and branchlets divergent, the latter subangular and very densely patently rufous-setulose (1.5–2 mm) and laxly finely patent-puberulous, terete, greyish and less densely setulose and practically not puberulous in the older parts. *Leaves* ovate or elliptic-ovate, apex broadly short-acuminate, the terminal gland conspicuous and somewhat prominent, base rounded to broad-attenuate, subcoriaceous or stiff-chartaceous, young ones ± densely rufous-setulose on both sides, mature ones glabrous and somewhat shining above, ± persistently setulose on the undersurface and the margin, finally dark brown-punctate there, entire or minutely denticulate, margin slightly revolute, (10–)12–17 by 8–12(–14) mm, midrib impressed above, prominent beneath, other nerves ± obscure; petiole setulose, 1–2 mm. *Flowers* axillary, solitary. Pedicels stoutish, very laxly setulose or short-hairy, 2–3 mm, basal bracts several, minute. Bracteoles ovate-acuminate, ciliate, 1 mm. *Calyx c.* 3 mm, glabrous, lobes ovate-acuminate, ciliolate, 2 mm. *Corolla* short tubular-subcampanulate, *c.* 4.5 mm, glabrous, shortly 5-lobed. *Filaments* subulate, slightly dilated at the base, glabrous, 2.2 mm; anther-cells 1.5 mm; tubules nearly 1 mm. *Ovary* rather densely greyish pubescent; style 3 mm. *Fruit* said to be green.

Distr. *Malesia*: North Borneo (Mt Kinabalu, Mt Tambuyokon).

Ecol. On steep rocky ridge, 2300–2895 m, twice found. *Fl.* June.

var. **elliptifolia** SLEUM. Reinwardtia 4 (1957) 136; Blumea 12 (1963) 118. — *D. consobrina* (*non* BECC.) RIDL. J. Str. Br. R. As. Soc. *n.* 39 (1903) 15. — *D. microphylla* (*non* BECC.) HENDERS. J. Fed. Mal. St. Mus. 13 (1927) 5.

Differs by ± elliptic leaves, which are subdensely and ± patently crisped-subsetulose as are the pedicels, (8–)10–17 by 6–12 mm. *Fruit* said to be pinkish or light blue.

Distr. *Malesia*: Malay Peninsula (Perak: Mt Kerbau; Pahang: Kluang Terbang, a subsidiary peak of Mt Benom) and North Borneo (Mt Kinabalu).

Ecol. In low jungle in the Malay Peninsula, at 1370–1525 m, on Mt Kinabalu apparently rare, (1650–)2745–3050 m. *Fl. fr.* March–Aug.

26. Diplycosia tetramera SLEUM. Reinwardtia 4 (1957) 136.

Small shrub. Branches erect, terete; bark striate by long blackish fissures. Branchlets rather densely leaved, densely clothed with appressed or somewhat spreading rufous bristles (1.5–3 mm). *Leaves* ± broad-elliptic to oblong-elliptic, sometimes narrower and oblong, apex short-acuminate, subacute or obtuse, apiculate by a small, slightly protruding gland, coriaceous, ± stiff, ± convex when dry, revolute at the margin, shining above, dull beneath, the youngest laxly rufous-setulose on both faces, mature ones early glabrous above, but for a longer time patent-setulose beneath, finally blackish punctate there, rather regularly minutely crenulate, ciliate (1.5 mm) initially, (0.7–)1–1.6(–2) by (0.5–)1.2(–1.4) cm, midrib ± distinctly impressed above, slightly or not raised beneath, nerves obscure; petiole stoutish, ± setulose, 2(–3) by 1 mm. *Flowers* axillary, solitary. Pedicels stoutish, rather densely set with fine bristles or scabrid short crisped hairs, 3–4(–6.5) mm at anthesis, somewhat accrescent in fruit. Bracteoles ovate-acuminate, glabrous dorsally, glandular-fimbriate (0.3–0.5 mm) along the margin, ciliolate at the apex, 1.5 mm. *Calyx* 4–5 mm, glabrous or with some thickish crisped hairs at the lobes, the latter ovate, subacute, ± spreading at anthesis, 2–3 mm, laxly and longish caducously glandular-fimbriate, short-pubescent at the very apex. *Corolla* cylindric-urceolate, 6–7 by *c.* 2 mm, contracted both at the base and the mouth, glabrous, or initially with some scattered, appressed, glandular hairs in its upper part, white, lobes 4 or 5, *c.* 1.5 mm. *Stamens* 8; filaments linear, somewhat dilated towards the base, glabrous, *c.* 4 mm; anthers oblong-ovate, granular, *c.* 2.5 mm including the tubules. *Ovary* glabrous or sometimes very slightly hairy on the top; style 5–6 mm. *Fruit* purplish to blackish, *c.* 5 mm ø.

Distr. *Malesia*: Sumatra (Atjeh, Gajo Lands: Mt Lembuh, Mt Losir, Mt Kemiri, Putjuk Angasan).

Ecol. In moss forest, ericoid scrub or ridge forest, open spots, 1850–3000 m. *Fl. fr.* Jan.–March.

27. Diplycosia parvifolia MERR. Philip. J. Sc. 5 (1910) Bot. 211; En. Philip. 3 (1923) 247; COPEL. *f.* Philip. J. Sc. 47 (1932) 81; SLEUM. Reinwardtia 4 (1957) 137.

Small erect epiphytic shrub, up to 1 m, diffusely branched. Branches slender, brown, glabrous, slightly striate, terete. Branchlets laxly subappressedly and rather longish rufous-setose. *Leaves* elliptic or elliptic-oblong, apex acuminate, subacute, the terminal gland thickish, somewhat protruding, base acutely attenuate, subcoriaceous, shining and glabrous above, dull and laxly blackish punctulate beneath, entire or nearly so, setose-ciliate when very young, but in later stages the margin somewhat cartilaginous and set with remote, dark, sessile, subimpressed glands, giving the impression of being crenulate, 1.6–2(–2.5) by 0.7–1 cm, midrib impressed above, scarcely

visible beneath, nerves ± obsolete; petiole ± setulose, glabrescent, *c.* 2 mm. *Flowers* axillary, solitary. Pedicels rather densely appressedly rufous-setulose, with some fine short hairs between the bristles, 3–4 mm in anthesis, accrescent up to 7 mm, basal bract minute. Bracteoles broad-ovate, glabrous dorsally, fimbriate, 1.2 mm. *Calyx* 2.5 mm, glabrous, deeply 5-lobed, lobes ovate, obtuse, shortly glandular-fringed at the margin, the very apex with a tuft of fine hairs. *Corolla* ovate-urceolate, glabrous, nearly full-developed *c.* 2.5 mm. *Stamens* 8; filaments flat-linear, glabrous; anthers ovate-oblong, tubules narrow, very short. *Ovary* glabrous or with a few hairs; style 2 mm in very young fruit.

Distr. *Malesia*: Philippines (Negros: Canlaon Volcano; reported also from Luzon: Ifugao, Mt Polis, material not seen), one collection.

Ecol. In mossy forest, *c.* 1500 m.

28. Diplycosia soror BECC. Malesia 1 (1878) 210; SLEUM. Reinwardtia 4 (1957) 137; Blumea 12 (1963) 118.

var. **soror.**

Epiphytic or terrestrial, erect shrub, 0.3–1(–1.5) m, one- or few-stemmed. Branchlets slender, subangular, densely to more laxly and ± appressedly setulose (bristles fine, subglandular, rusty, *c.* 3 mm), subdensely leaved; young shoots red-brown or reddish. *Leaves* elliptic to subobovate-elliptic, rarely subovate-elliptic, apex shortly acuminate to broadly attenuate, rarely subobtuse or rounded, generally apiculate by a blackish, protruding gland, base ± broadly attenuate or cuneate, never rounded, coriaceous to subcoriaceous, dark green above, paler beneath, glabrous above, laxly to subdensely clothed with short, subappressed, fine, brownish, ± caducous bristles and blackish punctate in later stages beneath, margin slightly or hardly revolute, minutely crenulate in the upper part of the lamina, the teeth ending in slender bristles which persist for a long time, 1.5–2.8 by (0.9–)1.2–2 cm, 3-nerved or rarely obscurely 5-nerved from above the base of the blade, midrib impressed above, obtusely prominent beneath, nerves curved-ascendent towards the apex of the lamina, very slightly impressed above, hardly visible beneath; petiole blackish in dry specimens, ± densely setulose, 2–3 mm. *Flowers* axillary, solitary, sometimes in pairs. Pedicels rather slender, set with short, stalked glands or muriculate hairs, no bristles or fine hairs, 2–3 mm at anthesis, up to 4 mm and glabrescent in fruit; basal bracts very small. Bracteoles broad-ovate, glabrous dorsally, ciliolate and laxly shortly glandular-fimbriate. *Calyx* 1.5–2 mm, glabrous, 5-lobed to almost ⅔, green, lobes ovate, subacute, often with purplish tinge, densely set with whitish hairs along, and with club-shaped, rather caducous glands or glandular hairs in the lower part of the margin. *Corolla* shortly urceolate, green, 3.5 mm, glabrous, lobes 1 mm, often purplish suffused especially in bud. *Filaments* subfiliform, glabrous, 1.2 mm; anthers oblong-ovate, granular, 0.7 mm including the tubules (0.5 mm). *Ovary* glabrous or with some sparse hairs around the style, the latter slender, glabrous, (2–)2.5 mm. *Fruit* finally bluish purple to blackish, pruinose, (4–)5 mm ø.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Arfak and Nettoti Mts).

Ecol. Epiphyte in riverine and mossy (*Nothofagus*-) forest, terrestrial in more open, devastated crest-forest, heath-like vegetation or summit scrub, (1550–)1650–2650 m, scattered, though rather common locally. *Fl. fr.* Nov.–Jan.

Note. A specimen similar in habit, but with shorter bristles (1.5 mm) on the branchlets, slightly smaller leaves (such as found in *D. amboinensis*), ovary hairy, style 2.5 mm, corolla and stamens not known, once collected in the N. Moluccas: Morotai, Mt Pare, *c.* 1000 m.

var. **nuda** SLEUM. Blumea 12 (1963) 118.

Young shoots glabrous or practically so, maybe with sparse darker glandular points. *Leaves* glabrous, generally as in *var. soror*, sometimes in part a little larger (up to 4.5 by 2.8 cm). *Flowers* known in bud stage only, apparently not different from those found in *var. soror*.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Tohkiri and Tamrau Mts), 2 collections.

Ecol. Epiphyte in *Castanopsis-Nothofagus* forest, 1400 m. *Fl.* Oct.–Nov.

29. Diplycosia glauciflora SLEUM. Reinwardtia 4 (1957) 137; Blumea 11 (1961) 7.

Shrub, 1.5–3 m. Branches terete, setose. Branchlets densely and exclusively clothed with spreading, dark, rufous-blackish bristles (1.5–2 mm), leaved towards the tips. *Leaves* ovate or elliptic-ovate (inferior ones sometimes elliptic), uppermost ones mostly gradually subcaudate-acuminate, lower ones short-acuminate at apex, the terminal gland slightly thickened, base rounded or rarely broadly cuneate, subcoriaceous, young ones apparently reddish, densely setulose on both faces initially, glabrous and shining above at maturity, rather densely and more persistently and patently rufous-setulose (0.7–1.5 mm) beneath, finally blackish punctulate there, margin slightly revolute, minutely crenulate, the teeth caducously setulose-ciliate, 2.5–4(–5.5) by (1.2–)1.4–2(–2.5) cm, midrib impressed above, raised beneath, one pair of basal nerves curved-ascending along the margin to the top of the lamina, slightly impressed above or as obscure as beneath, other higher pinnate nerves rather inconspicuous; petiole densely patent-setose, 2.5–4 by 1–1.5 mm. *Flowers* axillary, solitary or rarely in twos. Pedicels rather slender, ± densely crisped-rufous-pilose, 2–3 mm at anthesis, up to 5 mm in fruit. Bracteoles ovate-acuminate, glabrous dorsally, 1.2 mm. *Calyx* campanulate, glabrous or set with sparse thickish hairs, *c.* 3 mm, 5-lobed to nearly its base, lobes ovate, acute, shortly glandular-fimbriate as are the bracteoles. *Corolla* subcylindric-campanulate, greenish, somewhat glaucous, becoming blackish when dry, glabrous, *c.* 4 mm, shortly 5-lobed. *Filaments* S-curved, linear, gla-

brous, *c.* 2 mm; anthers ovate-oblong, granular, 2 mm including the slender short tubules. *Ovary* with rather sparse yellowish hairs on top; style 3–3.5 mm. *Fruit* bluish, finally blackish, *c.* 4 mm ø, glabrous on top of the capsule.

Distr. *Malesia*: N. Sumatra (Atjeh; Tapanuli; Eastcoast Res.).

Ecol. In ericoid ridge scrub, 1800–3000 m. *Fl. fr.* Jan., Febr.

Vern. *Daun bibis*, M.

30. Diplycosia ledermannii SCHLTR, Bot. Jahrb. 55 (1918) 165; SLEUM. *ibid.* 72 (1942) 211; Reinwardtia 4 (1957) 138.

Epiphytic shrub, 1–1.5 m, ramose. Branches and branchlets erect, terete, sparsely subappressedly setose initially, glabrescent, the bark then fissured. *Leaves* elliptic or subobovate, apex obtuse, the terminal gland manifest and protruding beyond the lamina, base cuneate into the petiole, coriaceous, glabrous above, punctate beneath, margin somewhat recurved, entire, 3.5–5.5(–6.5) by (2–)2.5–3.5 cm, 3-plinerved nearly from the base, midrib and nerves impressed above, rather obscure beneath as are some nerves higher from the midrib, the latter high ascending to the top of the lamina; petiole glabrous, 3–5(–6) mm. *Flowers* axillary, solitary or rarely in pairs. Pedicels slender, whether or not laxly appressedly short-setulose, moreover with a fine rufous pubescence, 8–13(–20) mm. Bracteoles broad-ovate, ciliolate, 0.7 mm. *Calyx c.* 3 mm, glabrous or minutely verruculose, lobes ovoid, obtuse, ciliolate, *c.* 2 mm. *Corolla* ovoid, whitish pink, glabrous, *c.* 7 mm, lobes short. *Filaments* filiform, glabrous; anthers oblong-lanceolate, cordate at the base, papillose, 2 mm. *Ovary* laxly to subdensely clad with brownish hairs on the top; style glabrous, rather thick, 4 mm. *Fruit* black, *c.* 7 mm ø.

Distr. *Malesia*: NE. New Guinea (Sepik region: Hunstein Mts).

Ecol. In mountain forest, 1050–1400 m. *Fl.* Febr., March, July, Aug.

31. Diplycosia brachyantha SLEUM. Reinwardtia 4 (1957) 138.

var. **brachyantha.**

Shrub. Branchlets obtusangular, 4–7 mm ø, greyish brownish, tips very sparsely setose, or glabrous. *Leaves* elliptic or broad-elliptic, rarely oblong-elliptic, apex short-attenuate, obtuse to rounded, the terminal gland thick and protruding, base cuneate into the petiole to nearly rounded, thick-coriaceous, glabrous and shining above, dull and laxly blackish punctulate beneath, entire, margin revolute, (4.5–)5–7.5(–10) by (2.5–)3–6 (–6.5) cm, midrib slightly impressed above, thick-prominent beneath, nerves 1–2 pairs from or from a little above the base, high curved-ascendent, faintly impressed above, rather distinctly raised beneath, at least in the lower ⅔ of the lamina, other much shorter nerves ± straight in 2–5 pairs but slightly conspicuous; petiole thick, rugose, glabrous, 6–9 by 1.5–3 mm, somewhat winged in its upper third by the decurrent lamina. *Flowers* axillary, 3–5 per fascicle, rarely also in twos or solitary in other axils of the same specimen, becoming black when dry. Pedicels stout (nearly 1 mm ø), ± densely clad with short, subappressed, brownish, coarse hairs as well glandular-muriculate or -verruculose, glabrescent in fruit, 5–7 mm at anthesis, basal bracts few, ovate-acuminate, rough-hairy, 1–2 mm. Bracteoles broad-ovate, apiculate, glabrous inside, hairy outside, ciliate, 2 mm. *Calyx* 6 mm, 5-lobed to nearly the base, lobes ovate-acuminate, subacute, laxly appressed-hairy dorsally especially on the lobes, or glabrous, ciliate, *c.* 4 mm long, 3 mm wide at base, spreading after anthesis. *Corolla* campanulate, broad-open, green, 6–7 mm long, 5–6 mm ø at the limb, glabrous or with some solitary hairs outside, lobes erect, *c.* 3 mm. *Filaments* linear, somewhat dilated above the base, wavy, papillose, 3.5 mm; anther-cells ovate-oblong, echinulate, *c.* 2.3 mm; tubules narrow, *c.* 1.2 mm. *Ovary* densely yellowish brownish hirsute; style glabrous, 3–4 mm. *Fruit* blackish when ripe, *c.* 1.3 cm ø; fruit-pedicel *c.* 1 cm.

Distr. *Malesia*: N. Sumatra (Atjeh, Gajo Lands: Mt Lembuh, Putjuk Angasan).

Ecol. In mossy forest on ridge or ericoid ridge scrub, 1800–2500 m, apparently not rare. *Fl.* Jan., Febr.

var. **parvula** SLEUM. Reinwardtia 4 (1957) 139.

Differing by smaller, obovate leaves, 2–3.5 by 1–2 cm, white and slightly smaller flowers (corolla 5–6 by 3 mm).

Distr. Found together with *var. brachyantha.*

32. Diplycosia morobeensis SLEUM. Bot. Jahrb. 72 (1942) 210; Reinwardtia 4 (1957) 140; Blumea 11 (1961) 7; *ibid.* 12 (1963) 119.

var. **morobeensis.**

Low erect shrub, 0.3–1.8(–3) m, often epiphytic. Branchlets rather densely foliate, appressed-setulose and reddish brown in the young, glabrescent and early covered with greyish cork in the older parts. *Leaves* oblong- to subovate-lanceolate, apex acuminate, the terminal gland small but distinct, base cuneate, subcoriaceous, greenish olivaceous when dry, rather dull on both faces, glabrous above, laxly set with ± appressed setulose, finally caducous hairs, becoming punctate at least, minutely denticulate or subentire, (1–)1.5–1.8(–2) by (0.4–)0.5–0.8(–1) cm, midrib ± impressed above, slightly raised beneath, nerves subobscure; petiole setulose, 1–2 mm. *Flowers* 1 or 2 per axil. Pedicels rather stoutish, subdensely shortly subappressed-setose-hairy at anthesis and 3–6 mm long, glabrescent and up to 10 mm in later stages. Bracteoles broad-ovate, ciliate, glabrous dorsally, 1 mm. *Calyx* 1.5–2 mm, lobes deltoid, blunt, with an almost translucent margin, glabrous, densely ciliate the entire length. *Corolla* cylindric-urceolate, rather fleshy, glabrous, white with flesh tinge, 4 mm, shortly 5-lobed. *Filaments* filiform, glabrous, 2–2.5 mm; anther-cells subovate, 1 mm; tubules broad, 0.3 mm. *Ovary* glabrous; style

slender, 3.5 mm. *Fruit* subglobose, blackish purplish, *c.* 3 mm ø.

Distr. *Malesia*: New Guinea (Wau-Edie Creek area; Star Mts; Eastern Highlands; Mt Saruwaged area).

Ecol. In lower montane rain-forest, mossy bush, or marsh meadow, 1525–3000 m. *Fl.* Jan.–Dec.

Vern. *Denugubo*, Chimbu: Masul, *jinne*, Wahgi: Minj, *nehra*, Mairi: Watabung.

var. **ovatifolia** SLEUM. Reinwardtia 4 (1957) 140.

Differing by the ovate or elliptic-ovate leaves and shorter pedicels, which are 2–3 mm long at anthesis.

Distr. *Malesia*: New Guinea (Eastern Highlands; Mt Yule; Mt Victoria).

Ecol. In forest, 2135–2540 m. *Fl.* Jan., Nov.

33. Diplycosia rupicola SLEUM. Reinwardtia 4 (1957) 140; Blumea 11 (1961) 7; *ibid.* 12 (1963) 119; *ibid.* 12 (1964) 343. — *D. morobeensis* (*non* SLEUM. 1957) SLEUM. *var. ovatifolia* SLEUM. Blumea 11 (1961) 7. — **Fig. 77h.**

Small, sometimes climbing shrub, up to 10–60 (–200) cm, sometimes ± prostrate; also epiphytic. Branchlets fuscous and rather densely clothed with longish (2–3 mm), ± spreading or subappressed rufous bristles, subangular, rather densely leaved. *Leaves* ovate to ovate-elliptic, apex short-acuminate, obtuse, the terminal gland rather thick, base rounded or more rarely broad-attenuate, coriaceous, rigid, glabrous above, laxly caducously setulose or punctulate beneath, margin slightly revolute and regularly minutely crenulate, the teeth ciliate initially, 0.8–1.1(–1.3) by (0.4–) 0.5–0.7 cm, midrib slightly impressed above, faintly visible beneath, nerves obscure; petiole stoutish, 1–1.5 mm. *Flowers* axillary, solitary. Pedicels stoutish, (1–)2–3 mm at anthesis, up to 4 mm in fruit in open, more slender and 5–7 mm at anthesis, up to 8 mm in fruit in shady situations, sparsely glandular-punctate, nodding. Bracteoles broad-ovate, obtuse, glabrous dorsally, ciliolate and glandular-muriculate, 1.5 mm. *Calyx* 3(–4) mm, red, glabrous or very laxly muriculate, lobes ovate, obtuse, the margin paler and almost translucent, ciliate and glandular-muriculate or -fimbriate, reflexed after anthesis, 1.8(–2.2) mm. *Corolla* urceolate-cylindric, glabrous, scarlet or pink, or orange-red, with greenish white lobes, honey-scented, (7–)8–10 by 3–4 mm, lobes pale green, 1.5 mm. *Filaments* linear, glabrous, 4–5 mm; anthers oblong, echinulate, 2.5 mm including the rather broad and short tubules. *Ovary* glabrous; style 5–6 mm. *Fruit c.* 5 mm ø, purplish blue, contracted at the base; calyx not much accrescent, the upper part of the capsule remaining uncovered.

Distr. *Malesia*: New Guinea (Star Mts; Western, Eastern and Southern Highlands).

Ecol. In low mossy forest, among rocks on mountain sides, or in semi-swampy alpine thickets or grassland, 2500–3650 m. *Fl.* Febr.–Sept.

Vern. *Agu-agu, ombe*, Mendi.

34. Diplycosia pendens SLEUM. Blumea 12 (1963) 119.

Epiphytic shrub, few-stemmed, hanging from tree trunks 2–3 m above the ground, 0.5–1 m. Branchlets slender, recent shoots densely, older ones densely to more laxly and exclusively set with rufescent, setular, ± appressed, eglandular hairs, glabrescent with age, becoming striate and blackish, 2–3 mm ø. *Leaves* lax, lanceolate, more rarely subovate- or subelliptic-lanceolate, apex shortly attenuate or subacuminate, the apical gland small and hardly protruding, base attenuate or cuneate to the petiole, subcoriaceous, dirty olivaceous, glabrous above at full maturity, laxly and finely setular below and along the edge, or finally punctulate below, minutely crenulate or subentire, (1–)1.3–2(–2.2) by 0.5–0.8(–1) cm, midrib very narrow and impressed above, slightly prominent beneath, nerves 1(–2) pairs, high curved-ascendent, rather obscure generally; petiole slender, *c.* 1 mm. *Flowers* solitary, or rarely in twos in the upper axils. Pedicels stoutish, subdensely or more laxly muriculate and finely hairy, 1–2 mm. Bracteoles ovate, acute, 1 mm, ciliolate. *Calyx* cup-shaped, green, glabrous, 2 mm in all, 5-lobed to ⅔, lobes deltoid, subacute, ciliolate and often laxly glandular-fimbriate below. *Corolla* urceolate, tube light green, purplish towards the lobes, glabrous, 3 mm. *Filaments* linear, glabrous, 1.3 mm; anthers oblong, base obtuse, 1 mm. *Ovary* with a few hairs on top, glabrous otherwise; style slender, *c.*1.8 mm. *Fruit* pale bluish, pruinose, *c.* 3 mm ø.

Distr. *Malesia*: W. New Guinea (Vogelkop Peninsula).

Ecol. In mossy (*Nothofagus*-)forest, also in riverine forest, 1400–1900 m, locally not rare. *Fl. fr.* Nov.–Dec.

35. Diplycosia schultzei SCHLTR, Bot. Jahrb. 55 (1918) 163; SLEUM. *ibid.* 72 (1942) 211; Reinwardtia 4 (1957) 139.

Erect shrub. Branches and branchlets terete, sparsely setose, finally glabrous. *Leaves* lax, elliptic, apex short-acuminate, though obtuse by a pronounced terminal gland, base cuneate-attenuate, coriaceous, very young ones rather densely setulose on both faces, mature ones set with some scattered bristles or finally quite glabrous above, and with longer persistent longish and appressed rufous bristle-like hairs beneath, subentire, 2.5–4.5(–7) by (1.5–)2.5–3.5 cm, impressedly 3-nerved above; petiole 3–6 mm. *Flowers* solitary. Pedicels slender, sparsely appressed-setose, (1.2–) 1.5–2 cm. Bracteoles ovate, ciliate at apex, otherwise dorsally clad with scabrid, rufous, bristle-like hairs as is the calyx. *Calyx* 3 mm, lobes oblong, obtuse, ciliolate. *Corolla* subglobose-urceolate, glabrous, 9 mm, shortly 5-lobed. *Filaments* filiform, glabrous; anthers ovate-oblong, papillose, 2.8 mm. *Ovary* glabrous; style glabrous, a little longer than the anthers.

Distr. *Malesia*: NE. New Guinea (Sepik region: *c.* 65 km S of the mouth of the Tami R.), 1600 m. One collection. *Fl.* July.

Note. No material seen recently (holotype destroyed).

36. Diplycosia stellaris SLEUM. Blumea 11 (1961) 6.

Low shrub, *c.* 0.3 m. Branchlets laxly subpatently rufous-setulose in the juvenile, still less so in the older, already greyish corticate parts, subdensely or more laxly foliate. *Leaves* obovate or oboovate-, more rarely subrotundate-elliptic, apex rounded or faintly emarginate, the terminal gland thick and protruding beyond the leaf margin, base broadly cuneate into the petiole, coriaceous, with sparse setular hairs on the midrib beneath and along the edge in immature, glabrous except very short muriculate glandular hairs on the undersurface in fully mature leaves, (1.5–)2–3 by (1–)1.5–2.5 cm, regularly subserrate-crenulate (the teeth 1–2 mm spaced), ± revolute especially towards the base of the lamina, midrib and nerves distinctly impressed above, subinconspicuous beneath, basal nerves 1, suprabasal ones 1 or 2 pairs, curved-ascending and anastomosing, other shorter nerves or veins from higher parts of the midrib faintly sunken above, or obscure; petiole grooved above, 4–6 by 1–1.5 mm, not rarely a little winged in the upper part by the shortly decurrent lamina. *Flowers* in 2–3-flowered fascicles, or more rarely solitary in the upper axils, nodding. Pedicels rather slender, laxly or very laxly subappressedly setular-hairy, or muriculate, 1–1.5 (–1.8) cm at anthesis. *Calyx* funnel-shaped below, 5 mm long in all, the 2 basal bracteoles ovate, ciliolate, 1–1.2 mm, tube reddish, minutely rugulose and muriculate, lobes ovate-triangular, subacute, ciliolate and glandular-fimbriate, *c.* 2 mm. *Corolla* cylindric-urceolate, thin, pink, whitish at the lobes inside, glabrous, *c.* 9 by 4 mm at full anthesis, lobes obtuse, suberect, 1 mm. *Filaments* narrow-linear, glabrous, a little wavy, *c.* 4 mm; anthers oblong, 3 mm long including the lobes; cells granular; tubules narrowed towards the apex *c.* 1.2 mm. *Ovary* glabrous; style slenderly columnar, glabrous, 5.5 mm.

Distr. *Malesia*: New Guinea (Star Mts: Mt Antares), once found; rather rare in alpine shrub vegetation at 3300 m. *Fl.* July.

37. Diplycosia undata J. J. S. in Fedde, Rep. 30 (1932) 171; SLEUM. Reinwardtia 4 (1957) 139, *non* H. J. LAM, 1945.

Small, very branched shrub. Branchlets longish (2–3 mm) ± patently rufous-setose in the younger, ± obtusely angled parts. *Leaves* suborbicular to broad-elliptic, apex subacuminate or mostly ± obtuse, the terminal gland thick and protruding, base broadly attenuate to rounded, or cuneate in the elliptic ones, firmly subcoriaceous, revolute at the finely crenulate margin, each tooth ending in a fine, longish, rather persistent bristle, rather shining above, glabrous above, ± laxly punctate beneath by the remaining bases of early caducous bristle-like hairs, 1.3–3.3 by (1–)1.2–2.9 cm, midrib impressed above, raised beneath, nerves 2–3 pairs coming from and from somewhat above the base of the lamina, curved-ascendent and anastomosing, slightly impressed above, visibly raised beneath, other nerves from the upper ⅔ of the midrib rather inconspicuous; petiole stout, setose, 1.5–3 mm. *Flowers* axillary, solitary. Pedicels rather slender, laxly appressed-setulose, or muriculate, 8–10(–12) mm. Bracteoles suborbicular-ovate, obtuse, glabrous dorsally, shortly glandular-fimbriate or -muriculate, *c.* 1.8 mm. *Calyx* 3–4 mm, glabrous, rugulose-muriculate externally, lobes ovate, acute, 2.5 mm, glandular-fimbriate. *Corolla* urceolate, slightly contracted apically, red, somewhat fleshy, glabrous, *c.* 9 by 3.5 mm, lobes obtuse, 1 mm. *Filaments* S-curved, linear, slightly dilated towards the base, glabrous, *c.* 4 mm; anthers oblong, granular, *c.* 2 mm including the short tubules. *Ovary* glabrous; style 5 mm.

Distr. *Malesia*: SW. Celebes (Peak of Bonthain).

Ecol. In brushwood, 2700–2890 m. *Fl.* June.

38. Diplycosia varians SLEUM. Blumea 12 (1964) 342.

Epiphytic or subscandent small shrub, 0.2–0.4 m. Tips of branchlets subdensely and exclusively set with setular subappressed hairs. *Leaves* lax, variable in shape and size, elliptic or oblong-elliptic, more rarely broad-elliptic, apex shortly attenuate-acuminate, rarely apiculate, the terminal gland a little prominent, base attenuate or rarely ± rounded, coriaceous, glabrous above, lower surface laxly subsetular-muriculate or finally punctate, margin crenulate, the crenations ending with a long rather persistent bristle, (2.2–)2.5–3.5(–4) by (1–)1.3–1.8(–2) cm, midrib distinctly impressed above, obtusely prominent beneath, nerves 2 pairs, the lower pair a little from above the leaf-base, the upper one from ± the middle of the midrib, both slightly immersed above, less distinct beneath; petiole 2–3 mm. *Flowers* solitary in the leaf-axils, nodding, 4–5-merous. Pedicels laxly muriculate, 2–3(–4) mm at anthesis, accrescent sometimes to 6 mm in fruit. *Calyx* tube cupular, attenuate at base, pinkish, 4–6(–7) mm in fresh specimens, lobes ovate-acuminate, glandular-ciliate; 2–3 mm. *Corolla* urceolate, rather fleshy, glabrous, pinkish, 8–9 by 6 mm in dry, 10–11 by 8 mm in fresh specimens, lobes whitish, 1.5 mm. *Stamens* 8 or 10; filaments linear, wavy, glabrous, 5 mm; cells 2.8 mm; style glabrous, 5(–6) mm. *Ovary* glabrous. Mature *fruit* pear-shaped, purple, 6–8 by *c.* 5 mm.

Distr. *Malesia*: New Guinea (Western Highlands: Nona-Minj Divide).

Ecol. In subalpine *Xanthomyrtus-Papuacedrus-Quintinia* shrubbery, 3250 m. *Fl. fr.* July.

39. Diplycosia subglobularis SLEUM. Blumea 11 (1961) 5.

Epiphytic shrub, *c.* 1 mm. Branchlets divaricate, rather robust, 1.5–3 mm ø, very densely set with rufous setular hairs at the youngest, gradually less densely so in the older parts, densely foliate. *Leaves* elliptic, shortly attenuate or more rarely subrotundate at the apex, which bears a thick, *c.* 1 mm protruding gland, base broadly attenuate,

coriaceous, dull, glabrous above, sparsely to very sparsely rufous-setulose, more densely appressedly glandular-muriculate beneath, youngest ones subcrenulate and caducously setular-ciliate, older ones subentire at full age, (1.5–)1.8–2.5 by (1–)1.2–1.5(–1.7) cm, the edge slightly revolute, midrib and nerves much impressed above, subinconspicuous beneath, the basal or slightly suprabasal nerves 1, upper nerves (from the lower third to half of the midrib) 1 (rarely 2) pairs, all high curved-ascending and anastomosing; petiole setular initially, 2–3 by *c.* 1 mm. *Flowers* solitary in numerous upper axils. Pedicels stoutish, laxly muriculate, at anthesis 1–2, in fruit up to 3 mm, with 2 ovate ciliate opposite bracteoles (1 mm) below the calyx. *Calyx* campanulate, glabrous, tube 0.5–0.7 mm, lobes subovate-deltoid, bluntish, (1–)1.5 mm, glandular-fimbriate. *Corolla* subglobular, much contracted or almost apiculate distally, early caducous, *c.* 2 by 2.5 mm, quite glabrous, pale pink, ± fleshy, lobes erect, hardly 0.5 mm. *Filaments* subulate, glabrous, 0.8–1 mm; anther-cells ovate-oblong, echinulate, 0.5 mm; tubules contracted, *c.* 0.3 mm. *Ovary* glabrous; style slender, glabrous, at anthesis 1–1.5, in fruit 1.5–2 mm. Immature *fruit c.* 2.5 mm, light blue.

Distr. *Malesia*: Central New Guinea (Star Mts), on peaty soil at 1500 m. One collection. *Fl.* July.

40. Diplycosia apoensis ELM. Leafl. Philip. Bot. 3 (1911) 1101; MERR. En. Philip. 3 (1923) 246; COPEL. *f.* Philip. J. Sc. 47 (1932) 79, t. 4, f. 2; SLEUM. Reinwardtia 4 (1957) 139.

Epiphyte or sprawling over moss-covered ground; stem *c.* 50 cm, branched, bark brown-greyish. Branchlets covered with greyish stout bristly hairs, younger parts only with ± spreading reddish brown bristles (2–3 mm). *Leaves* dense, elliptic, apex broadly acuminate, mostly rather obtuse, though apiculate by a thick protruding gland, base cuneate or rounded, subcoriaceous or coriaceous, shining green on the upper side, much paler and dull underneath when fresh, brownish when dry, laxly set on both faces with ± spreading, strigose, rufous hairs, glabrescent above with age, finally punctate beneath, margin slightly revolute, subentire, with bristle-like hairs (1.5 mm) along the margin, 2–3(–3.5) by 1.3–1.7(–2) cm, midrib a little impressed above, manifestly raised beneath, nerves 1–2 pairs, curved-ascending to the apex of the blade, the lower pair from or nearly from the base of the lamina, all nerves slightly impressed above, somewhat prominent beneath; petiole stout, setulose, *c.* 3 mm. *Flowers* axillary, mostly solitary or in twos, rarely also in threes in other axils of the same specimen. Pedicels setose, moreover scurfy or clothed with crisp brown hairs, 2–3(–5) mm. Bracteoles ovate, obtuse, glandular-fimbriate, 1.5 mm. *Calyx* 5 mm, glabrous, lobes ovate, acute, glandular-fimbriate. *Corolla* subcampanulate, glabrous, 4 mm, lobes short, reflexed. *Filaments* linear, wider below the middle, glabrous, *c.* 2.5 mm; anthers ovate-oblong, 2 mm including the short tubules. *Ovary* glabrous; style 3.5 mm.

Distr. *Malesia*: Philippines (Mindanao, Davao: Mt Calelan; Bukidnon: Mt Lipa), twice found.

Ecol. In mossy elfinwood, on exposed peaks and ridges, *c.* 2500 m. *Fl.* Sept.

41. Diplycosa muscicola SLEUM. Blumea 12 (1963) 118.

Weak epiphytic shrublet, trailing over moss cushions. Branches and branchlets 1–2 mm ø, young parts densely set with soft setular, initially glanduliferous, ± spreading, (2–) 3–4 mm long rusty hairs, older parts gradually glabrescent and greyish, laxly foliate. *Leaves* elliptic or subovate-elliptic, apex shortly acuminate, the apical gland rather small, base ± broadly attenuate, subcoriaceous, dark green and shining above, paler beneath when fresh, olivaceous above, brown below when dry, first covered on both sides and along the edge with long, ± appressed, bristle-like hairs, glabrescent above only with age, margin hardly revolute, entire or practically so, (2.5–)3–4 by (1.2–)1.5–2.3 cm, rather indistinctly impressedly trinerved above only; petiole (4–)5–6 mm. *Flowers* solitary, rarely in twos in the upper axils. Pedicels very slender, (2–)3–4(–5) mm, glabrous. Bracteoles ovate, 1 mm, cristate-fimbriate by glandular hairs. *Calyx* funnel-shaped, green, 3 mm long in all, 5-lobed halfway, glabrous, tube much attenuate towards the base, lobes ovate-acuminate, glandular-fimbriate, moreover ciliolate or barbulate distally. *Corolla* urceolate, light green when fresh, thin, glabrous, 4–4.5 mm. *Filaments* linear, wavy, glabrous, 3 mm; anthers ovate-oblong, base obtuse, 1.5 mm including the tubules. *Ovary* glabrous; style purplish, 3–3.5 mm.

Distr. *Malesia*: W. New Guinea (Vogelkop Peninsula: near waterdivide in the eastern part of the Tamrau Mts), once collected.

Ecol. In dense, ± stunted mossy *Nothofagus-*, *Myrtaceae-*, and *Rapanea*-forest, 1900–1950 m. *Fl.* Nov.

42. Diplycosia amboinensis BECC. Malesia 1 (1878) 210; SLEUM. Reinwardtia 4 (1957) 157. — **Fig. 77b.**

Small epiphytic, subdensely foliate shrub. Branchlets subdensely clothed with dark brownish rufous, appressed, non-glandular bristle-like hairs (*c.* 1.5 mm), no other fine pubescence present. *Leaves* elliptic to broadly subobovate-elliptic, apex broad-attenuate to nearly rounded, obtuse, the terminal gland thick and manifestly prominent, base broad-attenuate (not rounded), coriaceous, glabrous and shining above, paler and dull beneath, laxly set with short (0.7 mm), subappressed, setulose hairs underneath and caducously so along the margin, which is finely but distinctly crenulate and subrevolute, 1.4–2(–2.4) by 0.9–1.3(–1.7) cm, midrib strongly impressed above, or robust and prominent beneath, 1 pair of nerves from or somewhat from above the base of the lamina, high curved-ascending, anastomosing at the top, very slightly impressed above, or raised beneath, sometimes rather inconspicuous; petiole appressed-setulose, *c.* 2 mm. *Flowers* solitary. Pedicels slender, 6–7 mm, with sparse, rather appressed bristle-like

hairs. Bracteoles ovate, ciliate, *c.* 1.2 mm. *Calyx* glabrous, tube 1 mm, lobes ciliolate, 2 mm. *Corolla* only known in bud stage, glabrous. *Ovary* glabrous.

Distr. *Malesia*: Moluccas (Ambon: summit of Mt Sal(a)hutu), *c.* 1000 m, once found. *Fl.* Dec.

43. Diplycosia kalmiifolia SLEUM. Bot. Jahrb. 71 (1940) 154; Reinwardtia 4 (1957) 141; Blumea 11 (1961) 8.

Straggling shrub, sometimes epiphytic. Branchlets laxly longish rufescent-setulose in the older, more densely so in the younger parts. *Leaves* narrow lanceolate, apex acuminate, subacute, the terminal gland small, base gradually attenuate, subcoriaceous, glabrous above, laxly clothed with subappressed, strigose, rufous hairs or bristles, which are caducous except near the base of the lamina, remotely denticulate to subentire, (3.5–)4–5.5 by 0.3–0.6 cm, midrib impressed above the entire length, prominent beneath, nerves obsolete; petiole hirsute, *c.* 2 mm. *Flowers* 3–5 per fascicle in the upper axils. Pedicels rather stoutish, densely shortly rufous-pubescent and -setulose, 6–8 mm in fruit. Bracteoles broad-ovate, glabrous dorsally, ciliate, 1 mm. *Calyx* fleshy in fruit, lobes deltoid subacuminate, ciliate. *Fruit* subglobose, glabrous, *c.* 4 mm ø, blue when ripe; style slender, 5 mm.

Distr. *Malesia*: Borneo (Sarawak: Ulu Koyan on Mt Dulit in heath forest at *c.* 1000 m, said to be common and characteristic there; Hose Mts: Mt Lumut; Merurong Plateau: Bintulu, on open padang at 930 m). *Fr.* July, Oct.

44. Diplycosia kinabaluensis STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 193, t. 14, f. B 4–6; GIBBS, J. Linn. Soc. Bot. 42 (1914) 102; MERR. En. Born. (1921) 464; SLEUM. Reinwardtia 4 (1957) 141; Blumea 12 (1963) 120. — *D. memecyloides* (*non* STAPF) MERR. En. Born. (1921) 464 *p.p.* — **Fig. 72, 78e.**

Low shrub, 10–30 cm high, recumbent or creeping. Branches thick, terete, the greyish cork fissured lengthwise, scars of fallen leaves large (3–5 mm ø). Branchlets brownish, sparsely setose or glabrous, but the young shoots always with scattered, ± spreading, 2–4 mm long, bristles. *Leaves* obovate, sometimes elliptic or obovate-oblong, aggregated towards the ends of the branchlets, apex broad-attenuate to rounded, the terminal gland thick and protruding, base cuneate into the petiole, rigidly coriaceous, glabrous above,

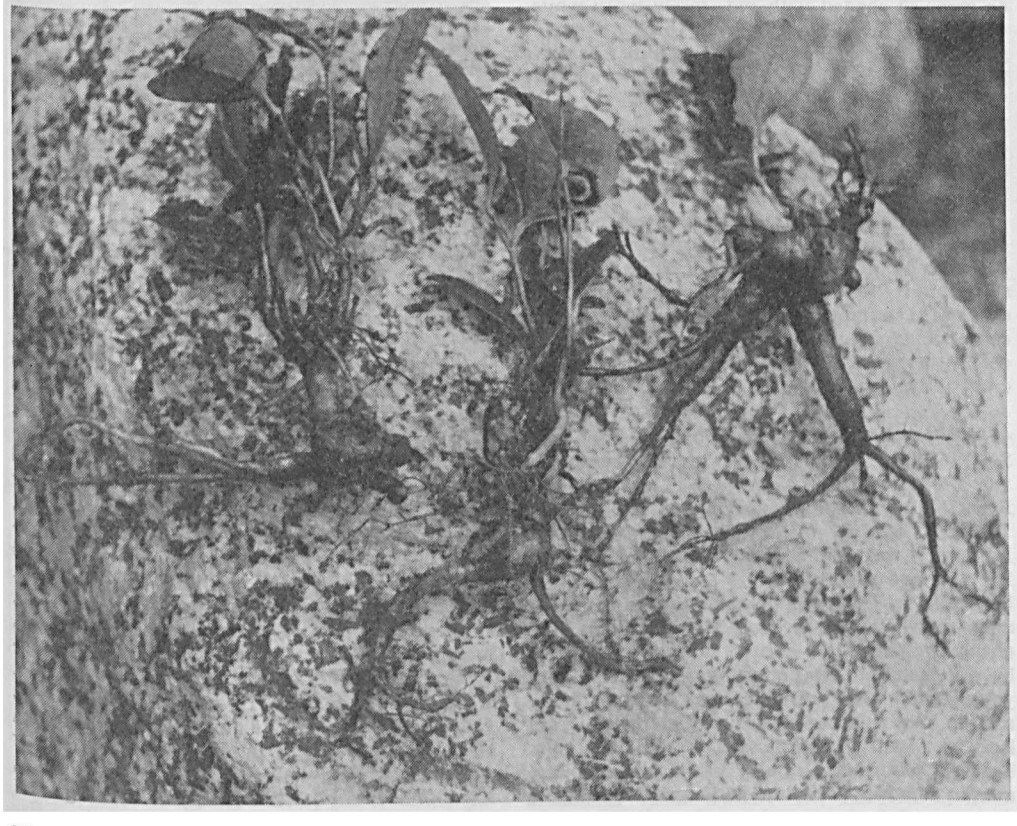

Fig. 72. *Diplycosia cf. kinabaluensis* STAPF, among mosses on temporarily inundated rocks in the Mesilau East R., 1950 m, Mt Kinabalu, North Borneo, showing swollen hypocotylar base and thickened roots (SLEUMER 4737) (SLEUMER, 1963).

laxly to subdensely patently and caducously setose or finally blackish punctate beneath, mostly crenulate in the upper half, the teeth ending in semipersistent, rather long bristle-like hairs, or completely entire, normal ones (6–)7–12 by (3–)4–6 cm, sometimes with other minor ones on the same specimen, margin slightly recurved, midrib mostly strongly impressed above, very prominent beneath, 5(–7)-plinerved, these main nerves curved-ascending and anastomosing, impressed above, prominent beneath, other higher nerves (2–5) from the midrib, less distinct, slightly impressed above, ± obscure beneath, veins ± transverse, veinlets coarsely reticulate, both somewhat impressed above, but ± inconspicuous beneath; petiole glabrous, deep red-purple as is the lower third of the midrib, 4–8 by 2–3 mm, ± flattened, ± winged in the upper part by the decurrent leaf blade. *Flowers* generally 3–4 per axil, sometimes only 2 or solitary in the one or other axil of the same specimen, both from the upper foliate axils or defoliate ones near to the ground. Pedicels stoutish, glabrous, 6–8(–10) mm, basal bracts rather large. Bracteoles rounded-ovate, obtuse, glabrous, ciliolate, 2–3 mm. *Calyx* greenish, *c.* 4 mm, glabrous, 5-lobed to nearly its base, lobes subacute. *Corolla* campanulate, pinkish to greenish, or greenish shaded with red, rarely ivory white, with strong scent, 9–11 mm long, base *c.* 5 mm ø, glabrous, lobes subacute, erect, 3–4 mm. *Filaments* linear, glabrous, papillose in their upper part, *c.* 5.5 mm; anthers oblong, echinulate, the base inflexed, 5 mm including the rather short tubules. *Ovary* glabrous; style 8 mm. *Fruit* light blue to blackish, *c.* 6 mm ø, the *capsule* entirely included by the somewhat fleshy calyx lobes.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. Abundant wherever the vegetation opens out, both on the olivine-serpentine ridge, the dwarf sub-summit forest and in the cracks of the granite core to the summit, where it forms one of the chief components of the vegetation, on wet places, chiefly between 2440–3960 m, occasionally with creeks down to 1830 m. *Fl.* Dec.-July.

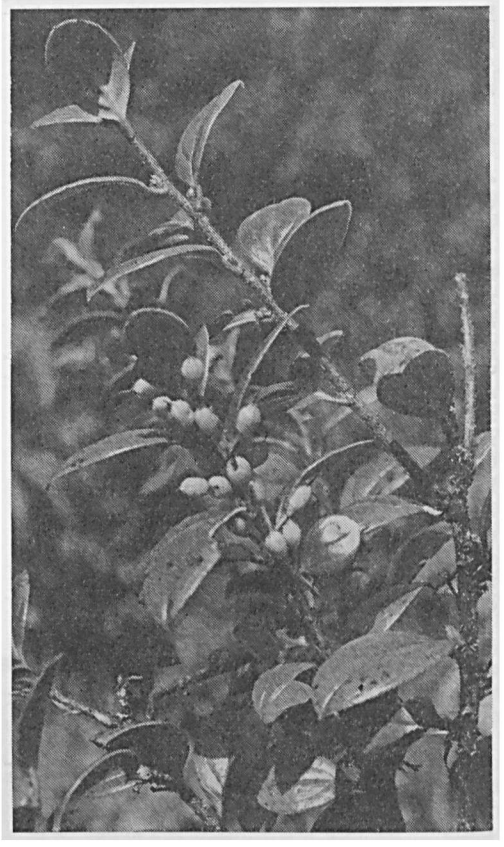

Fig. 73. *Diplycosia sumatrensis* MERR. Mt Singalang, Sumatra, *c.* 2800 m (MEIJER, 1957).

45. Diplycosia sumatrensis MERR. Pap. Mich. Ac. Sc. 19 (March 1934) 181; SLEUM. Reinwardtia 4 (1957) 141. — *D. patenticalyx* J. J. S. in Fedde, Rep. 35 (July 1934) 295. — **Fig. 73.**

Shrub, *c.* 1.5 m. Branches pallid-corticate. Branchlets angular, tips densely, older parts ± laxly clothed with rufous, ± spreading, 2–3 mm long bristles. *Leaves* elliptic, sometimes more ovate, apex shortly and rather broadly acuminate, the terminal gland thick, obtuse, sharply protruding, base cuneate into the petiole, coriaceous, the very young ones laxly rufous-setulose on both faces, mature ones glabrous and shining above, dull and laxly set with subappressed bristle-like hairs beneath, glabrescent, finally blackish punctulate, margin somewhat revolute and crenulate towards the apex of the lamina, the teeth ending in early caducous bristles, (2.2–)3–5(–7) by (1.3–)1.8–3(–4) cm, 3-plinerved, midrib impressed above, raised beneath, 1–2 basal nerves high-ascending, parallel with the margin to the top of the lamina, slightly impressed above, mostly hardly visible beneath, other (3–)4–6 less visible nerves from the midrib, anastomosing with the marginal nerve, mostly very slightly impressed above, or rather inconspicuous as is the lax reticulation above; petiole grooved, thick, glabrescent, 3–6 mm. *Flowers* 3–6 per fascicle, sometimes only 2 or 1 in one or the other axil of the same specimen. Pedicels stoutish, rather densely clad with appressed, glandular, crisped, bristle-like hairs, (5–)8–11 mm. Bracteoles broad-ovate, subacute, keeled, very laxly muriculate dorsally, shortly glandular-fimbriate, *c.* 2 mm. *Calyx* constricted at the basal part, nearly stipitate, *c.* 5 mm, very laxly glandular-crisped-setulose, lobes narrow-ovate, acute, 4 mm. *Corolla* subcylindric-urceolate, (6–)7 mm, glabrous, white, scented, lobes reflexed, 1.5 mm. *Filaments* linear, glabrous, wavy, *c.* 3.5 mm; anthers oblong, cordate at the base, 3 mm including the slender tubules. *Ovary* laxly hairy on the top; style glabrous, *c.* 5.5 mm. *Fruit* violet or mostly blue, *c.* 5 mm ø.

Distr. *Malesia*: Sumatra (Tapanuli: Luburadja; Westcoast: Mt Singalang, Mt Malintang).

Ecol. In *Vaccinium*-forest and subalpine low vegetation or thickets, 1700–2870 m, also on lava

soil, apparently common on Mt Singalang. *Fl. fr.* Jan., April-Aug.

Note. Dry material with fine, cumarine-like smell.

46. Diplycosia crassiramea SLEUM. Reinwardtia 4 (1957) 141.

Shrub. Branchlets terete in the older, greyish corticate and defoliate (6–8 mm ø) parts which bear big rounded scars, angular in the younger, more slender (3–5 mm ø) ones which are exclusively clad with scattered bristles (2–3 mm). *Leaves* oblong to obovate, sometimes obovate-elliptic, apex short-acuminate to broad-attenuate or rounded, the terminal gland very thick and protruding, base cuneate into the petiole, rigidly coriaceous, margin ± revolute, minutely crenulate or entire, glabrous above, rather densely blackish punctate beneath (bristles very early caducous, not to be seen in rather young leaves), (7–)8–13 by (3.5–)4–7.5 cm, midrib slightly impressed above, very thick and prominent beneath, main nerves in 3–4 distinct pairs, curved-ascending and ± anastomosing, slightly impressed above, raised beneath, other higher and shorter nerves or veins ± less distinct or obscure; petiole grooved above, winged in its upper part by the decurrent lamina, *c.* 1 by 0.3 cm. *Flowers* both from the foliate and defoliate axils, 4–8 per fascicle. Pedicels stout, densely ferrugineous-crisped-pubescent (not properly setulose), 7–10(–12) mm, basal bracts numerous, ovate to lanceolate, acute, ferrugineous-crisped-pubescent, 2–4 mm. Bracteoles ovate, subacute, very shortly glandular-fimbriate and ciliolate, externally ferrugineous-pubescent, (2–)2.5–3 mm. *Calyx* contracted at the base, glabrous or very shortly rufous-hairy at the lobes, 4–4.5 mm, lobes deltoid, subacute, reflexed at anthesis, shortly glandular-fimbriate, 2 mm. *Corolla* subcampanulate, slightly constricted both at the base and the limb, 6 by 4–5 mm, glabrous, green, lobes erect, *c.* 2 mm. *Filaments* linear, somewhat dilated above the base, papillose, 3–3.5 mm; anther-cells ovate-oblong, incurved at the base, echinulate, *c.* 2.5 mm; tubules rather narrow, 1.3 mm. *Ovary* glabrous; style *c.* 5 mm.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Ra.: Rantemario-Pokapindjang massif).

Ecol. On open slopes, 2400–3000 m. *Fl.* June.

47. Diplycosia trinervia ELM. Leafl. Philip. Bot. 3 (1911) 1102; MERR. En. Philip. 3 (1923) 247; COPEL. *f.* Philip. J. Sc. 47 (1932) 68; SLEUM. Reinwardtia 4 (1957) 142. — *D. luzonica* [*non* (GRAY) MERR.] ELM. Leafl. Philip. Bot. 3 (1911) 1105.

var. **trinervia.**

Epiphytic shrub, youngest parts of the branchlets ± densely and ± patently setose, somewhat angular, older ones early entirely glabrous. *Leaves* elliptic to oblong-elliptic or oblanceolate, apex subacuminate, the terminal gland rather large and protruding, base cuneate, subcoriaceous, margin subrevolute, entire, mature ones glabrous above, rather laxly punctate beneath, young ones laxly setose-ciliate, (3–)3.5–7 by 1.5–2(–2.5) cm, triplinerved, midrib slightly impressed above, raised beneath, nerves in 1–2 pairs from and/or somewhat from above the base of the lamina, high curved-ascending to and anastomosing at the top of the blade, somewhat impressed above or prominent beneath; petiole 3–7 mm. *Flowers* mostly 3 or 4 per axil, sometimes 2 or 1 in other axils of the same specimen. Pedicels nodding, slender, laxly subappressed-setulose, or nearly glabrous, 1–2 cm. Bracteoles ovate, acute, glabrous, glandular-ciliate, 1 mm. *Calyx c.* 4 mm, glabrous, lobes ovate, acute, glandular-ciliate, *c.* 2.5 mm. *Corolla* narrowly campanulate, greenish, glabrous, 5–6(–7) by 2.5 mm, lobes obtuse, 1.2 mm. *Filaments* linear, glabrous, S-curved, *c.* 3 mm; anthers linear-oblong, echinulate, *c.* 3 mm, the narrow tubules (1.2–1.5 mm) included. *Ovary* glabrous; style 5 mm.

Distr. *Malesia*: Philippines (Mindanao: Mt Calelan).

Ecol. In mossy elfinwood, at *c.* 2500 m. *Fl.* Sept.

var. **urdanetensis** (ELM.) SLEUM. Reinwardtia 4 (1957) 143. — *D. urdanetensis* ELM. Leafl. Philip. Bot. 7 (1915) 2628; MERR. En. Philip. 3 (1923) 247.

Differs by the branchlets which are sparsely and ± appressedly setose from the beginning, and the muriculate, finally glabrescent pedicels.

Distr. *Malesia*: Philippines (Mindanao: mossy forest on Mt Urdaneta), at *c.* 2000 m. One collection. *Fl.* Sept.

Vern. *Minamol*, Mbo.

48. Diplycosia lamii J. J. S. Nova Guinea 18 (1936) 99, t. 21; SLEUM. Bot. Jahrb. 72 (1942) 211; Reinwardtia 4 (1957) 143.

Shrub, 1.5 m, whether or not scandent. Branches elongate, stout. Branchlets short, terete, densely and exclusively ± patently rufous-setose. *Leaves* elliptic to subobovate-elliptic, rarely obovate, apex broad-attenuate, obtuse, the terminal gland thick and protruding, base cuneate into the petiole, stiff-coriaceous, shining and ± dark green above, light green and ± dull beneath, very young ones long-setose on both faces, mature ones laxly punctate above, laxly shortly blackish setulose or finally punctulate all over the undersurface, margin somewhat recurved, the teeth passing into early caducous fine bristles, 1.8–2.7(–3.5) by 1–1.7 cm, midrib strongly impressed above, rather obscure beneath, nerves 1–2 pairs from the base of the lamina or the lower third of the midrib, high curved-ascending, slightly impressed above, obscure beneath, other nerves faintly visible; petiole setose initially, glabrescent, 3–4.5 by 1.2 mm. *Fascicles* mostly 4–6-, in the upper axils sometimes only 3–2-flowered. Pedicels stoutish, recurved, sparsely to subdensely short-crisped-setulose, glabrescent except the bases of the bristles, (5–)6–8 mm. Bracteoles suborbicular-ovate, ciliolate, 1.5 mm. *Calyx* dark red, rugulose, glabrous, 2.5 mm, lobes ovate, subacute, *c.* 2 mm. *Corolla* pale green, limb reddish, urceolate, somewhat fleshy, glabrous, *c.* 5.5 mm, lobes 1.5 mm. *Filaments* linear, glabrous,

c. 3 mm; anthers oblong, base subcordate, *c.* 1.8 mm, the very short and broad tubules included. *Ovary* glabrous; style *c.* 4 mm. *Fruit* dark red.

Distr. *Malesia*: NW. New Guinea (Mt Doorman).

Ecol. On open slopes with rocks and sheltered ravine, 3200–3280 m. *Fl.* Oct.

49. Diplycosia orophila SLEUM. Bot. Jahrb. 71 (1940) 155; Reinwardtia 4 (1957) 143.

Shrub, 1–2 m. Branchlets terete, brown, laxly patent-setose to almost glabrous with age. *Leaves* oblong or mostly oblong-ovate, rather long gradually acuminate towards the apex, acute, base somewhat inequilateral, ± broad-attenuate to nearly rounded, coriaceous, glabrous above, laxly minutely punctulate beneath, minutely denticulate to subentire, (10–)12–17 by 3.5–5.5 cm, triplinerved, midrib and nerves slightly impressed above, raised beneath, other nerves or transverse veins higher from the midrib 8–9, very slightly impressed above, ± obsolete beneath; petiole thick, glabrous or sometimes laxly setose initially, *c.* 8 mm. *Flowers* 3(–5) per fascicle, mostly in the defoliate axils. Pedicels very shortly rufous-tomentose, 3–4 mm, basal bracts few, scariose, tomentose. Bracteoles ovate, rufous-tomentose externally, ciliate, 1.5 mm. *Calyx* whitish, 3 mm, lobes very shortly rufous-tomentulose outside, glabrous inside, 2 mm. *Corolla* urceolate, pale pink, rather fleshy, glabrous, 4.5 mm, lobes very short. *Filaments* linear, glabrous, 2 mm; anthers ovate-oblong, 1.5 mm, the very short tubules included. *Ovary* glabrous; style 3 mm.

Distr. *Malesia*: N. Borneo (Sarawak: Mt Dulit), 2 collections.

Ecol. Shady or open moss forest, 1230–1300 m. *Fl.* Sept.

50. Diplycosia luzonica (A. GRAY) MERR. Philip. J. Sc. 2 (1907) Bot. 293; *ibid.* 3 (1908) Bot. 378; *ibid.* 5 (1910) Bot. 371; En. Philip. 3 (1923) 247; COPEL. *f.* Philip. J. Sc. 47 (1932) 71, t. 2, f. 3–6, t. 4, f. 1; COX, Am. Midl. Nat. 40 (1948) 499 (*anat.*); SLEUM. Reinwardtia 4 (1957) 143; Blumea 12 (1963) 120. — *Gaultheria luzonica* A. GRAY, Proc. Am. Ac. Arts Sc. 5 (1861) 324. — *D. scandens* MERR. Philip. J. Sc. 1 (1906) Suppl. 219; En. Philip. 3 (1923) 247. — *D. fasciculiflora* MERR. Philip. J. Sc. 10 (1915) Bot. 52; En. Philip. 3 (1923) 246.

KEY TO THE VARIETIES

1. New shoots ± densely setose initially (though glabrescent with age). Pedicels at anthesis rather densely appressed- or crisped-setulose *and* finely short-pubescent, the bristles ± caducous in fruiting stage. Leaves setose on both faces initially.
2. Calyx glabrous . . . . . **1. *var.* luzonica**
2. Calyx manifestly greyish puberulous **2. *var.* pubens**
1. New shoots (very) laxly setulose initially (early entirely glabrescent). Pedicels not or very laxly setulose, ± densely short-pubescent, finally glabrescent. Leaves glandular-punctulate beneath when young.
3. Leaves elliptic, broadly acuminate at apex **3. *var.* calelanensis**
3. Leaves elliptic-lanceolate, ± long-acuminate at apex . . . . . **4. *var.* merrittii**

1. *var.* luzonica.

Tree, shrub or subshrub, terrestrial or epiphytic, whether or not scandent, 1–6(–10) m. Branches greyish corticate, striate. Branchlets densely ± spreading rufous-setose (2–3 mm) at tips and younger parts, glabrescent with age. *Leaves* aromatic, ovate to elliptic, rarely elliptic-obovate, apex mostly gradually short-acuminate, rarely obtuse, the terminal gland rather small, but protruding, thus the obtuse leaves apiculate, base ± broadly attenuate into the petiole to nearly rounded, subcoriaceous, firm, very young ones rather densely and ± appressedly rufous-setose on both faces, mature ones glabrous above, laxly and often ± persistently rufous-setose (1–1.5 mm) beneath, sometimes glabrescent, the punctiform bases of the bristles excepted, sometimes finally quite glabrous, margin mostly slightly recurved, serrulate in the upper part, the teeth ending with longish caducous bristles, (2–)3–5(–6, sometimes up to 10) by (1–)1.5–3(–6) cm, midrib impressed above, raised beneath, nerves in the smaller leaves 1–2 pairs, one of these ± basal, in the larger leaves 3–4(–5) and ± pinnately arranged, all curved-ascending and slightly impressed above, faintly raised or inconspicuous beneath; petiole setose initially, (2–)3–5(–7) mm. *Flowers* 3–8, sometimes only 2 per axil in the same specimen. Pedicels stoutish, at anthesis shortly appressed- or crisped-setulose *and* puberulous, 4–8 mm, glabrescent with age and finally accrescent to 15 mm. Bracteoles ovate, rather glabrous dorsally, ciliolate, 1.5 mm. *Calyx c.* 3.5 mm, glabrous, lobes ciliate, 2–3 mm. *Corolla* subglobose-urceolate, glabrous, 3–4 by *c.* 2.5 mm, white or rose, lobes ovate, 1 mm. *Filaments* linear, glabrous, 2–3 mm; anthers oblong, *c.* 2 mm, the short tubules included. *Ovary* glabrous; style 2–3 mm. *Fruit* first pale blue, finally purplish or blackish blue, *c.* 7 mm ø. *Seeds* flattened, subtriangular, *c.* 1 mm.

Distr. *Malesia*: Philippines (Luzon, Biliran I., Catanduanes, Negros, Mindanao).

Ecol. Both in mossy oak-forest or forest edge, and on dry exposed grassland-slope, 1100–2700 m. *Fl. fr.* Jan.-Dec.

Vern. *Atepen, ginula*, Ig., *Sagumati*, Bag.

2. *var.* pubens SLEUM. Reinwardtia 4 (1957) 143.

Differing by a dense greyish puberulence on the bracteoles and calyx.

Distr. *Malesia*: Philippines (Luzon, Benguet Prov., Mt Pulog-Pulogloco).

3. *var.* calelanensis (ELM.) SLEUM. Reinwardtia 4 (1957) 144; Blumea 12 (1963) 120. — *D. calelanensis* ELM. Leafl. Philip. Bot. 3 (1911) 1103; MERR. En. Philip. 3 (1923) 246; COPEL. *f.* Philip. J. Sc. 47 (1932) 74, t. 5, f. 1. — *D. glabra* MERR. Philip. J.

Sc. 14 (1919) 442; En. Philip. 3 (1923) 246. — *D. opaca* C. B. ROBINSON, Philip. J. Sc. 6 (1911) Bot. 355; MERR. En. Philip. 3 (1923) 247; COPEL. *f.* Philip. J. Sc. 47 (1932) 77, t. 5, f. 2.

Differs by laxly setulose, early glabrescent branchlets, and not or very laxly setulose (though puberulous), finally glabrescent pedicels. *Leaves* elliptic, broadly acuminate at apex, glandular-punctate when young, *i.e.* bristles very early caducous. Probably not more than a glabrescent variety of *D. luzonica.*

Distr. *Malesia*: Philippines (Luzon, Palawan, Mindanao).

Ecol. In forest, especially in mossy elfinwood on exposed peaks and ridges, 900–2500 m.

Vern. *Limatmat*, Bag., *dugni-is*, *manitil*, Ig.

4. *var.* **merrittii** (MERR.) SLEUM. Reinwardtia 4 (1957) 144. — *D. merrittii* MERR. Philip. J. Sc. 2 (1907) Bot. 293; *ibid.* 3 (1908) Bot. 378; En. Philip. 3 (1923) 247.

Similar to the preceeding in scarcity of bristles on branchlets, leaves and pedicels, but differing by elliptic-lanceolate, ± long-acuminate leaves.

Distr. *Malesia*: Philippines (Mindoro, Mindanao; reported from Palawan).

51. Diplycosia caryophylloides J. J. S. Bot. Jahrb. 68 (1937) 209, 214; SLEUM. Reinwardtia 4 (1957) 144.

var. **caryophylloides.**

Epiphytic shrub, *c.* 1 m. Branchlets terete. Branchlets subangulate, early covered with whitish or greyish cork, only tips and very young shoots laxly to rather densely clad with ± patent, gland-tipped bristles (1–1.5 mm) or their relics. *Leaves* inserted on a thick cushion, elliptic to broadly oblong-elliptic, apex broadly attenuate, ± obtuse, the terminal gland thickish and prominent, base broad-cuneate to rounded, coriaceous, glabrous above, setulose initially, glabrescent and finally rather sparsely punctate beneath, margin revolute, entire, the marginal bristles early caducous, 4.5–7 by 2.5–3.6 cm, midrib sharply impressed above, very prominent beneath, nerves in (3–)4–5 pairs curved-ascendent and anastomosing, ± distinctly impressed above, mostly rather prominent beneath, reticulation obscure; petiole thick, grooved, glandular-setulose initially, glabrescent, 2.5–5 by 1–1.5 mm. *Flowers* (3–)4–6 per fascicle, both in the foliate and defoliate axils. Pedicels stoutish, laxly covered with rufous fine ± spreading hairs, 3–5 mm, basal bracts rather numerous, small. Bracteoles short-ovate-triangular, rather obtuse, patent-puberulous dorsally, ciliolate, 1.5 mm. *Calyx* obconical, manifestly funnel-shaped attenuate towards the base, tube at anthesis *c.* 2, in fruit *c.* 3 mm, glabrous, lobes triangular, subacute, shortly glandular-fimbriate, *c.* 1.7 mm. *Corolla* campanulate, glabrous, greenish whitish, 5–6 mm, lobes abruptly attenuate towards the tips, *c.* 2 mm. *Filaments* linear, papillose, *c.* 2.8 mm; anther-cells ovate-oblong, inflexed at base, echinulate, 1.5 mm; tubules very narrow, 1.5 mm. *Ovary* glabrous; style 5–6 mm. *Fruit* pear-shaped, blue, *c.* 8 mm long, *c.* 4 mm ø in its upper part.

Distr. *Malesia*: SE. Celebes (Mengkoka Mts).

Ecol. In rain-forest, 1400–1500 m, apparently rare. *Fl.* March, Oct.

var. **longipes** SLEUM. Reinwardtia 4 (1957) 144.

Differing by smaller leaves (3–5 by 1.5–2.5 cm) and generally longer petioles (4–7) mm.

Distr. *Malesia*: SE. Celebes (mountains N of Kendari), one collection. *Fl.* Oct.

52. Diplycosia scabrida BECC. Malesia 1 (1878) 211; MERR. En. Born. (1921) 465; SLEUM. Reinwardtia 4 (1957) 144; Blumea 11 (1961) 7.

Epiphytic shrub. Branches greyish corticate, angular when dry. Branchlets densely ferrugineous setose and setulose at the subterete tips (the shorter bristles becoming furfuraceous), early glabrescent. *Leaves* elliptic or obovate-elliptic, sometimes suborbicular-elliptic, apex short-acuminate or mostly obtuse to rounded, the terminal gland rather small and slightly protruding, base attenuate into the petiole, coriaceous, very young ones covered with a dense dark rusty tomentum which consists of short bristles and shorter bristle-like hairs, the latter becoming furfuraceous, glabrescent with age, but remaining scabrid to the touch for a long time, finally glabrous, subentire, mostly ± distinctly revolute (at least in dry state), (4–)6–10 by (2–) 2.5–7.5 cm, midrib mostly impressed above, always strongly raised beneath, nerves in 3–4(–5) pairs curved-ascending and ± distinctly anastomosing, with some other shorter less distinct ones from the upper third of the midrib, all mostly slightly immersed above, only the lower ones somewhat raised beneath, no proper reticulation visible, although both faces are somewhat rugose in the dry state; petiole rugose, glabrescent, 5–8(–12) by *c.* 2 mm. *Flowers* 3–5 per fascicle. Pedicels stout, densely rusty setulose and -furfuraceous, 3–5 mm at anthesis, basal bracts very small. Bracteoles ovate, apiculate, rather glabrous dorsally, long-ciliate, *c.* 1.5 mm. *Calyx* very shortly contracted at the base, 2.5–3 mm, subdensely very shortly crisped-hairy in its upper half, lobes ovate, subacute, ciliolate, 2 mm. *Corolla* subcylindric-campanulate, green with red tinge, glabrous, 3.5–4 mm, lobes obtuse, reflexed, 1 mm. *Filaments* linear, glabrous, 2 mm; anther-cells ovate, granular, *c.* 1 mm; tubules rather broad, *c.* 0.5 mm. *Ovary* glabrous; style 2.5 mm. *Fruit* red, 3–4 mm ø.

Distr. *Malesia*: Borneo (Sarawak, Central and SE. Borneo).

Ecol. In mossy and *Agathis* forest, on acid sandy loam soil or sandstone, 20–1000 m. *Fl.* Oct.; *fr.* July.

53. Diplycosia capitata SLEUM. Bot. Jahrb. 71(1940) 149; Reinwardtia 4 (1957) 145.

Shrub. Branchlets angular, greyish, with short solitary bristles or finally glabrous. *Leaves* oblong to subovate-oblong, apex acuminate, the terminal gland rather thick, but not distinctly protruding beyond the leaf-margin, base broad-attenuate to nearly rounded, subcoriaceous, laxly to rather

densely clad with short (1 mm) bristles and bristle-like rufous hairs all over the undersurface, entire, margin caducously ciliate (1 mm), (4.5–)6–9(–12) by 2.5–3.5(–5.5) cm, midrib impressed above, dinstinctly raised beneath, nerves 4–5 pairs, the lowest pair nearly from the base, the upper 2–3 pairs curved, the uppermost pair more straight, all anastomosing and very slightly impressed above, rather indistinct beneath; petiole laxly setulose initially, glabrescent, 5–7 by 1.5–2 mm. *Flowers* 8–9 per fascicle. Pedicels stoutish, densely rusty-tomentose by rather short crisped hairs, 5–8 mm at anthesis, up to 10 mm in fruit, basal bracts small, subulate, tomentose. Bracteoles broad-ovate, obtuse, densely rusty-tomentose externally, glabrous inside, *c.* 2 mm. *Calyx* 2.5 mm, glabrous, lobes broad-ovate, obtuse, tomentulose at the margin, 2 mm. *Corolla* short-campanulate, green, glabrous, 6 by 4–5 mm, lobes triangular, obtuse, 1.5 mm. *Filaments* linear, glabrous, 2 mm; anther-cells oblong, 1.5 mm; tubules slender, 0.7 mm. *Ovary* glabrous; style 4.5 mm.

Distr. *Malesia*: Central Celebes (Mt Ponáa on the waterdivide N of Paloppo), at 1620 m. One collection. *Fl.* Sept.

54. Diplycosia fimbriata SLEUM. Blumea 12 (1963) 120.

Shrub, 3–4.5 m. Branchlets rather thick, variously obtusangular, older parts covered with greyish cork which bears the point-like relics of the fallen bristles, younger ones laxly set with spreading glandular-capitate bristly hairs. *Leaves* elliptic, apex rounded or slightly retuse, apiculate by a protruding gland, base broadly and shortly contracted in or decurrent on the petiole, coriaceous, glossy and punctulate above, dull and subdensely caducously glandular-setulose or punctate beneath, 4–5 by 2.5–4 cm, caducously setular and subcrenulate at the slightly revolute margin, midrib immersed above, obtusely prominent beneath, nerves 4(–5) pairs, curved-ascendent, and almost parallel, a little impressed above, the lower ones only ± prominent beneath, reticulation obscure; petiole slender, flattened, 1–1.5 cm by 1.5–2 mm, grooved above, laxly patently glandular-setulose. *Fascicles* 3–5(–6)-flowered; perulae ovate-acuminate, *c.* 2 mm. Pedicels slender, 1–1.3 cm, subdensely patently glandular-setulose. Bracteoles small, dorsally set with thick subsessile glands. *Calyx* tube cupular, 2.5 mm in all, contracted at the very base only, shining, corrugate in dry specimens, glabrous, lobes deltoid, *c.* 2 mm, fimbriate along the whole margin by thick (sub)sessile glands. *Corolla* narrowly campanulate, thin, pinkish white, glabrous, *c.* 8 mm long in all, 2.5 mm ø at base, 5–6 mm ø at limb, lobes triangular, 2 mm. *Stamens* 10, equal, connivent, 8 mm; filaments linear, glabrous; anthers elongate-ovate, tubules narrowed distally. *Disk* lobes thick, 0.5 mm. *Ovary* glabrous; style glabrous, rather slender.

Distr. *Malesia*: Borneo (Sarawak: summit area of Mt Mulu), one collection.

Ecol. Montane forest on exposed ridge, 1980–2380 m. *Fl.* June.

55. Diplycosia sagittanthera J. J. S. Bot. Jahrb. 68 (1937) 205; SLEUM. Reinwardtia 4 (1957) 145.

Epiphytic shrub. Branches slender, terete, rather short (30–40 cm), patent-rufous-setulose in the younger parts, most of the bristles ± distinctly gland-tipped, furthermore clothed with a fine patent pubescence. *Leaves* ovate to oblong-ovate, apex gradually acuminate, the terminal gland small, not or only a little prominent, base broad-attenuate to rounded, coriaceous, stiff, somewhat convex when dry, olivaceous, glabrous and somewhat shining above, all over the undersurface and along the margin with scattered, ± caducous, blackish, bristle-like hairs, finally blackish punctate, minutely denticulate, 1.7–3 by 0.9–1.2(–1.5) cm, midrib strongly impressed above, slightly raised beneath, 1 pair of nerves from near base of the lamina ascending to the top, slightly impressed above, subinconspicuous beneath, some higher inserted nerves faintly visible; petiole stout, grooved, setulose, 1.5–2.5 mm. Stipule-like axillary perulae subulate, as long as the petioles, persistent at least in the upper axils. *Flowers* solitary in the upper axils. Pedicels stoutish, subglabrous, 1–2 mm. Bracteoles ovate, obtuse, ciliolate and with a few long bristles along the margin, 1 mm. *Calyx* cupular, *c.* 2.5 mm, glabrous dorsally, lobes ± spreading, 1.5 mm, the very apex ciliolate, otherwise with numerous, coarse, longish (*c.* 1.5 mm), marginal bristles. *Corolla* cylindric or narrow-campanulate, white, glabrous, 5 mm, lobes 2 mm. *Filaments* S-curved, linear, but manifestly dilated above the base, 1.8 mm; anthers sagittate, as long as the filaments, the anther-cells echinulate; tubules narrow and ± divergent, 0.8 mm. *Ovary* glabrous; style *c.* 3 mm.

Distr. *Malesia*: Central Celebes (Mt Wawu Meusa, N of Lake Matana), in rain-forest at 800 m, said to be rare. Once collected. *Fl.* Sept.

56. Diplycosia acuminata BECC. Malesia 1 (1878) 212; MERR. En. Born. (1921) 463; SLEUM. Reinwardtia 4 (1957) 145; Blumea 12 (1963) 120. — **Fig. 77c.**

Small shrub, terrestrial or epiphytic. Branches terete, glabrous, divergent. Branchlets slender, both laxly to densely subpatently rufous-setulose and densely patent-puberulous. *Leaves* ovate, apex subcaudate-acuminate, subacute, the terminal gland small, base broad-attenuate to rounded, coriaceous, rather stiff, flat, glabrous above, with scattered, subappressed, blackish short (1 mm) bristles, or finally punctulate by their remaining bases, indistinctly crenulate especially in the upper half of the lamina, the teeth extending into caducous, very slender bristles (1–1.5 mm) which are persistent for a long time, (1.5–)2–3(–4) by (1–)1.2–1.8(–2.2) cm, midrib impressed above in its entire length, slightly raised beneath, nerves 3–4 pairs, the lower 1–2 pairs from or from above the base of the lamina, ascendent and slightly impressed above, other 2–3 higher pairs from the midrib and less distinct, these very slightly impressed above or altogether inconspicuous on both sides; petiole setulose, 1.5–2 mm. Stipule-like axillary perulae

subulate, as long as the petiole, ciliate, ± persistent. *Flowers* solitary axillary, subsessile. Pedicels glabrous, at anthesis hardly 1 mm, up to 2.5 mm in fruit. Bracteoles ovate, obtuse, glabrous, ciliolate, 1 mm. *Calyx* 2.5 mm, contracted at the base, glabrous, lobes ovate, obtuse, ciliolate, *c.* 1.8 mm. *Corolla* campanulate, tender, white, glabrous, 5(–6) mm, lobes obtuse, 1 mm. *Filaments* linear, dilated above the base, S-curved, 2.5 mm; anthers sagittate, echinulate, 2.5 mm including the slender tubules. *Ovary* glabrous; style 3.5–4 mm.

Distr. *Malesia*: Borneo (Sarawak, Central and Eastern Borneo).

Ecol. In mossy forest, on Mt Beratus also on sandstone, 700–1300 m. *Fl.* June, July, Nov.

57. Diplycosia crenulata SLEUM. Bot. Jahrb. 71 (1940) 153; Reinwardtia 4 (1957) 145.

Epiphytic shrub. Branchlets terete, very slender, subdensely covered with fine, rufous, bristle-like hairs (1–1.5 mm) and very densely with spreading, short, brownish, fine hairs. *Leaves* broad-ovate to suborbicular-ovate, apex ± rounded, the terminal gland ± indistinct, base slightly though manifestly cordate, subcoriaceous, laxly clad with caducous short bristle-like hairs on both faces when young, ± glabrous with age above, ± persistently blackish brownish punctate beneath, margin finely crenulate, the teeth with rather longish caducous bristles, (4–)5–8(–10) by (4–)7(–8) mm, midrib slightly impressed above, obscure beneath, one pair of nerves high curved-ascendent, very slightly impressed above or hardly visible above only; petiole setulose, 1–1.5 mm. Stipule-like axillary perulae fuscous, subulate, ± persistent, *c.* 1.5 mm. *Flowers* axillary solitary. Pedicels rather stoutish, nearly glabrous, 2(–3) mm. Bracteoles broad-ovate, obtuse, glabrous, ciliolate, 1 mm. *Calyx* contracted at the base, 2.5 mm, glabrous, lobes broad-ovate, rather obtuse, ciliolate, *c.* 1.7 mm. *Corolla* subcampanulate, rather firm, *c.* 6 by 4 mm, glabrous, flesh-coloured (or white?), lobes nearly 2 mm. *Filaments* linear, a little dilated above the base, glabrous, S-curved, 2.5 mm; anthers sagittate, 3 mm in all; anther-cells very granular; tubules slender, 1.3 mm. *Ovary* glabrous; style 4 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In ridge forest, 1220–1680 m. *Fl.* Jan., April, Oct.

58. Diplycosia elliptica RIDL. J. Fed. Mal. St. Mus. 10 (1920) 145; Fl. Mal. Pen. 2 (1923) 213; SLEUM. Reinwardtia 4 (1957) 145; Blumea 11 (1961) 7; *ibid.* 12 (1963) 121. — *D. cordifolia* RIDL. J. Fed. Mal. St. Mus. 10 (1920) 145; Fl. Mal. Pen. 2 (1923) 214. — *D. microphylla* (*non* BECC.) CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1882) 458; RIDL. J. Str. Br. R. As. Soc. *n.* 23 (1891) 146; J. Fed. Mal. St. Mus. 10 (1920) 145; Fl. Mal. Pen. 2 (1923) 213; BURK. & HENDERS. Gard. Bull. S. S. 3 (1925) 390; FLETCHER, Fl. Siam. En. 2 (1938) 315; HENDERS. Mal. Nat. J. 6 (1950) 264. — *Vaccinium microphyllum* (*non* BL.) K. & G. J. As. Soc. Beng. 74, ii (1905) 62; MERR. En. Born. (1921) 464; BURK. & HOLTT. Gard. Bull. S. S. 3 (1923) 57. — *D. kingii* MERR. Pap. Mich. Ac. Sc. 19 (1933) 182; Contr. Arn. Arb. 8 (1934) 128; Not. Nat. Ac. Nat. Sc. Philad. 47 (1940) 2. — **Fig. 77g.**

Epiphytic or terrestrial shrub or shrublet, up to 1 m, sometimes creeping or scrambling, with much branched, tough, wiry glabrous branches. Branchlets slender, tips subangular, laxly or rarely more densely clothed with ± appressed longish (1–2 mm) bristles as well as ± densely greyish to reddish patent-puberulous, or sometimes puberulous only, subdensely foliate. *Leaves* ovate to elliptic, variable in form, apex broad-attenuate, blunt, not rarely rounded, the terminal gland minute, base mostly rounded or nearly so, rarely (and only partly in the same specimen) cordate, coriaceous, rather stiff, old ones said to be scarlet, young ones purple underneath, glabrous, undersurface laxly set with very short blackish bristles, these caducous except their bases, entire or mostly faintly crenate in the upper half, teeth passing into fine ± caducous bristles, flat, margin not revolute, (7–)10–17 (–30) by (4–)6–10)(–18) mm, triplinerved, midrib and nerves slightly sunken on both faces, sometimes ± obscure; petiole rather slender, finally glabrous, 1–2 mm. Stipule-like axillary perulae subulate, 1–2 mm, easily recognizable on the young sterile branches, ± caducous with age. *Flowers* solitary, rarely in twos. Pedicels ± glabrescent, 1(–2) mm, basal bracts minute. Bracteoles ovate, ciliolate, *c.* 0.6 mm. *Calyx* initially funnel-shaped, contracted in the lower part, glabrous, 2 mm, lobes subtriangular, subacute, ciliolate. *Corolla* short-cylindric or subcampanulate, glabrous, white to greenish or pale yellow, 4–5 by 2.5–3 mm, lobes erect, 1–1.5 mm. *Filaments* rather filiform upwards, gradually expanded towards the base, somewhat S-curved, glabrous, *c.* 2.5 mm; anthers sagittate, very echinulate; anther-cells *c.* 1.5 mm; tubules slender, 1 mm. *Ovary* glabrous; style 3.5 mm. *Fruit* depressedly globular, the lower half only surrounded by the bluish, not much swollen calyx, pale to almost white when ripe, *c.* 3 by 4 mm.

Distr. S. Siam, in *Malesia*: Malay Peninsula, N. Sumatra (Gajo Lands, Eastcoast), Borneo.

Ecol. In evergreen mountain forest, moss forest, also in rather open places on crests or summits, within ericoid ridge scrub, in the Malay Peninsula between 915–1825 m, in Sumatra 950–2500 m, locally apparently rather common. *Fl.* Jan.-Dec.

59. Diplycosia microphylla BECC. Malesia 1 (1878) 212; MERR. En. Born. (1921) 464; SLEUM. Reinwardtia 4 (1957) 146; Blumea 11 (1961) 7. — **Fig. 77i, i'–i''.**

Shrublet, epiphytic, up to 40 cm with swollen base. Branches divaricate. Branchlets slender, tips rather densely covered with dark rufous ± appressed fine bristles (1–2 mm) and a dense to rather lax indument of fine very short spreading hairs, ± densely foliate. *Leaves* elliptic-oblong or elliptic, sometimes (in the same specimen) in part ovate-elliptic, apex short-attenuate, obtuse to rounded, the terminal gland small, only slightly prominent, base mostly short-attenuate, rarely rounded, coriaceous, stiff, flat, glabrous above, obscurely

punctate or finally completely glabrous beneath, crenulate, the teeth ending in very fine ± caducous bristles, margin not revolute, (7–)10–18 by (4–)5–7 mm, triplinerved, midrib and nerves slightly impressed on both faces, the latter not rarely rather inconspicuous at all; petiole setulose, glabrescent, 1–1.5 mm. *Flowers* mostly solitary, rarely in twos. Pedicels rather glabrous, 1.5–2 mm. Bracteoles minute, ovate, 0.5 mm. *Calyx* glabrous, 1.5 mm, lobes deltoid, obtuse, ciliolate, 1 mm. *Corolla* narrow-campanulate, white, glabrous, *c.* 5.5 mm, shortly 5-lobed. *Filaments* filiform, glabrous, S-curved, *c.* 2.5 mm; anthers sagittate, echinulate, 2.6 mm in all; tubules slender, *c.* 1.5 mm. *Ovary* glabrous; style 4–5 mm. Young *fruit* covered by the apparently slightly accrescent calyx in the lower part only.

Distr. *Malesia*: Borneo (Sarawak: Mt Mattang, Mt Poi; SE. Borneo: W. Kutei, Mt Palimasan).

Ecol. In *Agathis*-forest, 600–1370 m, apparently common on Mt Mattang, said to be frequent on rocks of Mt Poi. *Fl.* Oct.-Dec.

60. Diplycosia kostermansii SLEUM. Blumea 11 (1961) 5.

Shrublet, hardly 10 cm high, with a few prostrate, slender, rooting stems or twigs 3–8 cm, densely set with subappressed redbrown setular hairs and a very short spreading pubescence, subdensely foliate. *Leaves* elliptic-oblong or lanceolate, shortly attenuate at both ends, subcoriaceous, with a few crenulations, each crenation ending in a long redbrown setular and subappressed, finally caducous hair, such as are found here and there on both faces of the lamina, otherwise glabrous, 6–8 by *c.* 2 mm, midrib slightly sunken above, hardly visible beneath, nerves not visible; petiole slender, *c.* 1 mm. Stipule-like perulae subulate, early caducous. *Flowers* solitary in a few distant axils. Pedicels glabrous, 1 mm, with 2 distal setaceous-ciliate bracteoles. *Calyx* broadly campanulate, 2 mm, 5-lobed halfway, lobes triangular, obtuse, long subsetose-ciliate, glabrous otherwise. *Corolla* urceolate, 5-angular, rather thin, almost 7 by *c.* 3.5 mm, white, purplish at angles, glabrous, lobes deltoid, 1.5 mm. *Filaments* linear, dilated at the base, glabrous, 4.5–5 mm, a little wavy; anthers sagittate, 2 mm, cells rather narrow, echinulate; tubules as long as but narrower than the cells. *Ovary* glabrous; style columnar, glabrous, 4.5 mm.

Distr. *Malesia*: Borneo (Mt Palimasan in W. Kutei), in mossy forest on white acid sands at 800 m. One collection. *Fl.* Sept.

61. Diplycosia consobrina BECC. Malesia 1 (1878) 211; MERR. En. Born. (1921) 464; SLEUM. Reinwardtia 4 (1957) 146.

Epiphytic shrublet, up to 30 cm. Branchlets terete, slender, dark rufous-subappressed-setulose (1.5–2 mm) and densely patently greyish puberulent. *Leaves* ovate-elliptic or elliptic, sometimes ovate or broadly elliptic-ovate, apex short-acuminate, the very apex rather obtuse, the terminal gland small, not or slightly protracted, base mostly broad-attenuate, rarely rounded, subcoriaceous, stiff, flat, glabrous above, shortly and laxly setulose beneath initially, or dark brown-punctate in later stages, minutely crenulate, each tooth ending in a fine ± caducous bristle, margin not revolute, (13–)15–20 by (6–)7–13 mm, tripli- or irregularly faintly 5-nerved from and from somewhat above the base, midrib and nerves sunken above and beneath, the latter sometimes less distinct or hardly visible; petiole slender, setulose, 1–2 mm. *Flowers* solitary. Pedicels nearly glabrous, 1–2 mm, basal bracts minute. Bracteoles ovate, obtuse, ciliate, 0.7 mm. *Calyx* glabrous, 2 mm, lobes deltoid-ovate, obtuse, ciliolate, 1 mm. *Corolla* campanulate, glabrous, *c.* 4.5 mm, lobes reflexed, *c.* 1.3 mm. *Filaments* linear, broadened disk-like above the base, glabrous, S-curved, 2 mm; anthers sagittate, anther-cells ovate, very granular, 1 mm; tubules narrow, pipe-like, 1 mm. *Ovary* subdensely pubescent; style 3 mm.

Distr. *Malesia*: Borneo (Sarawak: Mt Mattang), twice found there at 500 m.

62. Diplycosia cinnabarina SLEUM. Reinwardtia 4 (1957) 146. — **Fig. 77k.**

Shrub, epiphytic, creeping. Branchlets rooting, red-brown and setose in the older parts, rather densely subpatently setulose (1.5–2 mm) and ± densely (rarely laxly) patently fuscous-puberulous. *Leaves* elliptic, sometimes subovate-elliptic or oblong-elliptic, broad-attenuate at both ends, the apical gland small though distinct, on each side accompanied by a protracted tooth, thus the apex becoming ± tridentate, rigid, coriaceous, glabrous above, set with scattered blackish, short ± caducous bristle-like hairs beneath, finally blackish punctulate, manifestly crenate, the teeth obtuse, passing into ± persistent bristles (1 mm), 0.7–1.4 by 0.4–0.7 cm, triplinerved, midrib distinctly sunken above, a little raised or sunken beneath, nerves impressed above, mostly obsolete, sometimes very slightly impressed beneath; petiole setulose, 1.5–2 mm. *Flowers* solitary. Pedicels slender, glabrous, (6–)7–10 mm. Bracteoles ovate, subacute, ± reflexed, rather long (0.6 mm) setulose. *Calyx* 2.5 mm, glabrous dorsally, lobes ovate-deltoid, 1.5 mm, margin with coarse longish (0.6–0.8 mm) bristles. *Corolla* urceolate, glabrous, bright red, 8.5–9.5 by *c.* 3.5 mm, lobes obtuse 1.5 mm. *Filaments* filiform, somewhat dilated above the base, S-curved, glabrous, 4.5 mm; anthers oblong, apiculate-recurved at the base, very granular, 3.5 mm, the rather broad tubules included. *Ovary* glabrous; style 7 mm.

Distr. *Malesia*: Sumatra (Atjeh, Gajo Lands: Mt Losir and vicinity).

Ecol. In mossy forest and mountain heath, 2100–2500 m. *Fl.* Jan.-Febr.

63. Diplycosia setiloba SLEUM. Blumea 12 (1963) 121.

Epiphytic shrublet or shrub, few-stemmed. Branches suberect or decumbent, rarely pendent, (0.3–)0.5–0.8(–1.5) m, roots thick and fleshy. Branchlets slender, densely set with longish (2–5 mm) rusty and ± spreading, bristly, and with finer, very short, spreading hairs, the latter disappearing

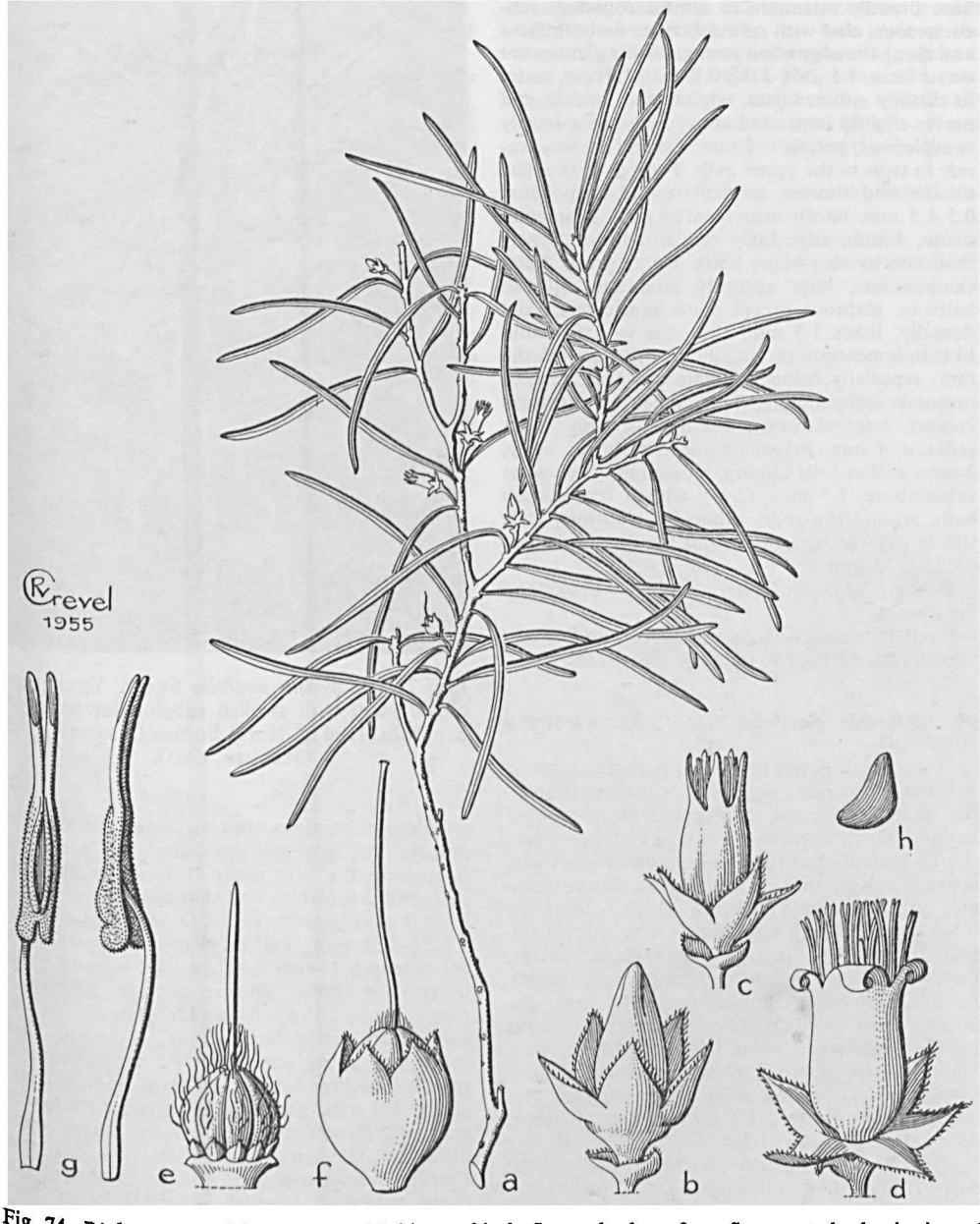

Fig. 74. *Diplycosia pinifolia* STAPF. *a.* Habit, × ⅔, *b.* flower bud, × 3, *c.* flower at the beginning of anthesis, × 3, *d.* flower at full anthesis, × 3, *e.* ovary and style, × 6, *f.* submature fruit, × 3, *g.* stamens in front and side view, × 10, *h.* seed, × 13 (*a–h* CLEMENS 33044).

in the older parts of the branchlets. *Leaves* laxly arranged, elliptic or more rarely subovate-elliptic, apex shortly subacuminate, the apical gland small, base broadly attenuate to almost rounded, subcoriaceous, clad with rufous bristles on both faces and along the edge when young, tardily glabrescent on surfaces, 1.5–2.5(–3) by 0.8–1.5(–1.8) cm, entire or distally subcrenulate, triplinerved, midrib and nerves slightly impressed above, otherwise hardly conspicuous; petiole *c.* 2 mm. *Flowers* solitary, rarely in twos in the upper axils. Pedicels with a few bristles and shorter, muriculate and crisp hairs, 0.5–1.5 mm, hardly accrescent in fruit. Bracteoles ovate, 1 mm, edge laxly setular and/or densely fimbriate by very short hairs. *Calyx* green, flatly campanulate, base abruptly attenuate, 5-lobed halfway, glabrous except some muriculate hairs dorsally, lobes 1.3 mm, the edge with a comb-like indumentum of glandular bristles (0.5–0.8 mm) especially below, ciliolate upwards. *Corolla* urceolate-campanulate, light green or greenish creamy, thin, glabrous, 4–5 by 3–4 mm, lobes reflexed, 1 mm. *Filaments* linear, glabrous, wavy, 2 mm; anther-cells oblong, base slightly retuse or subsagittate, 1.8 mm. *Ovary* with a few longish hairs around the style, otherwise glabrous; style slender, glabrous, 3 mm. *Fruit* finally purplish or bluish, *c.* 5 mm.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula).

Ecol. In mossy *Nothofagus-Podocarpus-Rapanea* crest forest, 1400–2050 m. *Fl. fr.* Nov.-Jan.

64. Diplycosia piceifolia SLEUM. Reinwardtia 4 (1957) 147.

Epiphytic shrublet, 10–20 cm. Branches terete *c.* 3–5 mm ø, tips again and again branched. Branchlets short, congested, aggregated in form of a cushion, verruculose in the young parts and very shortly patently brownish puberulous. *Leaves* very dense, acicular, apex subacute, base short-attenuate, subcoriaceous, glabrous, (1–)1.5–2 cm by 0.5–0.8 mm, midrib impressed above, nerves obscure; petiole 0.5–1 mm. *Flowers* axillary, solitary, minute. Pedicels subglabrous, 1.5–2.5 mm, slender. Bracteoles minute, ciliolate. *Calyx* 1.3 mm, glabrous, lobes ovate, obtuse, ciliolate. *Corolla* broad-cylindric, *c.* 2.5 mm, 5-lobed nearly halfway. *Filaments* sublinear, glabrous, 1 mm; anther-cells very granular, oblong, inflexed at the base, 0.8 mm; tubules narrow, 1.2 mm. *Ovary* glabrous; style 1.5 mm. *Fruit c.* 1.5 ø.

Distr. *Malesia*: Central Borneo (Mueller Mts: Amai Ambit). One collection. *Fl. fr.* April.

65. Diplycosia pinifolia STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 192, t. 14, f. A 1–3; MERR. En. Born. (1921) 465; SLEUM. Reinwardtia 4 (1957) 147; Blumea 12 (1963) 121; *ibid.* 12 (1964) 343. — **Fig. 74–76.**

Epiphytic or rarely terrestrial shrub, 0.6–1(–1.5) m, often with thick roots or subglobular-swollen base. Branches terete, striate, dark. Branchlets slender, brownish, exclusively densely patently

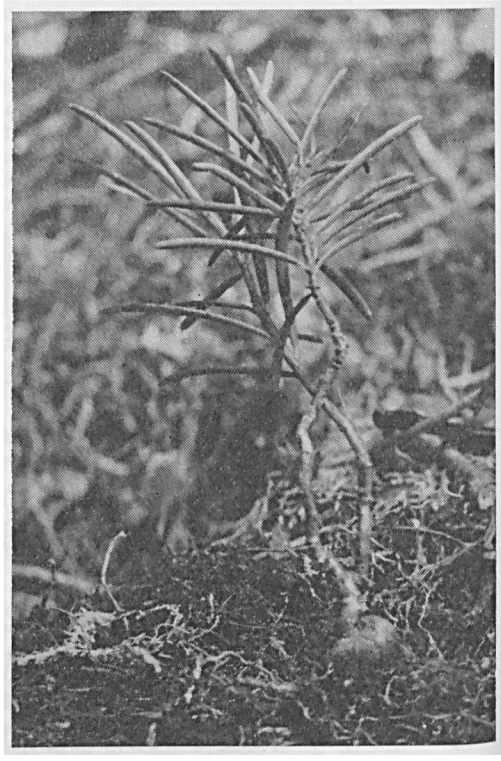

Fig. 75. *Diplycosia pinifolia* STAPF. Young epiphytic plant with swollen subglobular base, Mt Kinabalu, 1300 m, North Borneo (SLEUMER 4688) (SLEUMER, 1963).

papillose-puberulous. *Leaves* dense, linear, apex obtuse, the terminal gland minute, base attenuate into the very short (1 mm) petiole, subcoriaceous, brownish and shining above when dry, slightly paler beneath, entire, (3–)4.5–5.5(–6) cm by 1.5–2(–2.5) mm, midrib slightly impressed the entire length, somewhat prominent beneath, other nerves not visible. *Flowers* axillary, solitary or rarely in twos. Pedicels slender, glabrous or with some scattered stalked glands, 4–6 mm, basal bracts few, ovate-acute, nearly 1 mm. Bracteoles rounded to broad-ovate, ciliolate, 1 mm. *Calyx* green, 3–4 mm, glabrous, lobes ovate-triangular, subacute, glandular-fimbriate below, densely fimbriate by fine hairs towards the apex, 2–3 mm. *Corolla* narrow-urceolate, 5–6 by 3–4 mm, glabrous, white or greenish, or cream with green tinge, lobes triangular-acuminate, subacute, finally reflexed, 2 mm. *Filaments* linear, a little dilated above the base, glabrous, 3 mm; anther-cells oblong, very granular, 1.5 mm; tubules narrow, 1.5 mm. *Ovary* laxly clothed with longish brownish hairs; style *c.* 4 mm. *Fruit c.* 6 mm ø, blackish purple; fruit pedicel 8–10 mm. *Seeds* irregularly triangular, flat, nearly 1 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy forest, on open grassy slope on

landslide, even with mosses on stones in rivers, locally frequent but seldom seen in flower, 1065–2285 m. *Fl. fr.* Febr.-Aug.

66. Diplycosia lavandulifolia SLEUM. Blumea 12 (1963) 121.

Terrestrial, sometimes scandent, apparently small shrub. Branchlets with spreading fine hairs, lax longish bristles and scattered gland-thickened hairs in the recent parts or young shoots, older parts covered with a thin, flaky, early caducous bark, which still shows the bases of the glandular hairs and/or bristles as dark points, old parts striate-corticate and quite glabrous. *Leaves* linear, rather laxly arranged and ± spreading horizontally, sometimes more reflexed, subcoriaceous, shortly or gradually subacutely attenuate or acuminate, the apical gland minute, base shortly attenuate to the petiole, with a few long bristles along the margin when very young, glabrous at maturity, laxly brownish punctulate below, entire, ± flat, 4–7(–8) cm by 1.5–2.5(–3) mm, midrib much impressed above, rather obscure beneath, no nerves or veins; petiole 1.5–2 mm. *Flowers* axillary, solitary or in twos. Bracteoles glandular-fimbriolate. *Calyx* glabrous, 3 mm long, tube rather shortly and abruptly narrowed at the base, lobes ovate-triangular, blunt, *c.* 1.2 mm, subdensely with thickish subsessile glands (no hairs) along the whole margin. *Corolla* urn-shaped, widely opened, thin, glabrous, *c.* 4 by 2.5 mm, lobes *c.* 1 mm. *Filaments* linear, glabrous, 2 mm; anther-cells ovate-acuminate, base obtuse, *c.* 1.8 mm. *Ovary* glabrous; style slender, glabrous, *c.* 2.5 mm. Immature *fruit* creamy white.

Distr. *Malesia*: Borneo (Sarawak: Baram and Limbang Distr.).

Ecol. In padang or peat swamp forest, also in kĕrangas (peaty *Shorea albida* '*kerapah*') forest undergrowth, 60–801 m, locally abundant. *Fl.* April, July-Aug.

67. Diplycosia stenophylla SLEUM. Reinwardtia 4 (1957) 147. — **Fig. 77e.**

Erect shrub, *c.* 30 cm. Branches terete, becoming blackish when dry, striate. Branchlets puberulous, here and there set with a solitary appressed bristle. *Leaves* narrow-lanceolate, apex

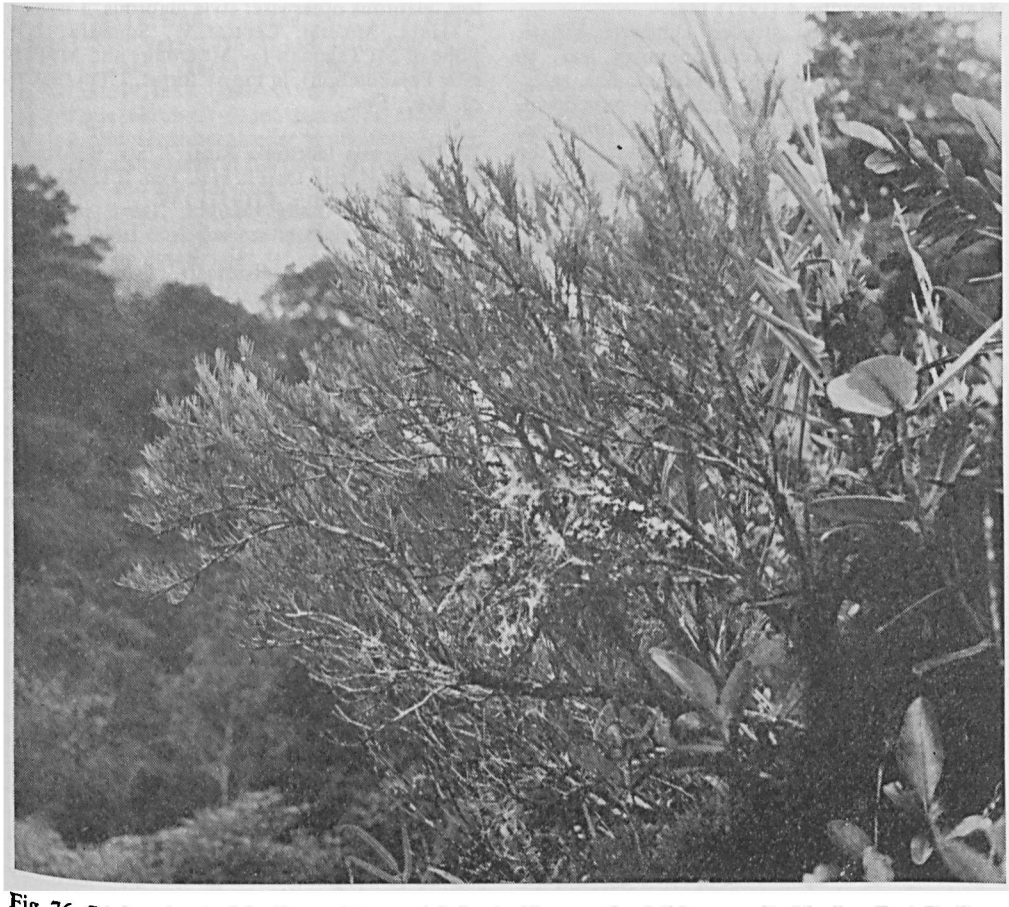

Fig. 76. *Diplycosia pinifolia* STAPF. Terrestrial shrub, ½ m, on landslide opposite Mesilau East R. Cave, Mt Kinabalu, 1950 m, North Borneo (SLEUMER 4734) (SLEUMER, 1963).

short-acuminate, the terminal gland small though somewhat prominent, base attenuate into the petiole, subcoriaceous, glabrous except some scattered blackish points underneath, entire or remotely ciliate-denticulate, (2–)2.3–3.5 cm by 4–6 mm, midrib impressed above, a little raised beneath, nerves obscure; petiole stoutish, 1–2 mm, inserted on a thick leaf-cushion. *Flowers* axillary, solitary or rarely in twos. Pedicels pubescent, *c.* 1.5 mm, basal bracts 2 or 3, minute. Bracteoles broad-ovate, glabrous, ciliate. *Calyx* 2 mm, contracted at the base, glabrous, lobes ovate, obtuse, fimbriate-ciliolate, 1 mm. *Corolla* cylindric-urceolate, red, 2.5–3 by *c.* 1.5 mm, glabrous, very shortly 4- (or 5-)lobed. *Stamens* 8 (rarely 10); filaments linear, inflexed, glabrous, *c.* 1.5 mm; anthers ovate, saccate at the base, *c.* 1.5 mm, the short tubules included. *Ovary* glabrous; style filiform, 2.5 mm.

Distr. *Malesia*: Central Celebes (Lake Poso), twice found.

Ecol. On quartzite peaty plateau, 1700–2000 m. *Fl.* Oct., Nov.

68. Diplycosia myrtillus STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 192; MERR. En. Born. (1921) 464; SLEUM. Reinwardtia 4 (1957) 148.

Shrub. Branchlets slender, subterete, striate, glabrous. Branchlets subquadrangular, laxly to subdensely covered with ± appressed, fine, rufescent bristles and densely papillose-puberulent. *Leaves* narrowly elliptic-oblong, subcoriaceous, apex short-acuminate, acute or subobtuse, the terminal gland small, slightly prominent, base cuneate, glabrous and shining above, dull and laxly blackish glandular-punctulate beneath, entire or indistinctly crenulate, the teeth passing into fine, rather early caducous bristles (1 mm), margin slightly revolute, (10–)12–14(–16) by (4–)5–6(–7) mm, midrib impressed above, a little raised beneath in its lower part, nerves obscure; petiole rather slender, rugulose, 1–2 mm. *Flowers* axillary, mostly solitary, rarely in twos. Pedicels laxly setulose, 3–4 mm, basal bracts *c.* 3, minute. Bracteoles ovate, glabrous, glandular-ciliolate, 1 mm. *Calyx c.* 3 mm, glabrous, 5-lobed to the middle, lobes ovate, acute, glandular-ciliolate. *Corolla* campanulate, base slightly contracted, glabrous, 6 mm, 5-lobed to nearly halfway. *Filaments* from the dilated base abruptly linear towards the apex, glabrous, *c.* 2.5 mm; anthers ovate-oblong, granular, 1.5 mm, the rather short tubules included. *Ovary* densely yellowish hairy; style 4–5 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu), twice found at 1525–2650 m. *Fl.* June.

69. Diplycosia rubella SLEUM. Reinwardtia 4 (1957) 148; Blumea 11 (1961) 8.

Terrestrial or epiphytic shrub. Branchlets (very) slender, terete, greyish brownish corticate, laxly setulose, toward the subangular tips more densely patently or subappressedly rufous-setulose (bristles 1–1.5 mm, gland-tipped initially) and densely patent-puberulent. *Leaves* ovate-lanceolate, subfalcate-caudate-acuminate towards the apex, acute, the terminal gland small, base broadly cuneate into the petiole, firmly subcoriaceous, glabrous and somewhat shining above, dull and ± laxly clad with subappressed bristles especially along the midrib, margin subrevolute, subentire, the teeth indicated by bristles which persist for a long time, 4–6 by 1–1.6 cm, triplinerved, midrib distinctly impressed above, prominent beneath, nerves very slightly sunken above only; petiole grooved, short setose, 2–3 mm. *Flowers* axillary, solitary or in twos. Pedicels stoutish, with several small basal bracts, glabrous 5–8 mm at anthesis, (9–)10–12 mm in fruit. Bracteoles cup-like, ovate-acuminate, subacute, glabrous dorsally, puberulous at the apex, very shortly subglandular-ciliolate or -fimbriate, 1.5 mm. *Calyx* campanulate, 2.5 mm, 5-lobed to nearly ⅔, lobes ovate-subacuminate, glabrous dorsally, glandular-fimbriate. *Corolla* broadly urceolate, but slightly contracted at the mouth, red, glabrous, *c.* 6 mm long in all, *c.* 3 mm ø in the lower third, lobes reflexed, *c.* 1.5 mm. *Filaments* broadly linear below, becoming almost filiform and distinctly S-curved upwards, *c.* 2 mm; anthers 2.5 mm long in all, cells ovate-oblong, base obtuse, recurved, passing into the narrow tubules which are as long as the cells. *Ovary* with some hairs on the top, glabrous otherwise; style glabrous, 3 mm.

Distr. *Malesia*: Central W. Sumatra (NW. slope of Mt Talamau (= Mt Ophir) and Mt Sago near Pajakumbuh), in mossy forest, 1700–1950 m. *Fl.* May, Dec.

70. Diplycosia lancifolia RIDL. J. Str. Br. R. As. Soc. *n.* 39 (1903) 15; Fl. Mal. Pen. 2 (1923) 214; SLEUM. Reinwardtia 4 (1957) 149.

var. **lancifolia.**

Shrub. Branches divaricate, subterete, dark brown-violaceous-corticate. Branchlets greyish, tips brownish when dry, subdensely clad with rufous patent slender bristles (2 mm) and a fine spreading puberulence. *Leaves* ovate-lanceolate, apex gradually acuminate, the very apex ± obtuse by the terminal, rather thick and slightly protruding gland, base broad-attenuate, coriaceous, mature ones shining and glabrous above, laxly setulose at the midrib and/or the lower part of the lamina, furthermore blackish punctulate beneath, margin entire or nearly so, with scattered, longish, caducous fine bristles, 3–5(–6.5) by 0.8–1.2(–1.7) cm, midrib slightly impressed above, prominent beneath mostly in the lower half only, nerves 1–2 pairs from or from somewhat above the base of the lamina, high curved-ascendent to the top, very slightly impressed above or rather inconspicuous, obscure beneath; petiole setulose, 2–3 mm. *Flowers* axillary, mostly solitary, rarely in twos. Pedicels slender, nodding, at anthesis 5–7(–9) mm, up to 10 mm in later stages, subdensely ± patently glandular-setulose. Bracteoles ovate, acute, keeled, slightly hairy in the upper half, glabrous elsewhere, glandular-fimbriate, *c.* 1.5 mm. *Calyx* 3 mm, attenuate at the base, all over densely shortly red-hairy, lobes 4–5, ovate, acute, glandular-fimbriate, 2 mm. *Corolla* urceolate, glabrous, pale greenish, *c.* 5 by 2.5 mm, shortly 4- or 5-lobed. *Stamens* 10,

rarely 8; filaments linear, a little dilated above the base, glabrous, *c.* 2 mm; anther-cells ovate-oblong, granular, 1 mm; tubules slender, 1 mm. *Ovary* slightly hairy; style 4 mm.

Distr. *Malesia*: Malay Peninsula (W. Pahang: Kluang Kerbang, a subsidiary peak of Mt Benom), once found.

var. **calvescens** SLEUM. Reinwardtia 4 (1957) 149.

Leaves more ovate-lanceolate, (3.5–)4.5–6.5 by (0.9–)1.1–1.7 cm, equally setulose beneath. *Calyx* slightly muriculate dorsally, otherwise glabrous.

Distr. *Malesia*: Malay Peninsula (Pahang: Mt Tahan, W of Teku Valley), once found in forest near stream, 1370 m. *Fl.* Sept.

71. Diplycosia pilosa BL. Bijdr. (1826) 858; DC. Prod. 7 (1839) 591; MIQ. Fl. Ind. Bat. 2 (1859) 1055; NIEDENZU, Bot. Jahrb. 11 (1889) 171, t. IV, f. 1 (*anat. fol.*); KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 107; KOORD. Exk. Fl. Java 3 (1912) 8; BACK. Bull. Jard. Bot. Btzg II, 12 (1913) 15; J. J. S. in K. & V. Bijdr. 13 (1914) 127; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 6; SLEUM. Reinwardtia 4 (1957) 149. — *Gaultheria pilosa* (BL.) ZOLL. Nat. Geneesk. Arch. N. I. 2 (1845) 9; ENDL. *ex* MOR. Syst. Verz. (1846) 42; ZOLL. Syst. Verz. 2 (1854) 138; MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 40. — *Amphicalyx pilosa* BL. Fl. Jav. Pl. inéd. (1863-83) t. 9.

Epiphytic shrub, 1–2 m. Branches elongate, hanging, ramose, rather slender. Branchlets slender, terete, densely covered at the tips with fine, yellow, short hairs and much longer (2–3 mm), coarse, ± spreading, rusty, minutely gland-tipped bristles, which become dark-fuscous at their bases. *Leaves* ovate or long-ovate, apex ± caudate-acuminate, acute, the terminal gland small, base rounded or mostly so, very shortly contracted into the petiole, subcoriaceous or coriaceous, deep green and shining above, paler and dull beneath, very young ones laxly to subdensely covered with long, appressed, rufous bristles on both faces, mature ones glabrous above, ± persistently setose beneath especially on the midrib and in the lower part of the lamina, finally ± glabrescent or minutely blackish punctulate all over the undersurface, margin somewhat revolute in dry specimens, minutely crenulate and ± persistently setulose-ciliate, 3.5–6.5 by 1–2.4(–4) cm, triplinerved, midrib strongly impressed the entire length above, manifestly raised beneath, nerves running near the leaf-margin to the top, slightly sunken above, obscure beneath, other nerves or transverse veins higher from the midrib (4–6 pairs) minutely impressed above, or ± inconspicuous on both faces; petiole stoutish, terete, grooved, setulose, 3–5 mm. *Flowers* axillary, mostly solitary, sometimes in twos, occasionally also in threes in other axils of the same specimen. Pedicel rather slender, nodding, ± densely covered with ± appressed, crisped, setose, and rufous hairs initially, finally glabrescent, 3–5(–7) mm, basal bracts small. Bracteoles ovate-obtuse, glabrous dorsally, ciliolate, *c.* 1.5 mm. *Calyx* glabrous, yellow-brown, *c.* 4.5 mm, lobes ovate-acuminate, subacute, glandular-ciliate, 2.5–3 mm. *Corolla* broadly cylindric or subcampanulate, contracted at the base, glabrous, greenish, 7–8 by 3–4 mm, lobes recurved, *c.* 2 mm. *Filaments* linear, somewhat dilated above the base, glabrous, S-curved, *c.* 3 mm; anther-cells oblong-ovate, granular, *c.* 1.7 mm; tubules slender, *c.* 1.7 mm. *Ovary* glabrous, or rarely with some scattered hairs on the top; style 6 mm. *Fruit* ± obovoid, up to 11 by 9 mm, first green, then grey-bluish to lead-coloured, finally blue-blackish, the proper capsule green.

Distr. *Malesia*: W. Java (from Banten to the Preanger Mts).

Ecol. In rain-forest and mossy forest, locally common, 1200–2200 m. *Fl.* Sept.-Dec.

Vern. *Kilai gĕdai bulu*, S.

72. Diplycosia caudatifolia SLEUM. Bot. Jahrb. 71 (1940) 150; Reinwardtia 4 (1957) 149. — *D. heterophylla* (*non* BL.) STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 192; MERR. En. Born. (1921) 464.

Small epiphytic shrub, 1.2–1.5(–2) m. Branches ± pendent, subterete, glabrous. Branchlets very slender, angular, brownish when dry, densely covered with a fine, spreading puberulence, moreover whether or not provided with scattered short bristles at the tips. *Leaves* lanceolate-ovate, apex caudate-acuminate, often somewhat falcate, acute, the terminal gland very small, base broadly attenuate to rounded, firmly chartaceous to subcoriaceous, margin slightly revolute, entire or nearly so, sometimes with a few ± persistent marginal bristles, (2.5–)3–5(–6) by (1–)1.2–1.7 (–2.1) cm, midrib impressed above, prominent beneath, nerves 1–2 pairs from and somewhat from above the base of the lamina, *i.e.* 3–5-plinerved to the top, nerves slightly sunken above or raised beneath, often ± inconspicuous as are other higher nerves or veins, raising straight from the upper half of the midrib; petiole glabrous, grooved, 2–3 mm. *Flowers* axillary, mostly solitary, rarely in twos. Pedicel slender, rufescent-papillose or nearly glabrous, *c.* 2 mm at anthesis. Bracteoles ovate, glandular-ciliolate, 1 mm. *Calyx* attenuate at the base, *c.* 3.5 mm, glabrous or very slightly puberulous, lobes ovate, glandular-ciliolate, 2 mm. *Corolla* urceolate, cream to whitish, sometimes purpurascent especially at the limb, 4 by 2.5 mm, lobes short, 0.5 mm. *Filaments* linear, glabrous, 2.5 mm; anthers ovate-oblong, granular, 1.5–2 mm including the very short tubules. *Ovary* glabrous; style 2 mm. *Fruit* reported both as cream or white and dark purple, *c.* 4 mm ø, fruit-pedicel *c.* 4 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In low mossy jungle, 2100–3050 m. *Fl.* April-June.

73. Diplycosia memecyloides STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 194; MERR. En. Born. (1921) 464 *p.p.*; HEINE in Fedde, Rep. 54 (1951) 245; SLEUM. Reinwardtia 4 (1957) 149; Blumea 12 (1963) 122.

Shrub, 1–3 m, rarely treelet up to 5 m, generally a large epiphyte. Branches greyish brownish

corticate, striate. Branchlets terete, pale brown, with shedding thin bark in the older parts, angular and papillose-puberulous in the young shoots. *Leaves* ovate-elliptic, apex rather abruptly or shortly acutely subcaudate-acuminate, not rarely somewhat falcate, the terminal gland small, base attenuate into the petiole or sometimes nearly rounded, rather fleshy-subcoriaceous to coriaceous, glabrous and ± shining above, rather dull and laxly mostly ± obscurely punctulate beneath, finally completely glabrous, margin sometimes slightly revolute, entire, (4–)5–8 by (1.5–)2.5–4 cm, 5–7-plinerved from and somewhat from above the base, midrib impressed above, manifestly prominent beneath, 2–3 outer pairs of nerves curved-ascending to the top of the lamina, slightly impressed above, ± raised beneath, other nerves less distinct, shorter and pinnate from the upper part of the midrib; petiole stoutish, grooved, 4–6(–8) mm. *Flowers* axillary, mostly 3–4(–6) per fascicle, occasionally only 2 or 1 in other axils of the same specimen. Pedicels stoutish, rather densely clothed with fine, yellowish hairs and some short thicker, ± crisped, brownish ones, at anthesis (3–)4–6 mm, glabrescent and a little accrescent in fruit, basal bracts few, small. Bracteoles ovate, obtuse, keeled, short-hairy along the midrib or glabrescent, ciliate and shortly glandular-fimbriate, 1.5–2 mm. *Calyx c.* 4 mm, glabrous, rugulose, lobes ovate, glandular-ciliolate and -fimbriate, *c.* 2.5 mm. *Corolla* campanulate, green to whitish green or cream, glabrous, 6 mm, lobes ovate, obtuse, reflexed, 1.5–2 mm. *Filaments* linear, slightly dilated towards the base, glabrous, curved in the upper half, 3 mm; anther-cells ovate-oblong, granular, 1.5 mm; tubules slender, 1.5 mm. *Ovary* mostly laxly hairy on top, sometimes glabrous; style 4–5 mm. *Fruit* 4–5 mm ø, blue-blackish.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy (*Tristania*-) forest, 915–2900 m. *Fl. fr.* Febr.-Aug.

74. Diplycosia gracilipes J. J. S. Bull. Jard. Bot. Btzg III, 1 (1920) 407, t. 54; SLEUM. Reinwardtia 4 (1957) 150.

Shrub. Branchlets often elongate, the young red-brown shoots angular, papillose-puberulous, occasionally with some short gland-tipped bristle-like hairs. *Leaves* subspathulate-obovate, apex rounded, sometimes slightly retuse, the terminal gland thick, protruding, base cuneate into the petiole, coriaceous, sparsely minutely blackish punctulate on both faces especially beneath, obscurely crenulate towards the apex, or nearly entire, flat, 1.4–3 by 0.6–1.5 cm, midrib impressed above, prominent beneath, obscurely impressedly triplinerved, nerves sometimes hardly visible above, mostly slightly raised beneath; petiole grooved, muriculate, 2–4 mm. *Flowers* mostly solitary, sometimes in twos, rarely in threes. Pedicels subfiliform, minutely laxly clavate-muriculate, 1.2–2.6 cm. Bracteoles broadly triangular to semi-orbicular, obtuse, puberulous and glandular-muriculate dorsally, ciliolate, *c.* 1 mm. *Calyx c.* 3 mm, puberulous, lobes triangular, subacute, margin glandular-muriculate and ciliolate, 1.8 mm. *Corolla* campanulate, white, glabrous, *c.* 1 cm, lobes obtuse, *c.* 3 mm. *Filaments* linear, somewhat dilated at the base, papillose, 3 mm; anther-cells oblong, inflexed at the base, 2 mm; tubules rather broad, nearly 1 mm. *Ovary* glabrous; style *c.* 7 mm.

Distr. *Malesia*: SW. Central Celebes (Mt Sinadji, N of Makale and Rantepao). *Fl.* Nov.

75. Diplycosia celebensis J. J. S. Bull. Jard. Bot. Btzg III, 1 (1920) 406, t. 53; Bot Jahrb. 68 (1937) 205; SLEUM. Reinwardtia 4 (1957) 150.

Shrub or treelet, up to 3 m. Branches virgate. Branchlets trigonous, greyish corticate, younger parts brownish reddish, tips densely patently papillose-puberulous, sometimes with some ± scattered bristle-like short hairs, which are slightly clavate or gland-tipped, no true bristles present. *Leaves* various in shape (also in the same specimen), lanceolate-elliptic or obovate-elliptic to obovate, apex broad-acuminate to rounded, the terminal gland thickish, distinctly prominent, base ± cuneate, subcoriaceous or coriaceous, glabrous and mostly a little shining above, laxly blackish punctulate and ± dull beneath, very slightly revolute at the somewhat cartilaginous margin, minutely glandular-crenulate, with some marginal ± caducous bristles, practically entire, (1.5–)2–5.3 by 0.7–2.5 cm, midrib slightly impressed above, ± flat beneath, nerves 2–3 pairs ascendent, very slightly sunken above, ± raised beneath; petiole grooved, glabrescent, 2–4(–6) mm. *Flowers* 2–3 (–5) per fascicle, occasionally also solitary in the same specimen. Pedicels rather stoutish, laxly puberulous and with some short crisped glandular hairs, 1.5–3 mm at anthesis, glabrescent and up to 6 mm in fruit. Bracteoles ovate, obtuse, muriculate-fimbriate and ciliolate, *c.* 1 mm. *Calyx* contracted at the base, *c.* 2.5 mm, glabrous or nearly so, lobes ovate, subacute, glandular-muriculate or fimbriate, 1.5 mm. *Corolla* subcampanulate or broad-tubular, white, glabrous, 6–7 mm, lobes ovate, obtuse, reflexed, 1.5 mm. *Filaments* linear, slightly curved, papillose, 3.5 mm; anther-cells oblong, granular, 1.5 mm; tubules rather narrow, 1.5 mm. *Ovary* glabrous; style *c.* 4 mm.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Ra.: Mt Sinadji; Mt Batuding; Mt Tinábang; Mt Pokapindjang).

Ecol. In low bush on ridge, 2400–3000 m. *Fl.* June, Nov.

Note. The leaves are said to smell strongly of anise after bruising.

76. Diplycosia haemantha SLEUM. Reinwardtia 4 (1957) 150.

Small shrub, whether or not epiphytic. Branches greyish corticate. Branchlets slender, red-brown, laxly clothed with ± appressed slender bristles and more densely with fine, spreading short hairs. *Leaves* elliptic or obovate-elliptic, sometimes obovate or oblong-elliptic, apex broad-acuminate to rounded, the terminal gland rather thick and prominent, base cuneate into the petiole, subcoriaceous to coriaceous, firm, margin paler and cartila

ginous, crenulate in the upper part of the lamina, the teeth initially ciliate, or subentire, or entire, glabrous above, laxly blackish punctulate beneath by the remaining bases of early caducous bristles, 1.4–2.5 (–3.5) by (0.8–)1–1.5 cm, midrib impressed above, nearly flat beneath, nerves obscure; petiole thickish, rugulose, laxly setulose, 2(–3) mm. *Flowers* axillary, solitary, or rarely in twos, occasionally also in threes. Pedicels slender, nodding, subglabrous, 6–8(–10) mm. Bracteoles ovate, obtuse, ± connate, ciliolate, 1 mm. *Calyx c.* 3 mm, glabrous, lobes ovate, obtuse, very shortly glandular-muriculate or -fimbriate, *c.* 2 mm. *Corolla* urceolate, glabrous, blood red, 6.5 mm, shortly 5-lobed. *Filaments* linear, glabrous, 4 mm; anthers ovate-oblong, echinulate, 1.8 mm, the broad and short tubules included. *Ovary* glabrous; style 3 mm. *Fruit* blackish, *c.* 4 mm ø.

Distr. *Malesia*: Celebes (E. Peninsula: N. spur of Mt Lumut; SE. Peninsula: Mt Watuwila).

Ecol. In rain-forest, *c.* 1500 m. *Fl.* March, Sept.

77. Diplycosia minutiflora SLEUM. Reinwardtia 4 (1957) 151.

Shrub, 2 m. Branches subangular, much branched distally. Branchlets erect, angular, stiff, greyish corticate in the older, brown-red and densely papillose-puberulous in the younger parts. *Leaves* obovate-elliptic or obovate, apex veryshortly and broadly attenuate to rounded, the terminal gland thick and prominent, base broad-cuneate into the petiole, subcoriaceous, glabrous and shining above, dull and rather densely minutely blackish punctate beneath, margin slightly revolute and minutely impressed-crenulate, seemingly entire, 1.5–3 by 0.9–1.7 cm, midrib slightly immersed above, prominent beneath only in its lower half, nerves in 2–3 pairs, the suprabasal pair high curved-ascendent to the top, the upper ones shorter and less curved, all faintly impressed above, ± inconspicuous beneath. Petiole stoutish, 2–3 mm. *Flowers* 3–6 per fascicle. Pedicels rather slender, ± densely shortly crisped-yellowish hairy, 3–5 mm. Bracteoles ovate, subacute, hairy in the middle externally, ciliolate, 0.8 mm. *Calyx* contracted at the base, glabrous, 2 mm, lobes ovate, subacute, glandular-fimbriate, 1 mm. *Corolla* tubular, white, glabrous, 3.5 by *c.* 1.8 mm, lobes erect, 0.6 mm. *Filaments* linear, glabrous, 1.5 mm; anther-cells oblong, echinulate, 1 mm, gradually passing into the tubules; tubules narrow, 1 mm. *Ovary* rather densely yellowish hairy; style 2–2.5 mm. *Fruit* red.

Distr. *Malesia*: N. Central Celebes (near Poso), 1800 m, in open forest, on flat, peaty-swampy quartzite ground, scattered, but rather common there. One collection. *Fl.* June.

78. Diplycosia kemulensis J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 459; SLEUM. Reinwardtia 4 (1957) 151.

Epiphytic shrub. Branches stoutish, terete. Branchlets rather short, angular, reddish when dry, covered with a fine papillose puberulence in the youngest parts, otherwhere glabrescent. *Leaves* oblong-cuneate or obovate, apex broadly obtusely attenuate or mostly rounded, sometimes retuse, the terminal gland rather thick and ± protruding, base cuneate into the petiole, stiff-coriaceous, glabrous above, laxly minutely punctate beneath, margin distinctly cartilaginous, ± revolute, entire or obsoletely crenulate especially towards the apex of the lamina, (1.8–)2.5–4.5 by (0.7–)1–2.5(–2.8) cm, ± triplinerved, midrib narrowly sunken above, shallowly and more broadly so beneath, nerves faintly impressed above; petiole grooved, glabrous, reddish when dry, 2–3 mm. *Flowers* 2 or 3, rarely up to 5 per fascicle, occasionally solitary. Pedicels rather slender, puberulous, *c.* 4 mm. Bracteoles ovate, subacuminate, ± puberulous dorsally, muriculate-ciliate, 1 mm. *Calyx* turbinate-contracted at the base, glabrous, *c.* 2 mm, 4-lobed halfway, lobes triangular, obtuse, muriculate- or clavate-ciliate. *Corolla* subglobose-urceolate, glabrous, light rose to nearly white, 3 by 2.5 mm, the 4 short lobes recurved. *Stamens* 8; filaments S-curved, linear, glabrous, 2 mm; anther-cells ovate-oblong, echinulate, *c.* 1.5 mm, the broad and short tubules included. *Ovary* glabrous; style *c.* 1 mm. *Fruit* depressed-globose, *c.* 3.5 mm ø, first whitish, finally light blue.

Distr. *Malesia*: Central East Borneo (top of Mt Kemul), once found..

Ecol. In primary forest, 1850 m. *Fl.* Oct.

79. Diplycosia rosmarinifolia SLEUM. Bot. Jahrb. 71 (1940) 156; Reinwardtia 4 (1957) 151. — **Fig. 77d.**

Shrub, 3–5 m. Branches terete; bark dark, peeling off. Branchlets verruculose by the thickened, cushion-like leaf-scars, tips brown when dry, completely glabrous. *Leaves* linear, elongate, apex obtuse, with a distinct blackish and protruding terminal gland, base attenuate into the petiole, coriaceous, glabrous, entire, shining above, (3–)5–7.5 cm by 1.5–3 mm, midrib impressed above the entire length, nerves indistinct; petiole rugose, 1–2 mm, nearly as thick as the lamina. *Flowers* 3–5(–6) per fascicle. Pedicels only seen in the immature fruit, then 4–6(–7) mm, laxly shortly patent-hairy, basal bracts 2 or 3, minute, scarious. Bracteoles broad-ovate, ciliolate, 1 mm. *Calyx* 3 mm in immature fruit, minutely verruculose dorsally, lobes ovate, obtuse, ciliolate, *c.* 1.5 mm. Developed *ovary* glabrous; style 2 mm. Immature *fruit* green or with purplish tinge, *c.* 3.5 mm ø. Mature fruit said to be finally dark blue.

Distr. *Malesia*: North Borneo (Mt Kinabalu), once found.

Ecol. On rock crest or ridge, *c.* 1980 m. *Fr.* July.

80. Diplycosia apiculifera J. J. S. in Fedde, Rep. 35 (1934) 296; SLEUM. Reinwardtia 4 (1957) 151.

Shrub or small tree. Branchlets angular, brownish when young, glabrous. *Leaves* obovate, apex obtuse or mostly rounded, the terminal gland thick and protruding, base cuneate into the petiole, coriaceous, rather shining above, ± dull beneath, glabrous, but laxly minutely punctate beneath, impressed-punctulate in the ± revolute margin, practically entire, 2.5–6 by (1.1–)2–3 cm, midrib

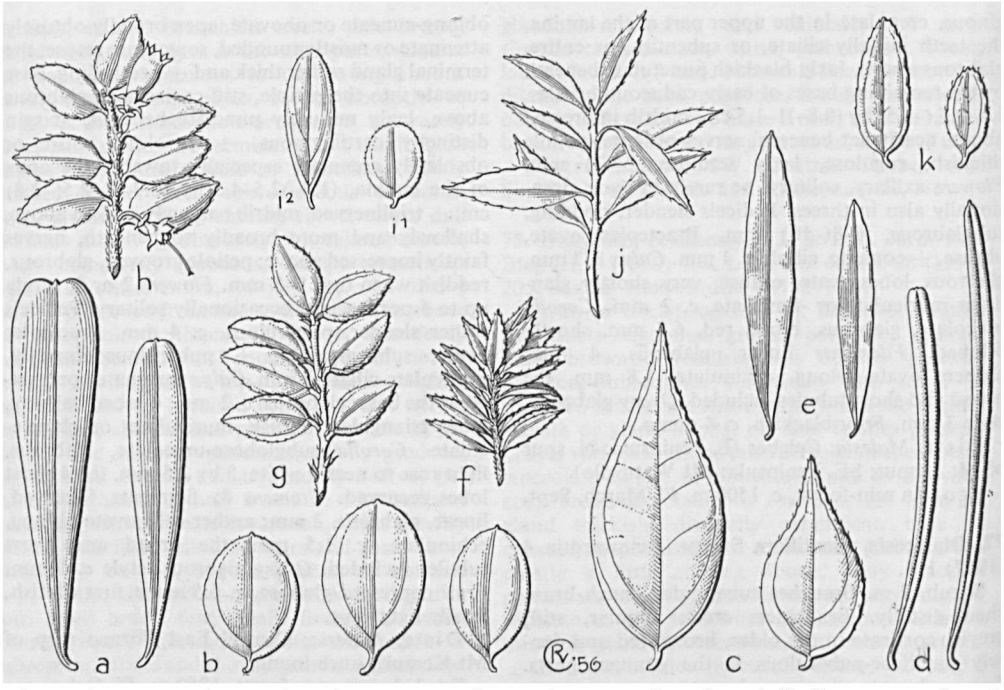

Fig. 77. Leaves or shoots of *Diplycosia spp.*, all nat. size. — *a. D. sphenophylla* SLEUM., two leaves. — *b. D. amboinensis* BECC., three leaves. — *c. D. acuminata* BECC., two leaves. — *d. D. rosmarinifolia* SLEUM., two leaves. — *e. D. stenophylla* SLEUM., two leaves. — *f. D. ciliolata* HOOK. *f.* — *g. D. elliptica* RIDL. — *h. D. rupicola* SLEUM. — *i. D. microphylla* BECC., *i'–i''*. two different leaves. — *j. D. filipes* SLEUM. — *k. D. cinnabarina* SLEUM., two leaves (*a* CLEMENS 40007, *b* BECCARI herb. nr. 5766, *c* BECCARI P. B. 3941, *d* CLEMENS 34205, *e* STEUP 10, *f* CLEMENS 32376, *g* BANGHAM 976, *h* NGF 5188 WOMERSLEY, *i'–i''* BECCARI P. B. 2931, *j* EYMA 1409, *k* VAN STEENIS 8428).

impressed above, strongly raised beneath, 3–5-plinerved, nerves slightly impressed above, ± inconspicuous beneath; petiole semiterete, grooved, stout, glabrous, 3–4(–5) mm. *Flowers* 1 or 2 per axil. Pedicels rather stoutish, sparsely muriculate, (7–)9–13 mm, basal bracts few, small. Bracteoles ovate-acuminate, glabrous, muriculate-ciliate, *c.* 2 mm. *Calyx* rather abruptly attenuate at the base, *c.* 6 mm, lobes erect, subovate, acuminate, muriculate-verruculose dorsally, with an apical tuft of very short hairs, *c.* 4 mm. *Corolla* ± tubular, somewhat contracted at the base and slightly widened towards the mouth, glabrous, rose or white, 9–11 by *c.* 5 mm (in the middle), lobes recurved, *c.* 2 mm. *Filaments* linear, glabrous, *c.* 8 mm; anther-cells oblong, *c.* 2 mm; tubules narrow, 1.8 mm. *Ovary* sparsely brownish hairy; style 9 mm. *Fruit* said to be dull purplish blue.

Distr. *Malesia*: Central W. Sumatra (once on Mt Singalang; otherwise from Mt Kerintji and Mt Talakmau = Mt Ophir).

Ecol. In forest, '*rèsam*' (= *Gleichenia*) zone, occasionally epiphytic, 2000–2950 m. *Fl.* April-June, *fr.* Aug.

81. Diplycosia pittosporifolia J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 460; SLEUM. Reinwardtia 4 (1957) 152.

var. **pittosporifolia.**

Shrub. Branchlets obtusangular, dilutely brown corticate, bark shedding early in thin brown flakes, younger parts laxly set with small, darker, wart-like lenticels but no hairs or bristles, young shoots not seen. *Leaves* elliptic, apex broad-attenuate, subacuminate to obtuse, the terminal gland thick, protruding, base cuneate into the petiole, coriaceous, shining above, dull beneath, mature ones glabrous, but sparsely blackish punctate beneath, very young ones laxly short-setose beneath, minutely impressed-crenulate along the entire, ± revolute margin, (5.5–)8–11 by (2–)3–5 cm, midrib slightly grooved above, strongly raised beneath, nerves in 4–6 pairs rather steeply ascending, curved and anastomosing, somewhat prominen in both faces, reticulation rather coarse, slightly raised on both faces especially above; petiole stout, rugose, grooved above, glabrous, 1–2.2 cm. *Flowers* (2–)3–4 per fascicle. Pedicels stout, laxly to subdensely longish (1–1.3 mm) ± patently glandular-setulose, 8–11 mm, basal bracts numerous, ovate-acuminate, *c.* 2 mm. Bracteoles orbicular-ovate, glabrous dorsally, glandular-ciliate, 2–2.5 mm. *Calyx c.* 4 mm, glabrous, lobes ovate-triangular, obtuse, glandular-ciliate, 3 mm. *Corolla* narrow-campanulate, glabrous, greenish or greenish white, with brownish

spots on both surfaces, rather fleshy, *c.* 8 mm, lobes ovate-triangular, obtuse, *c.* 2.5 mm. *Filaments* linear, slightly wavy, glabrous, *c.* 3 mm; anther-cells oblong, base cordate, echinulate, *c.* 2 mm; tubules straight, rather abruptly attenuate, 1 mm. *Ovary* glabrous; style 4.5 mm. *Fruit* purplish to blackish.

Distr. *Malesia*: Central East Borneo (top of Mt Kemul), once found.

Ecol. In primary forest on steep slope and humus, 1800 m. *Fl.* Oct.

var. **punctiloba** SLEUM. Reinwardtia 4 (1957) 152; Blumea 11 (1961) 8.

Differs by densely setose branchlets, nerves which are slightly impressed above, and pedicels more densely patent-glandular-setulose, 1.2–1.5 cm. *Corolla* greenish white or pink tinged, dotted dark red inside except near margin.

Distr. *Malesia:* North Borneo (Mt Kinabalu).

Ecol. In low jungle, also epiphytic, 2100–2745 m. apparently rare. *Fl.* March, June.

82. Diplycosia retusa SLEUM. Bot. Jahrb. 71 (1940) 156; Reinwardtia 4 (1957) 152.

Shrub, apparently epiphytic. Branchlets slender, laxly foliate, glabrous. *Leaves* obovate, apex rounded, the terminal gland thick and ± prominent, base cuneate, subcoriaceous, glabrous, entire or with some minute impressed glandular crenations on the subcartilaginous margin, 3–4 by 1.5–2 cm, midrib slightly impressed above, somewhat raised beneath, nerves in 1–2 pairs ascendent from and from above the base of the lamina, high-curved, anastomosing, rather obscure or very little sunken above, faintly raised beneath; petiole 4–5 mm. *Flowers* solitary. Pedicels very slender, glabrous, 1.5 cm. Bracteoles ovate, glabrous, 1 mm. *Calyx* glabrous, 5-lobed to nearly the base, lobes deltoid, acutish, 2.5 mm, glandular-ciliate. *Corolla* elongate-campanulate, 10 mm, apparently white, glabrous, lobes 3 mm. *Filaments* wavy, linear, glabrous, 2 mm; anther-cells 1.5 mm; tubules 1 mm. *Ovary* glabrous; style 5 mm.

Distr. *Malesia*: Central Celebes (Topapu Mts), once found, 1300–1700 m. *Fl.* Sept.

83. Diplycosia sanguinolenta SLEUM. Bot. Jahrb. 71 (1940) 157; Reinwardtia 4 (1957) 152.

Epiphytic shrub, 1–2 m. Branches 6–8 mm ø, nodose. Branchlets stoutish, obtusangular, reddish brownish, glabrous, rather shining. *Leaves* elliptic, apex broadly acuminate to rounded, obtuse, sometimes emarginate, the terminal gland thick, protruding as a distinct apiculus, base broad-attenuate into the petiole, very coriaceous and rigid, glabrous above, laxly punctate beneath, entire, margin ± revolute especially towards the base of the lamina, 9–14(–17) by 5–8(–9.5) cm, midrib ± distinctly grooved above, robust and prominent beneath, nerves one pair from the base, another from the lower third of the midrib, all steeply curved-ascending to the top, impressed above, very prominent beneath, 2–3 pairs of other nerves or transverse veins from the upper half of the midrib mostly faintly visible, or entirely obscure; petiole 1.2–1.5 by 0.3–0.4 cm. *Flowers* 3–5 per axil. Pedicels stoutish, shortly subpatently and densely brownish hirtellous, 5–7(–9) mm, basal bracts narrow-ovate, pubescent, up to 2 mm. Bracteoles broad-ovate, keeled, obtuse, pubescent dorsally, glandular-ciliate, 2 by 2–2.5 mm. *Calyx* 5 mm, rugulose, glabrous or with some scattered very short glandular hairs, 5-lobed halfway, lobes ovate, subacute, glandular-ciliate. *Corolla* nearly tubular, or narrow-campanulate, somewhat dilated towards the limb, bright red to blood red, fleshy, glabrous, 13–15 by *c.* 4.5 mm. *Filaments* linear, somewhat dilate at the base, S-curved in the upper part, 8 mm; anther-cells oblong, base curved, granular, *c.* 4 mm; tubules *c.* 2 mm. *Ovary* glabrous; style exserted, 12 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In steep forest or jungle ridge, 1525–1830 m. *Fl.* March-June.

84. Diplycosia sphenophylla SLEUM. Bot. Jahrb. 71 (1940) 158; Reinwardtia 4 (1957) 152; Blumea 12 (1964) 343. — **Fig. 77a.**

Shrub, 0.6–2.5 m, rarely a treelet, sometimes epiphytic. Branches dark, provided with the remnants of the thick leaf-cushions. Branchlets brownish and entirely glabrous. *Leaves* elongate-spathulate, widest in the upper third, apex rounded-obtuse or mostly slightly retuse, with a markedly protracted dark and thick terminal gland, base gradually attenuate into a thick, rugulose, 2–3 mm long petiole, coriaceous, stiff, margin subcartilaginous and revolute, (1.8–)4–6.5 by (0.3–)0.8–1.2 (–1.6) cm, midrib grooved above over the entire length, broadened and rather flat beneath, one pair of basal nerves running along the edge, very slightly impressed above, obsolete beneath, other upper nerves 1–2 on each side, faintly impressed or mostly inconspicuous. *Flowers* axillary, (2–)3 (–5) per fascicle. Pedicels rather slender, laxly to subdensely very shortly and patently hairy, 5–6 mm, basal bracts minute. Bracteoles broad-ovate, all over very shortly hairy, ciliolate, 1 mm. *Calyx* *c.* 4 mm, glabrous, minutely verruculose, lobes ovate, obtuse, ciliolate, 2 mm. *Corolla* subglobose-urceolate, 4 by 3 mm, rather fleshy, pink, glabrous, very shortly 5-lobed. *Filaments* linear, glabrous, 2 mm; anther-cells 1 mm; tubules 0.6 mm. *Ovary* glabrous; style 1.5 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy ridge forest, ± open places, 1220–2230 m. *Fl.* April-Aug.

85. Diplycosia rubidiflora J. J. S. in Fedde, Rep. 30 (1932) 172; SLEUM. Reinwardtia 4 (1957) 154.

Epiphytic or terrestrial shrub. Branchlets robust, angular, older parts greyish corticate, younger ones brownish, glabrous. *Leaves* broadly elliptic to obovate-elliptic, or suborbicular, sometimes obovate, apex broad-attenuate, obtuse to rounded, rarely subemarginate, the terminal gland thick and prominent, base shortly cuneate into the petiole, coriaceous, glabrous, but laxly punctulate beneath, shining above, rather dull beneath, entire, margin

revolute, 5–7(–8) by (3–)3.5–5(–5.8) cm, midrib grooved above, manifestly prominent beneath, nerves 3–4(–5) pairs, slightly curved towards the edge, ± anastomosing, mostly somewhat impressed above, raised beneath, reticulation rather inconspicuous above; petiole canaliculate, rugulose, 3–5 by 2 mm. *Flowers* 3–8(–15) per fascicle. Pedicels stoutish, rusty-tomentulose, 5–8 mm, basal bracts numerous, ovate acute, pubescent, *c.* 1.5 mm. Bracteoles suborbicular-ovate, obtuse, rusty-pubescent dorsally, 1.5 by 2 mm. *Calyx* 3.5–4 mm, glabrous, lobes ovate-acuminate, subacute, ciliate and glandular-muriculate, *c.* 2 mm. *Corolla* campanulate, light brown to fallow red, glabrous, 7–8 mm, lobes *c.* 2 mm. *Filaments* linear, somewhat dilated in the middle only, papillose in the upper half, *c.* 3 mm; anthers oblong, echinulate, 2.8 mm, the very short tubules included. *Ovary* glabrous; style 6 mm.

Distr. *Malesia*: SW. Celebes (Peak of Bonthain).

Ecol. In forest or scrub forest, 1900–2600 m. *Fl.* June, July.

86. Diplycosia urceolata STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 194; MERR. En. Born. (1921) 465; SLEUM. Reinwardtia 4 (1957) 153; Blumea 12 (1963) 122. — *D. coriifolia* SLEUM. Bot. Jahrb. 71 (1940) 152; — **Fig. 78d.**

Epiphytic or terrestrial subscandent shrub, 1–5 m. Branchlets thick, nodose, subterete, with large scars of the fallen leaves, tips obtusangular, reddish brown, completely glabrous. *Leaves* elliptic or mostly oblong-obovate to elliptic-obovate, apex subacuminate to rounded, sometimes emarginate, apiculate by a thickish gland, base cuneate into the petiole, stiff-coriaceous, thick, dark glossy green and glabrous above, rather dull and minutely blackish punctate beneath, margin slightly recurved and impressed-crenulate, each crenulation provided with a short, ± early caducous bristle-like hair, (5–)6–10(–11) by (2.5–)3.5–5(–7.5) cm, 5(–7)-plinerved, midrib and nerves sunken above, markedly raised beneath, the lowest 1–2 pairs of nerves from, the following upper 1–2 pairs a little from above the base of the lamina, all high curved-ascending and anastomosing at the top, other higher nerves or transversal veins from the upper half of the midrib, rather obscure; petiole glabrous, 1–1.3 cm by 2–3 mm. *Flowers* (3–)5–7 per axil. Pedicels rather stoutish, densely shortly ± patently rufescent-hairy, with a few glandular muriculate hairs between, 4–6 mm at anthesis, up to 1 cm in fruit, basal bracts ovate-acuminate, hairy, 1–1.5 mm. Bracteoles semi-orbicular-ovate, obtuse, densely short-hairy dorsally, ciliate, *c.* 1.5 by 2 mm. *Calyx* greenish, *c.* 2.5 mm, glabrous, lobes ovate, obtuse, short-fimbriate and ciliate, *c.* 1.5 mm, ± spreading. *Corolla* subglobose-urceolate, limb and base contracted, the middle ventricose, fleshy, of a translucent white to pinkish, sometimes purplish, glabrous, (4–)5–6.5(–8) mm high and ø, lobes spreading, 1 mm. *Filaments* linear, glabrous, inflexed below the anthers, *c.* 2 mm; anther-cells oblong, very granular, *c.* 2.8 mm, the very short tubules included. *Ovary* glabrous; style 3–4 mm. *Fruit* light purple when ripe, *c.* 3 mm ø.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy forest and on open exposed crest, even creeping on rocks, 2135–3350 m. *Fl. fr.* March-Aug.

87. Diplycosia lysolepis SLEUM. Bot. Jahrb. 72 (1942) 209; Reinwardtia 4 (1957) 152.

Epiphytic shrub. Branchlets angular, older parts decorticating in thin longish flakes, very young ones red-brown, glabrous, *Leaves* elliptic to obovate-elliptic, apex very broadly attenuate to nearly rounded, the terminal gland thick and prominent, base cuneate into the petiole, rigidly chartaceous to coriaceous, glabrous and somewhat shining above, rather dull and minutely laxly punctulate beneath, entire, 4–5.5 by (2–)2.2–3 cm, 5-plinerved, midrib impressed above, a little raised beneath, nerves mostly somewhat sunken above, not or only very slightly raised beneath; petiole thick, 3–4 mm. *Flowers* mostly solitary, rarely in twos. Pedicels only seen after anthesis, very shortly and laxly subglandular-hairy, glabrescent, 2–3(–4) mm. Bracteoles broad-ovate, glabrous, glandular-ciliate, 1 mm. *Calyx* glabrous, deeply 5-lobed, lobes deltoid, ciliate. *Ovary* glabrous. *Fruit* finally purplish blackish.

Distr. *Malesia*: E. New Guinea (Morobe Distr.: Sattelberg vicinity; Central Distr.: N of Port Moresby).

Ecol. In forest, 1150–1980 m. *Fl.* Sept., Dec.

88. Diplycosia commutata SLEUM. Reinwardtia 4 (1957) 153. — *D. urceolata* (*non* STAPF) SLEUM. Bot. Jahrb. 71 (1940) 153, *in text.*

Low terrestrial or epiphytic shrub, rarely treelet. Branchlets subterete, older parts greyish corticate, tips reddish brown when dry, completely glabrous. *Leaves* oblong to obovate-oblong, apex obtuse or rarely shortly broad-attenuate or slightly emarginate, the terminal gland thick and prominent, base rather shortly cuneate into the petiole, ± coriaceous, rigid, dark glossy green and glabrous above, dull and laxly blackish punctulate all over the undersurface, entire, margin somewhat cartilaginous and pale, indistinctly impressed-crenulate, the crenulations provided with early caducous bristles in the very young leaf, slightly or not revolute, (3.5–)4–6(–7) by (0.8–)1–1.8 (-2.5) cm, 3-5-plinerved, midrib distinctly impressed above, or prominent beneath, the lowest pairs of plinerves somewhat from above the base of the lamina, high curved-ascending to the top, other nerves pinnately from the midrib and ± curved, all ± manifestly impressed above, but sometimes only faintly so, nearly inconspicuous beneath; petiole glabrous, 2–4 by 0.6–1 mm. *Flowers* solitary or in twos in the upper axils, 3(–4) per fascicle in the lower ones. Pedicels laxly clad with short, glandular hairs or fine bristles, otherwise very short pubescent, or rather glabrous, at anthesis 2–3 mm, a little accrescent in fruit, basal bracts few, minute. Bracteoles ovate, obtuse, glabrous, subglandular-ciliate, 1 mm. *Calyx* 2 mm, deeply 5-lobed, lobes ovate, obtuse, shortly subglandular-fimbriate. *Corolla* subglo-

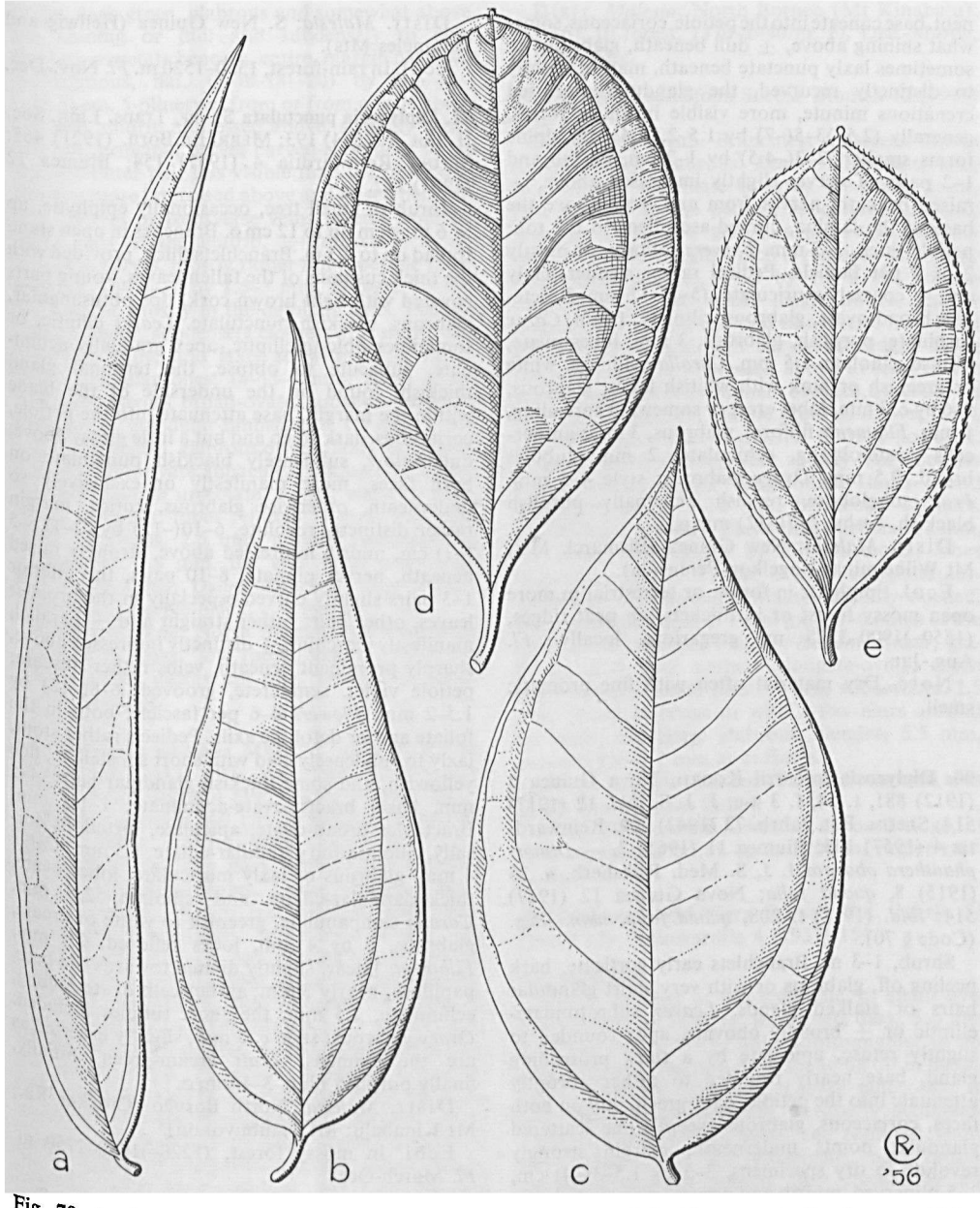

Fig. 78. Leaf types of *Diplycosia spp.*, all × ⅓. — *a. D. ensifolia* MERR. — *b. D. cinnamomifolia* STAPF. — *c. D. penduliflora* STAPF. — *d. D. urceolata* STAPF. — *e. D. kinabaluensis* STAPF. (*a* CLEMENS 32239, *b* CLEMENS 33131a, *c* CLEMENS *s.n.*, *d* CLEMENS 33189, *e* CLEMENS 33765).

bose-urceolate, rather fleshy, 3–4.5 by 2.5 mm, white (pinkish in bud), lobes 0.5 mm. *Filaments* linear, glabrous, slightly inflexed below, *c.* 3 mm; anthers oblong, ± granular, c. 1.8 mm, the short tubules included. *Ovary* glabrous; style 2.5 mm. *Fruit* subglobose, purplish, *c.* 3 mm ø when nearly ripe.

Distr. *Malesia*: North Borneo (Mt Kinabalu).
Ecol. In rain-forest, 1300–1525 m. *Fl.* Jan.-Dec.

89. Diplycosia edulis SCHLTR, Bot. Jahrb. 55 (1918) 163, f. 7 H–M; SLEUM. *ibid.* 72 (1942) 209; Reinwardtia 4 (1957) 152; Blumea 12 (1963) 122.

Epiphytic or terrestrial shrub, up to 1.5 m. Branchlets subangular, greyish corticate below, tips reddish to brown red, completely glabrous. *Leaves* generally obovate-elliptic to obovate, apex broadly attenuate to rounded, in alpine forms more elliptic, the terminal gland thick and promi-

nent, base cuneate into the petiole, coriaceous, somewhat shining above, ± dull beneath, glabrous, or sometimes laxly punctate beneath, margin slightly to distinctly recurved, the glandular-impressed crenations minute, more visible in alpine forms, generally (2.5–)3–5(–7) by 1.5–2.5(–4) cm, alpine forms smaller, 2–3(–4.5) by 1–2 cm, midrib and 1–2 pairs of nerves slightly impressed above, ± raised beneath, nerves from and from above the base of the lamina, curved-ascendent to the top; petiole thick, 3–5 mm. *Flowers* solitary, or mostly 2 or 3 per fascicle. Pedicel rather slender, laxly and ± coarsely muriculate, (5–)7–12 mm. Bracteoles broad-ovate, glabrous, ciliolate, 1 mm. *Calyx* turbinate, purplish, glabrous, 3 mm, lobes ovate, obtuse, ciliolate, 1.5 mm. *Corolla* cylindric, white or greenish or pink with whitish lobes, glabrous, 5–6 by *c.* 3 mm, lobes erect or somewhat spreading, 1 mm. *Filaments* filiform, glabrous, 3 mm; anther-cells ovate-oblong, echinulate, 2 mm; tubules broad, 0.5 mm. *Ovary* glabrous; style 4–5 mm. *Fruit* subglobose, reddish or finally purplish blackish, fleshy, 5–7(–12) mm ø.

Distr. *Malesia*: New Guinea (Bismarck Mts; Mt Wilhelmina; Vogelkop Peninsula).

Ecol. Epiphytic in forest, or terrestrial in more open mossy forest or in thickets, on peat ridges, (1550–)1900–3225 m, gregarious locally. *Fl.* Aug.-Jan.

Note. Dry material often with fine aromatic smell.

90. Diplycosia lorentzii KOORD. Nova Guinea 8 (1912) 881, t. 54, f. 3 a-e; J. J. S. *ibid.* 12 (1917) 514; SLEUM. Bot. Jahrb. 72 (1942) 209; Reinwardtia 4 (1957) 153; Blumea 11 (1961) 7. — *Dimorphanthera obovata* J. J. S. Med. Rijksherb. *n.* 25 (1915) 8, *quoad folia*; Nova Guinea 12 (1917) 514; *ibid.* (1918) t. 208, *quoad folia*, *nom. illeg.* (Code § 70).

Shrub, 1–3 m. Branchlets early corticate, bark peeling off, glabrous or with very short glandular hairs or stalked glands. *Leaves* subrotundate-elliptic or ± broadly obovate, apex rounded to slightly retuse, apiculate by a thick protruding gland, base nearly rounded to rather abruptly attenuate into the petiole, dark green, dull on both faces, coriaceous, glabrous except some scattered glandular points underneath, margin strongly revolute in dry specimens, 3–5 by 1.5–3(–4) cm, 3–5-plinerved, midrib and nerves impressed above, slightly or not raised beneath; petiole rather thick, 0.5–1 cm. *Flowers* mostly 3–4 per fascicle, occasionally only 2 or 1 in other axils of the same specimen. Pedicels slender, laxly and shortly hairy initially, early glabrescent, 0.7–1.3 cm. Bracteoles ovate, acute, ciliate, 1 mm. *Calyx* turbinate, glabrous, 2.5 mm, lobes ovate, obtuse, ciliolate, 1.5 mm. *Corolla* urceolate, slightly contracted at the limb, *c.* 6 mm, white, glabrous, lobes reflexed, 1 mm. *Filaments* filiform, glabrous, 3 mm; anthers oblong, echinulate, 0.9 mm; tubules rather slender, 0.9 mm. *Ovary* glabrous; style 5 mm. *Fruit* first red, finally nearly blackish, *c.* 5 mm ø.

Distr. *Malesia*: S. New Guinea (Hellwig and Perameles Mts).

Ecol. In rain-forest, 1350–1520 m. *Fl.* Nov.-Dec.

91. Diplycosia punctulata STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 193; MERR. En Born. (1921) 465; SLEUM. Reinwardtia 4 (1957) 154; Blumea 12 (1963) 122.

Shrub or small tree, occasionally epiphytic, up to 6 m; stem up to 12 cm ø. Branches in open stand spread up to 4.5 m. Branchlets thick, provided with the thick cushions of the fallen leaves, young parts covered with light brown cork, tips obtusangular, glabrous, blackish punctulate. *Leaves* elliptic, or sometimes oblong-elliptic, apex gradually acuminate, subacute to obtuse, the terminal gland thickish, found on the underside of the blade within the margin, base attenuate into the petiole, coriaceous, dark green and but a little glossy above, dull below, subdensely blackish punctulate on both faces, more manifestly or exclusively so underneath, otherwise glabrous, entire, margin rather distinctly revolute, 6–10(–12) by (2–)2.5–5 (–7) cm, midrib impressed above, strongly raised beneath, nerves pinnate, 8–10 pairs, the inferior 1–3 pairs slightly curved especially in the broader leaves, other pairs rather straight and ± parallel, manifestly inarching, ± distinctly impressed above, sharply prominent beneath, veins rather obscure; petiole violet, semiterete, grooved, 6–8(–12) by 1.5–2 mm. *Flowers* 4–6 per fascicle, both in the foliate and/or defoliate axils. Pedicels rather stout, laxly to subdensely clad with short substellate, fine yellowish, and some thickish glandular hairs, 4–5 mm, basal bracts ovate-acuminate, 1–1.5 mm. Bracteoles broad-ovate, apiculate, hirtellous dorsally, ciliolate and glandular-ciliate, 1.5 mm. *Calyx* 4 mm, glabrous or laxly muriculate, lobes ovate, thick-glandular-ciliate and ciliolate, 2.5 mm. *Corolla* campanulate, greenish to white or cream, glabrous, 5 by 4 mm, lobes reflexed, 2.5 mm. *Filaments* linear, slightly dilated towards the base, papillose, nearly 3 mm; anther-cells ovate-oblong, echinulate, 2.5 mm, the short tubules included. *Ovary* glabrous; style *c.* 5 mm, slightly exserted as are the stamens. *Fruit* cream-green initially, finally purplish blue, 3–4 mm ø.

Distr. *Malesia*: North Borneo (Crocker Ra.; Mt Kinabalu; Mt Tambuyokon).

Ecol. In mossy forest, (1220–)1680–2750 m. *Fl.* March-Oct.

92. Diplycosia cinnamomifolia STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 195; GIBBS, J. Linn. Soc. Bot. 42 (1914) 102; MERR. En. Born. (1921) 464; Cox, Am. Midl. Nat. 40 (1948) 499 (*anat.*); SLEUM. Reinwardtia 4 (1957) 154; Blumea 12 (1963) 122. — Fig. 78b.

Shrub, sometimes climber, whether or not epiphytic, 0.6–1.5 (–5)m. Branchlets subterete, greyish to dark brown-corticate, tips somewhat flattened or angular, brownish, completely glabrous. *Leaves* ovate to oblong-ovate, apex ± subcaudate-acuminate, acute, the terminal gland small, base rounded to subcordate, stiff, leathery and

fleshy, dark green, glabrous and somewhat above, less shining or dull and subdensely to laxly blackish punctate beneath, entire, margin narrowly cartilaginous, flat, (7–)8–18(–20) by (3.5–)4–7 (–10.5) cm, 5-plinerved from or from a little above the base, midrib impressed above, strongly raised beneath, principal nerves curved-ascendent to the top, the outer pair less visible than the inner one, which is more impressed above and raised beneath, other nerves or transverse veins several from the upper part of the midrib, ± transverse to the principal nerves, mostly rather faint; petiole thick, grooved, (6–)8–12 by 1.5–3 mm. *Flowers* (3–)4–6 per fascicle, mostly in the defoliate axils. Pedicels rather slender, subdensely clothed with short, fine, yellowish hairs, and laxly so with thick, rather short glandular ones, (4–)5–7 mm, basal bracts small. Bracteoles broad-ovate, subacute, dorsally short-hairy, glandular-fimbriate, *c.* 1.5 mm. *Calyx* *c.* 3 mm, greenish, glabrous or very laxly muriculate dorsally, lobes ovate, subacute, glandular-fimbriate, 1.5 mm. *Corolla* urceolate, 5 mm, white to pink, waxy, glabrous, lobes reflexed, 1 mm. *Filaments* linear, glabrous, 2.5 mm; anthers ovate-oblong, granular, *c.* 1.8 mm, the very short and broad tubules included. *Ovary* glabrous; style 4 mm. *Fruit* finally purple-black, *c.* 4 mm ø.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy low forest, also on open serpentine ridge, locally not rare, 2440–3440(–3600) m. *Fl.* Jan.-Dec.

93. Diplycosia ensifolia MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 107; En. Born. (1921) 465; SLEUM. Reinwardtia 4 (1957) 154. — **Fig. 78a.**

Shrub, epiphytic, 60 cm. Branchlets drooping, slender, terete, smooth, early covered with cork which peels off, tips dark brown-purplish when dry, completely glabrous. *Leaves* elongate-lanceolate, ensiform, slightly inequilateral, apex long-acuminate to caudate, sometimes falcate, the terminal gland small but dinstinct, base short-attenuate to nearly rounded, rather stiff, coriaceous, glabrous, the undersurface punctate by scattered blackish glands, 13–20(–24) by 1.1–1.8(–3.2) cm, widest below the middle, midrib impressed above the entire length, prominent beneath, 1 pair of nerves on each side from somewhat above the base of the lamina, high ascending along the edge nearly to the top, slightly impressed above, sometimes hardly visible, other nerves obsolete; petiole stout, blackish when dry, rugulose, 3–7 mm. *Flowers* axillary, solitary or in twos, sometimes also 3 or 4 in other axils of the same specimen. Pedicels slender, laxly papillose-puberulous, 4–5 mm, basal bracts minute, scariose. Bracteoles broad-ovate to reniform, ciliolate, 1–1.5 mm. *Calyx* 3.5 mm, glabrous, lobes ovate, erect, obtuse, glandular-ciliolate, 2 mm. *Corolla* ventricose-urceolate, contracted towards the base, glabrous, white, tinged with dull lavender or purple, or cream-green, 5 by *c.* 2 mm, lobes short. *Filaments* glabrous, linear, 2 mm; anther-cells oblong-ovate, 1.5 mm, the short tubules included. *Ovary* glabrous; style 2.5 mm. *Fruit* blackish when ripe, 4–5 mm ø.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In forest, 1370–2440 m. *Fl.* Dec.-March, *fr.* June-Aug.

94. Diplycosia salicifolia SLEUM. Blumea 12 (1963) 122.

Scrambling shrub. Branchlets subterete, striate longitudinally, glabrous. *Leaves* lanceolate, long to caudately attenuate towards the apex, acute, base cuneate to the petiole, subcoriaceous, laxly punctulate beneath, glabrous otherwise, slightly revolute at the margin which is remotely and finely subserrate-crenulate, 7–12 by 1.2–2 cm, midrib impressed over the entire length above, bluntly prominent beneath, one pair of nerves a little from above the base and high curved-ascendent along the edge, slightly impressed above at least in the lower ⅔, not much prominent beneath, other nerves or veins ± obscure; petiole grooved above, 0.6–1 cm by *c.* 1.5 mm. *Fascicles* (2–)3–6-flowered. Pedicels rather slender, very shortly hairy besides a few thicker longer subglandular hairs found below the calyx, 7–10 mm. Bracteoles carinate, shortly hairy dorsally. *Calyx* tube obconical, 2 mm, the lower half hidden by the bracteoles, lobes triangular, blunt, 2 mm, shortly subglandular-fimbriate. *Corolla* campanulate, broadly opened, thin, greenish white, *c.* 7 mm long, 5–6 mm ø at the limb, lobes reflexed, 1 mm. *Filaments* linear, glabrous, *c.* 3 mm; anthers elongate-ovate, much attenuate-acuminate distally, base subcordate, 2.5 mm. *Ovary* glabrous or with a few hairs around the style, the latter glabrous, slender, 5.5 mm, exserted for *c.* 2 mm at anthesis.

Distr. *Malesia*: Borneo (Sarawak: summit area of Mt Mulu), once found.

Ecol. In montane forest on exposed ridge, at 2010 m, said to occur up to 2200 m, rather rare. *Fl.* July.

95. Diplycosia viridiflora SLEUM. Bot. Jahrb. 71 (1940) 159; Reinwardtia 4 (1957) 154.

var. **viridiflora.**

Shrub, whether or not epiphytic, or small tree, occasionally up to 10 m. Branchlets dark, 5–6 mm ø, terete, striate in the older, obtusangular in the younger parts, the thin bark shedding off in flakes, tips completely glabrous. *Leaves* lanceolate to subovate-oblong-lanceolate, gradually acuminate towards the subacute apex, the terminal gland rather small and not prominent, base broad-attenuate into the petiole, very coriaceous and stiff, glabrous and glossy above, dull and rather laxly blackish punctulate beneath, entire, margin cartilaginous, ± strongly revolute in dry specimens especially in the lower half of the blade, 9–14(–17) by 2.5–4 cm. midrib deeply grooved above, very robust and prominent beneath, triplinerved, nerves running along the edge from base to top, slightly impressed above, not visible beneath, other nerves or veins numerous and ± straight from the midrib to the marginal nerve, inarching with it, parallel, faintly impressed on both faces, or mostly hardly visible; petiole rugose, 1–1.5 cm by 2–3 mm. *Flowers* 4–8 per fascicle,

rarely 3 or 2 on the same specimen, in whether or not defoliate axils. Pedicels rather slender, densely clothed with short, yellowish fine hairs and with short thickened glandular hairs laxly between them, 4–6 mm at anthesis, up to 8 mm in fruit, basal bracts several, subulate, *c.* 1 mm. Bracteoles broad-ovate, acuminate, markedly apiculate by the protruding keel, pubescent dorsally, glandular-ciliate, *c.* 2 mm. *Calyx* 5 mm, generally glabrous, occasionally with some very short hairs at the tips of the lobes outside, lobes ovate-acuminate, acute, glandular-ciliate, *c.* 4 mm. *Corolla* urceolate, rather fleshy, green, or greenish white outside, purplish inside, glabrous, 6–7 by 3 mm, lobes reflexed, narrow, *c.* 2 mm. *Filaments* linear, slightly wavy, glabrous, 3 mm; anther-cells ovate-oblong, granular, 2 mm; tubules very slender, 2 mm. *Ovary* glabrous; style *c.* 5 mm. *Fruit* deep purplish, not seen in mature state.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. In mossy forest or scrub-forest, 1220–1675 m. *Fl.* March-April.

var. **megalantha** SLEUM. Reinwardtia 4 (1957) 155.

Differs by solitary larger flowers. *Calyx* 7–8 mm. *Corolla* 11 mm; style 10 mm. Pedicels 1.5–2 cm.

Distr. *Malesia*: North Borneo (Mt Kinabalu), once found. *Fl.* Aug.

96. Diplycosia heterophylla BL. Bijdr. (1826) 858, *incl. var.*; DC. Prod. 7 (1839) 591; MIQ. Fl. Ind. Bat. 2 (1859) 1055; KOORD. Nat. Tijd. N.I. 62 (1902) 255; Exk. Fl. Java 3 (1912) 8; HALL. *f.* Med. Rijksherb. *n.* 12 (1912) 28; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 107; J. J. S. in K. & V. Bijdr. 13 (1914) 131, *incl. var. obovata* J. J. S. *l.c.* 135; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 4; HOCHR. Candollea 2 (1925) 494; SP. MOORE, J. Bot. 63 (1925) Suppl. 57; MALME in Fedde, Rep. 34 (1934) 284; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 162, p. 6, *excl. syn. D. latifolia* BL.; SLEUM. Reinwardtia 4 (1957) 155. — *Gaultheria heterophylla* (BL.) ENDL. *ex* HASSK. Cat. Hort. Bog. (1844) 160; ZOLL. & MOR. Nat. Geneesk. Arch. N.I. 2 (1845) 9; ZOLL. Syst. Verz. 2 (1854) 138; MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 40. — *Amphicalyx heterophyllus* (BL.) HASSK. Cat. Hort. Bog. (1844) 160, *in syn.*; BL. *ex* HASSK. Pl. Jav. Rar. (1848) 470. — *Gaultheria latifolia* ENDL. *ex* ZOLL. Syst. Verz. 2 (1854) 138. — *D. latifolia* (*non* BL.) HALL. *f.* Med. Rijksherb. *n.* 12 (1912) 28. — *D. bartlettii* MERR. Pap. Mich. Ac. Sc. 19 (1933) 182. — **Fig. 79–80.**

var. **heterophylla.**

Shrub or treelet up to 7 m, mostly epiphytic, rarely terrestrial. Branchlets greyish corticate, obtusangular, the young red shoots sometimes with some very short glandular hairs, practically glabrous, mostly a little shining. *Leaves* heteromorphous, not rarely variously shaped in the same specimen, oblong to oblong-elliptic, sometimes nearly ovate or obovate, apex mostly rather short-attenuate, acute or somewhat obtuse, very rarely rounded, the terminal gland small, not protruding, base acute or obtuse, glossy dark green above, dilutely green and less shining beneath, subcoriaceous to rather coriaceous, very young ones sparsely set with short stoutish hairs, mature ones glabrous above, ± laxly punctulate beneath by the persistent hair-bases, entire, margin flat or slightly revolute, especially towards the base of dry leaves, 3–7(–10) by (1–)1.5–3.5 cm, midrib said to be pale and shining as glass in fresh leaves, impressed above, obtusely raised beneath, nerves in 3–6 pairs (1–2 basal pairs ± high-ascending), curved and anastomosing, faintly impressed above, slightly raised beneath, not rarely almost invisible; petiole said to be often red when fresh, grooved above, 3–7 by 1–1.5 mm. *Flowers* 4–8(–15) per fascicle, from foliate or defoliate axils. Pedicels rather slender, laxly to (rarely) subdensely clothed with short, fine, ± spreading yellowish hairs as well as with some scattered thicker glandular hairs, rarely at anthesis clothed with the latter only, glabrescent, though the bases of the glandular hairs are ± persistent, (4–)5–7 mm, basal bracts broad-triangular, obtuse, fimbriate. Bracteoles suborbicular-ovate, obtuse, keeled, with some very short hairs on the keel, glabrous elsewhere, glandular-fimbriate, *c.* 1.5 mm. *Calyx* contracted at the base, often purplish suffused, glabrous, 2.5–3 mm, lobes ovate, obtuse, often thinner at the margin and ± reflexed at anthesis, densely glandular-fimbriate, 1.5–2 mm. *Corolla* narrow-campanulate, contracted at the very base, sordid or pinkish white to greenish or greenish pinkish, or green with purplish brownish lobes, glabrous, 4–5(–6) by (2–)2.5–3.5 mm, lobes recurved, 1.5 mm. *Filaments* linear, curved, glabrous, 2.5–3 mm; anther-cells ovate-oblong, very granular, 2–2.5 mm, the rather short tubules included. *Ovary* glabrous; style 4–5 mm. *Fruit* 4–5 mm ø, first greenish white, then dull lead-coloured, finally purplish blue or blackish and shining.

Distr. *Malesia*: Sumatra, Java, Lesser Sunda Is. (Bali, Lombok), ? Borneo.

Ecol. In mountain forest, locally common, (800–)1000–2400(–2700) m. *Fl. fr.* Jan.-Dec.

Vern. *Areuj hideung, areuj tjantigi, tjantigi bulu*, S, or mostly simply *tjantigi*, S, a common Sundanese name for *Ericaceae*.

var. **latifolia** (BL.) SLEUM. Reinwardtia 4 (1957) 156; Blumea 12 (1963) 123. — *D. latifolia* BL. Bijdr. (1826) 858; DC. Prod. 7 (1839) 591; MIQ. Fl. Ind. Bat. 2 (1859) 1055; BOERL. Handl. 2, 1 (1891) 270; KOORD. Nat. Tijd. N.I. 62 (1902) 255; K. & G. J. As. Soc. Beng. 74, ii (1905) 71; KOORD. Exk. Fl. Java 3 (1912) 8; J. J. S. in K. & V. Bijdr. 13 (1914) 130; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 57; MERR. En. Born. (1921) 464; RIDL. Fl. Mal. Pen. 2 (1923) 214; BURK. & HOLTT. Gard. Bull. S. S. 3 (1923) 57; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 256; FLETCHER, Fl. Siam. En. 2 (1938) 315; HENDERS. Mal. Nat. 6, 1 (1950) 264, f. 247. — *Gaultheria latifolia* (BL.) ENDL. *ex* HASSK. Cat. Hort. Bog. (1844) 160; ZOLL. & MOR. Nat. Geneesk. Arch. N.I. 2 (1845) 9; MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 41. — *Amphicalyx latifolius*

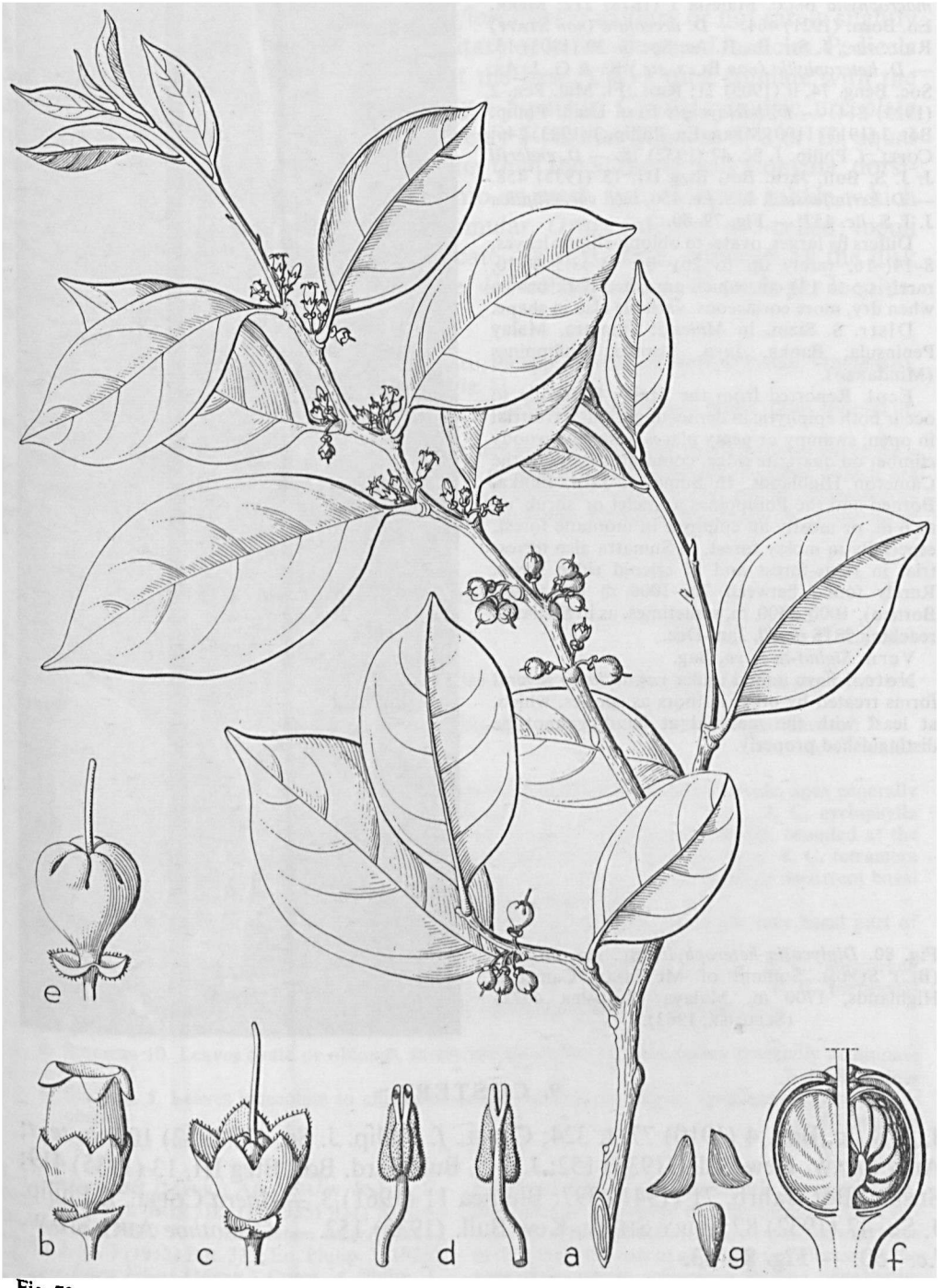

Fig. 79. *Diplycosia heterophylla* BL. *var. latifolia* (BL.) SLEUM. *a.* Habit, × ½, *b.* flower, × 3½, *c.* flower after anthesis, × 3½, *d.* stamens in front and back view, × 5, *e.* immature fruit, × 3½, *f.* ± schematized longitudinal section of young fruit, × 5, *g.* seeds, × 7½ (*a–d* after an unpublished coloured plate of BLUME, Fl. Javae, in the Rijksherbarium at Leyden, *e–g* FORBES 2049, from Sumatra).

BL. *ex* HASSK. Pl. Jav. Rar. (1848) 469. — *D. macrophylla* BECC. Malesia 1 (1878) 212; MERR. En. Born. (1921) 464. — *D. urceolata* (*non* STAPF) RIDL. *var.*, J. Str. Br. R. As. Soc. *n.* 39 (1903) 15. — *D. heterophylla* (*non* BL. *s. str.*) K. & G. J. As. Soc. Beng. 74, ii (1905) 71; RIDL. Fl. Mal. Pen. 2 (1923) 214. — *D. baclayensis* ELM. Leafl. Philip. Bot. 3 (1911) 1100; MERR. En. Philip. 3 (1923) 246; COPEL. *f.* Philip. J. Sc. 47 (1932) 78. — *D. endertii* J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 458. — *D. kerintjensis* J. J. S. *l.c.* 456, *incl. var. elliptica* J. J. S. *l.c.* 457. — **Fig. 79–80.**

Differs by larger, ovate- to oblong-elliptic leaves, 8–14(–16, rarely up to 20) by (3–)3.5–8(–10, rarely up to 12) cm, which are often dark brown when dry, more coriaceous, variable also in shape.

Distr. S. Siam, in *Malesia*: Sumatra, Malay Peninsula, Banka, Java, Borneo, Philippines (Mindanao).

Ecol. Reported from the Malay Peninsula to occur both epiphytic in dense jungle and terrestrial in open, swampy or peaty places, also as a woody climber on quartzite ridge, common locally in the Cameron Highlands. In Sumatra, Java, Banka, Borneo and the Philippines a treelet or shrub up to 6 m, or mostly an epiphyte in montane forest, especially in mossy forest, in Sumatra also terrestrial in ridge-forest and in ericoid ridge scrub. Rarely found between 700–1000 m (Java and Borneo), 1000–2500 m, sometimes, as in Sumatra, reaching 3315 m. *Fl.* Jan.-Dec.

Vern. *Sigbut-ta-kayo*, Bag.

Note. I have united under *var. latifolia* several forms treated by other authors as species, which, at least with the material at hand, cannot be distinguished properly.

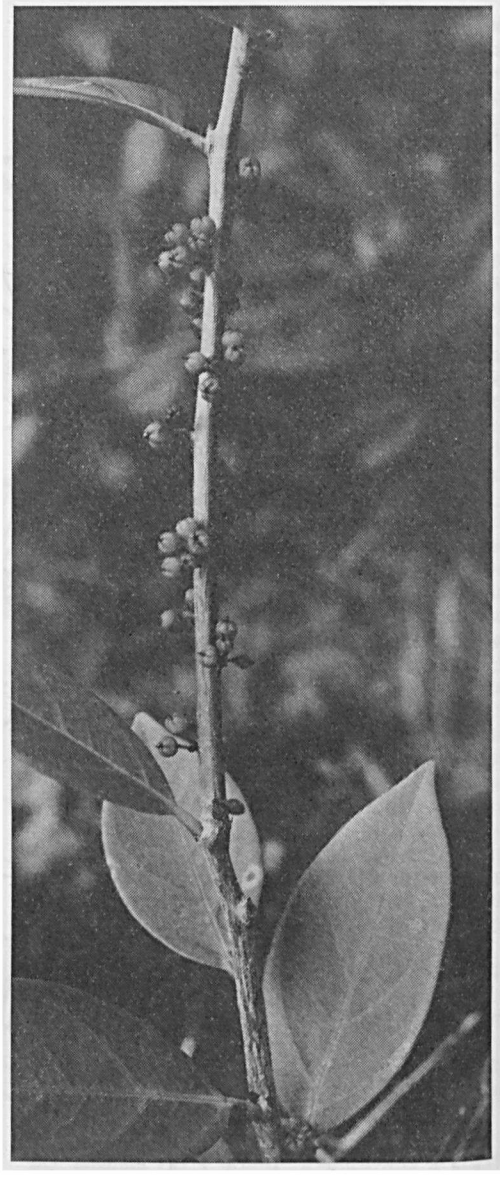

Fig. 80. *Diplycosia heterophylla* BL. *var. latifolia* (BL.) SLEUM. Summit of Mt Jasar, Cameron Highlands, 1700 m, Malaya (SLEUMER 4672) (SLEUMER, 1963).

9. COSTERA

J. J. S. Ic. Bog. 4 (1910) 77, t. 324; COPEL. *f.* Philip. J. Sc. 47 (1932) 102, *in text*; AIRY SHAW, Kew Bull. (1935) 152; J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 419; SLEUM. Bot. Jahrb. 71 (1941) 397; Blumea 11 (1961) 3. — *Iaera* COPEL. *f.* Philip. J. Sc. 47 (1932) 82; AIRY SHAW, Kew Bull. (1935) 152. — *Cymothoe* AIRY SHAW, *l.c.* 150. — **Fig. 81–83.**

Small shrubs, climbing or mostly epiphytic, sometimes with thickened roots. *Leaves* spiral, entire, with a pair of glands on the margin near to the petiole, or on the foot of the constricted (or decurrent) proper base of the blade, or on the petiole itself, 5–7-plinerved, coriaceous, glabrous, bearing no trace of glands or

glandular hairs on the undersurface but often with scattered prominent epidermal warts or elevated points on both faces. *Inflorescences* axillary or not rarely slightly extra- (supra-)axillary. *Flowers* small, solitary or in few-flowered fascicles. Pedicels continuous with the calyx, bracteolate at the base. *Calyx* tube connate with the ovary, ± cup-shaped; calyx limb ± deeply 4–5-partite. *Corolla* cylindric, urceolate or subcampanulate, shortly 5-lobed to deeply 5-partite. *Stamens* 5, 8 or 10, equal or almost so; filaments linear, much shorter than the anthers; cells elongate, dorsifix, ecalcarate, each extending upwards into an erect, free, elongate tubule, which opens by an introrse pore or slit. *Disk* annular. *Ovary* inferior, 4–5-celled; loculi many-ovuled; style filiform; stigma truncate. *Fruit* baccate, crowned by the disk and the persistent calyx lobes, subglobose, 4–5-celled, with 1–15 seeds per loculus. *Seeds* minute; testa reticulate.

Distr. In all 9 *spp.*, all in *Malesia*: Sumatra, Borneo, Philippines (Luzon, Negros, Panay, Mindanao), the northern Moluccas (Morotai and Talaud Is.). Fig. 81.

Ecol. Mostly epiphytic, more rarely terrestrial, in primary forest and mossy forest, from sealevel up to 1800 m.

Note. The genus is very close to *Vaccinium* and kept here apart from it merely on account of the characteristic shape and nervation of the leaves, absence of glandular hairs on undersurface (which are significant for most or perhaps all species of *Vaccinium*), in combination with the fasciculate inflorescences and the pedicel which is continuous with the calyx (articulate with the calyx, as it seems, in all species of *Vaccinium* as far as Malesia is concerned).

KEY TO THE SPECIES

1. Leaves 1.4–2.2 by 0.6–1.1 cm . . . . . **1. C. loheri**
1. Leaves (2.5–)4.5–12(–15) cm long.
2. Leaves with a pair of glands strictly inserted on the margin at the base of the lamina, the latter not contracted nor decurrent on the petiole.
3. Corolla *c.* 3 mm, shortly 5-lobed. (Leaves elliptic, apex obtuse or rounded, base attenuate.) **2. C. lucida**
3. Corolla 5–7 mm, deeply 4-lobed.
4. Corolla lobed to *c.* ⅓. Leaves suborbicular or rarely broadly ovate or elliptic-ovate, apex generally rounded, base auriculate-cordate, or rarely rounded. . . . . **3. C. cyclophylla**
4. Corolla lobed in full anthesis ± halfway. Leaves elliptic to subobovate-elliptic, rounded at the apex, broadly attenuate towards the base, subtruncate-obtuse at the very base **4. C. tetramera**
2. Leaves with a pair of glands inserted at the very base of the abruptly contracted or decurrent basal part of the lamina, or not rarely even lower, *i.e.* on the petiole itself.
5. Leaves with a pair of glands inserted at the abruptly contracted or decurrent very basal part of the lamina.
6. Flowers tetramerous. Corolla 2.5 mm . . . . . **5. C. sumatrana**
6. Flowers pentamerous. Corolla 6 mm . . . . . **6. C. borneensis**
5. Leaves with a pair of glands found at or slightly above the middle of the petiole.
7. Corolla 2.5 mm.
8. Stamens 10. Leaves ovate or oblong-, rarely lanceolate-ovate, apex rather markedly acuminate **7. C. lanaensis**
8. Stamens 5. Leaves lanceolate to elliptic-lanceolate or narrow-elliptic, apex generally rounded-obtuse . . . . . **8. C. endertii**
7. Corolla 3.5 mm . . . . . **9. C. ovalifolia**

1. **Costera loheri** (MERR.) AIRY SHAW & J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 421; SLEUM. Blumea 11 (1961) 3. — *Vaccinium loheri* MERR. Philip. J. Sc. 7 (1912) Bot. 323; En. Philip. 3 (1923) 250. — *Iaera loheri* (MERR.) COPEL. *f.* Philip. J. Sc. 47 (1932) 85, t. 7, f. 1–5. Fig. 83e.

Small epiphytic glabrous shrub. Branches terete, the greyish cork fissured longitudinally. Branchlets reddish brown, angular, wrinkled, minutely puberulous under a lens, densely foliate. *Leaves* elliptic to slightly obovate-elliptic, apex rounded, base broadly attenuate or subcuneate, a little decurrent on the petiole with the contracted very base of the blade, the pair of glands found there or at the apex of the petiole, coriaceous, shining, edge hardly recurved, 1.4–2.2 by 0.6–1.1 cm, distinctly 3- or faintly 5-plinerved, the pair of main nerves curved-ascending and anastomosing with the midrib a little below the very apex, ± raised on both faces especially underneath, veins numerous, ± trans-

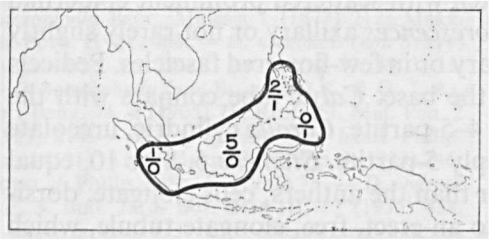

Fig. 81. Distribution of *Costera*. The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

verse from the midrib, often hardly visible, reticulation rather obscure; petiole ± flattened, 1–2 mm. *Flowers* solitary. Pedicels rather slender, glabrous, 2–6 mm, with several minute ovate bracteoles. *Calyx* tube cup-shaped or short-cylindric, base rounded, *c.* 1 mm, limb erect and deeply 5-partite, lobes deltoid, 0.5 mm. *Corolla* known in bud only, white. *Stamens* apparently 10; filaments linear, laxly hairy, 0.7 mm; cells oblong, 0.5 mm; tubules *c.* ⅓ as narrow as are the cells, obliquely cut distally, 0.6 mm. *Style c.* 2 mm (or perhaps longer?). *Fruit* shining, *c.* 3 mm ø. *Seeds* pitted, *c.* 1.2 mm.

Distr. *Malesia*: Philippines (Luzon: Montalban; Panay: Ilo-Ilo).

Ecol. In mossy forest, probably above 1000 m.

Note. The leaves of *C. loheri* are similar to those of *Vaccinium microphyllum* BL.

2. Costera lucida (MERR.) AIRY SHAW & J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 421. — *Diplycosia lucida* MERR. Philip. J. Sc. 11 (1916) Bot. 28. — *Vaccinium costeroides* MERR. En. Philip. 3 (1923) 248. — *Iaera lucida* (MERR.) COPEL. *f.* Philip. J. Sc. 47 (1932) 85, t. 6, f. 7–9.

Scandent or epiphytic shrub, entirely glabrous. Branchlets slender, terete, smooth, laxly foliate. *Leaves* elliptic, apex rounded or obtuse, base attenuate, with a pair of strictly basal marginal glands, coriaceous, shining, edge revolute, 5–7 by 2.5–3.5 cm, nerves 1–2 basal or slightly supra-basal, and 1–2 upper pairs, all curved-ascending and anastomosing, rather prominent; reticulation lax; petiole 5–7 by 1 mm. *Flowers* in pairs. Pedicels slender, *c.* 1.5 cm, with 2 minute bracteoles. *Calyx* tube cylindrical, base obtuse, *c.* 1.5 mm, limb broadly 5-dentate, *c.* 0.5 mm. *Corolla* cylindric, *c.* 3 mm, lobes broadly ovate, 0.5 mm. *Stamens* 10; filaments linear, laxly patently hairy, 1.7 mm; cells broad-oblong, *c.* 0.6 mm; tubules narrow-cylindric, 0.4 mm, obliquely cut apically, the pore small. *Style* with a club-shaped apex, *c.* 2.5 mm. *Fruit c.* 5 mm ø, black when dry, the calyx lobes broad, short, apiculate. *Seeds c.* 25 per fruit, brownish, pitted, *c.* 1.5 mm.

Distr. *Malesia*: Philippines (Luzon: Prov. Sorsogon, summit of Mt Kilibong), once found in mossy forest at *c.* 1000 m. *Fl. fr.* Aug.

Vern. *Dusóng-sikát.*

3. Costera cyclophylla (AIRY SHAW) J. J. S. & AIRY SHAW in Airy Shaw, Hook. Ic. (Dec. 1935) t. 3281; J. J. S. Bull. Jard. Bot. Btzg III, 13 (Dec. 1935) 424; SLEUM. Blumea 11 (1961) 3. — *Cymothoe cyclophylla* AIRY SHAW, Kew Bull. (May 1935) 151. — **Fig. 82.**

Straggling shrub or woody climber, whether or not epiphytic, 2–3 m, irregularly branched, glabrous in all outer parts. Branchlets terete, firm, up to 4 mm ø, red brown when dry, laxly foliate. *Leaves* suborbicular or sometimes broadly ovate or elliptic-ovate, apex generally rounded or somewhat truncate-retuse, rarely broadly obtusely subacuminate, base rounded to cordate and often auriculate or even amplexicaul, the auriculae large, ± rounded and overlapping, with a pair of strictly basal marginal not much conspicuous glands, sessile or shortly (up to 7 mm) petioled, coriaceous, often with verruculose prominent points on each face, 5–12 by 4–6 cm, nerves 4–6 pairs, all from the very base, high curved-ascending and regularly anastomosing, prominent on both sides as is the midrib, connected by conspicuously raised, ± transversal veins which form a rather lax network with the less prominent veinlets. *Flowers* 1–2(–5). Pedicels very slender, 1–2.7 cm, with 2 minute bracteoles. *Calyx* cup-shaped, *c.* 1.5 mm, limb suberect, 1–1.5 mm, halfway 5-lobed, lobes broadly triangular, acutish. *Corolla* narrow-campanulate, thin, pink or mauvish pink, or a very light violet at the top and nearly red at the base, 6–7 mm, 4-lobed, lobes deltoid-ovate, rather bluntish, erect, 2–3 mm. *Stamens* 8; filaments ascendently short-hairy, *c.* 2 mm; cells narrow-oblong, papillose, 1.5 mm; tubules erect, gradually attenuate upwards, *c.* 2 mm, the slits 0.5 mm. *Disk* inconspicuous. *Style* 5–6 mm, glabrous. *Fruit* baccate, 4–5 mm ø, obsoletely 4-locular. *Seeds* obtusely angular, 1–1.5 mm; testa foveolate-reticulate.

Distr. *Malesia*: Borneo (Sarawak: Mt Dulit; Merurong Plateau; Brunei: Mt Pagon; Central East Borneo: Mt Kemul).

Ecol. In primary heath forest or mossy forest, in shady places and on open ridge, 900–1800 m.

4. Costera tetramera SLEUM. Blumea 11 (1961) 4. — **Fig. 83a-d.**

Climbing shrub, apparently small, the slender, terete branchlets 1.5–3 mm ø, glabrous, laxly foliate. *Leaves* broad-elliptic to subobovate-elliptic, rounded, or rarely slightly retuse at the apex, broadly attenuate towards the base, the very base subtruncate-obtuse, bearing a pair of rather thickish, not much prominent marginal glands, coriaceous, laxly set with epidermal tubercles beneath, revolute particularly towards the base in dry specimens, (4.5–)6.5–9.5 by 3–5 cm, 5–7-plinerved from and a little from above the base, midrib broadened for the lowest *c.* 5 mm, abruptly narrowed upwards, prominent on both sides as are the nerves, the inner pair of nerves high ascending and anastomosing a little below the top of the lamina, veins lax, irregularly transverse, rather numerous, somewhat prominent above, less

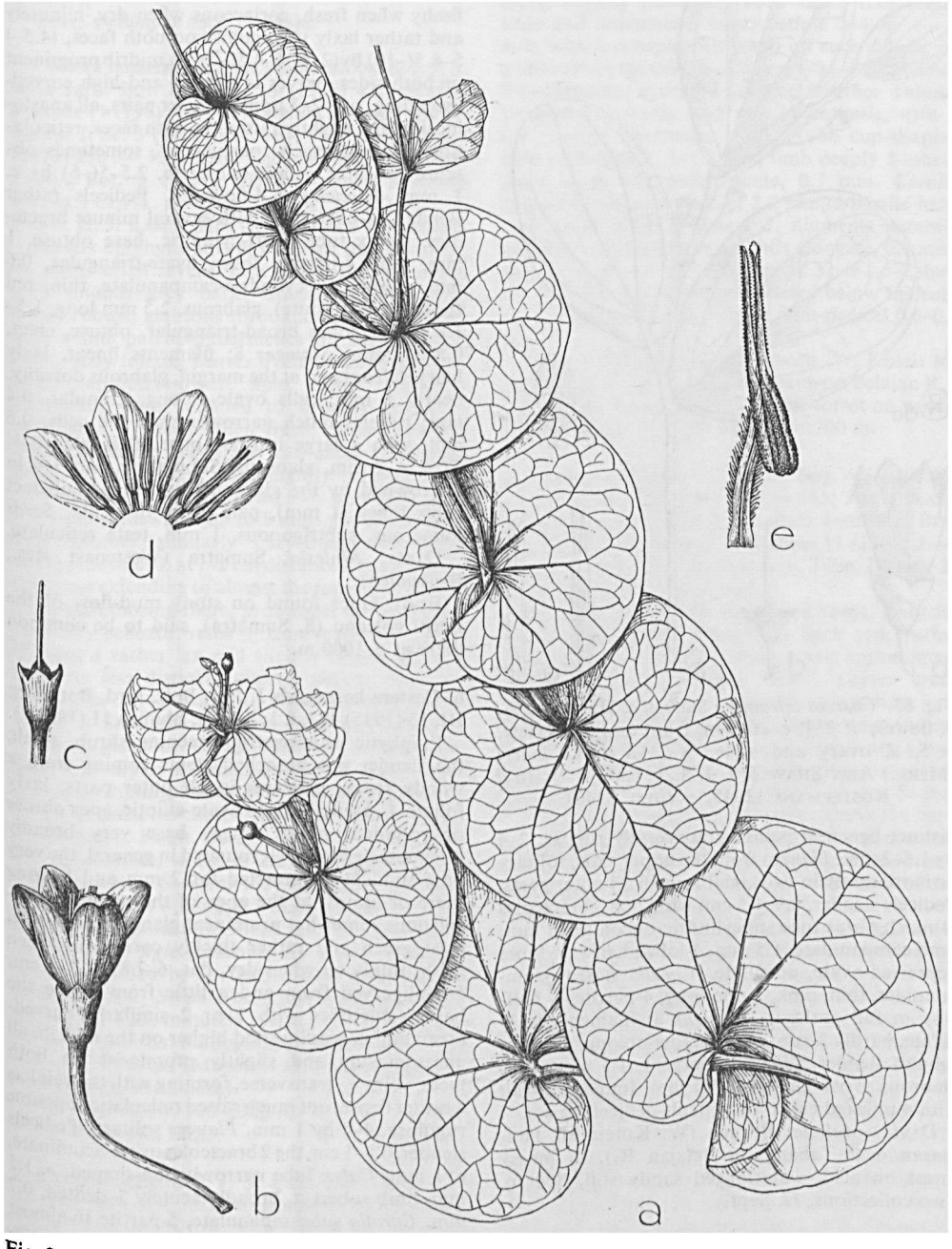

Fig. 82. *Costera cyclophylla* (AIRY SHAW) AIRY SHAW & J. J. S. *a*. Habit, × ½, *b*. flower, × 2, *c*. ovary and style, × 2, *d*. corolla and stamens, × 2, *e*. stamen, × 6 (*a–e* ENDERT 4258).

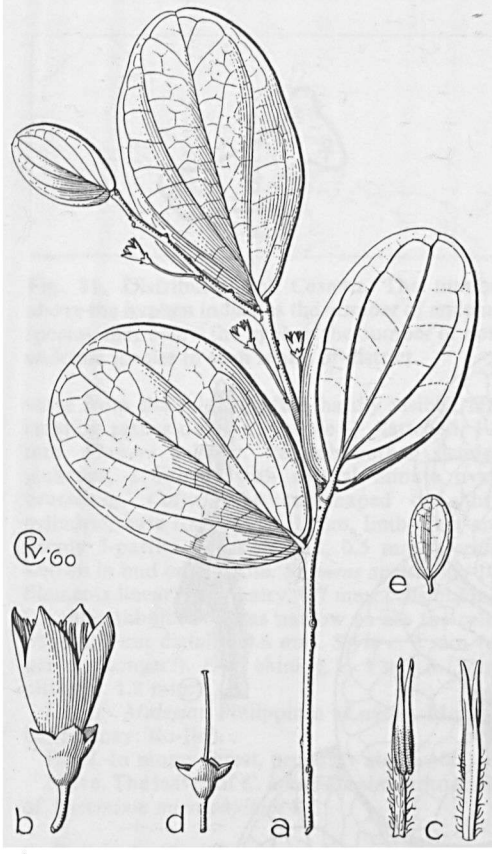

Fig. 83. *Costera tetramera* SLEUM. *a.* Habit, × ½, *b.* flower, × 2½, *c.* stamen, front and back view, × 5, *d.* ovary and style, × 2½. — *C. loheri* (MERR.) AIRY SHAW & J. J. S., *e.* leaf, × ⅛ (*a-d* KOSTERMANS 12945, *e* VIDAL 3146).

distinct beneath; petiole transversely rugose, 2–4 by 1.5–2 mm. *Flowers* from the upper axils, solitary or more rarely in twos, glabrous in all outer parts. Pedicels slender, 0.9–1.5 cm, with 2 or 3 bracteoles (1 mm). *Calyx* tube subcylindric-obconical, 1 mm; limb campanulate, 1.5 mm, 4-lobed halfway, lobes depressed-ovate, apiculate. *Corolla* narrow-campanulate, thin, pink, 5 mm long, 4-partite ± halfway in full anthesis. *Stamens* 8; filaments laxly ciliate, hardly 2 mm; cells narrow-oblong, 1.5 mm; tubules slender, slightly divergent, 1.5 mm. *Disk* glabrous. *Style* glabrous, 4.5 mm. Immature *fruit* with 4 inflexed calyx lobes; fruit-pedicel 1.5 cm.

Distr. *Malesia*: Borneo (W. Kutei: Mt Palimasan near Tabang on Belajan R.), in mossy forest on acid, waterlogged sandy soil, 800 m. Two collections. *Fl.* Sept.

5. Costera sumatrana J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 421; SLEUM. Blumea 11 (1961) 3.

Terrestrial or epiphytic, glabrous shrub. Branchlets angular at the tips, terete below, slender, laxly foliate, internodes unequal and sometimes not longer than 3 mm. *Leaves* ovate or elliptic-ovate, gradually obtusely attenuate or subacuminate towards the apex, base broadly attenuate to rounded in general, the very base suddenly contracted (2–4 mm) and bearing a thick prominent gland on each side or at the top of the petiole, stiffly fleshy when fresh, coriaceous when dry, minutely and rather laxly verruculose on both faces, (4.5–)5–8.5(–10) by (2.5–)3–4.5(–7) cm, midrib prominent on both sides, nerves in 2 basal and high curved-ascending, and 2–3 upper shorter pairs, all anastomosing and slightly raised on both faces, reticulation lax, not much conspicuous, sometimes obscure beneath; petiole subterete, 2.5–5(–6) by *c.* 1 mm. *Fascicles* 2–4-flowered. Pedicels rather slender, (3–)5–6 mm, with several minute bracteoles. *Calyx* tube short-cylindric, base obtuse, 1 mm, limb 4-partite, lobes ovate-triangular, 0.6 mm. *Corolla* subcylindric-campanulate, thin, red (possibly also white), glabrous, 2.5 mm long, 1.5–1.8 mm ø, lobes broad-triangular, obtuse, erect, 0.5–0.6 mm. *Stamens* 8; filaments linear, laxly hairy in front and at the margin, glabrous dorsally, nearly 1 mm; cells ovate-oblong, granular, 0.4 mm; tubules much narrower than the cells, 0.6 mm, with a large introrse pore. *Disk* glabrous. *Style c.* 2 mm, glabrous. Submature *fruit* 3–4 in ø, crowned by the glabrous disk and 4 suberect calyx lobes (1 mm), pale green or white. *Seeds* numerous, subtrigonous, 1 mm, testa reticulate.

Distr. *Malesia*: Sumatra (Westcoast Res., Bencoolen).

Ecol. Once found on stony mud-flow of the Beriti volcano (S. Sumatra), said to be common there at *c.* 1000 m.

6. Costera borneensis J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 423, f. 1; SLEUM. Blumea 11 (1961) 3.

Epiphytic or terrestrial creeping shrub, small, the slender not branched stems coming from a woody stock, glabrous in all outer parts, laxly foliate. *Leaves* elliptic to ovate-elliptic, apex obtuse or rounded, never retuse, base very broadly attenuate or mostly ± rounded in general, the very base suddenly contracted for 2 mm and bearing there or almost at the apex of the petiole a conspicuous somewhat prominent gland on each side, light green and rather thickly coriaceous when fresh, thinly so when dry, flat, 6–7.8 by 3–4 cm, 5–7-plinerved from and a little from above the base, sometimes with 1 or 2 similarly curved-ascending nerves inserted higher on the midrib, all anastomosing and slightly prominent on both faces, veins ± transverse, forming with the veinlets a rather dense, not much raised reticulation; petiole rugulose, 4–5 by 1 mm. *Flowers* solitary. Pedicels slender, 0.8–1 cm, the 2 bracteoles ovate-acuminate, *c.* 1 mm. *Calyx* tube narrowly cup-shaped, *c.* 1.5 mm, limb suberect, broadly acutely 5-dented, 0.7 mm. *Corolla* subcampanulate, 5-partite to almost the base, thin, *c.* 6 mm, lobes erecto-patent, ovate-oblong, subacute, nerved. *Stamens* 10; filaments ciliolate, 2.5 mm; cells elongate-oblong, minutely granular or papillose, 3 mm; tubules elongate-cylindric, minutely verruculose below, *c.* 2 mm. *Style* glabrous, 5 mm. *Fruit* purplish pink, *c.* 4

mm ø, with 5 one-seeded cells. *Seeds* oblong, excavate-punctate, 2.5 mm.

Distr. *Malesia*: W. Borneo (Karimata Is.: P. Madjang (Maja) and another not precisely given locality).

Vern. *Pělumpur badi*, P. Maja.

7. Costera lanaensis (MERR.) AIRY SHAW & J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 421; SLEUM. Blumea 11 (1961) 3. — *Vaccinium lanaense* MERR. Philip. J. Sc. 3 (1908) Bot. 161, 372; En. Philip. 3 (1923) 250 .— *Vaccinium medinilloides* ELM. Leafl. Philip. Bot. 3 (1911) 1097. — *Iaera lanaensis* (MERR.) COPEL. *f.* Philip. J. Sc. 47 (1932) 83, t. 6, f. 1–6; H. J. LAM & HOLTH. Blumea 5 (1942) 222.

Mostly epiphytic shrub, or small tree up to 1.5 m, stems often several in a clump up to 2 cm ø, with smooth grey bark. Branchlets slender to rather robust, glabrous throughout, or not rarely with a fine patent puberulence on the youngest parts, laxly foliate. *Leaves* ovate or oblong-ovate, rarely lanceolate-ovate, apex rather markedly acuminate, base rounded to broadly cuneately attenuate, ± fleshy when fresh, coriaceous and brittle when dry, laxly set with small prominent warts on both faces, edge slightly revolute, (5–)10–15 by (2–)2.5–4.5(–6) cm, 5–7- plinerved from and from somewhat (up to 5 mm) above the base, with another similarly curved-ascending pair leaving the midrib at 1–2 cm distance from the base, all nerves extending to almost the top of the lamina and anastomosing there, prominent on both faces especially beneath, veins ± transverse, numerous, forming a rather lax and slightly raised network with the less distinct veinlets; petiole rugulose, 3–6(–7) by 1.5–2 mm, with a pair of large lateral glands a little above the middle. *Fascicles* 2–5-flowered, glabrous. Pedicels slender, 3–4(–5) mm, each with a pair of small bracteoles. *Calyx* tube cylindric, shining, base obtuse, 2 mm, limb suberect, 5-partite to almost the base, lobes ovate-acuminate, *c.* 1 mm. *Corolla* broad- or subcampanulate-urceolate, white, *c.* 2.5 mm, lobes broadly ovate, *c.* 1 mm. *Stamens* 10; filaments laxly hairy, *c.* 0.8 mm; cells oblong, 0.7 mm; tubules gradually narrowed upwards, 0.5 mm, with oblique, rather narrow slits. *Style* glabrous, 1.5–2 mm. *Fruit* 4–5 mm ø, crowned by the calyx lobes and a small, annular disk. *Seeds* obscurely trigonous, dark brown, 1.5 mm, minutely pitted.

Distr. *Malesia*: Philippines (Mindanao, Negros, Panay), Moluccas (Morotai: Mt Pare; Talaud Is.: Karakelong, Mt Duata).

Ecol. In forest, 700–1300 m.

Vern. *Lumus*, Bag.

8. Costera endertii J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 420; SLEUM. Blumea 11 (1961) 3.

Epiphytic shrub, low, with several generally not branched slender stems from a woody clump. Upper parts of the stems or branchlets often crooked, with short internodes, laxly to subdensely foliate, glabrous except the finely puberulent tips. *Leaves* lanceolate to elliptic-lanceolate or narrow-elliptic, apex gradually narrowed, mostly obtuse or rounded, base obtuse, coriaceous, glabrous, edge slightly thickened, (2.5–)4–6(–7) by (0.5–)1–1.5 (–2) cm, 5-plinerved, nerves erect-ascending to nearly the top of the lamina and anastomosing there, slightly raised on both sides, transversal veins and reticulation faint; petiole 2–4 by 1–1.5 mm, with a conspicuous gland on each side at or a little above the middle. *Flowers* 1–2(–4), glabrous, the filaments excepted. Pedicels rather robust, thickened upwards, 4–5 mm in anthesis, with a few minute bracteoles. *Calyx* tube cup-shaped, base subtruncate, 1–1.5 mm, limb deeply 5-lobed, lobes erect, triangular, acute, 0.7 mm. *Corolla* cylindric, white or pink, *c.* 2.5 mm, 5-partite halfway, lobes blunt. *Stamens* 5; filaments patently hirtellous distally, 1.5 mm; cells elongate, 0.8 mm; tubules erect, 0.7 mm. *Disk* small. *Style* 1.5–2 mm. *Fruit* white, *c.* 4 mm ø, constricted below the suberect or incurved calyx lobes; fruit-pedicel 0.6–0.8 cm.

Distr. *Malesia*: Central Borneo (W. Kutei: Mt Kemul; Mt Palimasan near Tabang on Belajan R.).

Ecol. In forest, also in *Agathis*-forest on waterlogged, sandy and acid soil, 300–1200 m.

9. Costera ovalifolia J. J. S. Ic. Bog. 4 (1910) 77, t. 324; MERR. En Born. (1921) 465; AIRY SHAW, Kew Bull. (1935) 155; J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 420; SLEUM. Blumea 11 (1961) 3. — *C. elegans* J. J. S. *ex* DUNSELMAN, Trop. Natuur 28 (1939) 81, *in text, nom. nud.*

Epiphytic low shrub with thick roots, glabrous in all outer parts. Branchlets dark red, rather slender, often crooked and the nodes approximate up to 1 cm, subdensely leaved. *Leaves* erect, elliptic, apex rounded or slightly retuse, base very broadly attenuate to rounded, coriaceous though easily breakable in fresh state, pale green and glossy above, paler and dull beneath, edge somewhat thickened, (2.6–)4–7 by 2.5–4.5(–5.5) cm, 5- (sub 7-) plinerved from and a little from above the base, nerves curved-ascending, anastomosing near the top of the lamina, with sometimes one additional upper pair of nerves from the lower half of the midrib, all slightly raised on both faces as is the midrib, veins ± transverse, forming a rather lax network with the even less visible veinlets; petiole (2–)3–6(–7) by 1.5–2 mm, bearing a conspicuous little flattish or excavate gland on each side at about the middle. *Fascicles* (2–)4-flowered, arising from a kind of low cushion (1 mm), which consists of numerous minute ovate-acuminate imbricate perulae. Pedicel rather slender, red, 9—12 mm, with a pair of bracteoles. *Calyx* tube cup-shaped, 1.5 mm, limb low, 5-lobed, lobes erect, triangular, acute, gland-apiculate, 0.5 mm. *Corolla* subcampanulate, 5-partite to almost ⅔, thin, white, *c.* 3.5 mm, lobes erect, narrow oblong-triangular, ± recurved. *Stamens* 5, alternating with the corolla lobes; filaments very laxly hairy upwards, *c.* 0.7 mm; cells oblong, 1.5 mm; tubules erect, gradually tapering to the apex, set with subclavate papillae below, 1.5 mm, dehiscent with a minute pore. *Disk* small. *Style c.* 3.5 mm. *Fruit c.* 4 mm ø, crowned by the ± inflexed calyx lobes, apparently

4–5-celled, white or pale green, possibly red at full maturity, on pedicel up to 2.3 cm. *Seeds* few, oblongoid, 1.5–2 mm; testa reticulate.

Distr. *Malesia*: Borneo, Karimata I. (type), apparently also in Sarawak, Brunei, and West and East Borneo.

Ecol. In forest or forest edges, from low altitude up to *c.* 1500 m.

Vern. *Tjapien djantĕn*, Karimata.

Note. The one specimen from Sarawak with flowers has the vegetative characters of *C. ovalifolia*, but 5–6 mm long corollas and 10 stamens, the other specimens from Borneo are in fruit or sterile. The Bornean material may be kept specifically apart when more material is at hand.

10. VACCINIUM

LINNÉ, Gen. Pl. ed. 5 (1754) 166; Sp. Pl. (1753) 349; SLEUM. Bot. Jahrb. 71 (1941) 413; Blumea 11 (1961) 10–112; *ibid.* 12 (1963) 123; *ibid.* 12 (1964) 343. — **Fig. 84–115.**

Shrubs or small, rarely medium-sized trees, terrestrial or epiphytic; stems of epiphytic ones not rarely with a (hypocotylar) basal swelling, and roots sometimes considerably enlarged. *Leaves* spirally arranged (Mal.), coriaceous to subcoriaceous, rarely thin, evergreen (Mal.), usually with a distinct, ± basal, marginal gland on each side, entire or crenulate, whether or not clad with simple, gland-capitellate or glandular-muriculate hairs, rarely with stalked or subsessile glands, sessile or mostly petioled. *Racemes* axillary, sometimes reduced to a solitary flower, caducously perulate, or more rarely eperulate. Pedicels subtended by a (sometimes very early) caducous or ± persistent (foliaceous) bract and provided with 2, sometimes very early caducous bracteoles. *Calyx* tube cup-shaped, turbinate or rarely almost patellar, limb (4–)5-partite to various degree. *Corolla* tubular, urceolate or subglobose, the (4–)5 lobes imbricate in bud. *Stamens* 8 or 10 (rarely 12), inserted at the outer margin of the disk or near the base of the corolla tube; anthers dorsifix, whether or not 2-spurred dorsally, ending with tubules of various length, the pore strictly terminal and round, or introrse as an elliptical opening or narrow slit. *Disk* annular. *Ovary* inferior, (4–)5 (or falsely 8–10)-celled, placentas bifid, with ∞ (rarely few) ovules. *Style* ± as long as the corolla; stigma obtuse. *Fruit* a juicy and soft, or a more dry and rather hard berry with few to numerous seeds, crowned by the disk and the persistent calyx lobes. *Seeds* small, ellipsoid, irregularly compressed, albuminous; testa firm, smooth.

Distr. Approximately 450 *spp.*, of which 6 in Europe (4 *spp.* circumboreal, 1 *sp.* in Madeira, 1 *sp.* in the nearby Orient), *c.* 65 *spp.* in temperate North America (4 of which circumboreal), *c.* 30 *spp.* in tropical America, *c.* 5 *spp.* in SE. Africa and Madagascar, *c.* 76 *spp.* in tropical S. and SE. Asia (1 of which also in Japan), *c.* 22 *spp.* in Japan (5 of which also in temperate and subtropical E. Asia, 3 circumboreal), 11 *spp.* in the Pacific area (1 of which also in East Malesia), in *Malesia c.* 240 *spp.*, more than half of which are limited to New Guinea.

Ecol. Both epiphytic and terrestrial in primary and secondary montane rain-forest, terrestrial at the rim of craters, in alpine scrub vegetation and grasslands, reported from elevations up to 4400 m in New Guinea, rarely found in coastal vegetation at sea-level, generally on acid, sandy or peaty soil, occasionally reported from limestone. Species which are epiphytic at lower elevation, apparently may become terrestrial at higher altitudes. Some species (*V. laurifolium*, *V. myrtoides*, *V. lucidum*, *V. varingiaefolium* in W. Malesia) may form pure stands or even vegetation-belts in the upper montane zone or in summit vegetation.

The roots, especially in epiphytic specimens, are often swollen, possibly due to a mycorrhizal hypertrophy; a comparable structure is found in tropical American species of the genus, in the Northamerican vine-like *V. crassifolium* ANDR. (SE. Virginia to S. Carolina), and in the related genera *Costera*, *Agapetes*, and *Dimorphanthera*.

Galls. The flowers of certain species in Java are liable to attacks by the caterpillar of a *Microlepidopteron* (DOCTERS VAN LEEUWEN, Zoocecidia, 1926, 440, f. 830; Pangrango, 1933, 212); in that case the corolla does not open and changes into a bulging or fusiform gall. Quite the same has been found in the herbarium specimens of certain Sumatran and Bornean species. Another anomaly, probably due to a

fungus, are witchesbroom-like inflorescences with tubular corollas and the stamens much reduced in size (observed in *V. bracteatum*, *V. megalophyes*, *V. dubiosum* a.o.). In the Cameron Highlands I found normal urceolate pinkish and possibly galled, cylindrical and greenish corollas in the same inflorescence of *V. bancanum var. tenuinervium*; in these anomalous flowers the anthers were reduced to half their normal size. *Vaccinium* can also be attacked by a fungus disease (*Exobasidium*) which results in a deformation of the young shoots and of the fruits into galls (RACIBORSKI, Bull. Intern. Ac. Cracovie, Cl. Math. & Nat. 3, 1909, 367).

Uses. The fruits of some species are said to be juicy and palatable, of other to be rather hard and/or insipid. No regular use by men is known of the Malesian species as this is the case with several holarctic ones, *V. littoreum* and *V. myrtoides* excepted; animals, however, such as fruit-eating birds and rats are known to feed partially from *Vaccinium* fruits all over Malesia, and this may add to the dispersal.

The wood is very hard and from several species it is used for utensils.

KEY TO THE SECTIONS

1. Corolla (campanulate, thick-fleshy, deeply 5-partite) seemingly consisting of 2 layers, the outer one thick, split at the lobes to nearly the base of the corolla, the inner one thinner, less deeply split, forming a kind of decurrent membranous marginal zone towards the sinuses. (Tubules opening by introrse rather long slits.) *Spp.* 1–5 . . . . . **1. *sect.* Pachyanthum**
1. Corolla (of various form, thin to fleshy, 5-partite to various degree) consisting of one homogenous layer, showing no membranous wing at the sinuses.
2. Tubules opening by elongate introrse slits, which attain ⅓ to ½ of the length of the tubules.
3. Corolla campanulate, 5-partite ± halfway. Anthers with long dorsal spurs (1–1.5) mm, the tubules ± twice as long as the cells. *Sp.* 6 . . . . . **2. *sect.* Galeopetalum**
3. Corolla urceolate to subglobular, shortly 5-lobed. Anthers with short or rather inconspicuous dorsal spurs, the tubules ± as long as the cells. *Spp.* 7–29 . . . . . **3. *sect.* Rigiolepis**
2. Tubules opening by proportionally short introrse slits or (sometimes terminal) pores.
4. Flowers solitary. Peduncle, if any, very short [1]). *Spp.* 30–73. . . . . **4. *sect.* Oarianthe**
4. Flowers in distinct few- to many-flowered racemes, which may be reduced partially to a 2-, or even 1-flowered inflorescence (which then bears a distinct peduncle) [1]).
5. Calyx lobes elongate-subulate, 2–4 times as long as the calyx tube. *Spp.* 74–86 **5. *sect.* Neojunghuhnia**
5. Calyx lobes usually as long as or shorter than the calyx tube (if subulate, never exceeding the latter). *Spp.* 87–239 . . . . . **6. *sect.* Bracteata**

1. Section Pachyanthum

SLEUM. Bot. Jahrb. 71 (1941) 417; *ibid.* 72 (1942) 217; Blumea 11 (1961) 11. — **Fig. 84–86.**

Corolla campanulate, thick-fleshy, deeply 5-partite, seemingly consisting of two layers, the outer one thick, split at the lobes to nearly the base of the corolla, the inner one thinner, less deeply split, forming a kind of decurrent membranous marginal zone towards the sinuses. Tubules opening by introrse rather long slits. Berry apparently strictly 5-locular.

Distr. *Malesia*: 5 *spp.* confined to the eastern part of New Guinea. Fig. 84.

KEY TO THE SPECIES

1. Calyx relatively large at anthesis, (5–)6–7 mm long (including the lobes, which are 1.5–2.5 mm); calyx tube subcampanulate to broadly cylindrical.
2. Leaves very coriaceous and stiff, minutely but well visibly denticulate or crenulate, ovate or ovate-oblong, rarely oblong or suborbicular, 2–4(–4.5) by (1.3–)1.5–2(–2.5) cm. . . . . **1. V. macbainii**
2. Leaves coriaceous, but less stiff, entire or practically so, obovate to broad-elliptic or ± rounded, (5.5–)7–10(–15) by (3.5–)4–5.5(–8.5, sometimes –11) cm . . . . . **2. V. ingens**
1. Calyx relatively small at anthesis, (2–)3–4(–5) mm long (including the lobes which are 0.5–1(–1.5) mm); calyx tube generally semiglobose to subsemiglobose-cylindrical, or sometimes subcylindrical, 2–3 mm ø at anthesis.
3. Leaves ovate, acuminate, 7–12(–14) by 3.5–5.5(–7.5) cm. Pedicels without a collarette of glands at the very apex. . . . . **3. V. fissiflorum**
3. Leaves of other shape, mostly smaller. Pedicels with a collarette of numerous, ± spreading glands or glandular hairs at the very apex.

[1]) The peduncle can always be discriminated from the pedicel by the articulation.

4. Collarette consisting of thick and ± flattish, subulate glands which rarely occur also on the calyx and the pedicels . . . . . **4. V. keysseri**
4. Collarette consisting of slender (not flattened), less thickish glandular hairs, which not rarely occur also on the calyx and the pedicels . . . . . **5. V. amplifolium**

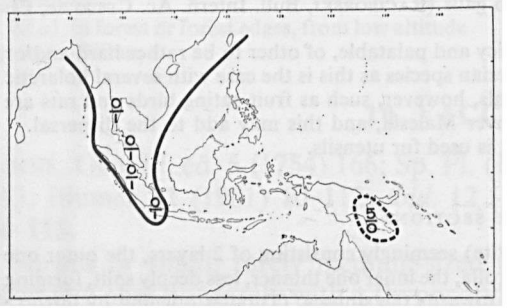

Fig. 84. Distribution of *Vaccinium sect. Galeopetalum* (———) in Malesia and of *sect. Pachyanthum* (– – –). The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

1. Vaccinium macbainii F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 17; WRIGHT, Kew Bull. (1899) 103; SLEUM. Bot. Jahrb. 72 (1942) 220; Blumea 11 (1961) 11.

Rather large, often stunted tree with short, crooked trunk, or compact, erect, branched bush, 2–8(–12) m. Branchlets robust, a little angular. *Leaves* densely arranged, ovate or ovate-oblong, or rarely (but sometimes partly in the same specimen) oblong or almost orbicular, apex very broadly attenuate, obtuse or rounded, base rounded to subcordate, very coriaceous, stiff and ± lustrous on both faces, flat, the slightly cartilaginous margin faintly and rather distantly crenulate or denticulate by short and early caducous bristle-like glands or their impressed marks, glabrous, except very short scattered glandular bristles or their point-like rests beneath, 2–4(–4.5) by (1.3–)1.5–2 (–2.5) cm, 5-plinerved from the base and with several higher, more sharply ascending nerves, all slightly impressed above, bluntly raised beneath, reticulation very lax and but little conspicuous; petiole (4–)5–7 by 1.5–2 mm. *Racemes* from the upper axils, mostly many-, rarely few-flowered, mostly glabrous in all parts, but occasionally with some very short glandular bristles or hairs on the pedicels, ± blackish in dry specimens; rachis 0.5–3(–4) cm. Pedicels stoutish, with 2 subulate bracteoles in the lower third, thickened distally, ± recurved downwards, (1–)1.5–2 cm. *Calyx* tube subcampanulate, *c.* 5 by 4 mm, broadly attenuate below, subcylindrical upwards, smooth, limb ± spreading, *c.* 2 mm high, its lobes or teeth subacute, *c.* 1.5 mm. *Corolla* campanulate, 5-lobed ± halfway, fleshy, pink or reddish pink, or pinkish white with darker tips, paler inside, (7–)8(–9) mm. *Stamens* nearly as long as the corolla; filaments broadly linear, 2.5–3.5 mm, glabrous below, densely to laxly set with long substrigose hair in the upper part or along the margin of the connective, much less so or almost glabrous dorsally; cells including tubules 4–5 mm, base much attenuate; tubules 2–2.5 mm, pores 1–1.5 mm. *Disk* glabrous. *Style* stoutish, green, 10–12 mm. *Fruit* subglobose, *c.* 5 mm ø, purple and fleshy.

Distr. *Malesia*: SE. New Guinea (Main Range between Mt Albert Edward and Mt Scratchley-Mt Knutsford).

Ecol. In high mountain forest patches near the timberline, locally common, 3050–3960 m. *Fl.* May-July.

2. Vaccinium ingens SLEUM. Bot. Jahrb. 72 (1942) 220; Blumea 11 (1961) 11; *ibid* 12 (1963) 123. — **Fig. 85.**

Large stiff, sparsely branched, erect, scandent or epiphytic shrub, up to 2 m. Branchlets robust, subterete, glabrous, laxly foliate. *Leaves* obovate to broad-elliptic or nearly orbicular, apex and base very broadly attenuate or ± rounded, coriaceous, slightly convex above, glabrous, but laxly glandular-punctulate beneath, (very) sparsely so above, entire, or faintly denticulate, margin somewhat revolute in dry specimens, (5.5–)7–10(–15) by (3.5–)4–5.5(–8.5, sometimes –11) cm, midrib broadened towards the base, nerves 2–3 pairs from and from above the base, with several less distinct higher ones from the upper half of the midrib, all like the midrib impressed above and prominent beneath to various degree, reticulation rather lax and mostly subinconspicuous; petiole (0.7–)1–1.5 cm by *c.* 2 mm. *Racemes* 12–15-flowered, glabrous in all parts, becoming blackish in dry specimens; rachis rather robust, (1.5–)2.5–3.5 cm. Pedicels stoutish, 7–8 mm, bibracteolate somewhat above the base. *Calyx* subcampanulate to broadly cylindric, base obtuse or almost truncate, dark green, tube 4–5 by (3–)4(–5) mm, limb suberect, 2–2.5 mm, 5-lobed to nearly the base. *Corolla* campanulate, fleshy, pale green or green, sometimes pinkish, (6–)7 mm, 5-lobed halfway. *Stamens* nearly as long as the corolla; filaments linear, glabrous, or ciliate only in the uppermost part or on the connective, 2.5–3 by *c.* 1 mm; cells elliptic, *c.* 1.5 mm; tubules as wide as the cells, 1.5 mm. *Disk* glabrous. *Style c.* 8 mm. Immature *fruit* bluish green, subglobose, 6–7 mm ø, crowned by the accrescent subinflexed lobes of the calyx limb (3 mm).

Distr. *Malesia*: SE. New Guinea (Morobe and Central Distr.).

Ecol. In ridge forest, or occasionally on open landslips on clayey soil, locally common, 1890–2440 m. *Fl.* May-Dec., *fr.* May-Sept.

3. Vaccinium fissiflorum SLEUM. Bot. Jahrb. 72 (1942) 219; Blumea 11 (1961) 11; *ibid.* 12 (1963) 123.

High climbing liana, with pendent branches.



Fig. 85. *Vaccinium ingens* SLEUM. Edie Creek, 1900 m, E. New Guinea (NGF 13942 WOMERSLEY & SLEUMER) (SLEUMER, 1961).

Branchlets angular, quite glabrous, laxly foliate. *Leaves* ovate, apex ± gradually acuminate, subobtuse at the very tip, base very broadly attenuate or mostly rounded, sometimes slightly cordate, coriaceous, glabrous, laxly punctate beneath only, 7–12(–14) by 3.5–5.5(–7.5) cm, margin remotely minutely dented or crenulate by impressed, very short and thickish glandular hairs, the two basal crenulations or glands on each side of the petiole more distinct than the upper ones, midrib strong, prominent at the base above and all over beneath, ± impressed distally above, the two pairs of basal and 2(–3) higher nerves curved-ascending to the top of the lamina, slightly impressed above, raised beneath, reticulation lax and visibly outstanding beneath only; petiole ± flattened, (0.8–) 1–1.5 cm by 2–3 mm. *Racemes* or fascicles laxly (4–)10–15(–20)-flowered, with a slender rachis rarely up to 2 cm, both from foliate and defoliate axils, sometimes from older parts of the stem,

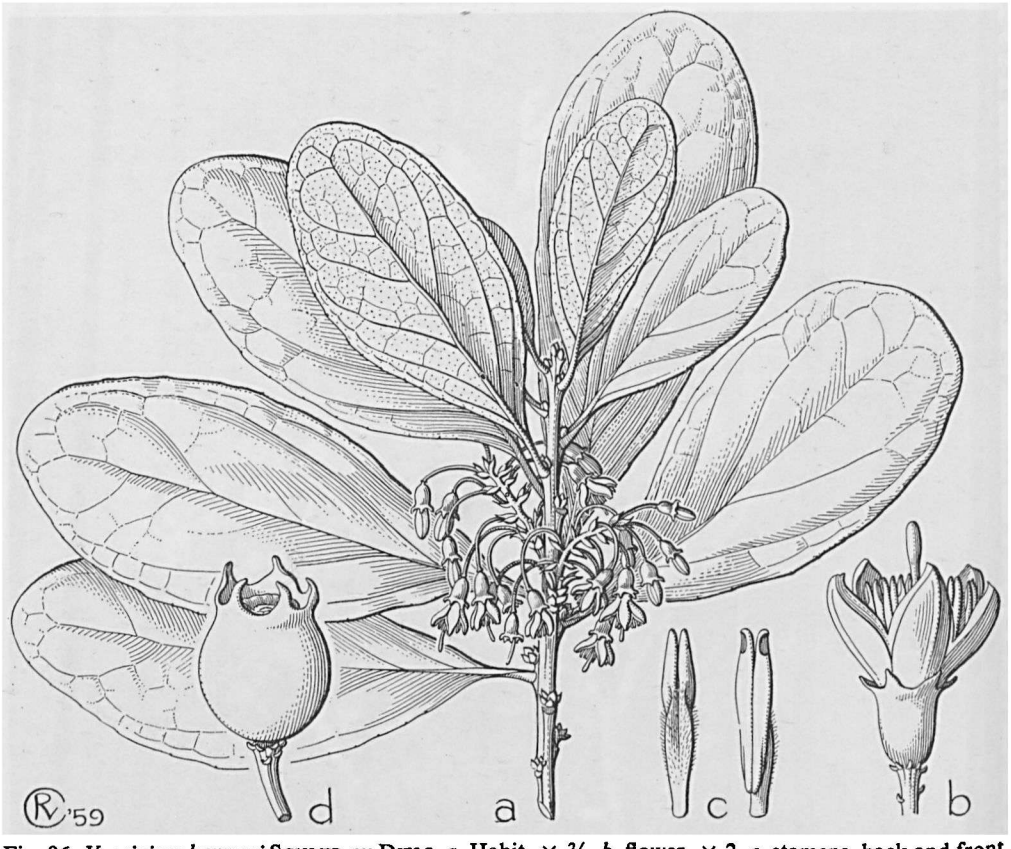

Fig. 86. *Vaccinium keysseri* SCHLTR *ex* DIELS. *a.* Habit. × ⅔, *b.* flower, × 2, *c.* stamens, back and front view, × 3⅓, *d.* submature fruit, × 3⅓ (*a–d* HOOGLAND & PULLEN 5566).

glabrous and pink or rose red to purplish in all parts, still reddish in dry specimens. Pedicels slender, 1.5–2.5(–3.5) cm, minutely bibracteolate at or sometimes above the base. *Calyx* (2–)3 mm long in all, tube semiglobose or subcylindrical, base rounded, 2–2.5 mm ø, limb very low and a little contracted, the teeth minute. *Corolla* subcampanulate when fully open, *c.* 7 mm long, then 5-lobed ± halfway, somewhat fleshy. *Stamens* 7 mm, red; filaments broadly linear, 1.5–2 mm, very laxly ciliate distally, glabrous dorsally; cells oblong, 3 mm, base of each cell extended into an acute appendage (1 mm); tubules slightly divergent, slender, 4 mm. *Disk* glabrous. *Style* 10–11 mm. *Fruit* subglobose, apex truncate, first rather dry, becoming more fleshy and blackish at maturity, 3–4 mm ø.

Distr. *Malesia*: E. and NE. New Guinea (Eastern and Western Highlands, Mt Saruwaged area).

Ecol. Locally common climber in tall mountain (*Nothofagus*-) forest, sometimes near river, 1700–2500 m. *Fl. fr.* May-Dec.

Vern. *Porrh*, Hagen: Wankl.

4. Vaccinium keysseri SCHLTR *ex* DIELS, Bot. Jahrb. 62 (1929) 488; SLEUM. *ibid.* 72 (1942) 219; Blumea 11 (1961) 12; *ibid.* 12 (1963) 123. — **Fig. 86.**

var. **keysseri.**

Erect, stiff shrub or straggling tree, up to 6 m; bole up to 1.5 by 0.12 m; outer bark *c.* 4 mm, pale brown, flaky, inner bark straw; wood pale brown. Branchlets robust, up to 1 cm ø, subterete, glabrous, rather densely foliate, early corticate. *Leaves* oblong- to elliptic-obovate, rarely more elliptic-oblong or elliptic, apex obtuse or mostly ± rounded, base broadly cuneate or sometimes rounded, coriaceous, a little convex in dry specimens, glabrous, but laxly punctate beneath only, shining above, mostly crenulate or denticulate by ± early caducous, thick glands or glandular bristles which are a little impressed at the sometimes revolute edge, more rarely entire, (3–)5–8 (–11) by (1.6–)2.5–3.5(–5.5, rarely in part up to 8) cm, midrib strong, sunken above, much prominent beneath, nerves 2 ± basal pairs and *c.* 2 upper ones higher from the midrib, all curved-ascending and rather distinctly anastomosing, moreover 2–3 less distinct and much shorter nerves spreading from the upper half of the midrib, all ± slightly impressed above, raised beneath, veins forming a very lax network which is a little prominent

beneath; petiole rugose, 6–10 by *c.* 2 mm. *Racemes* from numerous upper axils, rather dense, 10–15-flowered, glabrous in general and pink when fresh, brownish red to blackish in dry specimens in all parts; rachis rather robust, (1.5–)2–3(4.5) cm. Pedicels rather stoutish, recurved, (1–)1.5–2 cm at anthesis, possibly accrescent up to 3 cm, laxly set with subsessile glands over the whole length, moreover with a collarette of numerous thick and flattened, subsubulate and patent or reflexed glands (which occasionally are found also on the pedicel and/or on the calyx tube) immediately below the calyx, bibracteolate (2–3 mm) at or somewhat above the base. *Calyx* subcylindric in anthesis, *c.* 4 by 3 mm in all, base blunt, limb suberect or a little spreading, 1–1.5 mm, acutely 5-lobed to the base. *Corolla* campanulate, (6–)7(–8) mm long when fully developed, fleshy, pink, 5-split halfway. *Stamens* ± as long as the corolla, yellow-brown; filaments linear, *c.* 3 mm, long hairy in the upper part and the connective both marginally and dorsally; cells narrow, acutely attenuate at the base, *c.* 3 mm; tubules 3 mm. *Disk* glabrous. *Style* 8–10(–11) mm. *Fruit* subglobose, *c.* 6 mm ø when nearly ripe, crowned by the not accrescent calyx lobes, becoming blackish at full maturity.

Distr. *Malesia*: NE. New Guinea (Southern, Eastern and Western Highlands; Mt Saruwaged area).

Ecol. Mostly terrestrial, rarely epiphytic, locally common in montane *Podocarpus* forest, in edges of subalpine (mossy) forest, summit growth, (2300–)3000–3600(–3800?) m. *Fl.* March-Sept.

Vern. *Koil gagump, kwaldaggan*, Wahgi: Minj, *deggenba*, Chimbu: Masul, *kuldeguk*, Hagen: Towopa, *poro*, Hagen, *rambau*, Enga, *walyari*, Mendi.

var. **acutatum** SLEUM. Blumea 11 (1961) 12.

Differs by narrower, ± oblong leaves, which are shortly subacutely acuminate at the apex and bear glandular points on both faces, 4–7 by 1.8–3 cm.

Distr. *Malesia*: New Guinea (Eastern Highlands: Mt Wilhelm), 3500 m, among specimens of the type variety.

5. Vaccinium amplifolium F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 18; SLEUM. Bot. Jahrb. 72 (1942) 219; Blumea 11 (1961) 12.

See for further synonyms under the varieties.

KEY TO THE VARIETIES

1. Leaves large, (5–)6–9.5 by 3–5.5 cm (obovate or obovate-elliptic) . . . . **2. *var.* giganteum**
1. Leaves smaller, of various form.
2. Leaves subovate-elliptic, broad-elliptic or suborbicular or, if elliptic-oblong, surpassing 4 cm in length . . . . . **1. *var.* amplifolium**
2. Leaves obovate-elliptic, oblong-obovate or oblong.
3. Leaves obovate-elliptic or oblong-obovate. **3. *var.* stabilipes**
3. Leaves oblong or elliptic-oblong and rather small, (1.5–3(–4) by (0.8–)1–1.5 cm). **4. *var.* oblongum**

1. var. amplifolium.

Terrestrial as a weak, spreading tree or bush up to 6(–10) m, or a climber up to 8 m, with a stout stem and bushy crown, not rarely epiphytic as a shrub (1–2 m) with stout roots descending to the ground along the supporting tree trunk. Branchlets rather robust, subangular, glabrous or finely pubescent at the tips, laxly to subdensely leaved. *Leaves* subovate-elliptic, broad-elliptic or suborbicular, sometimes elliptic-oblong, apex very broadly and obtusely attenuate to rounded, base broadly narrowed into the petiole, with a basal marginal gland on each side, coriaceous, flat or somewhat convex above and darkening in dry specimens, a little shining on both faces, entire or minutely glandular-denticulate, edge subrevolute, (3–)3.5–6.5 by (2–)2.5–4(–5) cm, glabrous besides sparse glandular points or hairs beneath, sometimes with short apparently early caducous eglandular hairs beneath, with 5(–7) nerves curved-ascending from and from above the base and several shorter, more spreading ones from the upper part of the midrib, midrib and nerves slightly impressed above, not much raised beneath, outer nerves sometimes less conspicuous, reticulation lax and faint, or obscure in general; petiole 4–7(–8) by 1.5(–2) mm. *Racemes* from the upper 2–4(–6) axils, generally shining red all over when fresh, becoming blackish during the drying process, abbreviated, laxly 5–8(–12)-flowered; rachis rather slender, 1–2 cm, glabrous or laxly short-pubescent and/or with short club-shaped glandular hairs or glands as may be found on pedicels and calyces. Pedicels rather slender, (1–)1.5–2 cm, bibracteolate at or mostly somewhat above the base, moreover with a distal collarette of numerous spreading, blackish, subfiliform glands or gland-hairs immediately below the calyx. *Calyx* tube subsemiglobular to nearly cylindric, often somewhat constricted at the base of the limb, *c.* 2.5 by 2–2.5 mm, limb ± spreading, 1–1.5 mm, deeply 5-lobed or -dented. *Corolla* campanulate, fleshy or a little waxy, pale to dark pink, or more rarely greenish white, deeply 5-lobed, 5–6(–7) mm long in all. *Stamens* as long or slightly longer than the corolla; filaments linear, *c.* 3 mm, glabrous below, subdensely set with longish substrigose hairs in the uppermost part and at the connective dorsally and especially at the margin; cells oblong, base obtuse, sometimes with some hairs there, 2–2.5 mm; tubules 2–2.5 mm. *Disk* glabrous. *Style* stoutish, 6–7 mm at the start of the anthesis, accrescent and much exerted in later stages. *Fruit* subovate-globular, *c.* 5 by 4 mm, crowned by the inflexed, hardly accrescent calyx lobes.

Distr. *Malesia*: SE. New Guinea (Main Range of the Central and Milne Bay Distr.).

Ecol. In mossy forest, climbing in subcanopy layer, or in ridge crest vegetation, or even as an isolated compact shrub in alpine grassland, locally common, 2050–3050(–3960?) m. *Fl.* Jan.-Dec.

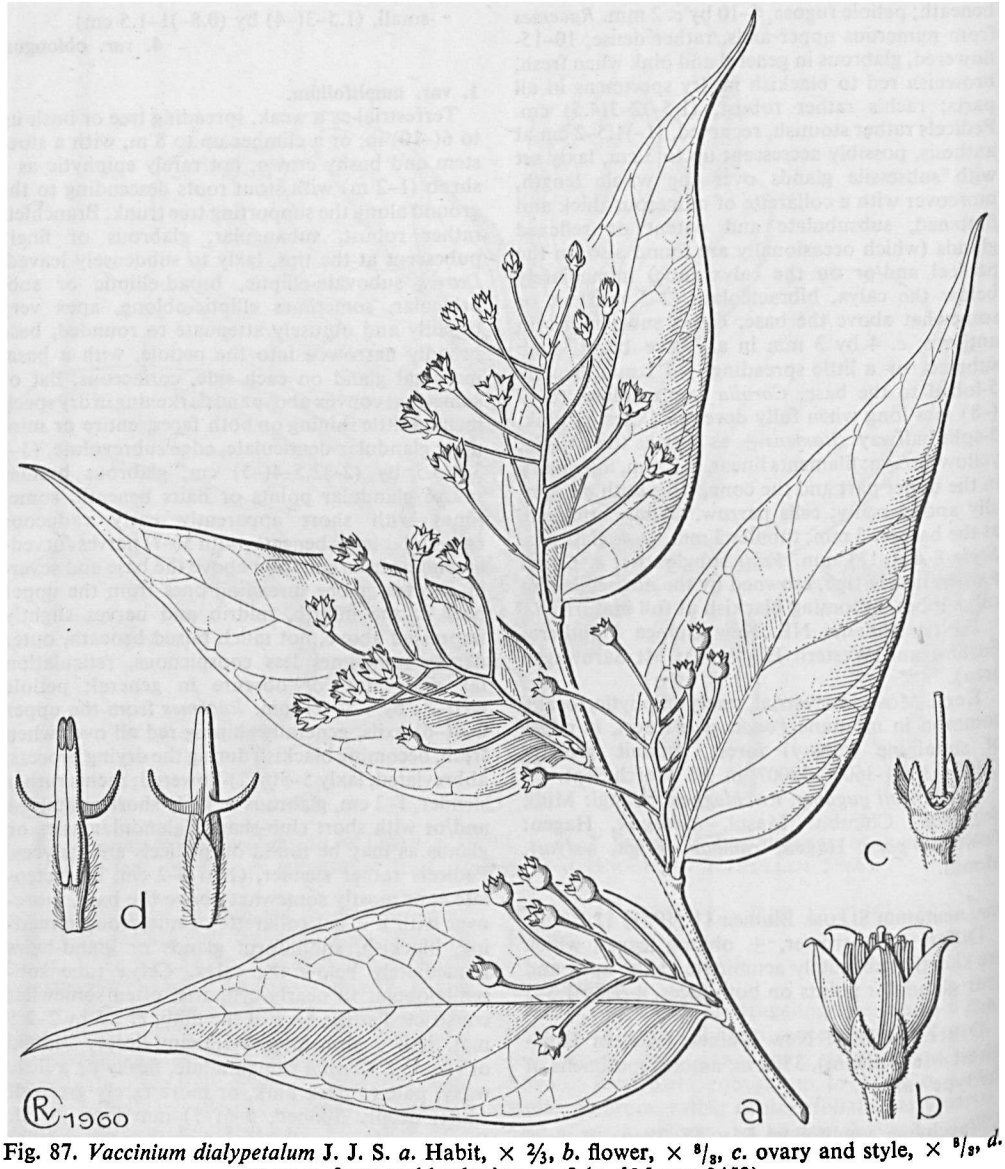

Fig. 87. *Vaccinium dialypetalum* J. J. S. *a.* Habit, × ⅔, *b.* flower, × ⁸/₃, *c.* ovary and style, × ⁸/₃, *d.* stamens, front and back view, × 5 (*a–d* MEIJER 3452).

Note. Rather variable both in leaf-shape and -size, and indument. The following ± extremes may be distinguished as varieties.

2. *var.* giganteum SLEUM. Blumea 11 (1961) 12.

Leaves large, obovate or obovate-elliptic, (5–) 6–9.5 by 3–5.5 cm. As to the leaves similar to 2. *V. ingens* SLEUM. but calyces much smaller.

Distr. *Malesia*: NE. New Guinea (Wau-Salamaua road and Mt Shungol, SW. of Wagau, Morobe Distr.), 1645–2252 m, in two forms, one with a roundish blunt, the other with a more acuminate-attenuate apex in the same locality.

3. *var.* stabilipes (SLEUM.) SLEUM. Blumea 11 (1961) 12; *ibid.* 12 (1963) 123. — *V. stabilipes* SLEUM. Bot. Jahrb. 72 (1942) 218.

Leaves obovate-elliptic or oblong-obovate, *c.* 3–5 by (1.5–)2–3 cm.

Distr. *Malesia*: NE. and SE. New Guinea (Eastern Highlands: Mt Saruwaged area to Mt Victoria in the Central Distr.; Goodenough I. in Milne Bay Distr.).

Ecol. As in *var. amplifolium*, 1220–2680 m.

4. *var.* oblongum SLEUM. Blumea 11 (1961) 13; *ibid.* 12 (1963) 123. — *V. oblongum* WRIGHT, Kew

Bull. (1899) 103, *non* GREENE, 1897. — *V. atrescens* SLEUM. Bot. Jahrb. 72 (1942) 218.

Leaves oblong or elliptic-oblong and rather small, 1.5–3(–4) by (0.8–)1–1.5 cm. *Corolla* light to dark red.

Distr. *Malesia*: Eastern New Guinea (Eastern Highlands to the Central Distr.), 2840–3460 (–3960?) m.

Ecol. As in *var. amplifolium*, also known as epiphyte.

2. Section Galeopetalum

(J. J. S.) SLEUM. Notizbl. Berl.-Dahl. 13 (1936) 115; Bot. Jahrb. 71 (1941) 418, 441; Blumea 11 (1961) 13. — *Vaccinium subg. Galeopetalum* J. J. S. Ic. Bog. 4 (1912) 101; in K. & V. Bijdr. 13 (1914) 141 ('*Galeipetalum*'). — **Fig. 84, 87.**

Corolla campanulate, 5-partite ± halfway; anthers with a pair of long dorsal spurs, the tubules ± double as long as the cells, opening by elongate introrse slits which attain ⅓–½ of the total length of the tubules.

Distr. About 20 *spp.* in SE. Asia (SE. Tibet, Sikkim, Bhutan, Assam, Upper Burma, SW. China, Indo-China, Siam, and Formosa), 1 *sp.* extending from S. Siam into *Malesia* (Sumatra, Malay Peninsula, W. Java). Fig. 84.

6. Vaccinium dialypetalum J. J. S. Ic. Bog. 4 (1912) 99, t. 331; in K. & V. Bijdr. 13 (1914) 140; COSTERUS & J. J. S. Ann. Jard. Bot. Btzg II, 29 (1916) 91; SLEUM. Bot. Jahrb. 71 (1941) 424; Blumea 11 (1961) 13. — *Agapetes griffithii* (*non* CLARKE in Hook.) K. & G. J. As. Soc. Beng. 74, ii (1905) 59; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 56; BURK. & HOLTT. Gard. Bull S. S. 3 (1923) 56. — *Agapetes parviflora* RIDL. J. Str. Br. R. As. Soc. *n.* 61 (1912) 26. — *Agapetes micrantha* RIDL. Fl. Mal. Pen. 2 (1923) 205; BURK. & HOLTT. Gard. Bull. S. S. 3 (1923) 57. — *Agapetes perakensis* RIDL. Fl. Mal. Pen. 2 (1923) 205; BURK. & HENDERS. Gard. Bull. S. S. 3 (1925) 390; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 255. — *Agapetes wrayi* RIDL. Fl. Mal. Pen. 2 (1923) 205. — *Agapetes pubescens* RIDL. J. Bot. 62 (1924) 298; Fl. Mal. Pen. 5 (1925) 318; HENDERS. Gard. Bull. S. S. 4 (1926) 98. — *V. urophyllum* MERR. Pap. Mich. Ac. Sc. 19 (1934) 184; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 123, p. 2. — *V. pauciflorum* FLETCHER, Kew Bull. (1936) 37; Fl. Siam. En. 2 (1938) 313; SLEUM. Bot. Jahrb. 71 (1941) 446. — *V. longilingua* SLEUM. *l.c.* 424. — *V. ridleyi* SLEUM. *l.c.* — *V. longipes* SLEUM. *l.c.* — **Fig. 87.**

Slender, woody, generally epiphytic climber, up to 5 m, with a tuberous stem or a swollen tap root. Branchlets subterete, flexuous, elongate, short-pubescent or glabrescent, early covered with greyish cork. *Leaves* ovate-acuminate or mostly ovate-lanceolate, sometimes lanceolate, apex shorter or mostly longish caudate, sometimes subfalcate, acute, base ± rounded with a marked gland on each side near the petiole, generally thinly coriaceous, lustrous on both faces, glabrous or pubescent beneath at the lower part of the midrib, rarely so on the nerves or veins, entire, edge mostly slightly revolute in dry specimens, (5–)8–14(–17) by (1.5–)2.5–4(–6.5) cm, midrib rather flat above, prominent beneath, nerves pinnate in (5–)7–8(–10) pairs, the lowest more curved-ascending than the upper ones, all anastomosing, slightly raised on both faces, reticulation fine and dense; petiole (2–)3–4 by 1 mm. Stipule-like perulae subulate, *c.* 1.5 mm, erect, somewhat above the axils of the youngest parts, rather early caducous. *Racemes* lax, 1–6 (–10) cm including the short peduncle, (3–)4–8 (–10)-flowered, or rarely reduced to a 2–3-flowered fascicle; rachis very slender, ± pubescent or glabrescent. Pedicels (1–)1.5–2.5(–3) cm, laxly short-pubescent or glabrescent, reddish when fresh, with a small subtending bract, and two minute bracteoles above the base. *Calyx* tube obconical, 1 mm, limb 5-partite to nearly the base, lobes ovate-lanceolate, suberect, acute, 2–3 by 1–1.5 mm, whether or not whitish pubescent. *Corolla* campanulate, a little 5-angled, thin, waxy, greenish or whitish to cream, often with a reddish tinge, laxly hairy at the angles or all over the lobes outside, mostly glabrous, 5 mm, rather obtusely 4-lobed almost halfway. *Filaments* linear, 3(–4) mm, densely set with spreading, rather coarse and longish hairs at the margin; cells broad-oblong, *c.* 1.5 by 1 mm, with 2 dorsal spreading and ultimately upwards curved, echinulate spurs (1.3–1.5 mm); tubules slender, erect, *c.* 3 mm, opening by elongate introrse slits of *c.* ⅓ their length or more. *Style* slenderly columnar, glabrous, 6(–7) mm. *Disk* glabrous. *Berry* subglobose, greenish with red tinge, *c.* 5 mm ø in dry, reported to attain *c.* 1 cm ø in

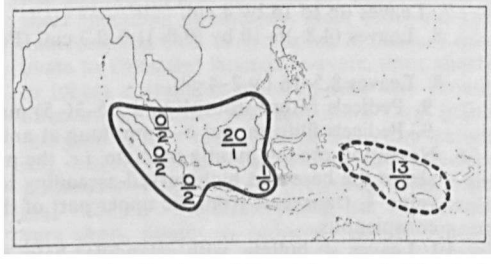

Fig. 88. Distribution of *Vaccinium sect. Rigiolepis* (———) and *sect. Neojunghuhnia* (– – –). The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

fresh specimens, crowned by the ± inflexed calyx lobes, 10-celled. *Seeds c.* 20, minute, ellipsoid or compressed, reticulate, blackish.

Distr. S. Siam, in *Malesia*: Sumatra, Malay Peninsula, and W. Java.

Ecol. In mountain forest, scrub or heath, by river side, in open marshy places, (600–)1000–2500 m. *Fl. fr.* Jan.-Dec.

Vern. *Andor-andor*, Tapanuli.

Note. Reported to be poisonous from Malaya.

3. Section Rigiolepis

(HOOK. *f*) J. J. S. Ic. Bog. 4 (1910) 69, *in text*; SLEUM. Bot. Jahrb. 71 (1941) 419; Blumea 11 (1961) 14. — *Rigiolepis* HOOK. *f.* Ic. Pl. (1876) 54, t. 1160; BENTH. & HOOK. *f.* Gen. Pl. 2 (1876) 572; NIEDENZU, Bot. Jahrb. 11 (1889) 246; DRUDE in E. & P. Nat. Pfl. Fam. 4, 1 (1889) 49; RIDL. Kew Bull. (1922) 106; COPEL. *f.* Philip. J. Sc. 47 (1932) 103; J. J. S. Blumea 1 (1935) 323. — **Fig. 88–89.**

Racemes (very) slender, few- to many-flowered, rarely reduced to a single axillary flower. *Corolla* small, urceolate or rarely almost tubular, membranous, shortly 5-lobed. Anthers with a pair of short, sometimes rather inconspicuous dorsal spurs; tubules ± as long as the cells, opening with introrse longitudinal slits for ± half their total length.

Distr. About 23 *spp.* in *W. Malesia*, part of which is not sufficiently known and difficult to distinguish. Fig. 88.

KEY TO THE SPECIES

1. Bracts, bracteoles and calyx lobes strongly ribbed parallel to the edge.
 2. Racemes much reduced in length and number of flowers (occasionally to a solitary flower); rachis 0–1 cm.
  3. Leaves (narrow-)lanceolate, (3–)4–6(–8) by (0.5–)0.7–1(–1.2) cm . . . . . **7. V. lanceifolium**
  3. Leaves ovate to (broadly) lanceolate-ovate, (2–)2.5–5 by 1–1.5(–2.5) cm . . . . . **8. V. lobbii**
 2. Racemes generally well developed and ± many-flowered; rachis normally exceeding 1 cm **9. V. borneense**
1. Bracts, bracteoles and calyx lobes not or but indistinctly ribbed.
 4. Flowers solitary (or rarely 2 in a fascicle), no rachis present.
  5. Corolla and calyx glabrous or nearly so . . . . . **10. V. monanthum**
  5. Corolla and calyx ± densely and patently hirsutulous . . . . . **11. V. uniflorum**
 4. Flowers in distinct, mostly elongate racemes.
  6. Nervation predominantly pinnate, *i.e.* the basal plinerves not or not much conspicuous, the upper pinnate ones, coming from the upper ¾ part of the midrib, generally much more distinct.
   7. Leaves large, (12–)14–30 by (4–)6.5–9 cm . . . . . **12. V. megaphyllum**
   7. Leaves up to 16 by 4 cm.
    8. Leaves (4.8–)6–10 by (0.8–)1.6–2.3 cm. (Pedicels filiform, 5(–6) mm at anthesis. Corolla 4 mm). **13. V. capillipes**
    8. Leaves 8.5–16 by 2–4 cm.
     9. Pedicels rather stoutish and 1.5–3(–5) mm long at anthesis. Corolla 4 mm **14. V. kemulense**
     9. Pedicels filiform and 6–8 mm long at anthesis. Corolla *c.* 2.5 mm . . . . . **15. V. filiforme**
  6. Nervation predominantly palmate, *i.e.* the proper main nerves starting from and from somewhat above the base and high curved-ascending to more or less the top of the lamina, other nerves or veins ± transverse from the upper part of the midrib short and much less conspicuous, or ± inconspicuous.
   10. Leaves ± bullate, with eglandular hairs all over the undersurface, 9–17(–21) by 4–7(–10) cm **16. V. sulcatum**
   10. Leaves not properly bullate; non-glandular hairs, if any, limited to the midrib and nerves.
    11. Leaves relatively small, 3–5 (sometimes in part in the same specimen up to 6.5) by 1–2(–2.2) cm.
     12. Pedicels 1.5–2 mm. (Leaves reticulate beneath.) Corolla *c.* 3 mm . . . . **17. V. minimiflorum**
     12. Pedicels (2–)3–4 mm. Corolla 4–4.5 mm.
      13. Disk glabrous. Leaves not reticulate beneath . . . . . **18. V. henrici**
      13. Disk pubescent. Leaves reticulate beneath.
       14. Calyx densely hairy . . . . . **19. V. uroglossum**
       14. Calyx sparsely glandular, epilose . . . . . **20. V. tenerellum**
    11. Leaves medium-sized to large, (4.2–)6–20(–27) by (1–)2–9 cm.
     15. Leaves abruptly protracted at the very base, *i.e.* distinctly decurrent in the upper part of the petiole for *c.* 2 mm and instructed there with a thick, protruding gland on each side (the glands seemingly on the petiole!) . . . . . **21. V. bigibbum**

15. Leaves not protracted at the base or not decurrent on the petiole, the two (whether or not protruding) glands found on the very margin of the lamina (and mostly in some distance from the petiole).
16. Basal glands thick, ± projecting from the edge of the lamina in the way of small auricles. **22. V. acuminatissimum**
16. Basal glands minute, or, if larger (*i.e.* well visible), not or hardly projecting beyond the edge of the lamina, or mostly impressed.
17. Leaves 6–9 cm wide (20–27 cm long) . . . . . **23. V. piperifolium**
17. Leaves 1–6(–6.5) cm wide (up to 18 cm long).
18. Corolla (3–)4 mm. Style *c.* 3.5 mm.
19. Leaves caudate-acuminate for 2–4 cm.
20. Leaves densely prominently reticulate on both faces. Pedicels 2–3(–4) mm **24. V. moultonii**
20. Leaves reticulate beneath only. Pedicels 4–7 mm . . . . . **25. V. dipladenium**
19. Leaves ± broadly acuminate for *c.* 1 cm . . . . . **26. V. andersonii**
18. Corolla 2–2.5 mm. Style up to 2.5 mm.
21. Leaves practically not reticulate at full age . . . . . **27. V. leptanthum**
21. Leaves densely reticulate on both faces or at least underneath.
22. Rachis (very) slender. Pedicels (sub)filiform. Corolla ovate- or subglobular-urceolate. **28. V. flagellatifolium**
22. Rachis stoutish. Pedicels more robust. Corolla subcylindric-urceolate **29. V. adenopodum**

7. Vaccinium lanceifolium (RIDL.) SLEUM. Bot. Jahrb. 71 (1940) 168 ('*lancifolium*'); MASAM. En. Phan. Born. (1943) 575; SLEUM. Blumea 11 (1961) 16. — *Rigiolepis lanceifolia* RIDL. Kew Bull. (1922) 106 ('*lancifolia*'); J. J. S. Blumea 1 (1935) 330.

Epiphytic (?) shrub, with slender virgate branches. Branchlets densely covered with a tomentum of short, ± spreading, non-glandular hairs in the younger, glabrescent in the older parts. *Leaves* (narrow-)lanceolate, apex gradually and rather long acuminate, subacute, base broadly attenuate to nearly rounded, the 2 basal glands strictly marginal, 1–2 mm distant from the petiole, subcoriaceous, glabrous on both faces except some hairs which may occur on the midrib beneath, other glandular hairs practically absent, entire, somewhat recurved at the edge in dry specimens, (3–)4–6(–8) by (0.5–)0.7–1(–1.2) cm, midrib much depressed above, sharply prominent beneath, one pair of intramarginal nerves hardly visible, other pinnate nerves from the midrib irregular and numerous, anastomosing with the intramarginal ones, slightly raised on both faces and forming a fine network with the veins and veinlets, or sometimes rather indistinct; petiole 1–2 mm, pubescent. Stipule-like perulae of the axillary buds acicular, 2–3 mm, persistent for a while at the upper leaves. *Inflorescence* in axillary short and dense (3–)5–8-flowered racemes or in few-flowered fascicles, ± densely clad with short brownish non-glandular hairs in all parts, especially on the calyx tube; rachis slender, 0–1 cm; perulae several, small. Pedicels 0.5 mm in anthesis, *c.* 1 mm in fruit, with one basal bract and 2 similar bracteoles, the latter immediately below the calyx, ovate to ovate-lanceolate, 2 mm, ribbed lengthwise. *Calyx* tube turbinate, 1 mm, lobes ovate-lanceolate or subdeltoid-lanceolate, subacute, with several ribs parallel to the edge, 1.8 mm, including ⅔ of the corolla. *Corolla* subglobose-urceolate, manifestly 5-angled, subdensely very shortly pubescent, *c.* 2.5 mm, lobes 0.5 mm. *Filaments* linear, subglabrous, 0.5 mm; anther-cells broadly oblong, 0.5 mm, with 2 distinct (0.2 mm) dorsal spurs; tubules rather broad, 0.5 mm, cleft introrsely to nearly the base. *Style* 1.8 mm, papillose. *Disk* pubescent. *Fruit* in nearly mature state a dry globose berry, *c.* 3 mm ø, crowned by the upright, not or but little accrescent calyx lobes.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. On limestone, at *c.* 450 m.

8. Vaccinium lobbii (RIDL.) SLEUM. Bot. Jahrb. 71 (1940) 168; MASAM. En. Phan. Born. (1943) 575; SLEUM. Blumea 11 (1961) 16. — *Rigiolepis lobbii* RIDL. Kew Bull. (1922) 107; J. J. S. Blumea 1 (1935) 330.

Straggling or scandent, sometimes epiphytic shrub, up to 1.5 m, with a bulb-like base. Branchlets slender, tips or new shoots covered with a short spreading pubescence, older parts glabrous and corticate, bark early peeling in flakes. *Leaves* ovate to (broadly) lanceolate-ovate, apex shorter or longer acuminate, bluntish, base very broadly attenuate or mostly rounded, the 2 basal glands marginal and a little remote from the petiole, not much distinct, coriaceous to subcoriaceous, glabrous on both faces excepted some hairs, which may occur on the midrib, laxly set with setular very short, finally ± caducous glands beneath, somewhat glossy on both sides, entire, slightly convex above in dry specimens, (2–)2.5–5 by 1–1.5(–2.5) cm, midrib strongly impressed above, or prominent beneath, faintly 3(–5)-plinerved, other nerves from the midrib irregular and numerous, forming a fine ± dense network with the veins and veinlets, which is a little sunken in old, and slightly prominent in younger leaves; petiole pubescent initially, 1–1.5(–2) by 0.5 mm. Stipule-like perulae of the axillary buds subulate, 1 mm, persistent for some time. *Flowers* in (2–)3–5-flowered short racemes or clusters in the upper axils, short-pubescent in all outer parts; rachis 0–5 mm. Pedicels very short, up to 1 mm, the basal

bracts and the 2 bracteoles ovate-lanceolate or lanceolate, *c.* 2 mm, ribbed lengthwise. *Calyx* tube obconical, 1 mm, lobes lanceolate, *c.* 1.8 by 0.5 mm at anthesis; developed calyx tube subsemiglobose, 2–3 mm ø, smooth, the erect lobes then distinctly ribbed lengthwise, 2–3 mm. *Corolla* urceolate, slightly 5-angled, white, 2.5 by 2 mm, short-pubescent outside. *Filaments* linear, hairy, 0.7 mm; anthers *c.* 1.2 mm in all, with 2 very short dorsal spurs. *Disk* hairy. *Style* papillate, 2 mm. *Berry* rather dry, ovoid-subglobose, 6–7 mm ø, pubescent, crowned by the suberect calyx lobes, said to be orange.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. On limestone ridge, 550–900 m. *Fl.* Aug.

9. Vaccinium borneense W. W. SM. Not. R. Bot. Gard. Edinb. 8 (1915) 329; MERR. En. Born. (1921) 466; SLEUM. Blumea 11 (1961) 16. — *Rigiolepis borneensis* HOOK. *f.* Ic. Pl. (1876) t. 1160; RIDL. Kew Bull. (1922) 106; COPEL. *f.* Philip. J. Sc. 47 (1932) 103; J. J. S. Blumea 1 (1935) 325. — *V. acuminatissimum* (*non* MIQ.) MERR. En. Born. (1921) 465.

See for further synonyms under the variety.

var. **borneense.**

Climbing or twining, not rarely epiphytic shrub, up to 4 m, with swollen tap root. Branchlets stout, tips or younger parts ± laxly set with elliptic verrucose lenticels; new shoots with several triangular-subulate ± foliaceous appressed perulae, which are strongly veined or costulate lengthwise, at and somewhat above the base, 0.2–1 cm. *Leaves* elliptic to lanceolate-elliptic, rarely subovate-elliptic, apex acuminate to subcaudate-acuminate, rather acute, the acumen (1–)1.5–2 cm long, base acute or mostly obtuse, the basal marginal glands in *c.* 5 mm distance from the petiole, rather distinct, ± coriaceous and glossy, glabrescent on both faces, the midrib and nerves excepted, the latter laxly set with very short glandular hairs beneath, finally becoming glabrous, entire, slightly revolute at the very margin, (6–)7.5–15 (–16) by (1.8–)3–5.5(–6) cm, 5-plinerved, midrib and inner pair of the nerves ± deeply impressed above, or prominent beneath, other transverse nerves or veins numerous from the midrib, anastomosing, forming a dense, not much prominent reticulation on both faces; petiole blackish when dry, pubescent, 3–5 by 1–1.5 mm. Stipule-like perulae of the axillary buds subulate, 3(–5) mm, rather long persistent. *Racemes* in the upper axils, rather many-flowered, brownish short-pubescent and ± laxly glandular in all outer parts, more densely hairy or nearly villous on the calyx tube; rachis stoutish, 1–2.5 cm, with several subsubulate perulae. Pedicels slender, *c.* 2.5 mm, the basal bract ovate-acuminate, prominently many-nerved lengthwise at the back, 2.5–3 by 1.5–2 mm; bracteoles inserted ± in the middle of the pedicel, lanceolate, prominently ribbed, 1.5–2 by 1 mm. *Calyx* deeply 5-partite, tube becoming early subglobose, lobes ovate-triangular to oblong-ovate, very prominently parallel-ribbed dorsally, 1.7–2.5 by *c.* 1 mm. *Corolla* subovoid-urceolate, much contracted at both ends, white, sometimes greenish white or cream, rarely pinkish, 5-angled, laxly pubescent outside, 2.5–3.5 by 1.5–2 mm, lobes 0.5 mm. *Filaments* linear, papillose, 0.7–1.2 mm; anther-cells ovate-oblong, echinulate, 0.4–0.6 mm, with 2 dorsal subulate spurs (0.3 mm); tubules cylindric, erect, 0.4–0.6 mm. *Disk* pubescent. *Style* glabrous, 2–3 mm. *Fruit* baccate, subglobose, orange or yellow, *c.* 4.5 mm ø, crowned by the suberect triangular lobes (3 mm). *Seeds* 1–2 per cell, triangular-oblong, compressed, sometimes curved, reticulate, *c.* 1.5 mm.

Distr. *Malesia*: Borneo (Sarawak, W. Borneo).

Ecol. In low wet forest, or kĕrangas forest, on ridge top, 300–1065 m.

var. **poianum** (J. J. S.) SLEUM. Blumea 11 (1961) 16. — *V. poianum* (J. J. S.) SLEUM. Bot. Jahrb. 71 (1940) 168; MASAM. En. Phan. Born. (1943) 576. — *Rigiolepis poiana* J. J. S. Blumea 1 (1935) 327, f. 1, a-f.

Young branchlets and leaves rather densely soft-hairy initially, as is the inflorescence. *Leaves* ovate-lanceolate, apex caudate-acuminate, 5.5–10 (–12) by 1.3–2.1(–3.2) cm. *Inflorescences* more slender; rachis 1.5–4(–6) cm.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. In low forest, at rocky summits, not rarely epiphytic, 1065–1700 m.

10. Vaccinium monanthum RIDL. Kew Bull. (1922) 108; SLEUM. Blumea 11 (1961) 17; *ibid.* 12 (1963) 124.

Long branched, twiggy shrub, 1–3 m, coming from small tuber. Branchlets slender, virgate, younger parts clad with a tomentum of very short brownish non-glandular hairs, older ones glabrescent. *Leaves* lanceolate or ovate-lanceolate, apex gradually subcaudate-acuminate, not rarely slightly curved, tip bluntish, base broadly attenuate to almost rounded, the basal gland on each side impressed on the margin, rather small but well visible, *c.* 2 mm spaced from the petiole, subcoriaceous, flat, glabrous except the sparsely hairy midrib beneath, moreover very laxly set with subappressed short glandular hairs over the whole undersurface, entire, (3–)3.5–5(–5.5) by (0.8–)1–1.5 cm, triplinerved, midrib impressed above, prominent beneath, one pair of intramarginal nerves ascending to the top of the lamina, another submarginal pair much shorter and less conspicuous, several (up to 10) other upper nerves short and pinnately from the midrib, all minutely raised on both faces as is the dense fine reticulation; petiole 1–2 by 0.5 mm, pubescent. Stipule-like perulae of the axillary buds acicular, 2–3 mm, persistent at least in the upper axils. *Flowers* solitary (rarely 2) per axil, coming from a tuft of minute perulae or basal bracteoles. Pedicels slender, slightly and very shortly pubescent, *c.* 3 mm. *Calyx* campanulate, glabrous, 5-lobed halfway, the lobes deltoid, subacute, *c.* 0.7 mm. *Corolla* urceolate-subglobose, white, turning pink before falling off, 2 mm, shortly 5-lobed, very sparsely set with

substipitate glands, no hairs. *Filaments* linear, pubescent, 0.7 mm; anthers oblong, 0.7 mm, with two short dorsal spurs. *Style* glabrous, *c.* 2 mm. *Fruit* subglobose, bright orange-yellow, glabrous, *c.* 4 mm ø, crowned by the very short, not accrescent calyx lobes.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. Epiphyte in submontane heath forest, or terrestrial on limestone, 600–900 m.

11. Vaccinium uniflorum J. J. S. Ic. Bog. 4 (1910) 67, t. 320; MERR. En. Born. (1921) 467; SLEUM. Blumea 11 (1961) 17. — *Rigiolepis uniflora* (J. J. S.) J. J. S. Blumea 1 (1935) 330.

Small epiphytic shrub. Branchlets slender, patently pubescent. *Leaves* lanceolate-ovate, apex rather long subcaudate-acuminate, tip blunt, base broadly attenuate to nearly rounded, subcoriaceous, glabrous above, sparsely appressed-puberulous on the intervenium, hairy on the midrib beneath and initially at the margin, entire, edge ± recurved, 2–5.8 by 0.8–1.7 cm, midrib sunken above, prominent beneath, 1(–2) pair(s) of basal nerves curved-ascending along the edge to the top of the lamina, several other shorter ones ± pinnately from the midrib, all finely prominent on both faces as is the reticulation; petiole almost villous, *c.* 2 mm. Stipule-like perulae of the axillary buds acicular to filiform, persistent for some time. *Flowers* solitary (rarely in pairs) in the upper axils, raising from a tuft of minute triangular pubescent perulae. Pedicels patently long-hairy, *c.* 2.7 mm, with 2 basal ciliate bracteoles and another one below the calyx. *Calyx* campanulate, 5-lobed halfway, densely hirsutulous, lobes triangular, acute, *c.* 1.3 mm. *Corolla* urceolate-globose, very shortly 5-lobed (0.5 mm) at the contracted mouth, hirsutulous by ± dense longish patent hairs outside, pubescent inside, *c.* 3.2 mm. *Filaments* sigmoid, linear, pubescent, *c.* 1.2 mm; anther-cells broad-oblong, granular, base retuse, with 2 distinct curved papillose dorsal spurs; tubules 0.7 mm, with wide introrse slits to almost their base. *Disk* hirsute. *Style* glabrous, 2.5 mm.

Distr. *Malesia*: Central Borneo (Amai Ambit) and Sarawak (Ulu Mayeng, Sg. Kakus), twice found.

12. Vaccinium megaphyllum SLEUM. Blumea 11 (1961) 17. — *V. macrophyllum* (J. J. S.) SLEUM. Bot. Jahrb. 71 (1940) 168; MASAM. En. Phan. Born. (1943) 575, *non* PIPER, 1908. — *Rigiolepis macrophylla* J. J. S. Blumea 1 (1935) 335.

var. **megaphyllum.**

Shrub. Branchlets subangular, short-pubescent, 3–4 mm ø. *Leaves* oblong-ovate, apex long-acuminate, the rather narrow acumen (3–5 cm) bluntish, base rounded, the 2 basal glands impressed on the margin in some distance from the petiole, coriaceous, not hairy except the midrib and nerves, which are short-pubescent in their basal part, laxly set with glandular hairs or points underneath, shining, entire, 20–30 by (6–)6.5–9 cm, 5–7-plinerved, with more distinct pinnate nerves from the midrib, in total 7–8 on each side, which are somewhat decurrent along the midrib, midrib and nerves prominent in a ± pronounced depression above, strongly raised beneath, all high curved-ascending and anastomosing before the edge, reticulation conspicuous and rather dense, slightly raised on both faces; petiole semiterete, grooved above, pubescent, 4–8 by *c.* 2 mm. *Flowers* not known. Immature infructescences axillary, a few in a fascicle or solitary, shortly peduncled, each bearing *c.* 15 young fruits; rachis angular, rather stoutish (1 mm), brownish puberulous, 3–3.5 cm. Bracts ovate, concave, 1.5 mm. Fruit-pedicel puberulous, 4–5 mm long, with 2 minute bracteoles in the middle or nearer to the calyx. *Fruit* baccate, subglobose, *c.* 3 mm ø, laxly pubescent, calyx lobes inflexed, 1.5 mm. *Disk* glabrous.

Distr. *Malesia*: Central Borneo (Mt Batu Lesong), once found.

var. **adenophorum** SLEUM. Blumea 11 (1961) 17.

Leaves ovate-oblong to lanceolate, very similar to *var. megaphyllum* in nervation and infructescence, but smaller and narrower, (12–)14–19 by 4–6 cm, longer and more acutish (subcaudate-) acuminate, the pair of basal glands inserted very near or seemingly on the apex of the petiole and distinctly prominent or even protracted (as in *V. bigibbum*). *Flowers* not known.

Distr. *Malesia*: Borneo (upper course of the Kapuas R.), once found.

13. Vaccinium capillipes SLEUM. Bot. Jahrb. 71 (1940) 168; Blumea 11 (1961) 17. — *Rigiolepis salicifolia* J. J. S. Blumea 1 (1935) 336, f. 6, a-k. — *V. salicifolium* (J. J. S.) MASAM. En. Phan. Born. (1943) 576, *non* STEUD. 1841.

Epiphytic shrub, apparently laxly branched. Branchlets elongate, slender or flexuous, densely puberulous as are the petioles, laxly foliate. *Leaves* ovate-lanceolate to narrow ovate-lanceolate, apex long or very long and ± gradually and narrowly acuminate, subacute, base broad-attenuate to almost rounded, the small basal glands inserted on the very edge of the lamina in some distance from the petiole, glabrescent at full age, some hairs in the lower part of the midrib excepted, laxly glandular-punctulate over the undersurface, rather glossy on both sides, thin-coriaceous, (4.8–)6–10 by (0.8–)1.6–2.3 cm, entire, 5-plinerved, with 2–3 other distinct pinnate nerves from the lower half of the midrib, all high-ascending and anastomosing near the edge, slightly prominent in shallow impressions above, well prominent beneath, reticulation fine and dense, raised on both faces; petiole finally glabrescent, 1.5–3 by 1 mm. *Racemes* solitary or rarely in twos in the upper axils, 7–12 (–15)-flowered, finely pubescent and set with minute glandular hairs (or stipitate subclavate glands) in all parts, the corolla excepted; rachis slender, 2.3–4.8 cm. Bracts small, ± oblong, acuminate, *c.* 1.5 mm. Pedicels filiform, 5(–6) mm, with 2 minute subulate bracteoles in their lower half. *Calyx* tube obconical, 0.6 mm, lobes broadly subovate-triangular, subacute, 0.8 mm, glabrescent. *Corolla*

ovoid-urceolate, slightly 5-angled, very laxly glandular-muriculate or practically glabrous outside, first yellow, afterwards red, membranous, *c.* 4 by 3 mm, lobes *c.* 0.5 mm. *Filaments* linear, wavy, patently hairy, 1.5 mm; anther-cells ovate-oblong, 0.6 mm, minutely echinulate, with 2 dorsal spurs curved upwards (0.5 mm); tubules erect, 0.7 mm. *Disk* puberulous. *Style* glabrous, 3 mm. *Fruit* baccate, rather dry, subglobose, pubescent and muriculate, first yellow, afterwards orange-red, *c.* 4.5 mm ø, apex truncate, crowned by the inflexed calyx lobes; fruit-pedicel 9 mm. *Seeds* 2–3 in each of the ten cells, triangular-oblong, *c.* 2.5 mm.

Distr. *Malesia*: Central Borneo (summit of Mt Kemul), in primary forest, 1800 m. *Fl.* Oct.

14. Vaccinium kemulense SLEUM. Bot. Jahrb. 71 (1940) 168; Blumea 11 (1961) 17; *ibid.* 12 (1963) 124. — *Rigiolepis endertii* J. J. S. Blumea 1 (1935) 339, f. 7, a-f. — *V. endertii* (J. J. S.) MASAM. En. Phan. Born. (1943) 574, *non* J. J. S. 1935.

Shrub up to 4 m, occasionally epiphytic. Branchlets rather slender, tips angular and short-pubescent, older parts laxly set with verruculose lenticels. *Leaves* ovate-lanceolate, apex long-acuminate or subcaudate, acute or nearly so, base broad-attenuate to rounded, slightly decurrent in the upper part of the petiole, the 2 basal glands strictly marginal in some distance from the petiole and well visible, ± coricaceous, glabrous except the laxly pubescent basal part of the midrib and the petiole, very laxly set with appressed glandular hairs on the undersurface, ± glossy on both faces, entire, 8.5–16 by 2–4.5 cm, 5–7-plinerved, furthermore with 3–4 pairs of higher pinnate nerves from the midrib, which are as distinct as or even more so than the basal ones, somewhat decurrent along the midrib, rather steeply high-ascending, anastomosing, slightly raised within a shallow depression above as is the midrib, ± sharply prominent beneath, reticulation dense, finely prominent on both faces; petiole somewhat flattened, grooved above, 3–5 by 1.5(–2) mm. *Racemes* solitary or a few in a fascicle, axillary, drooping, rather laxly 10–15 (–18)-flowered, very shortly peduncled, finely pubescent and glandular-muriculate in all outer parts except the corolla; rachis rather slender, 2.5–5 cm. Bracts oblong, ciliolate, *c.* 2.5 by 1 mm. Pedicels rather stoutish, 1.5–3(–5) mm in anthesis, up to 5 mm in fruit, with 2 lanceolate bracteoles (1 mm) in the middle or in the upper half. *Calyx* tube *c.* 1 mm, first turbinate, early becoming subglobose (*c.* 2 mm), lobes triangular, acute, 1 mm. *Corolla* subglobose-urceolate, 5-angular, light green (W.Kutei) or pinkish red (Mt Mulu), *c.* 4 by 3 mm, glabrous or laxly muriculate, lobes *c.* 0.6 mm. *Filaments* linear, wavy, patently hairy, 2 mm; anthers *c.* 1.1 mm long in all, with 2 dorsal straight spurs (0.3 mm); tubules *c.* 0.6 mm. *Disk* minutely muriculate or nearly glabrous. *Style* glabrous, 3.5 mm. *Fruit* baccate, globose, said to be yellow to orange.

Distr. *Malesia*: Borneo (Sarawak: Mt Mulu; W. Kutei: Mt Kemul and Mt Palimasan), in submontane or in mossy forest, on white acid sands or on rocky mountain ridge, 800–1800 m.

15. Vaccinium filiforme (J. J. S.) SLEUM. Bot. Jahrb. 71 (1940) 168; *ibid.* 71 (1941) 419, *in text*; MASAM. En. Phan. Born. (1943) 574; SLEUM. Blumea 11 (1961) 17. — *Rigiolepis filiformis* J. J. S. Blumea 1 (1935) 340, f. 8, a-e.

Epiphytic shrub, 4 m, hanging downward, with elongate branches. Branchlets subangular, younger parts puberulent. *Leaves* lanceolate, apex mostly subcaudate-acuminate, subacute, base attenuate, the basal glands in *c.* 2 mm distance from the petiole on the margin, thin-coriaceous, early glabrescent on both faces, sparsely glandular beneath, entire, slightly revolute at the edge, 9.5–15.5 by 2.5–4 cm, sub-5-plinerved, other distinct pinnate ± irregular nerves in 4–6 pairs from the midrib, suberect and ascending, anastomosing, but slightly prominent on both sides, midrib strong, raised within a rather deep impression above, much prominent beneath, reticulation fine and dense on both faces; petiole initially minutely pubescent, (2–)3–4 by 1–1.5 mm. *Racemes* both from the upper foliate and lower defoliate axils, solitary or 2–3 in a fascicle, subsessile, laxly 10–15-flowered, covered by a fine puberulence and sparse very shortly stalked glands in all outer parts; rachis filiform, 3–5 cm. Bracts oblong-acuminate, ciliolate, 1.5 mm. Pedicels filiform, 6–8 mm, with 2 minute bracteoles at or above the middle. *Calyx* turbinate to semiglobose, 0.5 mm, lobes triangular, acute, *c.* 0.6 mm. *Corolla* ovoid-urceolate, much constricted distally, light yellow, ± glabrescent, *c.* 2.5 mm, very shortly 5-lobed. *Filaments* linear, wavy, short-pubescent except the very base, 1.2 mm; anther-cells echinulate, *c.* 0.6 mm, the 2 dorsal spurs *c.* 0.2 mm; tubules linear, 0.7 mm. *Disk* with a few hairs in the central excavation. *Style* glabrous, 1.8 mm.

Distr. *Malesia*: Borneo (W. Kutei: Bolset), once found.

Ecol. In primary forest along riverbank, 400 m.

16. Vaccinium sulcatum RIDL. Kew Bull. (1922) 107; SLEUM. Blumea 11 (1961) 17; *ibid.* 12 (1963) 124. — *Rigiolepis sulcata* (RIDL.) J. J. S. Blumea 1 (1935) 336.

Epiphytic shrub up to 5 m. Branchlets rather robust, subterete, tips pubescent, older parts early glabrescent and covered with cork, 3–6 mm ø. *Leaves* ovate- to oblong-elliptic, apex rather shortly (2–3 cm by 2–10 mm) caudate-acuminate or cuspidate, acute, base ± rounded, not rarely lightly contracted or decurrent into the petiole, with a very thick and ± protruding basal gland on the margin very near to or practically on each side of the petiole, coriaceous, rather densely short-pubescent all over on both faces initially especially on the nerves, remaining laxly hairy on the intervenium beneath, but glabrescent and lustrous above, the midrib and nerves excepted, 9–17(–21) by 4–7(–10) cm, entire, ± revolute at the very edge, 7–9-plinerved from and from somewhat above the base, other less conspicuous nerves in several irregular pairs from the upper half of the

midrib short and spreading, anastomosing, midrib and all main nerves deeply, the reticulate veins less, but still markedly impressed above, or prominent beneath, the lamina thus becoming ± bullate; petiole thick, pubescent, 5–8 by 2–3 mm. *Racemes* 2–4 together in axillary fascicles, slender, subdensely covered with very short hairs and sparse minute slenderly stalked glands in all outer parts, more densely so on the calyx tube, laxly so on the corolla; rachis nearly filiform, bearing laxly arranged 10–20 flowers, 4–6 cm long, with numerous subulate stipule-like perulae, 3–4 mm. Pedicels filiform, (5–)6–7 mm, basal bract ovate-acuminate, 2 mm, the 2 subulate bracteoles (1.5 mm) fixed in the middle. *Calyx* 5-partite to nearly the base, the broad obconical tube 0.5 mm, lobes deltoid, 1–1.5 mm. *Corolla* urceolate, but slightly contracted apically, membranous, pale yellow, laxly puberulous along 5 faintly visible longitudinal angles, glabrous otherwise, 4–4.5 by 2.5–3 mm, lobes 0.5 mm. *Filaments* linear, almost villous, 2.5 mm; anther-cells ovate-oblong, echinulate, 1 mm, the pair of dorsal spurs 0.5 mm; tubules 1 mm. *Disk* hirsutulous. *Style* glabrous, 4 mm. *Fruit* subglobose, *c.* 4 mm ø, hirtellous, 10-locular. *Seeds* linear, compressed and curved.

Distr. *Malesia*: Borneo (Sarawak).

Ecol. In primary and secondary forest, at low elevation, also on limestone. *Fl.* June.

17. Vaccinium minimiflorum SLEUM. Bot. Jahrb. 17 (1940) 162; Blumea 11 (1961) 18.

Shrub, *c.* 1.5 m. Branchlets very shortly pubescent in the younger, glabrescent and greyish corticate in the older parts. *Leaves* ovate, apex subcaudate-acuminate, the very tip blunt, base rounded, the basal pair of small glands distant from the petiole, subcoriaceous, puberulous at the midrib and ciliate initially, glabrescent with age except some puberulence at the very base and on the petiole, very laxly glandular-punctate beneath, rather glossy on both faces, entire, 3–4 by 1–1.5 cm, (5(–7)-plinerved, with several other shorter and less conspicuous nerves from the upper part of the midrib, all nerves anastomosing, ± inconspicuous above except the midrib and the lowest pair, slightly raised as is the rather dense reticulation beneath; petiole 1–2 mm. *Racemes* axillary, lax, solitary, 2.5–3 cm, several-flowered; rachis slender, very shortly pubescent as are pedicel and calyx, furthermore with minute stalked glands or glandular hairs sparsely among the predominant simple hairs. Pedicels 1.5–2 mm; subtending bract subulate, 0.7 mm; bracteoles subulate, inserted below the calyx. *Calyx* tube campanulate, 0.8 mm, lobes deltoid, acutish, 1.2 mm. *Corolla* urceolate, contracted distally, whitish greenish, laxly clothed with very short, rufescent, glandular hairs at the base, glabrous for the rest, *c.* 3 mm. *Filaments* hairy, *c.* 1 mm; anther-cells *c.* 1 mm, with 2 long dorsal spurs; tubules 1 mm. *Disk* short-hairy. *Style* glabrous, 3 mm.

Distr. *Malesia*: Borneo (Sarawak: Ulu Koyan, Mt Dulit area), at *c.* 1000 m. Once found. *Fl.* March.

18. Vaccinium henrici SLEUM. Bot. Jahrb. 71 (1940) 161; Blumea 11 (1961) 18.

Epiphytic or subscandent shrub. Older parts of the branchlets red brown and glabrous, most recent ones covered with a whitish greyish, nearly villous tomentum. *Leaves* elongate-ovate, apex subcaudate-acuminate (2 cm), slightly curved, acute, base ± rounded, the basal pair of glands conspicuous, ± impressed on the margin in a short distance from the petiole, firmly subcoriaceous, entire, edge slightly revolute, 4.5–5 by 1.5–2 cm, immature ones laxly hairy all over the undersurface, mature ones glabrescent except some pubescence at the base beneath and on the midrib on both sides, moreover minutely glandular-punctate beneath, (3–)5-plinerved, midrib and the inner pair of basal nerves much impressed above, or distinctly raised beneath, the outer pair(s) of basal nerves and other ± pinnate shorter ones from the midrib much less or not impressed above, or indistinct beneath, veins laxly reticulate, visible above only; petiole pubescent, *c.* 2 by 1 mm. *Racemes* axillary, solitary, lax, very densely greyish hirtellous and shortly glandular-hairy in all outer parts except the corolla; rachis very slender, 3–4.5 cm, perulae narrow to subulate. Pedicels filiform, *c.* 4 mm; subtending bract subulate, 1 mm; bracteoles linear, inserted in the middle or nearer to the calyx. *Calyx* tube campanulate, *c.* 0.3 mm, lobes deltoid, *c.* 1 mm. *Corolla* subglobose-urceolate, membranous, 4 by 3.5 mm, contracted distally, whitish to cream, laxly and exclusively set with substellate, whitish, eglandular, very short hairs outside, hairy inside. *Filaments* linear or subsubulate, densely pubescent, 1.2 mm; anther-cells inflated, with 2 dorsal spurs (0.5 mm); tubules 1 mm. *Disk* glabrous. *Style* glabrous, *c.* 4 mm.

Distr. *Malesia*: SW. Celebes (Mt Lombasang), once found, 1100 m. *Fl.* Sept.

19. Vaccinium uroglossum SLEUM. Bot. Jahrb. 71 (1940) 166; Blumea 11 (1961) 18; *ibid.* 12 (1963) 124. — **Fig. 89.**

Epiphytic or subscandent shrub or treelet, (1–)2–3(–5) m, with a globose swelling size of an orange between root and stem, and pendent branches. Branchlets slender and densely greyhirtellous in the younger, glabrescent or early corticate in the older, ± defoliate parts. *Leaves* rather densely arranged, ovate or mostly oblong-ovate, apex acuminate to subcaudate, the very tip bluntish, base ± rounded, the basal pair of glands small and strictly marginal, each gland *c.* 2 mm distant from the petiole, subcoriaceous, pubescent and ciliate initially, becoming glabrous above with age except the base and the lower part of midrib and nerves, subdensely to laxly set with fine appressed, clavate, glandular hairs on both faces or beneath only for a long time, finally ± glabrescent, flat, 3–4.5(–6.5) by 1.4–2.2 cm, 5–7-plinerved from and somewhat from above the base, several other upper nerves irregular, ± pinnate and spreading, less distinctly raised than midrib and basal nerves, reticulation dense and minutely

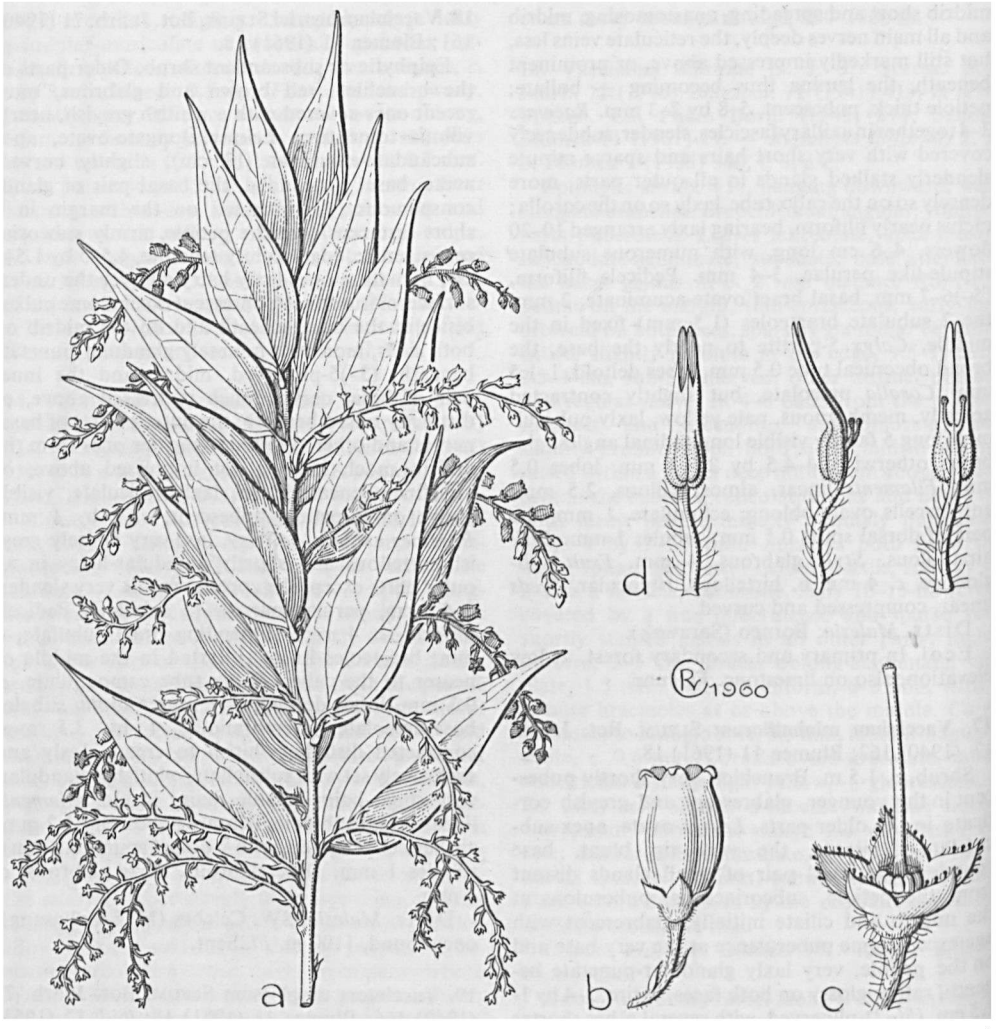

Fig. 89. *Vaccinium uroglossum* SLEUM. *a.* Habit, × ⅔, *b.* flower, × 4, *c.* calyx, disk and style, × 8, *d.* stamens, × 10 (*a* CLEMENS 40802, *b–d* CLEMENS 29013).

prominent on both sides; petiole 1.5–2.5 by 1 mm, ± densely hirtellous. *Racemes* axillary, solitary and ± secund, rather densely 10–20-flowered, subdensely covered with a fine indument of whitish short hairs mixed with slender glandular hairs in all outer parts except the corolla, more densely so on the calyx tube; rachis rather slender, 4–6 cm, with several subulate stipule-like perulae, similar to those found in the sterile axils, 2–4 mm. Pedicels slender, 2–3(–4) mm; subtending bract ovate-subulate, nearly equalling the pedicel; bracteoles subulate, inserted near the base or in the lower half of the pedicel, 1–1.5 mm. *Calyx* tube campanulate, *c.* 1 mm, lobes ovate-deltoid, more sparsely hairy than the tube, 0.8 mm. *Corolla* urceolate, slightly 5-angular, rather fleshy, greenish to cream or yellowish, 4(–4.5) mm, laxly clad with subclavate, glandular, but no eglandular hairs, or glabrescent especially towards the apex, lobes 0.5 mm. *Filaments* slightly wavy, linear, densely hairy, 1.5 mm; anther-cells granular, 0.8 mm, the 2 dorsal spurs *c.* 0.4 mm; tubules *c.* 1.5 mm. *Disk* densely pubescent. *Style* glabrous, 3.5 mm. *Berry* globose, *c.* 3 mm ø, yellow, base reddish, laxly pubescent.

Distr. *Malesia*: Borneo (Mt Kinabalu).

Ecol. In mountain forest, 1525-1830 m. *Fl.* Jan.-Dec.

20. Vaccinium tenerellum SLEUM. Blumea 11 (1961) 18.

Low scandent shrub. Branchlets very slender, young parts subterete, densely short-pubescent. *Leaves* lax, ovate-lanceolate, apex for 1.5–2.5 cm rather narrowly caudate-acuminate and a little curved, subacute, base ± rounded, subcoriaceous,

laxly appressedly glandular-muriculate beneath, otherwise glabrous except some hairs in the lower part of the midrib above, somewhat shining on both faces, ± convex above when dry, entire, not much revolute at the margin in the lower part of the lamina, 4–6 by 1.5–2.3 cm, midrib prominent within a shallow depression above, raised beneath, nerves in 2(–3) basal and slightly suprabasal pairs, curved-ascendent, slightly raised above, less so beneath, several other shorter nerves or veins ± pinnately and irregularly from the midrib, slightly raised on both sides as is the dense fine reticulation; petiole *c.* 2 mm, pubescent; stipule-like perulae of sterile axillary buds subulate, 2–3 mm. *Racemes* solitary from a few upper axils, laxly 8–12-flowered; rachis very slender in flowering time, clothed with fine short, whitish, patent hairs and scattered slenderly stalked brownish glands as are the pedicels, 3–5 cm. Pedicels very slender, 3–4 mm, subtending bract oblong-acuminate, *c.* 1.5 mm; bracteoles inserted in the upper half of the pedicel. *Calyx* tube shortly cylindric, slightly 5-angular, *c.* 0.8 mm, laxly glandular-muriculate, not hairy at all, lobes ovate-triangular, *c.* 1 mm, subglabrous dorsally, ciliolate and set with a few, thickish, substipitate, brownish marginal glands. *Corolla* urceolate, much contracted distally, thin, colour not known, *c.* 4 by 2.5 mm, lobes reflexed, obtuse, *c.* 0.4 mm. *Filaments* linear, hairy, 1.8 mm; cells subovate-oblong, 0.8 mm, with a pair of upward spreading dorsal spurs (0.8 mm); tubules narrow, *c.* 1 mm. *Disk* hairy. *Style* slender, glabrous, *c.* 3.8 mm. Immature *fruit* subglobose, apex truncate, *c.* 3 mm ø.

Distr. *Malesia*: Borneo (Brunei: Mt Pagon ridge).

Ecol. In mossy forest, on rugged exposed knife edge of sandstone and shale ridge, 1525–1860 m. *Fl.* April.

21. Vaccinium bigibbum J. J. S. Bull. Jard. Bot. Btzg III, 1 (1918) 408, t. 55; SLEUM. Blumea 11 (1961) 18; *ibid.* 12 (1963) 124. — *Rigiolepis bigibba* (J. J. S.) J. J. S. S. Blumea 1 (1935) 336.

Epiphytic or terrestrial shrub. Branchlets robust, puberulous at the tips, glabrescent at the lower parts which are laxly set with elliptic, not much raised warty lenticels. *Leaves* ovate to ovate-lanceolate, apex longer (*c.* 3 cm) or shorter subcaudate-acuminate, subacute, base obtuse to rounded in general, but the very base contracted or decurrent in the upper third of the petiole for *c.* 2 mm and instructed there with a thick, protruding gland on each side, coriaceous, glabrous except some puberulence at the base and on the petiole and rather dense minute early caducous glands beneath, ± shining above, less so or dull beneath, entire, slightly recurved at the margin, convex between the main nerves beneath, 7.5–21 by 3–7(–8) cm, 5(–7)-plinerved from and somewhat from above the base (the outer pair of nerves less distinct), these nerves high ascending and anastomosing, ± impressed as is the midrib, though raised within a shallow depression above, sharply prominent beneath, other shorter nerves from the upper part of the midrib in several pairs, irregular and much less distinct on both sides, reticulation rather lax, sometimes slightly sunken, but mostly a little prominent on both faces, occasionally less visible beneath; petiole rugose, 6–8 by *c.* 2 mm. *Racemes* 2(–3) together in axillary fascicles, or rarely solitary, lax, rather densely short-pubescent and finely glandular-hairy in all outer parts, less so at the angles of the corolla; rachis slender, 2–5(–7) cm, with several triangular to subulate stipule-like perulae. Pedicels slender, (2–)4–6 mm, with an ovate-acuminate subtending bract (*c.* 2 mm) and 2 subulate minute bracteoles in the middle. *Calyx* tube very short, lobes narrow-triangular, tips red, *c.* 1 mm. *Corolla* urceolate, cream or yellow, 5-angular, slightly puberulous outside, glabrous inside, *c.* 4 by 2.5 mm when fully developed. *Filaments* wavy, linear, hairy, 2 mm; anther-cells papillose, *c.* 1 mm; spurs subulate, 0.5 mm; tubules slender, erect, introrsely slit almost their entire length, *c.* 1 mm. *Disk* densely hairy. *Style* slender, glabrous, 4 mm.

Distr. *Malesia*: Borneo.

Ecol. In West and Central Borneo and in Sarawak on boulders in forested ravine or epiphytic in peat-swamp- or *Dipterocarpus*-forest, 5–200 m, in Brunei on clay ridge at 550 m. *Fl.* May-Aug.

22. Vaccinium acuminatissimum MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 36; RIDL. J. Str. Br. R. As. Soc. *n.* 33 (1900) 103; K. & G. J. As. Soc. Beng. 74, ii (1905) 66; RIDL. Fl. Mal. Pen. 2 (1923) 210; BURK. & HENDERS. Gard. Bull. S. S. 3 (1925) 390; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 2; SLEUM. Blumea 11 (1961) 19. — *Gaylussacia lanceolata* BL. Bijdr. (1826) 861 ('*(Gay)Lussacia*'); DUNAL in DC. Prod. 7 (1839) 557; HASSK. Cat. Hort. Bog. (1844) 160; MIQ. Fl. Ind. Bat. 2 (1859) 1063. — *Agapetes lanceolata* (BL.) NIEDENZU, Bot. Jahrb. 11 (1889) 201, *in clavi*, 246. — *Agapetes acuminatissima* (MIQ.) NIEDENZU, *l.c.* 201, 224, 247. — *Adnaria lanceolata* (BL.) O. KTZE, Rev. Gen. Pl. 2 (1891) 383. — *V. lanceolatum* (BL.) J. J. S. Ic. Bog. 3 (1910) 68; KOORD.-SCHUM. Syst. Verz. (1912) fam. 233, p. 109; J. J. S. in K. & V. Bijdr. 13 (1914) 144; KOORD. Exk. Fl. Java 3 (1912) 12; DE VOOGD, Trop. Natuur 23 (1934) 83, *in text*, *non* DUNAL, 1839. — *Rigiolepis lanceolata* (BL.) J. J. S. Blumea 1 (1935) 330.

See for further synonyms under the forms.

KEY TO THE FORMS

1. Leaves (sub)ovate-oblong or mostly ovate-lanceolate or -elliptic.
2. Leaves (1.8–)2.5–4(–4.7) cm wide **1. *f.* acuminatissimum**
2. Leaves 1.1–2 cm wide . . . **2. *f.* marapiense**
1. Leaves more elliptic or oblong-elliptic **3. *f.* ellipticum**

1. *f.* acuminatissimum. — *V. acuminatissimum* MIQ.

f javanicum MIQ. & *f. sumatranum* MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 36. — *Thibaudia singalensis* KORTH. *ex* BOERL. Handl. 2, 1 (1891) 263, *in syn.* — *V. acuminatissimum* MIQ. *var. singalense* J. J. S. in K. & V. Bijdr. 13 (1914) 145, *in text.* — *Rigiolepis lanceolata* (BL.) J. J. S. *f. sumatrana* (MIQ.) J. J. S. Blumea 1 (1935) 331, f. 2, a-f. — *V. lanceolatum* (BL.) J. J. S. *f. sumatranum* (MIQ.) SLEUM. Bot. Jahrb. 71 (1940) 168.

Epiphytic or climbing shrub, up to 25(–30) m, trunk *c.* 8 cm ø then. Branchlets slender, flexuous, distally clothed with a short, cinereous, ± spreading pubescence, foliate in the younger, glabrescent and with verruculose lenticels in the older, defoliate parts. *Leaves* (sub)ovate-oblong or mostly ovate- or -elliptic-lanceolate, or lanceolate, ± long and gradually, or more subcaudately acuminate, acute, base broadly attenuate to almost rounded, the two basal glands ± thick, excavate and much protruding, inserted on the edge in a short distance from the petiole, coriaceous to subcoriaceous, recent ones pubescent on both faces, ± glabrescent especially above with age except the midrib, nerves and leaf-base, moreover laxly clad with short glandular (muriculate) ± appressed subpersistent hairs beneath, shining especially above, entire, margin very slightly revolute, 9–14 by (1.8–)2.5–4(–4.7) cm, 5–7(–9)-plinerved, main nerves and midrib slightly raised within a rather shallow groove above, more or less sharply prominent beneath, high ascending and anastomosing, other much shorter and ± pinnate nerves from the midrib much less conspicuous, reticulation mostly dense and slightly raised on both faces, occasionally rather obscure beneath; petiole semiterete, persistently and densely pubescent, (2–)3–5 by 1.5–2 mm. *Racemes* axillary, solitary, almost spreading, lax, 8–15-flowered, ± densely clad in all parts with short eglandular and thicker glandular hairs (the latter less numerous, often in form of fine stalked glands, more densely found on the calyx tube), with several subulate stipule-like perulae; rachis slender, (2.5–)3–5(–6.5) cm. Pedicels rather stoutish, 2–(3) mm, the subtending bract ovate-acuminate, ± as long as the pedicel, the 2 bracteoles inserted above the base up to the middle, subulate, 1–1.5 mm. *Calyx* tube obconical, 0.6–0.8 mm, lobes subdeltoid, ciliate, 0.7–1 mm. *Corolla* short-urceolate, puberulous outside especially along the 5 slightly pronounced angles, glabrous otherwise, white or cream, 2.5–3 by 2–2.5 mm, lobes 0.5–0.7 mm. *Filaments* linear, rather sparsely hairy, *c.* 1 mm; anther-cells oblong, papillose, 0.5 mm, dorsal spurs *c.* 0.3 mm; tubules 0.5 mm. *Disk* hairy. *Style* glabrous, 2.5(–3) mm. *Fruit* baccate, subglobose, ± densely pubescent, first yellow, changing to orange and cherry red in later stages, crowned by the inflexed calyx lobes, *c.* 4 mm ø. *Seeds* linear, compressed, blackish, pitted.

Distr. *Malesia*: Sumatra, Malay Peninsula, West Java.

Ecol. In rain-forest, also in marshy forest, once found on stony mud-flow of Beriti volcano in S. Sumatra, 360–1400 m. *Fl.* Jan.-Dec.

2. *f.* marapiense (J. J. S.) SLEUM. Blumea 11 (1961) 19. — *Rigiolepis lanceolata* (BL.) J. J. S. *f. marapiensis* J. J. S. Blumea 1 (1935) 332, f. 3, a-g. — *V. lanceolatum* (BL.) J. J. S. *f. marapiense* (J. J. S.) SLEUM. Bot. Jahrb. 71 (1940) 168.

Differs by smaller (4.2–8.5 by 1.1–2 cm), more coriaceous leaves, with the midrib more pronouncedly sunken in dry specimens.

Distr. *Malesia*: Central West Sumatra (Mt Marapi), 1100–1200 m.

3. *f.* ellipticum (J. J. S.) SLEUM. Blumea 11 (1961) 19. — *V. acuminatissimum* (*non* MIQ. *s. str.*) RIDL. Kew Bull. (1926) 71. — *Rigiolepis lanceolata* (BL.) J. J. S. *f. elliptica* J. J. S. Blumea 1 (1935) 333, f. 4, a-k. — *V. lanceolatum* (BL.) J. J. S. *f. ellipticum* (J. J. S.) SLEUM. Bot. Jahrb. 71 (1940) 168.

Leaves distinctly ± obliquely elliptic or oblong-elliptic, apex rather abruptly narrow-acuminate, subacute, base ± obtuse, 7–13 by 2.5–4.7 cm.

Distr. *Malesia*: Islands W of Sumatra: Simalur and Mentawei Is. (Sipora).

Ecol. Epiphytic in forest.

Vern. *Lingkih datan*, Simalur.

23. Vaccinium piperifolium SLEUM. Blumea 11 (1961) 20.

Epiphytic shrub, *c.* 3 m. Branchlets obtusangular, tips minutely puberulous and gland-haired, older parts glabrescent, 4–5 mm ø, laxly covered with verrucose, elliptic-subrotundate lenticels, finally whitish greyish corticate. *Leaves* sparse, large, elliptic-oblong, apex shortly (2–3) cm subcaudate- or subcuspidate-acuminate, acutish, base broadly attenuate, the two basal glands rather large, not protruding beyond the leaf margin and inserted near the end of the petiole, coriaceous, puberulous in the basal part of the midrib, otherwise quite glabrous except some very sparse glandular points which may occur on the undersurface, ± glossy on both faces, entire, 20–27 by 6–9 cm, shortly revolute at the very edge, 7-plinerved from and a little from above the base, midrib and inner two pairs of nerves equally prominent above within a shallow depression, much prominent beneath, outer pair of nerves much less distinct on both sides, numerous other shorter nerves pinnately from the upper part of the midrib and ± irregular, slightly impressed above, but little raised beneath, veins and veinlets forming a rather dense and an equally finely prominent network on both faces; petiole somewhat rugose, glabrous, 5–6 by *c.* 2 mm. *Racemes* axillary, solitary, laxly *c.* 10-flowered, with several subulate, very acute perulae (4–6 mm) which occur also in the sterile axils; whole inflorescence puberulous and very minutely gland-hairy except the corolla; rachis slender, 4–6 cm. Pedicels rather slender, 2–3 mm, the subtending bract ovate-acuminate, 1.5–2 mm, the 2 minute bracteoles inserted ± in the middle. *Calyx* laxly glandular-hairy, even less puberulous, tube semi-globose, *c.* 0.5 mm, lobes ovate-acuminate, subacute, *c.* 1 mm. *Corolla* ovoid-urceolate, thin, white?, *c.* 3 mm, laxly clothed with short muriculate

glandular, but no eglandular hairs. *Filaments* long hairy, 0.5 mm; anther-cells broad-oblong, papillose, *c.* 0.7 mm, the dorsal pair of spurs 0.3 mm; tubules 0.7 mm. *Disk* laxly pubescent. *Style* glabrous, 2.5 mm.

Distr. *Malesia*: Borneo (Sarawak: Gat, Upper Rejang R.).

Ecol. On large forest tree along river margin.

24. Vaccinium moultonii MERR. J. Str. Br. R. As. Soc. *n.* 87 (1923) 22; SLEUM. Blumea 11 (1961) 20; *ibid.* 12 (1963) 124. — *Rigiolepis moultonii* (MERR.) J. J. S. Blumea 1 (1935) 336. — *V. borneense* (*non* W. W. SMITH) ANDERSON, Gard. Bull. Sing. 20 (1963) 184.

Shrub or small tree. Branchlets slender, terete, tips or young shoots smooth, finely puberulous, laxly leaved, older parts early glabrescent or corticate. *Leaves* ovate- or oblong-lanceolate, apex caudate-acuminate for 3–4 cm, subacute, base broadly attenuate to nearly rounded, the very base a little contracted or decurrent, bearing a conspicuous not protruding marginal gland at each side of the petiole, subcoriaceous, ± glossy, dark brown in dry specimens, glabrous, though laxly glandular-punctate underneath, entire, flat, 10–15 by 4–6(–6.5) cm, 5(to sub-7)-plinerved from and from somewhat above the base, inner pair of main nerves and midrib slightly raised within a marked depression above, much prominent beneath, outer pair (or pairs) less so, or both pairs slightly raised on both faces, other shorter nerves (or veins) higher from the midrib, numerous and irregular, ± spreading, more distinctly raised beneath than above, reticulation very dense and sharply prominent on both faces; petiole rugulose, (2–)3–5 by 1.5 mm; stipule-like perulae of the axillary buds acicular, *c.* 3 mm, rather long persistent at the upper axils. *Racemes* solitary or in pairs, axillary, laxly 8(–12)-flowered, sparingly puberulous and very shortly gland-haired in all outer parts except the corolla; rachis slender, 4–5 cm. Pedicels slender, 2–3(–4) mm, the subtending bract ovate-acuminate, 1 mm, the two bracteoles inserted a little below the middle. *Calyx* tube obconical, 1 mm, lobes ovate-acuminate, acute, obscurely costulate lengthwise, ± spreading, 1.5 mm. *Corolla* ovoid-urceolate, much contracted at the opening, thin, pale cream or greenish white, also said to be dark red (on Bukit Raja), glabrous or nearly so outside, (3–)4 by 2.5 mm, lobes hardly 0.5 mm. *Filaments* linear, subdensely hairy, 1 mm; anther-cells oblong, granular, 0.6 mm, dorsal spurs 0.5 mm; tubules 0.8 mm. *Disk* glabrous. *Style* glabrous, slender, *c.* 3.5 mm.

Distr. *Malesia*: Borneo (Sarawak, North Borneo).

Ecol. In submontane and in moss forest, 600–1250 m, also in low country: in shrub layer of *Shorea albida* padang on peat swamp.

Vern. *Akar manumpang kayu*, Tawau.

25. Vaccinium dipladenium SLEUM. Bot. Jahrb. 71 (1940) 168; Blumea 11 (1961) 20. — *V. acuminatissimum* MIQ. *f. borneense* MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 36. — *Rigiolepis korthalsii* J. J. S. Blumea 1 (1935) 334, f. 5, a-f. — *V. korthalsii* (J. J. S.) MASAM. En. Phan. Born. (1943) 575, *non* MIQ. 1863.

Shrub. Branchlets rather slender, tips or new shoots shortly subpatent-pubescent, older parts early striate-corticate and laxly set with warty, rounded-elliptic lenticels. *Leaves* lanceolate to broadly ovate, apex caudate-acuminate (2–3 cm), acute, base ± rounded, the 2 basal, not protruding glands on the leaf margin in some distance from the petiole, coriaceous, glabrous except some short pubescence on the lower part of the midrib, laxly appressed glandular-setulose or -hairy, finally laxly punctate beneath, entire, edge very slightly or not revolute, 4–11 by (1.7–)4–6 cm, 5- to sub-7-plinerved, midrib and nerves strongly impressed above, or prominent beneath, main nerves ascending to the top of the lamina and ± anastomosing, other upper nerves from the midrib or veins numerous, faintly raised above, even less so beneath, reticulation fine and dense, restricted practically to the undersurface; petiole pubescent, (2–)3–5 by 1–1.5 mm, on a much thickened base or cushion, which runs very shortly into the branchlet; stipule-like perulae of the axillary buds subular, pubescent, (4–)5–7 mm, long-persistent. *Racemes* axillary, solitary, rather laxly set with numerous flowers, shortly and patently non-glandular-pubescent in all outer parts, the corolla excepted; rachis rather slender, angular, (1–)3–6 cm, with 4–6 subulate stipule-like perulae, 5–7 mm long, *c.* 1 mm wide at the base. Pedicels slender, 4–7 mm, the subtending bract ovate, subacuminate, *c.* 2.5 mm, the 2–3 bracteoles inserted in the middle or sometimes 2 near to the calyx, narrow-subulate, 1–1.5 mm. *Calyx* tube short-campanulate, 0.8 mm, lobes narrow ovate-acuminate, 1.2–1.5 mm. *Corolla* (described from rests adhering to a young fruit) urceolate, glabrous outside, 4 by 2.7 mm. *Filaments* almost filiform, very laxly pubescent, 1.2–1.5 mm; anther-cells ovate-oblong, 0.5 mm, dorsal spurs *c.* 0.4 mm; tubules slender, 0.6 mm. *Disk* glabrous. *Style* filiform, glabrous, 3.5 mm. *Fruit* baccate, subglobose, slightly pubescent, *c.* 5 mm ø, crowned by the inflexed calyx lobes. *Seeds* elliptic, compressed, *c.* 2 mm.

Distr. *Malesia*: SE. Borneo (Mt Sakumbang, SE of Banjermasin), once collected by KORTHALS in 1836.

26. Vaccinium andersonii SLEUM. Blumea 12 (1963) 124.

Epiphytic shrub. Branchlets subterete, greyish or reddish corticate, glabrous, lenticels almost rounded. *Leaves* subovate- to oblong-elliptic, apex for *c.* 1 cm obtusely acuminate, base subtruncate-rounded, rarely subcordate, the pair of basal glands impressed next to the petiole, coriaceous, firm, glossy above, glabrous except fine, hardly visible setular hairs beneath, entire, (5–)6–10 by 3–4.5 cm, 7- to sub-9-plinerved, midrib depressed for the whole length above in dry specimens, prominent beneath, nerves in 3(–4) pairs from and from up to 2 cm above the base,

slightly prominent above, more distinctly so beneath, veins and veinlets rather densely prominent-reticulate, especially beneath; petiole 4–5 by 1.5–2 mm. *Racemes* axillary, laxly many-flowered, basal perulae few, subulate; rachis slender, set with fine spreading hairs and brownish muriculate glands as are all other outer parts of the inflorescence. Pedicels slender, 2–4 mm, bibracteolate at or above the middle. *Calyx* cup-shaped, tube subtruncate at base, hardly 1 mm, lobes acutely triangular, glandular-fimbriate and ciliolate. *Corolla* urceolate, pale yellow, pubescent and glandular-muriculate especially at the angles outside, quite glabrous inside, *c.* 4 by 2.5 mm, lobes hardly 1 mm. *Filaments* linear, glabrous at the base, subvillous above, *c.* 4 mm; anther-cells ovate, echinulate, *c.* 0.4 mm, with 2 distinct dorsal spurs; tubules narrow, 1 mm. *Disk* subdensely short-hairy. *Style* slender, laxly short-hairy for the lower ¾ part. *Berry* globose, apex crowned by the hairy disk, *c.* 5 mm ø.

Distr. *Malesia*: Borneo (Sarawak: summit area of Mt Api).

Ecol. In submontane forest on limestone hill, 915–1220 m. *Fl. fr.* July.

27. Vaccinium leptanthum MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 37; KOORD. Exk. Fl. Java 3 (1912) 12; J. J. S. in K. & V. Bijdr. 13 (1914) 146; SP. MOORE, J. Bot. 63 (1925) Suppl. 55; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 2; SLEUM. Blumea 11 (1961) 20; *ibid.* 12 (1963) 125. — *Agapetes leptantha* (MIQ.) NIEDENZU, Bot. Jahrb. 11 (1889) 201, *in clavi.* — *V. acuminatissimum* MIQ. *f. leptanthum* (MIQ.) VUYCK in Boerl. Handl. 2, 1 (1891) 263 ('*leptantha*'). — *Rigiolepis leptantha* (MIQ.) J. J. S. Blumea 1 (1935) 338.

See for further synonyms under the forms.

KEY TO THE FORMS

1. Leaves ± lanceolate, the base cuneate. Pedicels very slender, (4–)5–6 mm long at anthesis **1. *f.* leptanthum**
1. Leaves ovate-elliptic or elliptic, the base broadly attenuate. Pedicels stouter, (2–)3–4 mm long at anthesis.
2. Leaves 4.5–7.5 by 1.6–2.6 cm **2. *f.* ellipticum**
2. Leaves 6–11 by (2.5–)3–4 cm **3. *f.* malayanum**

1. *f.* leptanthum.

Small, usually epiphytic, much branched shrub; stem *c.* 50 cm long, up to 1.5 cm ø, base with a subglobular swelling *c.* 5 cm ø. Branchlets pendent, rather slender, ± densely puberulous in the youngest, glabrescent, corticate and verrucose-lenticellate in the older parts. *Leaves* lax, lanceolate or oblong-lanceolate, apex rather abruptly acuminate or subcaudate (1–2 cm), often subfalcate, acute, base cuneate, the basal glands (one, or mostly two on each side) small, impressed on the edge in some distance from the petiole, thin-coriaceous, light green, somewhat shining above, mostly rather dull beneath, glabrous with age except some puberulence at the base or on the lower part of the midrib and the sparse appressed short glandular hairs on both faces, entire, edge subrevolute in dry specimens, 4.5–9(–11) by 1.3–2.5 cm, 3(or faintly 5)-plinerved from the very base, midrib ± deeply impressed, but prominent within the depression above, obtusely raised beneath, main nerves high ascending and slightly raised above, hardly so or often quite obscure beneath, other shorter nerves or veins rather numerous from the midrib, irregularly pinnate, forming a subdense, slightly prominent network above in young leaves, which becomes less visible in older, ± dull leaves, reticulation in general ± inconspicuous beneath, the whole undersurface practically smooth; petiole puberulous, (2–)3–5 by *c.* 1 mm. *Racemes* mostly solitary, rarely in twos, axillary, laxly 10–15-flowered, rather densely covered with a minute puberulence of very short eglandular and glandular hairs; rachis slender, 4–5.5 cm, with several subulate acuminate perulae, 3–4 mm. Pedicels slender to filiform, (4–)5–6 mm at anthesis, slightly accrescent in fruit; subtending bract ovate-acuminate, concave, ciliate, *c.* 1.5 mm; bracteoles subulate, *c.* 1 mm, inserted in the lower part of the pedicel. *Calyx* tube campanulate, in general more densely puberulous or glandular than the calyx lobes, 0.5 mm, lobes deltoid, acute, ciliate, 0.6 mm. *Corolla* urceolate or more ovoid-subglobose, yellow or cream, puberulous in the lower, ± glabrescent in the upper half outside, 2–2.5 mm, lobes hardly 0.5 mm. *Filaments* linear, long-hairy, 0.7 mm; anther-cells broad-oblong, granular or papillose, 0.5 mm, with 2 distinct dorsal spurs; tubules narrow, almost 1 mm. *Disk* pubescent. *Style* glabrous, 2 mm. *Fruit* baccate, subovoid-globose, apex truncate, crowned by the persistent calyx lobes, puberulous, *c.* 3 mm ø, yellow to yellow-orange.

Distr. *Malesia*: S. Sumatra (possibly also in Central Sumatra), Malay Peninsula (Johore), Lingga Arch. (P. Lingga, P. Sebangka), West Java, Borneo (Sarawak, Brunei).

Ecol. Generally epiphytic on tall trees, occasionally also terrestrial (in Sarawak on limestone), apparently rare, 10–700 m. *Fl.* Jan.-Dec.

2. *f.* ellipticum (J. J. S.) SLEUM. Bot. Jahrb. 71 (1940) 168; Blumea 11 (1961) 21. — *Rigiolepis leptantha* (MIQ.) J. J. S. *f. elliptica* J. J. S. Blumea 1 (1935) 338. — *V. leptanthum* MIQ. *var. ellipticum* (J. J. S.) MASAM. En. Phan. Born. (1943) 575.

Leaves elliptic or ovate-elliptic, apex long and ± abruptly acuminate, base broadly attenuate, 4.5–7.5 by 1.6–2.6 cm.

Distr. *Malesia*: Borneo (W. Borneo, Sarawak).

Ecol. Reported to grow epiphytically on mangrove near Kuching (Sarawak).

3. *f.* malayanum SLEUM. Blumea 11 (1961) 21. Leaves ovate-elliptic to elliptic, 6–11 by (2.5–)3–4 cm. Pedicels rather robust, (2–)3–4 mm long at anthesis.

Distr. *Malesia*: Malay Peninsula (Pahang, Kelantan, Trengganu).

Ecol. Epiphytic at low altitude, occasionally on *Dipterocarpus oblongifolius*.

28. Vaccinium flagellatifolium COPEL. *f.* Philip. J. Sc. 42 (1930) 567; SLEUM. Blumea 11 (1961) 21. — *V. caudatifolium* MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 103; En. Born. (1921) 466, *non* HAYATA, 1913. — *Rigiolepis caudatifolia* (MERR.) J. J. S. Blumea 1 (1935) 340. — *V. myrianthum* SLEUM. Bot. Jahrb. 71 (1940) 162.

Shrub or small tree, up to 5 m, epiphytic on tall trees, or woody liana climbing up to 20 m. Branchlets short-pubescent at the tips, early glabrescent and covered with greyish reddish, thin cork, lenticels sparse to rather numerous, elliptic, slightly raised. *Leaves* elongate-oblong to oblong-lanceolate, apex gradually or mostly subcaudate-acuminate (2–3 cm), subacute, base cuneate, slightly decurrent into the petiole, the 2 basal marginal glands in a short distance from the petiole, firmly subcoriaceous, glabrous besides sparse appressed glandular hairs underneath, shining above, entire, but very slightly or not revolute at the very margin, (9–)12–16 by (2–)2.5–3(–4) cm, 5–7-plinerved from and from a little above the base, midrib raised within a conspicuous depression above, much prominent beneath, main nerves slightly prominent above, faintly raised beneath, high ascending and anastomosing, several other much less distinct and shorter nerves in an acute angle from the midrib, equally steeply ascending, reticulation fine and dense, prominent on both faces in young, at least so beneath in older leaves; petiole somewhat flattened, 2–3(–4) by *c.* 1.5 mm, glabrous. *Racemes* axillary, mostly 2 or 3 in a fascicle, rarely solitary, laxly 8–15-flowered, covered with a fine brownish puberulence of non-glandular and less numerous glandular hairs in all parts except the corolla; rachis (very) slender, 3.5–5 cm, with several subulate perulae, 2–3 mm. Pedicels (sub)filiform, 4–6 mm at anthesis, accrescent up to 8 mm in fruit, subtending bracts narrowly ovate-acuminate, 2(–3) mm, bracteoles subulate, borne on the lower half of the pedicel, *c.* 1.5 mm. *Calyx* tube broadly campanulate, hardly 0.5 mm, lobes a little spreading, triangular, subacute, 0.7–1 mm. *Corolla* ovoid- or subglobular-urceolate, *c.* 2 mm, glabrous, (pale) yellow, lobes 0.5 mm. *Filaments* linear, hairy, 0.6 mm; anther-cells inflated, granular, 0.5 mm, minutely 2-spurred dorsally; tubules slender, 0.8 mm. *Disk* glabrous or very shortly pubescent. *Style* glabrous, *c.* 2 mm. *Fruit* baccate, subglobose, apex ± truncate, *c.* 3 mm ø, glabrous except the top, said to be bright yellow.

Distr. *Malesia*: Borneo (W. and E. Borneo, Sarawak).

Ecol. In forest, along river bank, from low elevation up to 400 m.

29. Vaccinium adenopodum SLEUM. Blumea 11 (1961) 21.

Shrub. Branchlets terete, with numerous suborbicular lenticels in the older, pubescent in the younger parts. *Leaves* lanceolate, caudate-acuminate at the apex for 1.5–2 cm, acute, base more broadly or narrowly cuneate into the petiole, not decurrent, the pair of basal glands distinct, though generally not properly prominent, found very near the end of the petiole, coriaceous, glossy on both sides, glabrous, with minute sparse blackish glandular points on the undersurface, entire, edge a little recurved in dry specimens, 10–15 by 3–4 cm, 5(–7)-plinerved, main nerves from and up to 1.5 cm above the base, much impressed above as is the midrib, rather prominent beneath, other lateral nerves or veins pinnately from the upper ⅔ of the midrib, but slightly conspicuous, reticulation rather lax above, more dense beneath, raised on both sides; petiole transversely rugulose, 5–6(–7) by *c.* 1 mm; stipule-like perulae in the upper sterile axils subulate, 2–3 mm. *Racemes* both from the foliate and lower defoliate axils, suberect, all over densely 12–15 (–20)-flowered, 2–3.5 cm long, subdensely very shortly brownish-pubescent and -glandular in all parts, the corolla excepted; rachis rather robust, almost 1 mm across the base, which bears several subulate, 2–3 mm long perulae. Pedicels rather stoutish, (2–)3–4 mm, basal bract ovate-acuminate, *c.* 2 mm, subulate bracteoles 1–1.5 mm, inserted ± in the middle of the pedicel, rather early caducous. *Calyx* tube campanulate, 0.7 mm, lobes narrowly ovate-acuminate, *c.* 1 mm, with a minute apical gland. *Corolla* subcylindric-urceolate, slightly 5-angular, faintly pubescent at the angles outside, otherwise glabrous, yellow, 2 by 1.5 mm, shortly 5-lobed. *Stamens* 8; filaments linear, subdensely hairy, 1 mm; anther-cells 0.3–0.4 mm, dorsal spurs short; tubules *c.* 0.5 mm. *Disk* glabrous, though the cavity bears some hairs within. *Style* slender, glabrous, *c.* 2.5 mm.

Distr. *Malesia*: Central Borneo (P. Sepandan near Kapuas Lakes), once found.

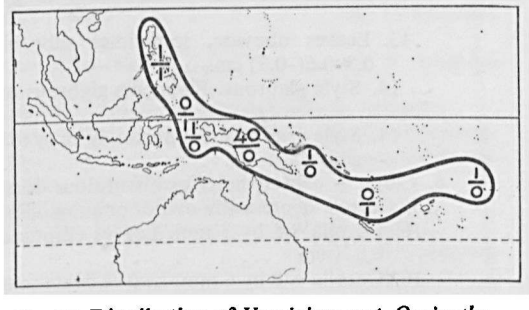

Fig. 90. Distribution of *Vaccinium sect. Oarianthe.* The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

4. Section Oarianthe

SCHLTR, Bot. Jahrb. 55 (1918) 169; COPEL. *f.* Philip. J. Sc. 42 (1930) 599; SLEUM. Bot. Jahrb. 71 (1941) 418; *ibid.* 72 (1942) 221; Blumea 11 (1961) 22. — **Fig. 90–93.**

Inflorescence reduced to a single axillary flower. Peduncle, if any, very short, articulated with the pedicel which bears two or several small bracts (bracteoles) at the base. *Corolla* of various shape. Anthers whether or not 2-spurred dorsally; tubules short in general, transversely or obliquely cut at the apex. *Leaves* generally small to very small.

Distr. In all 46 *spp.*, of which 1 *sp.* in Samoa, and 1 *sp.* in the Solomon Is.; in *Malesia* (Philippines, Moluccas and New Guinea) 44 *spp.*, one of which extends to the New Hebrides. Fig. 90.

KEY TO THE SPECIES

1. Leaves entire, or with 1 (rarely 2 or 3, very rarely 4) depressed marginal glands irregularly set on each side, not properly regularly crenate or crenulate.
2. Corolla villous all over outside . . . . . **30. V. villosiflorum**
2. Corolla laxly (and only partly) hispidulous- or glandular-hairy, or muriculate, or mostly glabrous outside (the lobes sometimes ciliate).
3. Anthers (cells plus tubules) markedly longer than the filaments (which are glabrous).
4. Leaves ovate to ovate-elliptic, base subtruncate-rounded, 4–7(–9) by 3–5 mm. Corolla 6–7 mm. **31. V. densifolium**
4. Leaves elliptic, base attenuate into the petiole, 5–8 by 3–4 mm. Corolla 4 mm **32. V. sparsicapillum**
3. Anthers (cells plus tubules) rarely as long as, mostly shorter than the filaments (which are hairy or at least sparsely so at the base, except in 59. *V. microphyllum*).
5. Flowers sessile or nearly so, *i.e.* pedicel plus peduncle, if any, rarely up to 2 (very rarely 3) mm at anthesis.
6. Calyx epilose dorsally, glabrous or may be provided with some muriculate glands.
7. Leaves elliptic to ovate- or oblong-elliptic, base broadly attenuate to rounded.
8. Leaves 0.8–1.5(–2) by 0.5–0.8(–1) cm . . . . . **33. V. finisterrae**
8. Leaves 0.4–0.8(–0.9) by 0.3–0.5 cm.
9. Filaments glabrous.
10. Disk and style glabrous. A form with subentire leaves of **69. V. amblyandrum *var.* amblyandrum**
10. Disk and style hairy . . . . . **49. V. bodenii**
9. Filaments hairy . . . . . **34. V. haematochroum**
7. Leaves ± obovate, base short- or long-cuneate.
11. Leaves 0.6–1.4 cm wide.
12. Leaves 1.4–3 by 0.7–1.4 cm. Corolla depressedly subglobose-urceolate, *i.e.* much constricted apically, *c.* 5 by 4–5 mm . . . . . **67. V. pullei**
12. Leaves 1–1.5 by 0.6–0.9(–1) cm. Corolla subcylindric-urceolate, *c.* 7 by 3 mm **35. V. brachycladum**
11. Leaves 0.3–0.6(–0.7) cm wide.
13. Leaves narrow-obovate, base ± long-cuneate, 1–1.5(–1.7) by 0.4–0.5(–0.7) cm **36. V. hatamense**
13. Leaves obovate, sometimes suborbicular-obovate, base short-cuneate, (0.4–)0.5–1 by 0.3–0.6(–0.7) cm.
14. Style glabrous. Filaments glabrous or very sparsely hairy. Calyx rugulose **37. V. parvulifolium**
14. Style densely subappressedly hairy to the lower ⅔. Filaments subdensely hairy below. Calyx smooth . . . . . **38. V. scyphocalyx**
6. Calyx ± densely hairy or hirsutulous dorsally.
15. Corolla depressedly ovoid- or subglobose-urceolate.
16. Corolla 3.5 by 3 mm. Leaves elliptic or oblong-obovate to obovate, (0.7–)1–2.3 by (0.6–)0.8–1 cm . . . . . **39. V. versteegii**
16. Corolla *c.* 8 by 6 mm. Leaves ovate to elliptic-ovate, (0.8–)0.9–1.2(–1.3) by (0.5–)0.6–0.8 cm. **46. V. culminicolum**
15. Corolla narrowly ovoid- or subconical-urceolate (at least 5 mm).
17. Corolla narrowly ovoid-urceolate, 5–6 mm. Leaves obovate to elliptic-obovate, 0.8–1.3 by (0.3–)0.4–0.7 cm . . . . . **40. V. myrsinoides**
17. Corolla narrowly ovoid-conical, 7–8(–9) mm. Leaves obovate, 0.7–1 by 0.5–0.7 cm **41. V. convexifolium**
5. Flowers distinctly stalked (pedicel plus peduncle generally at least 3 mm).
18. Leaves widest at or below the middle, *i.e.* never distinctly obovate.
19. Calyx (tube and lobes) dorsally puberulous or mostly ± densely hairy or almost hispidulous at least at anthesis (sometimes ± glabrescent in fruit).
20. Leaves narrow-oblong (0.9–1.8 by 0.2–0.4 cm). . . . . **42. V. taxifolium**

20. Leaves ovate to elliptic, or sometimes oblong, subobovate-oblong or subobovate-elliptic.
21. Leaves 2.5–4.3 by 0.8–1.8 cm.
22. Leaves oblong-elliptic, 2.5–3 by 0.8–1 cm. Corolla ovoid-urceolate, 5(–6) by *c.* 3 mm. **43. V. wondiwoiense**
22. Leaves elliptic or ovate-lanceolate, 2.5–4.3 by 1–1.8 cm. Corolla subglobular-urceolate, *c.* 7 by 5 mm . . . . . **44. V. schultzei**
21. Leaves up to 2 by 1 cm.
23. Leaves prominently veined beneath (ovate to ovate-elliptic, rarely elliptic, (0.7–)1–2 by (0.4–)0.5–0.9(–1) cm). . . . . **45. V. cyclopense** *f.* **cyclopense**
23. Leaves not or hardly veined beneath.
24. Leaves ovate to elliptic-ovate, base rounded to subcordate, 0.8–1.3 by (0.5–)0.6–0.8 cm. Pedicels 2–3 mm . . . . . **46. V. culminicolum**
24. Leaves elliptic or subovate- or subobovate-elliptic, base rounded to broadly attenuate or cuneate. Pedicels 5–8(–9) mm.
25. Leaves 1–1.5(–2) by 0.6–0.8(–1) cm, edge thickened and much revolute. **58. V. oranjense** *var.* **marginellum**
25. Leaves 0.5–1.2(–1.4) by (0.3)0.4–0.5(–0.6) cm, edge not thickened, slightly revolute below, or mostly quite flat . . . . . **61. V. leptospermoides** *f.* **leptospermoides**
19. Calyx (tube and lobes) dorsally epilose (lobes sometimes ciliate or fimbriate, or with an apical tuft of hairs), or may be provided with some muriculate glands, or quite glabrous.
26. Leaves (narrow-)lanceolate to subelliptic- or oblong-lanceolate, or narrow-oblong, up to *c.* 3 mm wide.
27. Leaves obtuse at the apex, (0.7–)1(–1.2) by 0.2–0.3 cm . . . . . **47. V. piceifolium**
27. Leaves subacute at the apex.
28. Leaves 0.7–1 by *c.* 0.3 cm. Pedicel 3–4 mm. A form with subentire leaves of **72. V. prostratum**
28. Leaves 0.6–1.1 by *c.* 0.2 cm. Pedicel 5–6(–7) mm . . . . . **48. V. pugionifolium**
26. Leaves ovate to elliptic, sometimes oblong-elliptic or oblong-ovate. Leaves generally (at least partly) wider than 3 mm in the same specimen.
29. Disk ± densely, rarely more laxly set with long ± erect hairs.
30. Pedicels (2–)3 mm. (Leaves ovate-elliptic to elliptic, 0.6–1 by (0.3–)0.4–0.5 cm). **49. V. bodenii**
30. Pedicels at least 4 mm.
31. Leaves 4–6.3 by 1.5–2.5 cm (ovate-elliptic or elliptic-oblong) . . . **50. V. absconditum**
31. Leaves up to 1.8 by 0.8 cm (elliptic or oblong-elliptic).
32. Leaves 0.7–1 by 0.4(–0.5) cm. Corolla *c.* 5 mm . . . . . **51. V. ceramense**
32. Leaves 0.8–1.5(–1.8) by 0.4–0.6(–0.8) cm. Corolla 6–7 mm.
33. Branchlets angular. Corolla urceolate, 6–7 by 3–4 mm . . . . . **52. V. whiteanum**
33. Branchlets terete. Corolla ovoid-urceolate, 7–8 by *c.* 7 mm . . . . . **53. V. igneum**
29. Disk quite glabrous.
34. Style hairy at least in the lower half. (Leaves elliptic to narrow- or oblong-elliptic, 0.7–1.3 (–1.4) by (0.3–)0.4–0.6(–0.7) cm. Corolla 6–7 mm) . . . . . **54. V. sororium**
34. Style quite glabrous.
35. Leaves 2.5–4.3 by 1–1.8 cm (elliptic or ovate-lanceolate) . . . . . **44. V. schultzei**
35. Leaves up to 2 by 1.2 cm.
36. Leaves 4–6(–7) by 3–4 mm (ovate to elliptic, sometimes oblong-ovate or -elliptic).
37. Corolla 6–8 by 4–6 mm. Pedicel 6–9 mm. . . . . **55. V. decumbens**
37. Corolla 5 by 2.5–3 mm. Pedicel 2–3 mm . . . . . **34. V. haematochroum**
36. Leaves all or at least partly exceeding 6 by 4 mm in the same specimen.
38. Leaves (0.6–)0.7–1 (rarely and but partly –1.4) by (0.3–)0.4–0.5 cm.
39. Leaves thick-coriaceous. Corolla and calyx laxly glandular-muriculate outside. **56. V. crassiflorum**
39. Leaves coriaceous to subcoriaceous, less stiff. Corolla and calyx practically glabrous outside.
40. Leaves subovate- or elliptic-oblong, base broadly attenuate to rounded. **57. V. oreomyrtus**
40. Leaves subobovate-elliptic, base cuneate . . . . **61. V. leptospermoides** *f.* **glabrum**
38. Leaves larger in general or at least for their greater number in the same specimen, (0.6–)0.8–2.2 by (0.4–)0.6–1(–1.2) cm.
41. Leaves coriaceous and ± stiff, edge markedly revolute, veins and veinlets obscure. (Corolla ventricose-urceolate, (6–)7–9 by 5–6 mm below, 3–4 mm distally; filaments laxly long-hairy below) . . . . . **48. V. oranjense** *var.* **oranjense**
41. Leaves chartaceous to subcoriaceous, edge flat or but slightly revolute, veins and veinlets generally visibly raised beneath.

42. Pedicels slender. Corolla subglobose-urceolate, apex much contracted, 4–5(–6) by 3–4 mm below, or 1.5–2 mm distally; filaments glabrous or practically so. **59. V. microphyllum**

42. Pedicels rather stoutish. Corolla subglobose-urceolate, 6–8(–9) by 5 (sometimes –7) mm; filaments (very) laxly hairy below. . . . . **45. V. cyclopense *f.* glabrum**

18. Leaves widest above the middle, *i.e.* properly obovate or at least oblong-obovate.

43. Leaves with (1–)2–3(–4) ± deeply sunken marginal glands on each side, and thus seemingly remotely crenulate, the glands distributed over ± whole length of the margin (if one gland only, then found ± in the middle of the margin, not near the petiole), (0.4–)0.6–1.2 by 0.2–0.4(–0.5) cm. Calyx and disk glabrous. Pedicels glabrous or laxly hairy . . . . . **60. V. globosum**

43. Leaves with 1(–2) pairs of ± basal, much less or not impressed marginal glands (which occur generally within the section, but are sometimes minute and hardly visible), found near to or in a (rather) short distance from the petiole (never in the middle or upper half of the margin).

44. Calyx ± densely short-hairy or subhirsute dorsally.

45. Disk glabrous. Pedicels hairy . . . . . **66. V. lorentzii *f.* puberulum**

45. Disk hairy, Pedicels glabrous or practically so.

46. Leaves 0.8–1.5(–1.8) by (0.2–)0.3–0.5(–0.6) cm **61. V. leptospermoides *f.* leptospermoides**

46. Leaves 1–2 by 0.7–1(–1.3) cm . . . . . **62. V. vonroemeri**

44. Calyx (and disk) glabrous.

47. Pedicels hairy. (Filaments barbate or nearly villous in the middle. Corolla glabrous inside, *c.* 4 by 3 mm) . . . . . **63. V. barbatum**

47. Pedicels glabrous (or very laxly glandular-muriculate. Corolla pubescent inside).

48. Filaments quite glabrous. (Peduncle plus pedicel 8–10 mm) . . . . . **64. V. inconspicuum**

48. Filaments laxly to densely hairy.

49. Leaves 0.8–1.5(–1.8) by (0.2–)0.3–0.5(–0.6) cm.

50. Branchlets puberulous. Pedicels slender, 6–8 mm . . **61. V. leptospermoides *f.* glabrum**

50. Branchlets quite glabrous. Pedicels rather stoutish, 3.5–5 mm . . . **65. V. sanguineum**

49. Leaves (1.2–)1.4–3(–3.8) by 0.7–1.3(–1.6) cm.

51. Peduncle plus pedicel 3–4(–5) mm. Flowers 6–7-merous. Style bottle-shaped. **66. V. lorentzii *f.* lorentzii**

51. Peduncle plus pedicel (1–)2 mm. Flowers 5-merous. Style columnar . . . **67. V. pullei**

1. Leaves distinctly and regularly (equidistantly) crenate or subserrate-crenulate over the whole margin or at least in its upper half.

52. Flowers subsessile. Peduncle plus pedicel up to 2(–2.5) mm, ± stoutish (not or hardly elongate in fruit).

53. Corolla subcylindric-urceolate, (6–)7(–8) by 2.5–3(–4) mm. (Leaves narrowly obovate or elliptic-, or more rarely oblong-obovate, apex obtuse to rounded, base ± cuneate.) . . . **68. V. whitfordii**

53. Corolla broad-urceolate, (4–)5 by 3(–3.5) mm . . . . . **69. V. amblyandrum**

52. Peduncle plus pedicel (3–)4–6 mm, rather stoutish or mostly slender.

54. Style laxly hairy in the lower part. Filaments *c.* 4.5 mm. Leaves oblong-elliptic, (0.9–)1–1.5 by 0.5–0.7 cm. . . . . **70. V. evanidinervium**

54. Style quite glabrous. Filaments up to 3 mm. Leaves 0.4–1 by 0.2–0.4 cm.

55. Leaves elliptic or ovate-elliptic, apex ± obtuse, 4–6(–7) by 2.5–4 mm, nerves practically obsolete. **71. V. coelorum**

55. Leaves ± lanceolate, apex subacute, 5–7(–10) by 2–3(–3.5) mm, nerves generally raised beneath.

56. Pedicel 3–4 mm. Corolla white or pink . . . . . **72. V. prostratum**

56. Pedicel 5–6 mm. Corolla red . . . . . **73. V. wollastonii**

30. Vaccinium villosiflorum J.J.S. in Gibbs, Arfak (1917) 171; SLEUM. Bot. Jahrb. 72 (1942) 228; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 482; SLEUM. Blumea 11 (1961) 26; *ibid.* 12 (1963) 125. — *V. pilosiflorum* J. J. S. in Gibbs, Arfak (1917) 172; Nova Guinea 18 (1936) 110; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 482; SLEUM. Bot. Jahrb. 72 (1942) 228; Blumea 11 (1961) 26.

Shrub, generally terrestrial, rather many-stemmed and dense, on wind-swept summits even compact, with numerous ± erect branches, or few-stemmed with overhanging elongate branches, sometimes epiphytic with long pendent branches, (0.3–)0.5–1.5 (as epiphyte up to 3) m. Branches much ramified distally. Branchlets subvillous in the younger, glabrescent in the older parts. Leaves rather densely arranged, elliptic or mostly ovate-elliptic with a short blunt acumen in the terrestrial forms, elliptic-ovate to ovate, rarely elongate-ovate and often with more elongate, sometimes even subcaudate acumen in the epiphytic state, base ± rounded, the pair of marginal glands in a short distance from the petiole, distinct, dark, slightly impressed, green to glaucous-green above, paler beneath, flush pink, coriaceous and ± convex above in the terrestrial, subcoriaceous and flattish in the epiphytic form, subdensely to laxly hairy on both faces initially, glabrescent to various degree with age, tardily so at the base and on the petiole, furthermore laxly set with short brownish glandular hairs beneath, entire, edge ± revolute, 1–2.5(–4) by 0.6–1.5(–2) cm, midrib slightly raised above, prominent beneath, nerves 1–2(–3) pairs, curved-ascending, slightly prominent on both faces

as are the upper shorter nerves or veins, reticulation lax, rather coarse, sometimes subobscure especially beneath; petiole 1.5–3 by 1 mm, on a rather thick leaf-cushion. *Flowers* axillary, generally solitary or rarely in twos, very rarely forming a short terminal 3–4-flowered raceme when the upper flowerbearing leaves are much reduced. Peduncle generally very short or none. Pedicels villous, slender, 1–2(–3) mm, with several imbricate, oblong, brownish, ciliate, otherwise glabrous perulae, 1–2(–3) mm. *Calyx* green, villous, tube broadly subobconical, 1.5–2 mm, limb spreading, 1 mm, cut into 5 triangular lobes to almost the base. *Corolla* ovoid-urceolate, fleshy, carmine to pink, deeper coloured at the lobes, villous all over outside, laxly hairy especially in the upper part inside, (6–)7–9 by 3–4 mm, lobes ovate, finally recurved, 1–1.5 mm. *Filaments* dilated and laxly to subdensely hairy above the base, gradually narrower and glabrescent upwards, 3–4 mm; anther-cells oblong, echinulate, 1.5–1.7 mm; tubules almost as wide as the cells, 0.7–0.8 mm, subobliquely cut distally. *Disk* laxly to densely set with longish erect hairs, rarely glabrous. *Style* columnar, glabrous, 5–5.5 mm. *Fruit* a subglobose, apically truncate, soft, pale violet berry, *c.* 6 mm ø. *Seeds* brownish, densely finely striate, 1 mm.

Distr. *Malesia*: New Guinea (Arfak Mts).

Ecol. Terrestrial with erect or overhanging branches and elliptic to ovate-elliptic, ± coriaceous leaves in edge of forest and in summit scrub, ± open places, epiphytic with longer, pendent branches, softer, more ovate and subcaudate leaves in mossy forest, 1200–2600 m, locally plentiful. *Fl. fr.* Jan.–Dec.

31. Vaccinium densifolium J. J. S. Med. Rijksherb. *n.* 25 (1915) 9; Nova Guinea 12 (1917) 525; *ibid.* (1918) t. 214; SLEUM. Bot. Jahrb. 72 (1942) 228; Blumea 11 (1961) 28.

Low, erect, much branched shrub, up to 1.2 m. Branchlets abbreviate, densely short-hairy or almost hirsutulous at the young and densely foliate, glabrescent and dark-corticate at the older, ± defoliate parts. *Leaves* subpatent, ovate to ovate-elliptic, gradually attenuate towards the blunt apex, base subtruncate-rounded, the two marginal basal glands thick, blackish and at some distance from the petiole, coriaceous and firm, ± convex above in dry specimens, entire, somewhat recurved at the edge, glabrous above, laxly set with dark, appressed, glandular hairs or bristles beneath initially, finally laxly punctate, 4–7(–9) by 3–5(–7) mm, midrib and often 2–3 pairs of curved-ascending nerves faintly sunken above, rather or quite obsolete beneath; petiole 1–2 mm, pubescent. *Flowers* axillary, solitary, nodding. Peduncle 0. Pedicel rather robust, laxly to subdensely short-pubescent, moreover at the base laxly, towards the apex more densely set with short, thickish, glandular hairs, 3–4 mm at anthesis, basal bracts several, glabrous, 1–2 mm. *Calyx* subcampanulate, glabrous, or mostly slightly hairy at the very base, rugulose, a little shining, tube 5-angular, 2 mm, limb spreading, lobes triangular, subacute, ciliolate, *c.* 1 mm. *Corolla* subovoid-urceolate, slightly 5-angular initially, contracted distally, glabrous outside, laxly long-hairy in the upper ¾ inside, fleshy, red, 6–7 by 2.5–3 mm, lobes a little recurved, obtuse, pale yellow or white, 1 mm. *Filaments* linear-subulate, ± wavy, glabrous, *c.* 2 mm; anther-cells oblong, base incurved and very shortly 4-lobed, echinulate, 1.5 mm; tubules cylindric, erect, a little divergent, slightly widened and recurved at the opening, obliquely truncate, 1.5 mm. *Disk* glabrous. *Style* glabrous, 4.5 mm. *Berry* said to be blue.

Distr. *Malesia*: New Guinea (Oranje and Hubrecht Mts, Mt Wilhelmina).

Ecol. Locally abundant in marginal shrubberies of subalpine forest, 3100–3800 m. *Fl.* Febr., Aug.–Sept.

32. Vaccinium sparsicapillum SLEUM. Blumea 11 (1961) 28.

Small shrub. Branchlets dense, tips angular, patent-puberulous and laxly minutely verrucose, older parts glabrescent. *Leaves* dense, elliptic, apex obtusely attenuate or rounded, base narrowed into the petiole, the 2 basal marginal glands a little impressed and distant from the petiole, coriaceous, glabrous above, laxly set with appressed glandular hairs beneath, entire, flat, margin slightly or not revolute, 5–8 by 3–4 mm, midrib ± impressed above, hardly prominent beneath, nerves in 2–3 pairs, obsolete above, minutely raised or sometimes scarcely visible beneath; petiole rather slender, early glabrescent, (1–)2 mm. *Flowers* solitary, remote in the upper axils. Pedicels rather slender, glabrous or muriculate especially below the calyx, (2–)3–4 mm, base hidden by several ovate-oblong, concave bracts, 1.5 mm. *Calyx* glabrous, tube obconical, 2 mm, limb spreading, 1.3 mm high, deeply partite into 5 broad-triangular, subacute, not ciliate lobes. *Corolla* urceolate, rather fleshy, probably red, glabrous outside, laxly long-hairy in the upper ⅔ inside, 4 by *c.* 2.5 mm. *Filaments* linear, glabrous, 1.3 mm; anther-cells oblong, echinulate, *c.* 1.3 mm; tubules much narrower than the cells, erect, 0.8 mm, the pore oblique, rather small, not dilated distally. *Disk* glabrous. *Style* subclavate, glabrous, 2.5 mm.

Distr. *Malesia*: West New Guinea (Wissel Lakes region), once found, 1800–2900 m. *Fl.* Aug.

33. Vaccinium finisterrae SCHLTR, Bot. Jahrb. 55 (1918) 169, f. 9; SLEUM. *ibid.* 72 (1942) 226; Blumea 11 (1961) 26; *ibid.* 12 (1963) 125. — *V. sessiliflorum* SCHLTR, Bot. Jahrb. 55 (1918) 170. — *V. parvulifolium* (*non* F. v. M.) DIELS, *ibid.* 62 (1929) 488. — *V. haemanthum* SLEUM. *ibid.* 72 (1942) 226.

Low epiphytic (0.4 m) or erect terrestrial, 0.6–1.5(–2.5) m, much branched shrub. Branchlets slender, tips subterete and ± densely clad with short spreading hairs and some sparse club-shaped glandular hairs, early glabrescent, older parts greyish corticate. *Leaves* rather dense, elliptic to

ovate- or oblong-elliptic, apex obtuse to rounded, base ± broadly attenuate to rounded, with a pair of minute marginal glands in a rather long distance from the petiole, subcoriaceous and quite glabrous with age besides some glandular hairs or points on the undersurface, entire, edge subrevolute, 0.8–1.5(–2) by 0.5–0.8(–1) cm, nerves and reticulation slightly raised on both sides, or not rarely ± obsolete; petiole 0.5–1(–2) mm, pubescent initially. *Flowers* solitary and remote in the upper axils, sessile or almost so. Peduncle 0. Pedicel stoutish, glabrous, up to 1.5 mm, ± hidden by several ovate, obtuse, ciliate bracts. *Calyx* glabrous, tube obconical-campanulate, 2–2.5 mm, lobes broadly ovate-subacuminate, ciliate, *c.* 1 mm. *Corolla* broadly ovoid-urceolate, contracted apically, rather fleshy, pale pink to blood-red, (4–)5–6(–7) by (2.5–)3–4 mm, glabrous outside, hairy within the upper third inside, lobes 1–1.5 mm. *Filaments* narrow-linear, laxly hairy in the lower part to almost glabrous, 2–3 mm; anther-cells oblong, *c.* 1 mm, with 2 very short or obscure dorsal spurs; tubules nearly as wide as cells, hardly 0.5 mm, ± obliquely cut apically. *Disk* glabrous. *Style* rather thick, glabrous or laxly subpatently hairy, 3–4(–5) mm. *Fruit* subglobose, truncate at the apex and crowned by the ± inflexed short calyx lobes, 3–4 mm ø.

Distr. *Malesia*: East New Guinea (Star Mts: Mt Sirius; Hunstein, Finisterre and Saruwaged-Rawlinson Mts, Mt Amungwiwa S. of Wau, Wharton Ra., Southern Highlands Distr. and Mt Victoria region).

Ecol. Mostly epiphytic in moss forest or alpine scrub, or terrestrial on forest borders, in *Miscanthus* grass swamp or in open hill side, (1050–)2000–3500(–3600?) m. *Fl. fr.* Jan.–Dec.

Vern. *Ant, walakamp*, Mendi.

34. Vaccinium haematochroum SLEUM. Blumea 12 (1963) 126.

Semiprostrate or decumbent, few-branched shrublet, up to 35 cm. Branchlets slender, densely leaved youngest parts and petioles set with a few long white hairs, older ones quite glabrous. *Leaves* elliptic, apex and base broadly attenuate to almost rounded, the basal pair of marginal glands small and impressed above the base, 5–7 by 3–4 mm, glabrous except scattered minute glandular hairs beneath, entire, nerves and one pair of basal and one pair of upper curved-ascending nerves rather obscure above, slightly prominent beneath; petiole 1–1.5 mm. Flowers solitary. Peduncle 0. Pedicel nodding, slender, glabrous or with a few glandular subpatent hairs distally, 2–3 mm. Calyx glabrous, tube subcylindric, base truncate, 0.6 mm, lobes deltoid, 0.8 mm, the apical gland small. Corolla ovoid-urceolate, much attenuate upwards, glabrous outside, laxly hairy in the upper half inside, blood red, fleshy, *c.* 5 by 2.5–3 mm below, lobes hardly 1 mm. *Filaments* linear, laxly subpatently longish white-hairy in the lower third, 2.5 mm; anther-cells broad-oblong, echinulate, *c.* 1.4 mm including the equally wide, very short tubules. *Disk* thick, glabrous. *Style* slenderly columnar, glabrous, 3.5 mm.

Distr. *Malesia*: West New Guinea (Wissel Lakes), once found.

Ecol. In apparently secondary forest on stony sand derived from white sandstone, at 1820 m, locally common. *Fl.* May.

Vern. *Ukwa-piepa*, Kapauku.

35. Vaccinium brachycladum SLEUM. Blumea 11 (1961) 26.

Terrestrial shrub, 1–1.5 m, densely branched distally. Branches 4–5 mm ø. Branchlets brown, angular, 1–1.5 mm ø, subdensely shortly patent-hairy. *Leaves* dense, obovate or elliptic-obovate, apex almost rounded and not rarely a little retuse, ± broadly cuneate into the petiole, the 2 basal marginal glands small, found in 1–2 mm distance from the petiole, coriaceous, laxly appressedly glandular-muriculate beneath, glabrous otherwise, entire, submarginate, 1–1.5 by 0.6–0.9(–1) cm, edge flat, midrib slightly impressed above, or prominent beneath, nerves in 2–3 basal and suprabasal pairs, obscure above, not much conspicuous beneath, no reticulation; petiole thickish, pubescent initially, *c.* 2 mm. *Flowers* solitary in the upper axils, sessile, nodding, surrounded at the base by several narrow-deltoid, glabrous, ciliate bracts, *c.* 2 mm. *Calyx* glabrous, tube campanulate, *c.* 2 mm, lobes triangular, bluntish, ciliate especially distally, 1.5 mm. *Corolla* subcylindric-urceolate, *c.* 7 mm long, 3 mm ø at the base, 2 mm ø at the opening, red, fleshy, glabrous outside, laxly hairy at the mouth inside, lobes erecto-patent, 1.3 mm. *Filaments* linear, laxly hairy below, glabrous upwards, wavy, 1.2–1.5 mm; anther-cells oblong, 1 mm; tubules nearly as wide as the cells, 0.5 mm, obliquely cut distally. *Disk* glabrous. *Style* columnar, glabrous, *c.* 7 mm.

Distr. *Malesia*: Central New Guinea (Star Mts: on Mt Antares), 3000 m. *Fl.* July.

36. Vaccinium hatamense BECC. Malesia 1 (1878) 210; SLEUM. Bot. Jahrb. 72 (1942) 226; Blumea 11 (1961) 27; *ibid.* 12 (1963) 125.

Epiphytic or terrestrial, often trailing shrublet, 30–50 cm. Branchlets angular at the slightly puberulous or almost glabrous tips. *Leaves* narrow-obovate, apex rounded or not rarely subemarginate, base ± long cuneate and somewhat decurrent into the petiole, with a minute depressed marginal gland on each side a little above the very base, coriaceous, glabrous, entire, marginate, edge faintly recurved, 1–1.5(–1.7) by 0.4–0.5(–0.7) cm, midrib and nerves obsolete above, hardly visible beneath; petiole *c.* 1 mm. *Flowers* sparse, solitary in the upper axils, quite glabrous in all outer parts. Peduncle 0. Pedicel 1–1.5 mm, with several scarious, ovate, subacuminate basal bracts, 0.8 mm. *Calyx* tube obconical, 1.5 mm, lobes triangular, subacute, not ciliate, 1.5 mm. *Corolla* ventricose, much attenuate distally, *c.* 4 by 3.5 mm, sparsely glandular outside, hairy in the upper third inside, pinkish red, lobes whitish. *Stamens* 8; filaments filiform, rather villous, 2 mm; cells oblong, not spurred, *c.* 1 mm; tubules nearly as

wide as the cells, 0.5 mm, opening by wide sub-oblique slits. *Disk* glabrous. *Style* glabrous, equalling the corolla.

Distr. *Malesia*: New Guinea, known from the Vogelkop Peninsula (Arfak Mts, Nettoti Ra.) and the Wissel Lakes region; sterile specimens with similar leaves found in the Gauttier and Cycloop Mts.

Ecol. In heath or summit vegetation. also epiphytic in moss forest, locally common, 1525–2150 m. *Fl.* Jan.–Dec.

37. Vaccinium parvulifolium F. v. M. Trans. R. Soc. Vict. 1, 2 (1889) 20; SLEUM. Bot. Jahrb. 72 (1942) 235; Blumea 11 (1961) 27.

Epiphytic, small, dense shrub. Branchlets in the youngest parts subangular, puberulous and minutely verruculose. *Leaves* dense, obovate, sometimes suborbicular-obovate, apex rounded or faintly emarginate, base ± cuneate, the 2 basal marginal glands distant from the petiole, coriaceous, pale, ± shiny, convex above in dry specimens, glabrous, entire, margin slightly cartilaginous, but little or not revolute, (0.4–)0.5–0.7(–0.8) by 0.3–0.5 cm, midrib rather obscurely sunken above, or raised beneath, nerves subinconspicuous; petiole puberulous, slender, *c.* 2 mm. *Flowers* solitary, axillary, nodding. Peduncle 0. Pedicels *c.* 2 mm in anthesis, sometimes up to 3 mm in fruit, rather stoutish, glabrous, basal bracts several, minute. *Calyx* subcampanulate, quite glabrous, shining, rugulose in dry specimens, tube 2.5 mm, lobes suberect, deltoid, subacute, slightly inflexed, not ciliate, *c.* 1 mm. *Corolla* urceolate, rather thin, cream, *c.* 4 by 2.5 mm, very laxly muriculate outside, laxly hairy inside, lobes suberect, *c.* 1 mm. *Filaments* linear, glabrous or but very sparsely hairy, 1.5 mm; anther-cells broad-oblong, *c.* 0.7 mm, slightly granular, distinctly 2-spurred dorsally (0.2–0.3 mm); tubules slightly curved, narrower than the cells, ± transversely cut apically, 0.5 mm. *Disk* glabrous. *Style* columnar, glabrous, 3 mm. *Fruit* ovoid-subglobose, apex truncate, seen up to 3 mm ø, said to be yellowish.

Distr. *Malesia*: New Guinea, only known from the Owen Stanley Ra. (Mt Musgrave, Mt Tafa).

Ecol. Epiphyte in ridge forest trees, 2135–2440 m. *Fl.* May–Sept.

38. Vaccinium scyphocalyx SLEUM. Blumea 11 (1961) 27.

Epiphytic shrublet. Branches much divided distally, terete, laxly pubescent, glabrescent, 2–3 mm ø. Branchlets subangular, patently hairy, slender. *Leaves* subdense. obovate. similar to those of *V. convexifolium*, apex rounded-obtuse, cuneate towards the base, the pair of basal marginal glands minute, blackish, slightly impressed and in 1–2 mm distance from the petiole, subcoriaceous, brown when dry, a little convex above in dry specimens, glabrous at full age, sparsely glandular-punctate beneath, sometimes with a tuft of hairs at the very apex in young leaves, entire, edge revolute, 0.7–1 by 0.4–0.6(–0.7) cm, minutely corrugate above when dry, smooth beneath, midrib and two pairs of nerves not much conspicuous above, hardly or not visible beneath, no reticulation; petiole slender, pubescent, *c.* 1 m. *Flowers* solitary and sessile in the upper axils, remote, with several minute basal bracts. *Calyx* tube campanulate, glabrous, 1.2 mm, lobes triangular, subacute, smooth, ciliate, 0.8 mm. *Corolla* urceolate, pink, rather thin, laxly muriculate outside, hairy inside, *c.* 4 by 2 mm, lobes suberect, 0.7 mm, paler in colour than the corolla tube. *Filaments* subulate-linear, subdensely hairy below, narrower and glabrous upwards, 1.5 mm; anther-cells oblong, granular, 0.7 mm, shortly 2-spurred dorsally; tubules erect, *c.* half as wide as the cells, 0.5 mm, almost transversely cut apically. *Disk* glabrous. *Style* columnar, *c.* 3 mm, densely subappressedly pubescent in the lower ⅔. *Berry* subglobose, *c.* 5 mm ø and violaceous-blackish at maturity.

Distr. *Malesia*: Central New Guinea (Star Mts), 1500 m, once found.

39. Vaccinium versteegii KOORD. Nova Guinea 8 (1909) 190; J. J. S. *ibid.* 12 (1917) 520; *ibid.* (1918) t. 210; SLEUM. Bot. Jahrb. 72 (1942) 227; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 482; SLEUM. Blumea 11 (1961) 28; *ibid.* 12 (1963) 125.

Epiphytic or terrestrial and semiscandent, much branched shrub, 0.5–2(–3) m. Branchlets slender, clothed with short, ± spreading hairs in the younger subangular, glabrescent and dark-corticate in the older terete parts. *Leaves* subdense, elliptic or oblong-obovate to obovate, apex ± rounded, base cuneate to various degree, with a minute impressed marginal gland in some distance from the petiole on each side, rather fleshy when fresh, coriaceous and not rarely rugose above in dry specimens, glabrous besides some hairs at the base of the midrib beneath, often glabrous all over epunctate, entire, margin manifestly revolute, (0.7–)1–2.3 by (0.6–)0.8–1.1 cm, midrib slightly sunken above, prominent beneath, nerves in *c.* 3 erecto-patent pairs, anastomosing, often ± obsolete, reticulation rather inconspicuous; petiole pubescent, *c.* 2 mm. *Flowers* solitary, axillary, subsessile. Peduncle 0. Pedicel hardly 1 mm, ± included by several minute ovate subacuminate, obtuse, glabrous, thin bracts. *Calyx* subdensely short-hairy, tube obconical, somewhat 5-angular, *c.* 1.5 mm, limb expanded, 1 mm, very shortly 5-lobed or -denticulate. *Corolla* depressedly ovoid-urceolate, much contracted distally, ± laxly short-glandular-hairy or muriculate all over or only in the upper half outside, fleshy, dark to brownish red, *c.* 3.5 by 3 mm, lobes recurved, *c.* 1 mm. *Filaments* subulate, wavy, densely pubescent or almost villous, 1–1.5 mm; anther-cells oblong-ovate, 0.8 mm; tubules broad, 0.5 mm. *Disk* glabrous. *Style* stout, glabrous, *c.* 2.8 mm. *Fruit* subsemiglobose, apex much truncate, pubescent, purplish blackish, 5–7 mm ø at full maturity.

Distr. *Malesia*: New Guinea (Tohkiri and Tamrau Mts, southern part of the Oranje Mts, the Sibil valley, and from the Palmer R. in the Western Distr.).

Ecol. In forest, often as an epiphyte in canopy trees, 80–1520 m. *Fl.* Jan.–Dec.

Note. Specimens with similar, but larger and thinner, conspicuously reticulate leaves have been found at the Rouffaer R. and near Dalman (Geelvink Bay), at 175–500 m.

40. Vaccinium myrsinoides SCHLTR, Bot. Jahrb. 55 (1918) 173; SLEUM. *ibid.* 72 (1942) 227; Blumea 11 (1961) 28. — *V. collivagum* SLEUM. Bot. Jahrb. 72 (1942) 227.

Epiphytic or terrestrial, much branched shrub, up to 1.2 m. Branchlets rather stout, densely leaved, tips angular and laxly hairy or subvillous, older parts subterete, early covered with an ashy cork. *Leaves* obovate to elliptic-obovate, apex shortly obtusely attenuate to rounded, base cuneate into the petiole, the 2 small basal marginal glands markedly distant from the petiole, coriaceous or nearly so, entire, the very edge slightly revolute (the whole lamina not rarely a little convex above in dry specimens), first puberulous at the midrib and petiole, quite glabrous with age, with scattered, dark, very short, appressed glandular hairs or points beneath, 0.8–1.3 by (0.3–)0.4–0.7 cm, midrib and 1(–2) pairs of ascending nerves faintly raised on both faces, not rarely ± inconspicuous, no reticulation; petiole 1–2 mm. *Flowers* axillary, solitary, sessile or almost so, basal bracts rather numerous, ovate, subacute, stiffly membranous, glabrous, ciliolate, 1–2.5 mm, covering the lower part of the calyx. *Calyx* campanulate, all over laxly short-hairy, tube 2 mm, lobes erecto-patent, ovate-deltoid, subacute, ciliolate, with blackish points dorsally, *c.* 1 mm. *Corolla* narrow-ovoid-urceolate, contracted at both ends, fleshy, dark red or crimson, sparsely set with very short glandular hairs, but no proper pubescence outside, or nearly glabrous, *c.* 5–6 by *c.* 2.5 mm, lobes paler, recurved, 1.5 mm. *Stamens* 10 or 8; filaments subulate, very laxly hairy, *c.* 1.3 mm; cells ovate-oblong, *c.* 1 mm, no spurs; tubules as long and wide as the cells, obliquely cut apically. *Disk* glabrous. *Style* columnar, glabrous or papillose, *c.* 5 mm.

Distr. *Malesia*: New Guinea (Schrader Mts, Upper Minj R. valley in the Western Highlands, and Mt Victoria).

Ecol. In mountain thickets or open hill side, 2070–3410 m.

41. Vaccinium convexifolium J. J. S. Med. Rijksherb. *n.* 25 (1915) 10; Nova Guinea 12 (1917) 527; *ibid.* (1918) t. 216; SLEUM. Bot. Jahrb. 72 (1942) 228; Blumea 11 (1961) 28.

Much branched shrub, 2–5 m. Branchlets slender, densely patently hairy or almost tomentose in the new shoots, gradually glabrescent with age, older parts grey-corticate. *Leaves* subdense, obovate, apex obtuse or rounded, rarely slightly emarginate, base cuneate, the 2 basal marginal glands in some distance from the petiole, coriaceous, glabrous besides the shortly barbate extreme apex, ± convex above in dry specimens, entire, edge slightly revolute, 0.7–1 by 0.5–0.7 cm, midrib impressed above, a little raised beneath, nerves and veins ± obsolete above, faintly prominent beneath; petiole pubescent, 1.5–2 mm. *Flowers* axillary, solitary, subsessile. Peduncle 0. Pedicels up to 1.5 mm, ± included by several concave, oblong-ovate, glabrous bracts, 1.5 mm. *Calyx* turbinate, ± densely short-pubescent, tube 1–1.5 mm, lobes triangular, acute, c. 0.8 mm. *Corolla* narrowly ovoid-conical, shortly subtubular-contracted at the base, gradually narrowed distally, fleshy, red, laxly glandular-muriculate, but not properly hairy outside, 7–8(–9) by (2.5–)3(–3.5) mm, lobes ovate-orbicular, paler, suberect, *c.* 0.8 mm. *Filaments* linear, laxly hairy at the base, glabrous above, *c.* 1 mm; anther-cells broad-oblong, *c.* 1 mm; tubules as wide as the cells, very short, obliquely cut distally. *Disk* glabrous. *Style* somewhat thickened in the middle, papillose, *c.* 7 mm.

Distr. *Malesia*: West New Guinea (Hellwig Mts), in ridge forest at 2600 m. Once found.

42. Vaccinium taxifolium SLEUM. Blumea 11 (1961) 29.

Small epiphytic shrub, laxly thin-branched. Branchlets slender, densely shortly subhispidulous-pubescent in the youngest, glabrescent in the older parts. *Leaves* subdense, narrow-oblong, apex obtuse or rounded, base subtruncate-obtuse, the basal marginal glands rather inconspicuous, found almost on the petiole, subcoriaceous, rather firm, glabrous except the very base and the petiole which are subhispidulous-pubescent, laxly glandular-punctate beneath, entire, marginate, edge not rarely a little revolute, 0.9–1.8 by 0.2–0.4 cm, midrib and nerves rather inconspicuous above, slightly raised beneath, nerves in 3–4 pairs coming in an acute angle from the midrib, high-ascendent and subparallel to the margin, reticulation fine and visible beneath only; petiole 1–1.5(–2) mm. *Flowers* axillary, solitary, nodding. Pedicels rather slender, glabrous, (5–)6–9(–10) mm, base involucrate by several minute bracts, 0.5–1 mm. *Calyx* mostly all over ± densely shortly hispidulous-pubescent or almost villous, rarely glabrescent at the lobes, tube turbinate, 1–1.5 mm, limb spreading, 5-partite to nearly the base, lobes deltoid, subacute, 1–1.3 mm. *Corolla* urceolate, thin, fiery red, glabrous outside, laxly long-hairy in the upper part inside, 6–8 by 3–5 mm, lobes obtuse, suberect, 1 mm. *Filaments* filiform, a little dilated at the base, laxly pubescent in the lower ⅓, 3–3.5 mm; anther-cells broad-oblong, echinulate, 0.8–0.9 mm; tubules nearly as wide and long as the cells, apex obliquely truncate. *Disk* laxly long-hairy. *Style* thickish, glabrous, 4–5 mm.

Distr. *Malesia*: West New Guinea (Wissel Lakes region), at 1800–2900 m. Twice found. *Fl.* Aug., Oct.

43. Vaccinium wondiwoiense J. J. S. Nova Guinea 18 (1936) 114, t. 29, f. 1; SLEUM. Bot. Jahrb. 72 (1942) 228; Blumea 11 (1961) 29.

Small, apparently epiphytic shrub. Branchlets very slender, shortly patently pubescent. *Leaves* lax, oblong-elliptic, apex and base equally gradually attenuate and ± obtuse, the basal marginal

glands hardly visible, subcoriaceous, glabrous, entire, edge subrevolute, 2.5–3 by 0.8–1 cm, 3(–5)-plinerved, other pinnate nerves in 3–4 pairs higher from the midrib, irregular, anastomosing, midrib and nerves slightly prominent on both faces, reticulation dense, equally raised and well visible; petiole slender, 1–1.5 mm, pubescent. *Flowers* axillary, solitary. Peduncle extremely short or none, with several vaginular small bracts. Pedicel slender, glabrous below, gradually dense patently hairy upwards, *c.* 4 mm. *Calyx* all over densely shortly hispid-hairy, tube obconical, slightly 5-angular, 2 mm, lobes broad-triangular, 0.5 mm. *Corolla* ovoid-urceolate, glabrous, membranous, red, *c.* 5(–6) by *c.* 3 mm. *Filaments* subulate, laxly hairy in the lower half, glabrous and more filiform above, 3.5 mm; anther-cells oblong, echinulate, 1 mm; tubules ± as wide and long as the cells, obliquely cut apically. *Disk* sparsely long-hairy. *Style* glabrous, 5 mm.

Distr. *Malesia*: New Guinea (Wondiwoi Mts on Wandammen Peninsula, Geelvink Bay), at 1800 m. One collection.

44. Vaccinium schultzei SCHLTR, Bot. Jahrb. 55 (1918) 173; SLEUM. *ibid.* 72 (1942) 228; Blumea 11 (1961) 29.

Erect, branched, apparently small shrub. Branchlets erecto-patent, subvillous initially, tardily glabrescent. *Leaves* lax, elliptic or ovate-lanceolate, bluntly acuminate, coriaceous, glabrous, slightly recurved at the edge, 2.5–4.3 by 1–1.8 cm. *Flowers* axillary, solitary, nodding. Peduncle apparently 0. Pedicel slender, glabrous, 8–10 mm, with a few small basal bracts. *Calyx* patelliform, puberulous, *c.* 3.7 mm long in all, lobes triangular, subacute, ciliate. *Corolla* subglobose-urceolate, glabrous and rugulose outside, sparsely hairy inside, apparently light pink, 7 by *c.* 5 mm, lobes broadly ovate, subacute, erecto-patent. *Filaments* subulate, hairy, shortly longer than the anthers, the latter oblong; tubules with oblique oblong pores. *Disk* glabrous. *Style* cylindric, glabrous, 6 mm.

Distr. *Malesia*: NE. New Guinea (Sepik R., bivouac 48 at *c.* 4°45′–141°10′), once found.

Note. Translated from the original Latin description, as the type material is lost and the species not yet recollected.

45. Vaccinium cyclopense J. J. S. Nova Guinea 12 (1914) 156, t. 44; *ibid.* 18 (1936) 112, *p.p.*; SLEUM. Bot. Jahrb. 72 (1942) 228; Blumea 11 (1961) 29; *ibid.* 12 (1963) 125. — *V. cyclopense* J. J. S. *var. arfakense* J. J. S. in Gibbs, Arfak (1917) 171. — *V. rariflorum* SCHLTR, Bot. Jahrb. 55 (1918) 171. — *V. ledermannii* SCHLTR, *l. c.* 172.

f. cyclopense.

Terrestrial or epiphytic, laxly branched, ± trailing or pendent shrub, up to 0.6 m high. Branchlets up to 1 m long, slender, rooting, tips of new shoots subangular, densely short-pubescent, older parts more terete and glabrescent, laxly to subdensely leaved. *Leaves* dark green above, much paler beneath, varying in shape and size, ovate to ovate-elliptic, sometimes elliptic, rarely lanceolate-elliptic, apex blunt to rounded, base ± rounded or subcordate, the basal pair of marginal glands found near the petiole and often hardly noticeable, subcoriaceous, rather firm, ciliate when young, quite glabrous with age, laxly gland-hairy or punctate beneath, entire, the very margin ± distinctly recurved, the proper lamina flat or but slightly convex above in dry specimens, (0.7–)1–1.7(–3) by (0.4–)0.5–0.9(–1.4) cm, triplinerved, midrib and one basal pair of curved-ascending nerves more conspicuous than the other higher and shorter lateral, equally anastomosing ones, reticulation rather lax, nerves and veins very slightly sunken or a little raised above, prominent beneath; petiole pubescent, 1–2 mm. *Flowers* axillary, solitary, very rarely in twos, nodding, or rarely also from defoliate axils. Peduncle, if any, very short, rarely up to 2 mm. Pedicel rather stoutish, thickened upwards, laxly hairy distally, glabrous below, (4–)5–8 mm, with several oblong-spathulate glabrous basal bracts, 1 mm. *Calyx* green or pinkish, all over ± densely subhispid-hairy, tube turbinate and 5-angular, 2 mm, limb expanded, 2 mm, its deltoid subobtuse lobes ciliate, 1.3 mm. *Corolla* subglobose-urceolate, ± fleshy, generally light to deep pink or light carmine and lobes whitish or greenish, rarely white or greenish white and lobes white or green, 6–8(–9) by 5(–7) mm, glabrous or very sparsely glandular-muriculate outside, mostly long-hairy inside, lobes spreading, 1 mm. *Filaments* subulate, *c.* 3 mm, (very) laxly pubescent at and somewhat above the base; anther-cells oblong, echinulate, 1 mm; tubules as long and wide as the cells, obliquely cut apically. *Disk* laxly long-hairy. *Style* red, columnar to club-shaped, glabrous or sometimes with a few hairs at the base, *c.* 5 mm. *Fruit* a soft, purplish or pale violet, or sometimes whitish berry, subglobose, apex truncate, *c.* 5 mm ø when fresh.

Distr. *Malesia*: New Guinea (from the Vogelkop Peninsula to the Cycloop, Torricelli and Finisterre Mts, Mt Saruwaged area, in the Main Range from the Star Mts to Mt Victoria), apparently widespread, though local.

Ecol. In mossy mountain (Nothofagus) forest, 800–2900(–3300?) m. *Fl.* Jan.–Dec.

Vern. *Midjimserei*, *mungat*, Hattam, *foyo*, Wapi.

Note. Flowers not rarely galled, altered into whitish or greenish or reddish hairy globules.

***f.* glabrum** SLEUM. Blumea 11 (1961) 30; *ibid.* 12 (1963) 125.

Calyx glabrous dorsally, lobes long ciliate or fimbriate. Pedicels glabrous, (4–)5–6 mm. *Corolla* pale to deep pink, lobes cream or green.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Tamrau, Nettoti and Arfak Mts; central part: Sibil Valley).

Ecol. In dense mossy forest, sometimes together with *f. cyclopense*, 1260–2100 m. *Fl.* Jan.–Dec.

46. Vaccinium culminicolum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 91; SLEUM. Bot. Jahrb. 72 (1942) 229; Blumea 11 (1961) 30.

Low shrublet, apparently epiphytic. Branchlets very slender, youngest parts ± densely hispidulous-hairy. *Leaves* lax, ovate to elliptic-ovate, apex ± rounded or at least obtuse, if narrowed, base rounded or mostly slightly cordate, the basal pair of marginal glands invisible, coriaceous, rather firm, glabrous except some long hispid hairs which may be found at the margin and the base initially, laxly glandular-punctate beneath, (0.8–)0.9–1.2 (–1.3) by (0.5–)0.6–0.8 cm, entire, marginate, *i.e.* the edge a little thickened, quite flat, midrib faintly impressed above, hardly raised beneath, nerves obscure; petiole 1 mm, hispid-hairy. *Flowers* solitary, axillary. Pedicels 2–3 mm, subdensely white-hispid-hairy as is the whole calyx to a lesser degree, basal bracts minute. *Calyx* tube campanulate, base rounded, *c.* 2 mm, limb spreading, lobes deltoid, subobtuse, 1.5 mm. *Corolla* subglobose-urceolate, thin, colour not known, glabrous outside, hairy in the upper part inside, *c.* 8 by 6 mm, lobes suberect, *c.* 2 mm. *Filaments* filiform, laxly hairy but immediately above the base, glabrous otherwise, 4 mm; anther-cells oblong, echinulate, *c.* 1 mm; tubules as wide as the cells, 0.7 mm, obliquely cut apically. *Disk* laxly hairy. *Style* columnar, papillose, 4 mm.

Distr. *Malesia*: New Guinea (ascent from Utakwa R. to Mt Carstensz), 3200–3800 m, once found.

47. Vaccinium piceifolium WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 92; SLEUM. Bot. Jahrb. 72 (1942) 231; Blumea 11 (1961) 31. — *V. crassiflorum* (*non* J. J. S. 1912 & 1914) J. J. S. Nova Guinea 12 (1917) 526; SLEUM. Bot. Jahrb. 72 (1942) 231, *p.p.* — *V. sp.* KOORD. Nova Guinea 8 (1912) 884.

Small shrub, up to 0.5 m. Branchlets rather stiff, young parts angular, very laxly hairy or glabrous. *Leaves* dense, with thick, decurrent leaf-cushions, narrow-oblong, apex short-attenuate, obtuse, often with a minute gland, base subcuneate into the petiole, the basal pair of marginal glands hardly visible, coriaceous, glabrous, ± shining, very laxly glandular-muriculate or practically glabrous beneath, flat, 0.7–1(–1.2) by 0.2–0.3 cm, entire, midrib faintly impressed above, prominent beneath as are the 1–2 pairs of basal or a little suprabasal, steeply high-ascending nerves, these not rarely rather obscure above, no reticulation; petiole 0.5–1 mm. *Flowers* axillary, solitary, nodding, quite glabrous in all outer parts. Pedicels 5–7 mm at anthesis, rather stoutish, with a few shortly stalked glands at the articulation with the calyx, basal bracteoles ovate-oblong, *c.* 1 mm. *Calyx* tube turbinate, slightly 5-angled, 2 mm, limb much spreading, lobes triangular, 1.5 mm. *Corolla* ovoid-urceolate, glabrous outside, very laxly hairy inside, *c.* 6 by 4 mm, fleshy, red, lobes 1 mm. *Filaments* linear, laxly hairy in the lower part, 2 mm; anther-cells oblong, echinulate, 1.3 mm; tubules cylindric, erect, narrowed upwards, 0.7 mm, obliquely cut distally. *Disk* glabrous. *Style* columnar, glabrous, 3–4 mm.

Distr. *Malesia*: West New Guinea (Main Range from Mt Carstensz to Hellwig Mts and Mt Goliath).

Ecol. In ridge forest or in summit vegetation, 2000–2600 m. *Fl.* Nov.–Dec.

48. Vaccinium pugionifolium SLEUM. Bot. Jahrb. 72 (1942) 230; Blumea 11 (1961) 31.

Suberect shrub, 20–30 cm. Branchlets pubescent at the tips, glabrescent below. *Leaves* dense and almost distichous, narrow-lanceolate, apex gradually acuminate, subacute, base cuneate, subcoriaceous, glabrous, 0.6–1.1 by *c.* 0.2 cm, midrib slightly sunken above, nerves inconspicuous on both faces; petiole hardly 1 mm. *Flowers* axillary, solitary, nodding, glabrous in all outer parts. Peduncle 0. Pedicel rather slender, 5–6(–7) mm, with a few acicular basal bracts. *Calyx* turbinate, contracted at the base, *c.* 3 mm including the lobes, the latter broadly triangular, subacute, 1.5 mm. *Corolla* ventricose-urceolate, ± fleshy, glabrous outside, laxly hairy inside, 6 by 4 mm, contracted immediately below the lobes, intensely rose coloured. *Filaments* subulate, slightly dilated and laxly hairy at the base, glabrous upwards, *c.* 2.5 mm; anther-cells oblong, 1 mm; tubules very short, nearly as wide as the cells, obliquely cut apically, the back wall thus ending in a short acumen. *Disk* glabrous. *Style* columnar, a little thickened towards the apex, glabrous.

Distr. *Malesia*: East New Guinea (Sambanga, Mt Saruwaged area), at 2000 m, once found.

Note. Copied from the original description, as the type material is lost.

49. Vaccinium bodenii WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 91; SLEUM. Bot. Jahrb. 72 (1942) 231; Blumea 11 (1961) 31.

Small shrub. Branchlets rather slender, but firm, the youngest parts angular, sparsely pubescent. *Leaves* subdensely arranged, ovate-elliptic to elliptic, apex obtuse to rounded, base very broadly attenuate to almost rounded, the pair of basal marginal glands minute, impressed, distant from the petiole, coriaceous, glabrous, laxly glandular-punctate beneath, entire, marginate, flat, 0.6–0.8 (–1) by (0.3–)0.4–0.5 cm, midrib faintly sunken above, distinctly raised beneath, nerves in 1–2 basal and suprabasal, curved-ascending pairs, slightly prominent beneath, other 1–2 pairs of higher and shorter nerves mostly less visible; petiole puberulous, 1 mm. *Flowers* solitary in the upper axils, nodding, glabrous in all outer parts. Peduncle very short (1 mm) or none, hidden in the membranous, rather numerous bracts which are oblong-ovate, ciliolate, up to 2.5 mm. Pedicel stoutish, (1–)2–3 mm. *Calyx* tube obconical, *c.* 2 mm, limb much expanded, deeply lobed, lobes ovate-deltoid, subacute, veined, *c.* 1.5 mm. *Corolla* ovoid-urceolate, laxly muriculate in the lower part or all over glabrous outside, densely hairy in the upper part inside, *c.* 5 by 3–4 mm, lobes suberect, blunt, 1 mm. *Filaments* linear,

densely pubescent, almost 3 mm; anther-cells broad-oblong, echinulate, 1.2 mm; tubules cylindric, slightly curved, narrowed upwards, 1.2 mm. *Disk* set with erect whitish hairs at the inner margin. *Style* columnar, laxly hairy, 3.5 mm.

Distr. *Malesia*: New Guinea (ascent from Utakwa R. to Mt Carstensz), 3350–3800 m, once found.

50. Vaccinium absconditum J. J. S. Nova Guinea 18 (1936) 113, t. 28, f. 2; SLEUM. Bot. Jahrb. 72 (1942) 228; Blumea 11 (1961) 31.

Small shrub, with elongate slender, rooting, *c.* 50 cm long branches. Branchlets laxly short-hairy. *Leaves* lax, ovate-elliptic or elliptic, rarely oblong-elliptic, apex ± gradually acuminate, subacute, base broadly attenuate or obtuse, more rarely nearly rounded, no basal marginal glands visible, coriaceous, hairy at the very base and on the petiole, laxly set with brownish, appressed, very short setular gland-hairs beneath, entire, margin recurved, 4–6.3 by 1.5–2.5 cm, triplinerved, midrib and nerves slightly sunken or ± obscure above, but little raised beneath, other 1–2 pairs rather indistinct; petiole 3–4 by *c.* 0.5 mm. *Flowers* solitary from defoliate axils, nodding. Peduncle glabrous, 2(–3.5) mm, with several minute basal glabrous bracts. Pedicel rather slender, glabrous or practically so, *c.* 9 mm, with 1–2 minute basal bracteoles. *Calyx* glabrous or sparsely hairy, tube campanulate-turbinate, 5-angular, 3(–4) mm, lobes broad-triangular, subacute, ciliate, *c.* 1.3 mm. *Corolla* subglobose-urceolate, much contracted distally, shortly 6-lobed, sparsely muriculate, not properly hairy outside, laxly long-hairy inside, fleshy, bright or pale red, *c.* 9 by 6–7 mm, lobes obtuse, 1 mm. *Stamens* 12, *c.* 7.5 mm; filaments linear, patently long-hairy at the base, glabrous otherwise, *c.* 5 mm; anthers bifid in the upper $^2/_5$; cells oblong, minutely echinulate, 1.5 mm; tubules nearly as long and wide as the cells, opening by oblique terminal pores. *Disk* hairy. *Style* columnar, glabrous, *c.* 6.5 mm.

Distr. *Malesia*: West New Guinea (West Nassau Mts), on moss in moss forest, 2500–2600 m, twice found.

51. Vaccinium ceramense SLEUM. Blumea 11 (1961) 31. — *V. microphyllum* (non BL.) J. J. S. in Fedde, Rep. 30 (1932) 177.

Apparently terrestrial shrublet, with slender, elongate branches, again branched distally. Branchlets very slender, patently puberulous. *Leaves* lax, elliptic or oblong-elliptic, apex rounded or mostly a little emarginate, base broadly attenuate into the petiole, the pair of marginal glands very small and found at the very base of the lamina, subcoriaceous, glabrous, sparsely glandular-punctate beneath, entire, margin slightly revolute especially towards the base, 0.7–1 by 0.4(–0.5) cm, midrib and 2 pairs of nerves sometimes a little raised beneath, often all obscure; petiole slender, pubescent, *c.* 1.5 mm. *Flowers* solitary, sparse, in one or the other axil. Pedicels rather robust, with a few glandular, but no eglandular hairs in the upper part, *c.* 5 mm, the base surrounded by several minute bracts. *Calyx* broadly campanulate, glabrous, tube turbinate, hardly 1 mm, limb spreading, 5-partite to nearly the base, lobes deltoid, acute, 1.5 mm. *Corolla* urceolate, rather fleshy, red, laxly glandular-muriculate, not properly hairy outside, laxly pubescent inside, *c.* 5 by 2.5 mm, lobes 1 mm. *Filaments* subulate, subvillous at and a little above the base, glabrous for the rest, 2.5 mm; anther-cells oblong, echinulate, 0.9 mm; tubules nearly as long and wide as the cells. *Disk* subdensely set with longish erect hairs. *Style* glabrous, 3.5 mm.

Distr. *Malesia*: Moluccas (Central Ceram: Mt Murkele).

Ecol. In primeval forest on limestone, locally abundant, at 1900–2500 m. One collection. *Fl.* July.

52. Vaccinium whiteanum SLEUM. Notizbl. Berl.-Dahl. 12 (1935) 486; Bot. Jahrb. 72 (1942) 234; Blumea 11 (1961) 32; *ibid.* 12 (1963) 126.

Epiphytic or scandent shrublet. Branchlets slender, angular at the shortly patent-pubescent tips, older parts glabrous. *Leaves* subdense, elliptic, apex rounded, base broadly cuneate to nearly rounded, the basal marginal glands very small and near the petiole, practically absent, subcoriaceous, bright pink when young, glabrous except some hairs at the base beneath, which disappear with age, laxly glandular-muriculate beneath, entire, 1.1–1.5(–1.8) by 0.4–0.6(–0.8) cm, midrib slightly impressed above, prominent beneath, nerves in *c.* 3 pairs, slightly raised on both faces, reticulation rather inconspicuous or none; petiole 0.5–1 mm. *Flowers* solitary in the axils of the upper leaves, each with 2–3 basal subulate bracteoles (*c.* 2 mm). Pedicel slender, glabrous, *c.* 1 cm at anthesis. *Calyx* glabrous, tube turbinate, 1.5 mm, limb expanded, lobes deltoid, ciliate at the apex only in early stages, 1.5 mm. *Corolla* urceolate, 6–7 by 3–4 mm, bright red, glabrous outside, pubescent inside, lobes 1 mm. *Filaments* linear, broadened at the base, pubescent below, gradually narrowed and glabrous upwards, 2 mm; anther-cells oblong, subgranular, 1 mm; tubules as long as and slightly narrower than the cells, 0.9 mm. *Disk* slightly to subdensely set with erect hairs. *Style* columnar, glabrous, 5 mm.

Distr. Melanesia: Solomon Is., in rain-forest, on Bougainville at 1500 m, locally common. *Fl.* Aug.

53. Vaccinium igneum J. J. S. Nova Guinea 18 (1936) 112, t. 28, f. 1; SLEUM. Bot. Jahrb. 72 (1942) 231; Blumea 11 (1961) 32.

Epiphytic shrub, *c.* 0.8 m, with numerous divergent branches. Branchlets terete, puberulous in the younger, glabrescent in the older parts. *Leaves* subdensely arranged, elliptic or oblong-elliptic, apex ± obtuse or very slightly emarginate, not rarely with an apical tuft of short hairs initially, base broadly attenuate to obtuse, the 2 basal marginal glands minute, impressed in some distance from the petiole, ± coriaceous, glabrous, entire, edge mostly a little revolute, 0.8–1.5 by 0.4–0.7 cm, midrib faintly sunken above, obtusely

raised beneath, nerves in 2–3 pairs, ± spreading, minutely though visibly prominent beneath only, reticulation none; petiole puberulous, 1–1.5 mm. *Flowers* axillary, solitary, nodding, glabrous in all outer parts. Peduncle hardly perceptible, occasionally up to 1.5 mm, surrounded by several minute scarious bracts (0.5–1 mm). Pedicel slender, 6–8 mm. *Calyx* tube short-conical, 1 mm, limb much expanded, almost disk-like, obscurely lobed, ciliolate, *c.* 4 mm ø. *Corolla* ovoid-urceolate, much contracted at the opening, fleshy, fiery red, glabrous outside, sparsely patently long-haired inside, 7–8 mm long, *c.* 7 mm ø below, lobes recurved, 1 mm. *Filaments* linear, dilated at the base, laxly patently long-hairy over their whole length, *c.* 3 mm; anther-cells oblong, echinulate, *c.* 0.9 mm; tubules more or less as long and nearly as wide as the cells, obliquely cut distally. *Disk* densely clothed with erect hairs. *Style* lageniform, glabrous, *c.* 4.5 mm.

Distr. *Malesia*: West New Guinea (Doormantop), in mossy forest, 1420–2480 m. *Fl.* Oct.

54. Vaccinium sororium J. J. S. Med. Rijksherb. *n.* 25 (1915) 10; Nova Guinea 12 (1917) 526; *ibid.* (1918) t. 215; SLEUM. Bot. Jahrb. 72 (1942) 232; Blumea 11 (1961) 32. — *V. cryptodon* SLEUM. Bot. Jahrb. 72 (1942) 236.

Low, ascending shrub, 10–40 cm, laxly branched from the base. Branchlets angular and puberulous at the tips, densely leaved, glabrescent below. *Leaves* elliptic to narrow- or oblong-elliptic, apex shortly apiculate-acuminate, subacute, rarely more bluntish, base broadly attenuate, the 2 (or sometimes 4) basal marginal glands minute, blackish, much distant from the petiole, coriaceous, rather stiff, ciliate when very young or immature, quite glabrous with age, margin distinctly cartilagineous, entire or with 3–4(–5) minute prominent teeth-like glands on both sides, but not properly crenate, very slightly or not revolute, 0.7–1.3(–1.4) by (0.3–)0.4–0.6(–0.7) cm, midrib a little sunken above, slightly raised beneath, nerves 2–3 ± steeply ascending pairs, faintly impressed or obsolete above, minutely prominent beneath, or ± obscure on both faces; petiole puberulous initially, 2–3 mm. *Flowers* solitary in the upper axils, glabrous in all outer parts. Peduncle generally very short (rarely up to 3 mm), with several basal, appressed, ovate to oblong-ovate, ciliolate bracts (*c.* 2 mm). Pedicel rather stoutish, 1.5–2.5 mm. *Calyx* tube cup-shaped, obtuse at the base, glaucous-purple when fresh, 2(–2.5) mm, limb ± spreading, lobes subovate-deltoid, ciliolate, 1.2–1.5 mm. *Corolla* subglobose-urceolate, much contracted at the lobes, base rounded, glabrous outside, laxly hairy in the upper third inside, fleshy, light red, darker at the base, or pink, 6–7 by 5 mm, lobes ciliolate, *c.* 1.5 mm. *Filaments* dilated above the base, linear towards the apex, papillose or mostly laxly long-hairy below, 2.5–2.7 mm; anther-cells broad-oblong, echinulate, 1.5(–2) mm; tubules nearly as long as, but a little narrower than the cells, ± transversely cut distally, pore undulate. *Disk* glabrous. *Style* thick-columnar to elongate-conical, with scattered long hairs in the lower $^3/_5$, 5.5–7 mm. *Fruit* soft and black, subglobose, *c.* 3 mm ø in dry specimens.

Distr. *Malesia*: West New Guinea (Wissel Lakes region and the Oranje Mts: Lake Habbema area, Wichmann Mts).

Ecol. In wet, peaty opening of forest, open shores of lake, or in long grass in open marsh, also on sandy or clayey soil, locally plentiful, 1800–3225 m. *Fl.* Aug.–Nov., Febr.–March.

55. Vaccinium decumbens J. J. S. Nova Guinea 18 (1936) 110, t. 26, f. 2; SLEUM. Bot. Jahrb. 72 (1942) 231; Blumea 11 (1961) 32. — *V. chionostomum* SLEUM. Bot. Jahrb. 72 (1942) 231.

Small shrub, sometimes with decumbent stem, 20–90 cm. Branchlets slender, subangular, tips puberulous and minutely verrucose. *Leaves* dense, ovate, ovate-elliptic or elliptic, sometimes oblong-ovate or -elliptic, apex gradually obtusely attenuate to almost rounded, base broadly attenuate to rounded, the pair of basal marginal glands minute, impressed at some distance from the petiole, stiff coriaceous, slightly convex above in dry specimens, glabrous, very laxly glandular-punctate beneath, whether or not provided with 1 or 2 shallow crenations on each side, i.e. entire or practically so, marginate, edge very slightly revolute or flat, 4–6(–7) by 3–4 mm, midrib a little sunken above, or prominent beneath, nerves ± obsolete; petiole early glabrescent, 1.5–2 mm. *Flowers* axillary, solitary, nodding, glabrous in all outer parts. Peduncle very short or none in general, sometimes up to 2 mm. Pedicel rather slender, 6–9 mm, with 2 subulate bracteoles (2 mm), or with several basal and slightly suprabasal lanceolate bracts, if a peduncle is not present. *Calyx* tube almost cupular, 1.5–2 mm, limb spreading, lobes triangular, bluntish at least at the tip, ciliate, 2 mm. *Corolla* broad-urceolate, rather fleshy, fiery red, 6–8(–10)? by 4–6(–8?) mm, glabrous outside, laxly hairy in the upper part inside, lobes paler in colour, ± recurved, 1.5–2(–2.5?) mm. *Filaments* linear, dilated at the base, long and ± patently hairy in the lower half, glabrous above, 2.5–3.5(–5?) mm; anther-cells oblong, very granular, 1.2–1.6 mm; tubules nearly as wide as the cells, 0.5–0.7 mm, obliquely cut apically. *Disk* glabrous. *Style* thick-columnar, glabrous, 4.5–5.5 mm.

Distr. *Malesia*: West New Guinea (Doormantop and Oranje Mts: Lake Habbema, Mt Wilhelmina area).

Ecol. On Doormantop on steep open slopes at 3200 m, in the Oranje Mts in mossy glades between tree thickets on peat ridges, locally abundant, 3225–3400 m.

Note. There are slight differences in the form of the leaves between *V. decumbens* and *V. chionostomum*, the former having ovate-elliptic or mostly elliptic, the latter more ovate to oblong- or elliptic-ovate leaves. Differences in the flowering parts, however, are very slight, and it seems reasonable, to unite these species at least preliminarily.

56. Vaccinium crassiflorum J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 52; Nova Guinea 12 (1914) 157, t. 45 A; SLEUM. Bot. Jahrb. 72 (1942) 231, *p.p.*; Blumea 11 (1961) 32, *non* J. J. S. Nova Guinea 12 (1917) 526. — *V. ciliatipetalum* J. J. S. Nova Guinea 18 (1936) 108, t. 25, f. 2; SLEUM. Bot. Jahrb. 72 (1942) 232.

Small shrub, stem mostly creeping or prostrate for the greater part, covered with a grey bark. Branches erect. Branchlets densely leaved, often reddish, youngest parts subangular and ± densely short-hairy, older ones more terete and early glabrescent. *Leaves* ovate-elliptic, apex shortly attenuate or acuminate, the very tip subacute or more bluntish, base broadly attenuate to almost rounded, the pair (or sometimes two pairs) of basal marginal glands impressed at a marked distance from the petiole, thick-coriaceous, stiff, not rarely a little convex above in dry specimens, base and petiole laxly pubescent initially, blade quite glabrous with age, very laxly blackish gland-pointed beneath, entire, edge thickened, faintly or not revolute, 0.7–0.8 by (0.3–)0.4–0.5 cm, midrib grooved above at least in its lower part, obtusely prominent beneath, nerves in *c.* 2 curved-ascending pairs, very slightly or not sunken above, somewhat raised beneath, not rarely ± inconspicuous on both faces; petiole (1–)1.5–2(–2.5) mm. *Flowers* axillary, solitary, nodding, glabrous except the calyx and the corolla which are laxly muriculate. Peduncle 0–1 mm, surrounded by several oblong ciliolate bracts (1–2 mm). Pedicel rather stoutish, (5–)6–9 mm. *Calyx* cup-shaped, tube 2 mm, limb erect, 2 mm, lobed nearly to the base, lobes deltoid, rather obtuse, ciliolate except the base. *Corolla* broad-urceolate, much contracted apically, fleshy, red or pink except the cream or whitish lobes, laxly muriculate outside, laxly long-hairy all over inside, 6–8 by 4–5 mm in dry, *c.* 1.2 by 1 cm in fresh specimens, lobes erect, ciliolate, 1.5 mm. *Filaments* subulate-linear, ± densely patent-hairy in the lower half, glabrous for the rest, 4–4.5 mm; anther-cells oblong, echinulate, *c.* 1.5 mm; tubules a little narrower than the cells, *c.* 0.8 mm, obliquely cut terminally. *Disk* glabrous. *Style* thick-cylindric, glabrous, nearly as long as the corolla.

Distr. *Malesia*: New Guinea (Doormantop and Oranje Mts including Mt Goliath).

Ecol. In open, sometimes marshy flat places or slopes with rocks, or on bogs or wet flats in alpine grassland, locally abundant, 2500–3800 m. *Fl.* Aug.–Oct.

57. Vaccinium oreomyrtus SLEUM. Bot. Jahrb. 72 (1942) 233; Blumea 11 (1961) 32. — *V. luridum* SLEUM. Bot. Jahrb. 72 (1942) 233.

Straggling, small, epiphytic shrub, loosely branched, up to 1 m. Branchlets rather densely puberulous and glandular-muriculate at the tips, finely verruculose or tubercled by the remnants of the glands at the older, glabrescent parts, subdensely leaved. *Leaves* subovate- or elliptic-oblong, apex broadly subacuminately attenuate to obtuse or almost rounded, base broadly attenuate to rounded, the pair of basal marginal glands near to the petiole, ± coriaceous, ciliate especially at the apex when very young or immature, quite glabrous (epilose) at maturity, undersurface laxly set with appressed short glandular hairs or points, entire, edge narrowly cartilagineous, flat or slightly revolute, (0.6–)0.7–1.2 by (0.3–)0.4–0.5 cm, midrib and *c.* 2 pairs of ± steeply ascendent nerves faintly impressed above, or raised beneath, not rarely ± inconspicuous on both faces; petiole rather slender, puberulous initially, *c.* 2 mm. *Flowers* axillary, solitary, practically glabrous in all outer parts. Peduncle 0–1 mm. Pedicel rather slender, 6–8 mm, basal bracts subovate-oblong, ciliate, 1–2 mm. *Calyx* tube subobconical, slightly 5-angular, 1.5–2 mm, limb spreading, lobes broadly subovate-triangular, obtuse, ciliolate, 1.5–2(–2.5) mm. *Corolla* urceolate, narrowed apically, fleshy, red, 7–8 by 4–5 mm, glabrous outside, laxly hairy in the upper part inside, lobes ± reflexed, not ciliate, *c.* 1.5 mm. *Filaments* subulate to subfiliform, except the dilated base, (very) laxly long-hairy in the lower half, 2.5–3 mm; anther-cells oblong, granular, 1–1.5 mm; tubules as wide as the cells, very obliquely cut distally, 1 mm. *Disk* glabrous. *Style* columnar, glabrous, *c.* 5 mm.

Distr. *Malesia*: New Guinea (Idenburg R. and Lake Habbema vicinity).

Ecol. In mossy forest, 1800–3000 m. *Fl.* Febr., Oct.

58. Vaccinium oranjense J. J. S. Med. Rijksherb. *n.* 25 (1915) 9; Nova Guinea 12 (1917) 524; *ibid.* (1918) t. 213; SLEUM. Bot. Jahrb. 72 (1942) 234; Blumea 11 (1961) 32. — *V. buxoides* J. J. S. Nova Guinea 18 (1936) 111, t. 27, f. 1; SLEUM. Bot. Jahrb. 72 (1942) 234. — *V. disterigmoides* SLEUM. *l.c.* 232.

See further synonym under the variety.

var. **oranjense.**

Small epiphytic shrub, up to 0.3(–2?) m, sometimes terrestrial, creeping and ascending to 10 cm. Branchlets slender, sometimes rooting, loosely short-hairy to subvillous (hairs ± spreading, *c.* 0.5 mm), subdensely leaved. *Leaves* elliptic, sometimes subovate-elliptic, apex ± rounded or slightly emarginate, base very broadly attenuate to rounded, the pair of basal marginal glands hardly visible, coriaceous and ± stiff, glabrous with age, laxly glandular-muriculate beneath, entire, the ± thickened edge distinctly revolute, (0.8–)1–1.7(–2.2) by (0.5–)0.6–1(–1.2) cm, midrib and *c.* 2 pairs of basal or somewhat suprabasal high curved-ascending nerves minutely impressed above, sometimes obtusely raised beneath, or not rarely rather indistinct on both faces, veins and veinlets obsolete; petiole 1.5–2.5 (–3) mm, pubescent initially. *Flowers* axillary, solitary, nodding, glabrous in all outer parts. Peduncle *c.* 1 (occasionally up to 3) mm, with several ovate-triangular basal bracts, *c.* 1.5 mm. Pedicel stoutish, muriculate at apex, 6–8(–9) mm. *Calyx* tube subcampanulate, 2–3 mm, limb ex-

panded, *c.* 2 mm, obtusely or subacutely 5-lobed to nearly its base, lobes deltoid, ciliate at least at apex. *Corolla* ventricose-urceolate, base rounded, fleshy, red to light rose, occasionally greenish, glabrous outside, sparsely hairy in the upper half inside, (6–)7–9(–10) mm long, 5–6 mm ø below, 3–4 mm ø at the opening in dry, *c.* 1.1 by 0.8 mm in fresh specimens, lobes 5 (or 6) ovate, pale, not ciliate, *c.* 1.5 mm. *Stamens* 10(–12); filaments subsubulate-linear, laxly long-hairy in the lower half, 3–4(–5) mm; cells oblong, echinulate, 1.6–2 mm; tubules slightly narrower than the cells, 0.6–0.8 mm, ± transversely cut apically. *Disk* glabrous. *Style* columnar, glabrous, 4–6(–7) mm. *Fruit* subglobose, apex truncate, *c.* 4 mm ø when dry, soft and blue when fresh.

Distr. *Malesia*: New Guinea (Doormantop and Oranje Mts).

Ecol. Epiphytic in subalpine forest, also terrestrial in thin open forest, or sometimes massed on open ground with rocks, locally abundant, 3000–3600 m.

var. **marginellum** (SLEUM.) SLEUM. Blumea 11 (1961) 33. — *V. marginellum* SLEUM. Bot. Jahrb. 72 (1942) 229.

Differs from *var. oranjense* by the laxly or mostly subdensely hispid-hairy calyx and the rather densely long-hairy disk. *Leaves* 1–1.5(–2) by 0.6–0.8(–1) cm.

Distr. *Malesia*: West New Guinea (Doormantop and Oranje Mts), together with *var. oranjense*, at 3250–3800 m.

59. Vaccinium microphyllum REINW. ex BL. Bijdr. (1826) 851; G. DON, Gen. Syst. 3 (1834) 857; DUNAL in DC. Prod. 7 (1839) 576; MIQ. Fl. Ind. Bat. 2 (1859) 1063; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 38; *ibid.* (1864) 221; F.-VILL. Nov. App. (1880) 121; MERR. Philip. J. Sc. 1 (1906) Suppl. 221; *ibid.* 3 (1908) Bot. 371; ELM. Leafl. Philip. Bot. 3 (1911) 1092; KOORD.-SCHUM. Syst. Verz. 3 (1914) 100; MERR. En. Philip. 3 (1923) 250; COPEL. *f.* Philip. J. Sc. 42 (1930) 600, t. 7, f. 3–7; SLEUM. Blumea 11 (1961) 33, *non* K. & G. J. As. Soc. Beng. 74, ii (1905) 62; MERR. En. Born. (1921) 464; BURK. & HOLTT. Gard. Bull. S. S. 3 (1923) 57 (= *Diplycosia elliptica* RIDL.). — *Gaultheria blumei* F. v. M. Trans. R. Soc. Vict. n. s. 1, 2 (1889) 21, *in text, sub G. mundula, nom. superfl. pro V. microphyllum* BL., *cf.* SLEUM. Reinwardtia 4 (1957) 184. — *V. mindorense* RENDLE, J. Bot. 34 (1896) 355; MERR. Philip. J. Sc. 2 (1907) Bot. 293.

Dwarfed, generally epiphytic, rather rigid shrub, often with elongate, slender branches, up to 50 cm. Branchlets subterete, puberulous, subdensely or mostly rather laxly leaved. *Leaves* elliptic, ± obtuse-rounded at both ends, apex not rarely a little emarginate, the 2 basal marginal glands minute, found in a marked distance from the petiole, subcoriaceous, or sometimes almost chartaceous, glabrous except some hairs at the very base and on the petiole, laxly glandular pointed on the undersurface, entire, edge slightly revolute or flat, hardly marginate, (0.6–)0.7–1.5 (–2) by (0.4–)0.6–0.8(–0.9, rarely up to 1.2) cm, midrib and 2 pairs of basal or a little suprabasal nerves high curved-ascending, faintly impressed above or raised beneath, other higher nerves 1–2 pairs, anastomosing with the basal ones, and often less visible, veins generally forming a faint reticulation on both faces especially beneath, but sometimes (Philippines) rather inconspicuous; petiole 1–2 mm. *Flowers* in few of the upper axils, solitary, subpendulous, glabrous (epilose) in all parts. Peduncle 0–1 mm, surrounded by minute bracts, 1–1.5 mm. Pedicel slender, 5–7 mm, with some stalked glands distally. *Calyx* tube obconical, very laxly muriculate, *c.* 2 mm, limb suberect, lobes deltoid, subacute, keeled, 1–1.5(–2) mm. *Corolla* subglobose-urceolate, contracted distally or subapiculate, rather thin, red, greenish yellow, cream or white, 4–5(–6) mm long, 3–4 mm ø below, 1.5–2 mm ø distally, glabrous or very laxly muriculate outside, sparsely hairy in the upper part inside, lobes suberect, 1 mm. *Filaments* linear, base dilated, glabrous or practically so, *c.* 2.5 mm; anther-cells broadly oblong, echinulate, 0.8–1 mm; tubules as wide as, but a little shorter than the cells, very obliquely cut apically, the back wall in form of a tooth. *Disk* glabrous. *Style* columnar, glabrous, ± equalling the corolla in length. *Berry* ovoid- or obconical-subglobose, apex truncate, crowned by the calyx lobes, 3–4 mm ø in dry specimens, said to be purple to steel-blue when ripe, covered with a thin skin, very juicy when fresh, with a fine sweet flavour, insipid. *Seeds* oval, laterally flattened, yellow, *c.* 1 mm.

Distr. New Hebrides (Espiritu Santo), in *Malesia*: Philippines (Luzon, Mindoro, Negros, Panay, Mindanao), Moluccas (Ternate, Tidore, Halmahera).

Ecol. On mossy exposed ridges and also epiphytic in moss-forest, locally common, 1400–3200 m.

Vern. Philippines: *likoplikop*, C. Bis., *manalali*, Bag.; *dělima*, Halmahera; *dělima gumi*, Ternate.

Notes. MERRILL said that in the Philippines the terrestrial form at higher altitudes and exposed situations has smaller and more densely crowded leaves (the whole plant more congested) than the epiphytic form.

The specimen from Espiritu Santo has a distinct tuft of hairs at the apex of the calyx lobes (as is often found in *V. oranjense* and other *spp.*), whilst the material from the Philippines and the Moluccas has quite glabrous calyces. *V. microphyllum* is not yet known to occur in New Guinea. Its nearest allies are *V. oranjense* (New Guinea) and *V. whiteanum* (Bougainville), the first discernable from *V. microphyllum* by the obscure venation of the leaves, larger corollas and laxly hairy filaments, the latter by a hairy disk and some minor differences.

60. Vaccinium globosum J. J. S. Nova Guinea 12 (1914) 155, t. 43; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 481; SLEUM. Bot. Jahrb. 72 (1942) 235; Blumea 11 (1961) 33; *ibid.* 12 (1963) 126. —

V. globosum J. J. S. *var. latifolium* J. J. S. in Gibbs, Arfak (1917) 171.

Erect, much branched, compact, terrestrial shrub, up to 3 m. Branchlets angular and crisped-puberulous in the new shoots, subterete and glabrescent, finally covered with dark cork in the older parts, very densely leaved. *Leaves* dark green above, paler beneath, (narrow-)obovate, apex rounded or mostly slightly retuse, base cuneate into the petiole, with no proper basal, but (1–)2–3 (–4) deeply impressed distant dark glands on each side along the entire margin, which thus becomes a more or less remotely crenate appearance, but is not properly crenate (if one gland, then this found ± in the middle on each side), glabrous except the very base and the petiole which bear some short pubescence, laxly set with very short caducous glandular hairs or points beneath, margin a little thickened, paler than the lamina and revolute, (0.4–)0.6–1.2 by 0.2–0.4(–0.5) cm, midrib faintly sunken or mostly obsolete above, slightly raised beneath as are the 2–3 pairs of rather inconspicuous, sharply ascending and anastomosing nerves, no reticulation; flush greenish or reddish; petiole slender, (1–)1.5–2 mm. *Flowers* axillary, solitary, nodding, glabrous in all parts outside. Peduncle mostly 0, rarely up to 3 mm, surrounded by several minute, mostly early caducous bracts. Pedicel rather slender, mostly glabrous, sometimes very laxly or even more rarely subdensely puberulous, 6–8 mm. *Calyx* tube cup-shaped, 1.5–2 mm, limb suberect, *c.* 1.5 mm, lobes deltoid, bluntish, not rarely with an apical tuft of short hairs (otherwise quite glabrous as is the tube). *Corolla* subglobular-urceolate, much contracted apically, *c.* 4 by 3.5 mm, waxy, of an almost transparent white, glabrous at both sides, lobes subacute, 1 mm. *Filaments* subulate-linear, laxly long-hairy to the lower ¾, *c.* 1 mm; anther-cells oblong, distinctly echinulate, *c.* 0.6 mm; tubules much narrower and a little longer than the cells, subcylindric, ± transversely cut apically. *Disk* glabrous. *Style* cylindric, glabrous, *c.* 3 mm. *Berry* subglobose, *c.* 3 mm ø in dry specimens, purplish black when ripe.

Distr. *Malesia*: New Guinea (Arfak Mts, Wandammen Peninsula: Wondiwoi Mts, and Wissel Lakes region).

Ecol. In low (moss) forest edge, in heath vegetation or summit scrub, locally common, 1800–2500 m. *Fl.* Jan.–Dec.

Vern. *Kieta*, Kapauku.

Note. A specimen with similar leaves, but shorter pedicels (flowers absent) was found on Mt Antares (Star Mts), at 3000 m.

61. Vaccinium leptospermoides J. J. S. Nova Guinea 12 (1914) 154, t. 42; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 481; SLEUM. Bot. Jahrb. 72 (1942) 234; Blumea 11 (1961) 34; *ibid.* 12 (1963) 126. — *V. urnigerum* SLEUM. Blumea 11 (1961) 30. — **Fig. 91–92.**

f. **leptospermoides. – Fig. 91–92.**

Much branched shrub, generally low and with trailing branches, rarely erect, 0.2–1(–2) m. Branchlets slender, tips puberulous to shortly hispid-hairy and glandular-verruculose, ± densely leaved. *Leaves* broadly to narrowly obovate, sometimes obovate-elliptic or even in part elliptic, apex rounded-obtuse, base cuneate, with 1(–2) pairs of minute basal marginal glands near to or not much remote from the petiole, coriaceous, somewhat convex above in dry specimens, glabrous except the short pubescence at the base and the petiole, laxly dark brownish punctate beneath, entire, edge marginate, slightly or not recurved, (0.5–)0.8–1.4(–1.8) by (0.2–)0.3–0.5 (–0.6) cm, midrib faintly impressed above or raised beneath, nerves in 2–3 steeply ascending pairs, hardly or not prominent beneath, or mostly ± obsolete on both faces, no reticulation; petiole slender, 1–1.5 mm. *Flowers* axillary, generally solitary, sometimes also in twos on the same specimen. Peduncle very short, almost imperceptible, with several ovate-oblong to lanceolate, ciliolate, basal bracts (1–2 mm). Pedicels slender, glabrous, 6–8(–10) mm. *Calyx* green or with reddish tinge, all over densely shortly hispid-hairy, tube broadly conical or turbinate, 2 mm, lobes spreading, deltoid, subacute, 1.5–2 mm. *Corolla* broadly or depressedly urceolate, much contracted apically, waxy or fleshy, deep pink to rose-red, glabrous outside,

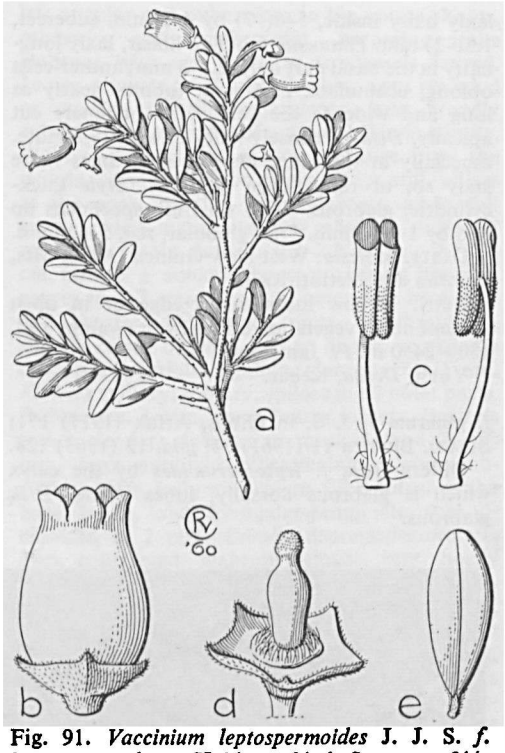

Fig. 91. *Vaccinium leptospermoides* J. J. S. *f. leptospermoides*. *a.* Habit, × ⅔, *b* .flower, × 3⅓, *c.* stamens, front and back view, × 6½, *d.* ovary, hairy disk and style, × 3⅓, *e.* leaf, × 1 (*a–e* VAN ROYEN 3860).

laxly hairy inside, 5–6(–7) by 4–5 mm, suberect, 1.3(–2) mm. *Filaments* subulate-linear, laxly long-hairy in the basal part only, 2.5–3 mm; anther-cells oblong, echinulate, *c.* 1 mm; tubules nearly as long and wide as the cells, very obliquely cut apically. *Disk* ± densely hairy or shortly hirsute, especially at the inner margin, sometimes more laxly so, or rarely even glabrous. *Style* thick-cylindric, glabrous, 3.5–4 (in fresh specimens up to 5 by 1 mm) mm. *Fruit* globular, red, 5–6 mm ø.

Distr. *Malesia*: West New Guinea (Arfak Mts, Tamrau and Nettoti Ra.).

Ecol. In low moss forest edge or in open summit heath vegetation on sandy or swampy soil, 1800–2450 m. *Fl.* Jan.–Dec.

Vern. *Derau*, Kebar.

f. **glabrum** J. J. S. in Gibbs, Arfak (1917) 171; SLEUM. Blumea 11 (1961) 34; *ibid.* 12 (1963) 126.

Differs from *f. leptospermoides* by the calyx which is glabrous dorsally; lobes ciliate. *Disk* glabrous.

Distr. *Malesia*: New Guinea, together with the typical form, 1900–2430 m.

62. Vaccinium vonroemeri KOORD. Nova Guinea 8 (1912) 883; J. J. S. *ibid.* 12 (1914) 154, *nota sub V. leptospermoides*; *ibid.* 12 (1917) 523; SLEUM. Bot. Jahrb. 72 (1942) 236; Blumea 11 (1961) 34.

Epiphytic or terrestrial shrub, 0.5–1 m. Branchlets slender, young parts subdensely clad with short ± crisp or nearly woollen hairs, older ones glabrescent, rather densely leaved. *Leaves* obovate, apex rounded or minutely emarginate, base broadly cuneate into the petiole, the basal pair of marginal glands minute or hardly visible, distant from the petiole, ± coriaceous, laxly pubescent all over initially, glabrescent, practically glabrous with full age except the very base and the petiole, laxly dark impressed-pointed beneath, entire, the very edge ± distinctly revolute, 1–2 by 0.7–1(–1.3) cm, midrib and 1 or 2 pairs of basal, high curved-ascending nerves faintly impressed or sometimes obsolete above, very slightly raised beneath, other



Fig. 92. *Vaccinium leptospermoides* J. J. S. *f. leptospermoides*. Mt Nettoti, 1850 m, NW. New Guinea (VAN ROYEN & SLEUMER 7441) (SLEUMER, 1961).

upper nerves shorter, forming a lax network with the veins, sometimes visible beneath only; petiole rather slender, *c.* 2 mm. *Flowers* axillary, solitary. Peduncle *c.* 1 mm, surrounded by several oblong bracts (1–2 mm). Pedicels slender, 5–8(–10) mm, glabrous except some hairs in the uppermost part. *Calyx* all over laxly hirsutulous, tube narrow-obconical, base nearly funnelshape-contracted, 1.5–2 mm, lobes ± spreading, triangular, subacute, 1.5 mm. *Corolla* urceolate, laxly muriculate outside, pubescent inside, 6–7 by 2.5–3 mm, red or pink at the tube, green at the lobes, the latter suberect or reflexed, obtuse, 1 mm. *Filaments* linear, slightly dilated at the base, laxly long-hairy, 3–3.5 mm; anther-cells oblong, echinulate, 1.5–1.8 mm; tubules as wide and nearly as long as the cells, obliquely cut distally, the back wall ending in a kind of tooth. *Disk* laxly long-hairy. *Style* slenderly columnar, glabrous, 4.5 mm. *Berry* said to be blackish bluish.

Distr. *Malesia*: West New Guinea (Oranje Mts: Mt Hellwig, Erica top, Mt Dromedaris).

Ecol. In shrub vegetation on summits, 1250–1900 m. *Fl.* Dec.

63. Vaccinium barbatum J. J. S. Nova Guinea 18 (1936) 109, t. 26, f. 1; SLEUM. Bot. Jahrb. 72 (1942) 235; Blumea 11 (1961) 34.

Much branched shrub. Branchlets rather stiff and short, densely short-pubescent and set with minute warts. *Leaves* dense, obovate, apex obtuse or mostly rounded, base cuneate, the 2 basal marginal glands manifestly impressed in a large distance from the petiole, coriaceous, immature ones puberulous at the base and ciliolate at the apex, mature ones quite glabrous, entire, margin paler than the rest of the lamina, flat or but very slightly revolute, 0.4–0.7 by 0.3–0.4 cm, midrib and *c.* 2 pairs of curved nerves and some veins a little sunken above in fully mature leaves, ± obsolete beneath; petiole pubescent, 1(–2) mm. *Flowers* axillary, solitary, nodding, 4–5-merous. Peduncle *c.* 1 mm, with several basal vaginate minute bracts. Pedicels rather slender, short-hairy, laxly muriculate distally, 4–6 mm, minutely bibracteolate at the base. *Calyx* turbinate, glabrous, tube 1.5 mm, lobes ovate-triangular, obtuse, ciliolate, 1–1.5 mm. *Corolla* subovoid-urceolate, glabrous at both sides, membranous, *c.* 4 by 3 mm, rose, lobes recurved, obtuse, 0.5 mm. *Stamens* 8 or 10; filaments linear, base dilated and glabrous, barbate or villous in the middle, again glabrous upwards, 1 mm; cells broad-oblong, echinulate, curved inwards, 0.5 mm; tubules ± divergent, cylindrical, recurved, more slender than the cells, 0.6 mm, transversely cut apically, the edge of the round pore slightly dilated. *Disk* glabrous. *Style* thickish, glabrous, 3 mm.

Distr. *Malesia*: West New Guinea (Nassau Mts), in moss forest, 2600 m. *Fl.* Oct.

64. Vaccinium inconspicuum J. J. S. Nova Guinea 18 (1936) 109, t. 26, f. 1; SLEUM. Bot. Jahrb. 72 (1942) 235; Blumea 11 (1961) 34.

Much branched, slender shrub, 2–3 m. Branchlets angular and puberulous in the young shoots, otherwise early glabrescent, becoming quite glabrous with age, laxly to subdensely leaved. *Leaves* obovate to elliptic-obovate, apex rounded or mostly markedly emarginate, base broadly cuneate, the basal pair of marginal glands minute, slightly impressed in a large distance from the petiole, coriaceous, not rarely rather stiff, ciliate at the apex initially, quite glabrous when full grown, entire, marginate, edge mostly ± distinctly recurved, rarely flattish, 0.9–2.2(–3) by 0.7–1.2 cm, midrib ± sunken above, prominent beneath, nerves in 1–2 steeply curved-ascending basal and 2–3 shorter and upper pairs, anastomosing, slightly raised beneath, less so above, veins laxly reticulated; petiole rugulose, glabrous, 2(–3) mm. *Flowers* axillary, solitary, epilose in all outer parts. Peduncle *c.* 1 mm, basal bracts minute. Pedicels rather slender, glabrous or muriculate, 8–9(–10) mm, base minutely bibracteolate. *Calyx* subcampanulate, laxly muriculate, tube obtuse at the base, 2 mm, lobes triangular-acuminate, apex ± ciliolate, *c.* 2 mm. *Corolla* depressed-urceolate, apex contracted, glabrous outside, very shortly hairy in the upper half inside, thick-membranous, red, 6 by *c.* 4 mm, lobes ovate, obtuse, purple, 1 mm. *Filaments* linear, base dilated, quite glabrous, nearly 2 mm; anther-cells broad-oblong, echinulate, 1.5–2 mm; tubules nearly as wide as the cells below, narrowed upwards, 1 mm, transversely cut apically or with a more introrse roundish pore. *Disk* glabrous. *Style* cylindric, glabrous, 4 mm.

Distr. *Malesia*: New Guinea (Nassau Mts (West), and the Idenburg R. near Bernhard camp).

Ecol. In mossy forest and in low scrub on exposed summits, locally common, 2100–2500 m. *Fl.* Febr., Oct.

65. Vaccinium sanguineum SCHLTR, Bot. Jahrb. 55 (1918) 172; SLEUM. *ibid.* 72 (1942) 235, *as syn. of V. globosum*; Blumea 11 (1961) 34.

Epiphytic, erect, much branched shrub, 0.4–0.6 m. Branchlets angular, quite glabrous, densely leaved. *Leaves* oblanceolate-spathulate or narrow-obovate, apex obtuse, base cuneate into the petiole, the pair of basal marginal glands small, impressed in a short distance from the petiole, coriaceous, glabrous, edge recurved, 0.9–1.4 by 0.4–0.6 cm, midrib and 1–2 steeply ascending pairs of nerves faintly impressed above or raised beneath, nerves not rarely ± obscure; petiole *c.* 1.5 mm, on a thick, decurrent leaf-cushion. *Flowers* axillary, solitary, remote, nodding, glabrous in all outer parts. Peduncle 0. Pedicel rather stoutish, reddish, 3.5–5 mm at anthesis, with several basal ovate-oblong bracts, 2 mm. *Calyx* tube short-obconical, 1.5 mm, limb erecto-patent, lobes triangular, subacuminate, ciliolate at apex, 2 mm. *Corolla* broadly ovoid-urceolate, rather fleshy, blood red, with white lobes, *c.* 5 by 3.5–4 mm, glabrous outside, laxly hairy inside, lobes suberect, ovate-triangular, subacute, 1 mm. *Filaments* linear, laxly hairy below, 1.8–2 mm; anther-cells oblong, echinulate, 1.3–1.5 mm; tubules suddenly narrowed, 0.4 mm

long, obliquely cut apically. *Disk* glabrous. *Style* cylindric, glabrous, 3.5 mm.

Distr. *Malesia*: New Guinea (Sepik Distr.: Schrader Mts, and from Star Mts: Mt Antares).

Ecol. In moss forest, 2070–2360 m. *Fl.* May, July.

Note. The above description of *V. sanguineum*, of which the type material is lost, is based on the original diagnosis and the material recently collected on Mt Antares, which in no single character contradicts the original description.

66. Vaccinium lorentzii KOORD. Nova Guinea 8 (1912) 883; J. J. S. *ibid.* 12 (1914) 157; *ibid.* 12 (1917) 521; *ibid.* (1918) t. 211; SLEUM. Bot. Jahrb. 72 (1942) 235; Blumea 11 (1961) 34.

f. **lorentzii.**

Shrub, often epiphytic, 1–3 m. Branchlets rather robust, angular, even the youngest immature shoots quite glabrous. *Leaves* rather lax, obovate, more rarely oblong-obovate, apex rounded or obtuse, sometimes minutely notched, base cuneate into the petiole, the basal pair of marginal glands minute, much distant from the petiole, coriaceous, minutely ciliate or barbate at the apex initially, very laxly gland-pointed beneath, quite glabrous on both faces with age, entire, edge mostly rather strongly revolute, 1.2–3(–3.8) by 0.8–1.3(–1.6) cm, midrib and 2 pairs of basal, high curved-ascending and anastomosing nerves faintly sunken or not rarely subinconspicuous above, slightly raised beneath, veins laxly reticulate and mostly visibly prominent beneath; petiole glabrous, 2–3 mm. *Flowers* axillary, solitary, 6–7-merous, glabrous (epilose) in all external parts. Peduncle 1–2(–3) mm, rounded by several basal, ovate-acuminate bracts, 1–2 mm. Pedicel rather stoutish, mostly bent downwards. laxly minutely glandular-muriculate, (2–)3–4(–5) mm. *Calyx* minutely glandular-muriculate, tube broadly turbinate, 2 mm, lobes spreading, triangular, subacute, ciliolate especially at apex, *c.* 2 mm. *Corolla* broadly ovoid-urceolate, contracted distally, laxly glandular-muriculate outside, patently hairy inside, fleshy, (dark) red, (7–)8–9 by 5(–6) mm, lobes ovate, obtuse, 1–1.5 mm. *Stamens* 12–14; filaments linear, subdensely to laxly long-hairy, *c.* 3 mm; cells broad-oblong, echinulate, *c.* 1.8 mm; tubules nearly as wide as the cells, 1.2 mm, obliquely cut apically. *Disk* glabrous. *Style* thick-columnar, bottle-shaped, *i.e.* much swollen below, glabrous, *c.* 4 mm. Immature *fruit* almost globose, apex truncate, *c.* 3 mm ø.

Distr. *Malesia*: New Guinea (Oranje Mts and vicinity: Hellwig and Johannes Keyts Mts, Mt Goliath).

Ecol. In moss forest, swampy shrub vegetation, open places with moss covered rocks, locally common, 1350–2500(–3000) m.

f. **puberulum** J. J. S. Nova Guinea 12 (1917) 522; SLEUM. Bot. Jahrb. 72 (1942) 236; Blumea 11 (1961) 35.

Differs from the typical form by ± densely puberulous pedicels and calyces.

Distr. *Malesia*: New Guinea, together with the typical form in the Hellwig Mts.

67. Vaccinium pullei J. J. S. Med. Rijksherb. *n.* 25 (1915) 9; Nova Guinea 12 (1917) 522; *ibid.* (1918) t. 212; *ibid.* 18 (1936) 108; SLEUM. Bot. Jahrb. 72 (1942) 235; Blumea 11 (1961) 35; *ibid.* 12 (1963) 127. — *V. hatamense* (*non* BECC.) KOORD. Nova Guinea 8 (1912) 883.

Much branched, apparently exclusively terrestrial shrub, (0.5–)1–2(–3) m. Branchlets clad with a rather lax, fine puberulence, mixed with sparse muriculate glands in the new reddish shoots or younger parts, early glabrescent below, subdensely to more laxly foliate. *Leaves* much resembling those of *V. lorentzii* in shape, size and nervation, *i.e.* obovate, or more rarely oblong-obovate, apex rounded, often slightly emarginate, base cuneate into the petiole, coriaceous, glabrous, laxly shortly glandular-muriculate or punctate beneath, entire, the very edge slightly recurved in dry specimens, 1.4–3 by 0.7–1.4 cm, 5(–7)-plinerved from and from above the base, midrib and nerves faintly sunken or almost obscure above, prominent beneath, the laxly reticulate veins but slightly so or subinconspicuous; petiole rugulose, glabrous, 2–3(–4) mm. *Flowers* axillary, often subsessile, glabrous in all outer parts. Peduncle 0–1 mm, surrounded by several ovate-subacuminate bracts, 1–2 mm. Pedicel stoutish, curved, sparsely appressed-muriculate, (1–)2 mm. *Calyx* subcampanulate, base obtuse to rounded, minutely muriculate, tube 2 mm, lobes ± spreading, triangular, ciliate at apex only, *c.* 1.5 mm. *Corolla* depressedly subglobose-urceolate, much constricted apically, glabrous outside, laxly hairy inside, thick-fleshy, (dark) red to pinkish or almost white, *c.* 5 by 4–5 mm, lobes recurved, *c.* 1.2 mm. *Filaments* linear, laxly longish patent-hairy except the uppermost part, *c.* 1.8 mm; anther-cells oblong, echinulate, *c.* 1.2 mm; tubules nearly as wide as the cells, 0.7 mm, obliquely cut apically. *Disk* glabrous. *Style* columnar, glabrous, 3.5 mm. *Fruit* blue-blackish when ripe.

Distr. *Malesia*: New Guinea (Oranje Mts, Mt Hellwig, Nassau Mts, around the Wissel Lakes, and Arfak Mts).

Ecol. In moss forest, swampy *Dacrydium* forest or shrub vegetation, 1700–2500 m, on peaty soil. *Fl.* Dec., May.

Vern. *Kieta, piepa*, Kapauku, *tembies*, Hattam.

Note. Specimens similar in leaves, but sterile or bearing no corollas, seen from the Weyland Mts, Mt Carstensz and Cycloop Mts.

68. Vaccinium whitfordii MERR. Philip. J. Sc. 2 (1907) Bot. 295; *ibid.* 3 (1908) Bot. 372; BROWN, Min. Prod. Philip. For. 2 (1921) 362; MERR. En. Philip. 3 (1923) 252; COPEL. *f.* Philip. J. Sc. 42 (1930) 594, t. 6, f. 6–8; SLEUM. Blumea 11 (1961) 35. — *Gaultheria sp.*, VIDAL, Rev. Pl. Vasc. Filip. (1886) 170.

Terrestrial or sometimes epiphytic, erect shrub

or small tree, 0.7–3(–5) m. Branchlets slender, younger parts angular and puberulous, early glabrescent. *Leaves* dense, narrowly obovate or elliptic-, or more rarely oblong-obovate, apex obtuse to rounded, base ± cuneate into the petiole, coriaceous, glabrous, laxly set beneath with minute glandular dark points, rather regularly and distantly crenulate especially in the upper part by 3–4 deeply impressed glands on each side, (0.9–) 1.2–1.5(–1.8) by 0.4–0.6(–0.8) cm, midrib slightly sunken above, somewhat prominent beneath, one basal and 1–2 suprabasal pairs of steep and high-ascending nerves sometimes faintly impressed above, or raised on both faces, but often ± obsolete, veins still less distinct, visible beneath only; petiole ± flattened, 1–2 mm, puberulous initially. *Flowers* axillary, solitary, subsessile. Peduncle hardly 1 mm, clasped by several minute ovate bracts. Pedicel stoutish, sparsely to more densely puberulent, 1–2 mm. *Calyx* glabrous, tube broadly obconical, base ± truncate, 1.5–2(–2.5) mm, lobes deltoid, obtuse by a thick dark gland, suberect, 1–1.5 mm, ciliolate. *Corolla* narrow- or subcylindric-urceolate, membranous, red, glabrous at both sides, 6–7(–8) mm long, 2.5(–3, rarely –4) mm ø below, *c.* 2 mm ø at the upper third, lobes ovate, much reflexed, 1 mm. *Filaments* subulate, dilated below, glabrous at the very base, subdensely and rather longish white-hairy otherwise, alternately 3 and 4 mm; anther-cells obovoid-oblong, 1.5 mm, slightly granular; tubules almost as wide as the cells, 1.3 mm, very obliquely cut apically, the pore widely flaring. *Disk* glabrous. *Style* slenderly cylindric, glabrous, 6–7(–8) mm, distinctly exserted when the corolla lobes are reflexed in full anthesis. *Berry* subglobose-ovoid, glabrous, *c.* 5 mm ø, purple or blackish at maturity. *Seeds* red brown, fusiform, 1 mm.

Distr. *Malesia*: Philippines (Luzon, particularly in the Mountain Prov.; Mindoro, Leyte, Negros).

Ecol. In forests, open heaths and thickets, 1000–2500 m. *Fl. fr.* Jan.–Dec.

Vern. *Fafalong*, Bon., *gutmu*, If., Ig., *katmo*, *lusong*, Ig., *parukapol*, Neg.

Uses. The berries are small, black, juicy, subacid, sweet, and of good quality; collected locally for food, not cultivated.

69. **Vaccinium amblyandrum** F. v. M. Trans. R. Soc. Vict. 1, 2 (1889) 19 (*sphalm.* '*ambyandrum*'); SLEUM. Bot. Jahrb. 72 (1942) 237; Blumea 11 (1961) 35; *ibid.* 12 (1963) 127; *ibid.* 12 (1964) 343. — Fig. 93.

KEY TO THE VARIETIES

1. Leaves oblong-elliptic, more rarely oblong or elliptic (apex ± obtuse to subacute), 0.4–0.7 (–0.9) by *c.* 0.3 cm. . . **1.** *var.* **amblyandrum**
1. Leaves larger, elliptic, elliptic-oblong or more rarely lanceolate-elliptic, 0.8–1(–1.4) by (0.4–) 0.5–0.6 cm.
2. Leaves subacute or obtuse at apex **2.** *var.* **maiusculum**
2. Leaves acute, or mostly rather pungent at apex. . . . . **3.** *var.* **pungens**

var. **amblyandrum.**

Dwarf or low shrub, erect or often decumbent, prostrate or creeping, 25–35(–60) cm, produced from a large rootstock. Branches numerous, stiff, often ± spreading, sometimes short and dense together. Branchlets subdensely set with short, whitish, crisped or ± spreading hairs in the youngest angular, glabrescent in the older subterete parts. *Leaves* rather densely arranged, reddish when young, dark green with age, oblong-elliptic, more rarely oblong or elliptic, apex and base broadly attenuate, subobtuse to subacute, coriaceous, ± shining, ciliate in the lower part initially, quite glabrous at full age, very laxly glandular-pointed beneath, 0.4–0.7(–0.9) by *c.* 0.3 cm, margin cartilaginous, slightly or not recurved, ± distinctly crenulate to subserrate-crenulate, rarely less distinctly so and seemingly entire, with a small tooth-like gland within each depression, midrib mostly faintly impressed above, slightly raised beneath, nerves 1–2 basal and suprabasal, high curved-ascending pairs, obsolete above, minutely prominent beneath as are the laxly reticulate veins; petiole pubescent, *c.* 1 mm. *Flowers* solitary in the upper axils. Peduncle 0. Pedicel glabrous or rarely hairy, 1(–2) mm, concealed by the rather large, ovate, imbricate, ciliate bracts (1.5–2 mm), which sometimes even cover the base of the calyx. *Calyx* glabrous, tube tubular-campanulate below, constricted below the limb, *c.* 2 mm at anthesis, afterwards soon swollen and subglobose, limb spreading, lobed to ⅔, lobes broad ovate-triangular, obtuse by a small terminal gland, ciliate, 1 mm. *Corolla* broad-urceolate, sometimes more open, sometimes much constricted at the opening, rather thin, white or pink, glabrous outside, laxly hairy in the upper part inside, 4(–5) by 3(–3.5) mm in dry, up to 7 by 6 mm in fresh specimens, lobes slightly spreading, 1 mm. *Filaments* alternately 1.8 and 2 mm, subulate-linear, papillose, epilose; anther-cells broad-oblong or ovate-ellipsoid, *c.* 1 mm, base of each cell apiculate-appendiculate, no dorsal spurs; tubules as wide as the cells, 0.3 mm, transversely cut, resulting in a wide round pore. *Disk* glabrous. *Style* slenderly columnar, papillose, epilose, as long as the corolla. *Berry* fleshy, purple or black, 0.7–1 cm ø when fresh, palatable.

Distr. *Malesia*: New Guinea (Main Range from the Star Mts (Mt Antares) through the Western, Eastern and Southern Highlands to Owen Stanley and Maneau Ra.).

Ecol. In forest glades, *Sphagnum* formation or other wet places in grassland, on old landslides or open hillside on cleared summits, creeping over rocks, along creeks or forest borders, often massed, 2440–3680(–4265) m. *Fl.* Jan.–Dec.

Vern. *Tadampso*, Mendi.

var. **maiusculum** SLEUM. Bot. Jahrb. 72 (1942) 237; Blumea 11 (1961) 36; *ibid.* 12 (1964) 343.

Leaves larger, elliptic-oblong, subacute or obtuse at the apex, 0.8–1(–1.4) by (0.4–)0.5–0.6 cm.

Distr. *Malesia*: New Guinea (Mt Saruwaged

region, Western Highlands (Kubor Ra.) and the SE. part of the Main Range: Mt Dayman, Mt Simpson).

Ecol. In grass- and peaty moorland, on exposed ridges, 2000–3820 m, locally plentiful.

var. **pungens** SLEUM. Blumea 11 (1961) 36; *ibid.* 12 (1963) 127. – Fig. 93.

Erect stiff shrub, 0.3–0.7 m, smaller on dry places. *Leaves* elliptic or more rarely lanceolate-elliptic, the apex distinctly acuminate, acute, or not rarely even ± pungent, 0.8–1.4 by 0.4–0.6 cm.

Distr. *Malesia*: New Guinea (Southern, Western and Eastern Highlands: Mt Giluwe, Hagen Ra., Wahgi Divide area, Mt Wilhelm).

Ecol. In shrubbery mountain side or (sub) alpine grassland or sedge-bog, or *Miscanthus* regrowth, also creeping over rock faces, locally common, sometimes together with *var. amblyandrum* but quite distinct in habit, (2040–)2400–3615 m.

Vern. *Rohn*, Enga, *kusuwamp*, Mendi.

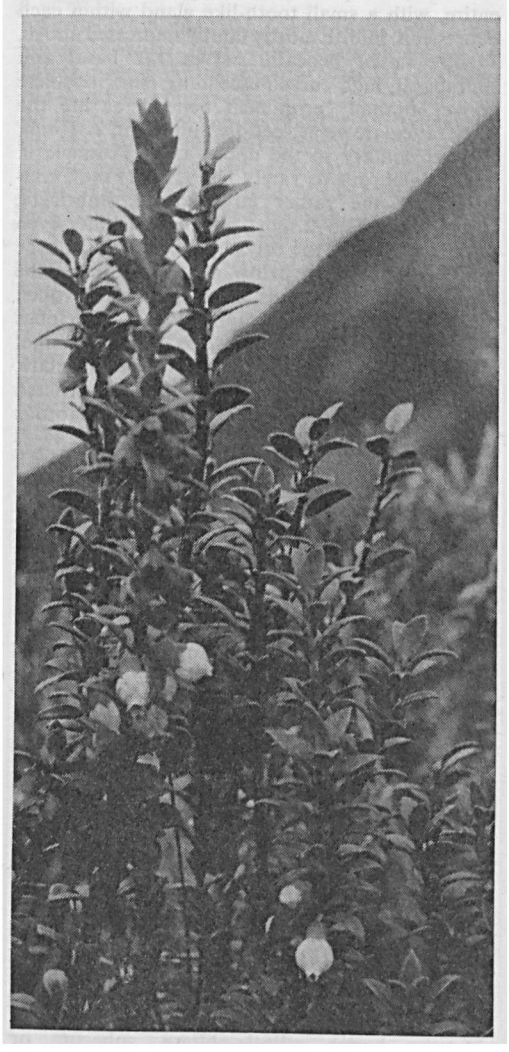

Fig. 93. *Vaccinium amblyandrum* F. v. M. *var. pungens* SLEUM. Mt Wilhelm, 3600 m, New Guinea (SLEUMER 4161) (SLEUMER, 1961).

70. Vaccinium evanidinervium SLEUM. Blumea 11 (1961) 36.

Terrestrial shrub, 1–1.5 m. Branches erect, rather robust, much branched apically. Branchlets reddish, subangular and subdensely short-pubescent at the tips, subterete and glabrescent below. *Leaves* dense, oblong-elliptic, apex shortly subacuminate-attenuate, the very tip subacute or bluntish, base ± broadly attenuate, the pair of basal marginal glands minute and in a rather wide distance from the petiole, coriaceous, glabrous, rather lustrous beneath, crenulate along the whole margin or certainly so in the upper part, or entire in the lower part of the lamina, crenations initially set with a small, rather early caducous gland, (0.9–)1–1.5 by 0.5–0.7 cm, midrib slightly impressed above, not much prominent beneath, nerves in *c.* 3 curved-ascending and anastomosing pairs hardly visible above, raised with the lax reticulation on the undersurface of young, gradually evanescent beneath in fully mature leaves; petiole slender, *c.* 2 mm. *Flowers* solitary in a few of the upper axils. Peduncle *c.* 1 mm, ± included by several small, ciliolate bracts. Pedicel rather stoutish, 3–5 mm, laxly set with fine glandular hairs or muriculate. *Calyx* green, glabrous, shining, tube rugulose, subcampanulate-obconical, 2–2.5 mm long, *c.* 2 mm ø below the limb, the latter much spreading, *c.* 1.5 mm high and 4–5 mm ø, shortly 5-lobed or -dented, lobes broadly deltoid, subacute, ciliate, 0.5 mm. *Corolla* subcylindric-urceolate, fleshy, bright red, glabrous at both sides, 9(–10) by 5(–6) mm, lobes erect, subacute, 1.5 mm. *Filaments* filiform, slightly dilated at the base, bearing a few long hairs in the lower part, glabrous otherwise, *c.* 4.5 mm; anther-cells oblong, 1.2 mm; tubules narrower than the cells, a little curved upwards and flaring at the oblique opening, 0.8 mm. *Disk* glabrous. *Style* columnar, laxly subappressedly long-hairy in the lower third, *c.* 7 by 1 mm. *Fruit* globose, blue-blackish, 5–6 mm ø.

Distr. *Malesia*: New Guinea (Mt Kinkain in the Central Kubor Ra., Western Highlands), in alpine thickets at 3560–3600 m. *Fl. fr.* July.

71. Vaccinium coelorum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 91; SLEUM. Bot. Jahrb. 72 (1942) 237; Blumea 11 (1961) 36. — *V. arenarium* SLEUM. Bot. Jahrb. 72 (1942) 232.

Prostrate shrublet. Branchlets rather stoutish, tips angular, puberulous, very densely leaved. *Leaves* from a thick leaf-cushion, subsessile, elliptic or ovate-elliptic, apex obtuse or obtusely subacuminate, base very broadly attenuate or obtuse, coriaceous, stiff, glabrous, regularly ± shallowly crenulate at least in the upper half of

the distinctly marginate (thickened), not revolute edge, laxly glandular-punctate beneath, 0.4–0.6 (–0.7) by 0.25–0.4 cm, midrib and nerves faintly impressed above, or often inconspicuous on both faces; petiole hardly 1 mm. *Flowers* axillary, solitary, nodding, glabrous in all external parts. Peduncle 1–2 mm, with several oblong basal minute bracts. Pedicel rather stoutish, 3–5(–6) mm. *Calyx* broadly turbinate, verruculose and shining in dry specimens, tube almost funnel-shaped, 1.5 mm, limb much expanded, deeply 5-lobed, lobes deltoid, subacute, laxly ciliolate, 1.5 mm. *Corolla* depressed-urceolate, the mouth contracted, glabrous outside, densely hairy inside, fleshy, red, 5–6(–7) by 5 mm. *Filaments* subulate or almost filiform, laxly to subdensely hairy, 2.5 mm; anther-cells oblong, 1.7 mm; tubules 0.3 mm, obliquely cut apically. *Disk* glabrous. *Style* thick-columnar, glabrous, 3.5–4 mm.

Distr. *Malesia*: West New Guinea (Mt Carstensz and the N. slope of Mt Wilhelmina).

Ecol. In alpine grassland and edges of subalpine forest, locally abundant on weathered sandstone, 3200–4000 m. *Fl.* Sept.

72. Vaccinium prostratum SLEUM. Bot. Jahrb. 72 (1942) 230; Blumea 11 (1961) 37; *ibid.* 12 (1963) 127.

Prostrate subshrub, 30–60 cm. Branchlets spreading, somewhat flexuous, densely leaved, tips erect, youngest parts very shortly grey-pubescent. *Leaves* lanceolate to subelliptic-lanceolate, apex gradually acuminate, subacute, base attenuate, subcoriaceous, though rather firm, dark green above, paler below, glabrous, seemingly entire, in fact with several shallow crenulations on each side in the upper part of the lamina, 0.7–1 by *c.* 0.3 cm, a little shining, midrib impressed above, no nerves or veins; petiole *c.* 1 mm. *Flowers* axillary, solitary, glabrous in all outer parts. Peduncle 0. Pedicel rather slender, 3–4 mm, with several basal and slightly suprabasal, narrow-subulate bracts. *Calyx* turbinate or subcampanulate, contracted at the base, light green, tube 2 mm, lobes broadly triangular, subacute, 1 mm. *Corolla* urceolate, fleshy, white or pink, glabrous outside, hairy inside, 6 mm, very shortly 5-lobed. *Filaments* filiform, base very slightly dilated and sparsely patently hairy, otherwise glabrous, 2.5–3 mm; anther-cells broad-oblong, papillose-granular, 1 mm; tubules very short, slightly narrower than the cells, obliquely cut distally. *Disk* glabrous. *Style* columnar, glabrous, almost as long as the corolla.

Distr. *Malesia*: New Guinea (Mt Saruwaged area), in open heath vegetation or alpine meadow on rather dry calcareous soil, 3000–3655 m. *Fl.* Febr., Oct.

73. Vaccinium wollastonii WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 93; SLEUM. Bot. Jahrb. 72 (1942) 237; Blumea 11 (1961) 37.

Shrublet. Branchlets slender, finely short-pubescent, subterete, subdensely leaved. *Leaves* lanceolate to lanceolate-oblong, ± acutely acuminate towards the apex, base ± broadly attenuate, coriaceous, regularly subserrate-crenulate at least in the distal half, margin hardly or not thickened nor revolute, 0.5–0.7 by 0.2–0.3(–0.35) cm, midrib ± obsolete above, distinctly raised beneath as are the 2(–3) pairs of basal and suprabasal nerves beneath; petiole 0.5 mm. *Flowers* axillary, solitary, nodding, glabrous in all external parts. Peduncle slender, 2(–3) mm, with several minute basal bracts. Pedicel slender, 5–6 mm, with 2–3 basal bracteoles, 1 mm. *Calyx* tube obconical-subcampanulate, 1.5 mm, limb ± spreading, lobed to almost its base, 1 mm, lobes ovate-triangular, acute. *Corolla* ovoid-urceolate, contracted at the opening, glabrous outside, laxly hairy inside, red, 5–6 by 3–4 mm. *Filaments* linear, laxly hairy at the base, 2–2.5 mm; anther-cells oblong, echinulate, 1 mm; tubules cylindric, as wide as the cells, 0.5 mm, obliquely cut distally. *Disk* glabrous. *Style* columnar, glabrous, *c.* 5 mm.

Distr. *Malesia*: New Guinea (Mt Carstensz and Mt Wilhelmina area).

Ecol. Epiphytic in subalpine forest, or terrestrial amongst grass in moist places, 2530–3800 (–4400) m. *Fl.* Sept.–Dec.

5. Section Neojunghuhnia

(KOORD.) SLEUM. Bot. Jahrb. 71 (1941) 419; *ibid.* 72 (1942) 217, 238; Blumea 11 (1961) 37. — *Neojunghuhnia* KOORD. Nova Guinea 8 (1909) 183, t. 48. — *Disiphon* SCHLTR, Bot. Jahrb. 55 (1918) 166, f. 8. — **Fig. 88, 94.**

Racemes ± lax, sometimes reduced to few-flowered fascicles or very rarely to a solitary flower; pedicels slender, elongate. Bracteoles inserted at the base of the pedicels, minute and very early caducous, practically absent. *Calyx* lobes (laciniae) long-subulate, (much) longer than the calyx tube.

Distr. *Malesia*: 13 *spp.*, in New Guinea. Fig. 88.

KEY TO THE SPECIES

1. Tubules narrow-cylindrical, parallel to, but well separated from each other, laxly set with stalked glands, transversely cut at the very apex, the pore round. Corolla at least partly pubescent.
2. Corolla ellipsoid-urceolate or ventricose, gradually attenuate at both ends, widest in the middle, white, all over laxly hairy. (Leaves (3–)4–6 by (1.5–)2–3 cm.) . . . . . **74. V. schlechterianum**

2. Corolla elongate-urceolate, very shortly attenuate at the base, long so towards the mouth, widest below the middle, but partially hairy.
3. Corolla (red) laxly hairy along 5 vertical stripes. (Leaves ovate, (2.5–)3–4 by 1–1.8 cm.). **75. V. kostermansii**
3. Corolla laxly hairy at the apex, glabrous for the rest.
4. Corolla white. Leaves ovate, 3–5.5 by (1.5–)1.8–3.5 cm, base rounded to subcordate **76. V. insigne**
4. Corolla (pale) pink with reddish lobes. Leaves narrowly elliptic-ovate, 2.5–4 by 1–1.5 cm, base broadly cuneate . . . . . **77. V. malacothrix**

1. Tubules broad-cylindrical, parallel and close to each other, never set with stalked glands, obliquely cut at the apex, the pore ± elliptic, the back of each tubule ± prolonged into a kind of tooth, which may be minutely bidented again. Corolla glabrous or practically so.
5. Calyx lobes (laciniae) ¼–⅓ as long as the total corolla at full anthesis.
6. Calyx lobes narrow-deltoid to broad-subulate, ± gradually attenuate or acuminate distally. (Anther-cells distinctly acute.) . . . . . **78. V. oreites**
6. Calyx lobes subulate, *i.e.* narrowed ± abruptly upwards from a rather broad base into a long needle-like distal part.
7. Calyx and pedicels glabrous. Anther-cells bluntish . . . . . **79. V. timonioides**
7. Calyx and pedicels laxly to subdensely patently hairy, finally ± glabrescent. Anther-cells distinctly acute . . . . . **80. V. longisepalum**
5. Calyx lobes (laciniae) at least half as long as the total corolla at full anthesis.
8. Leaves very densely imbricate, enclosing the branchlets . . . . . **81. V. imbricans**
8. Leaves more laxly to subdensely arranged, leaving the branchlets visible at least for their greater part.
9. Leaves ovate-lanceolate, (3.5–)4–5 by 1–1.6 cm, base broadly attenuate. **82. V. hispidulissimum**
9. Leaves (broadly or narrowly) ovate, base rounded to subcordate.
10. Leaves (5–)6–8 by 3–4 cm . . . . . **83. V. cardiophorum**
10. Leaves smaller, up to 5 by 2.3 cm.
11. Calyx lobes dorsally glabrous, ciliate, 4–5 mm. Branchlets and pedicels with both eglandular and gland-tipped hairs. (Leaves laxly soft-hispidulous at the midrib and edge underneath, otherwise set with sparse, shorter, dark, subappressed glandular hairs on the intervenium. Style glabrous.) . . . . . **84. V. spaniotrichum**
11. Calyx lobes densely softly hispidulous, dorsally so at least in the lower half, 6–7 mm. Branchlets and pedicels exclusively with eglandular hairs.
12. Leaves densely softly hispidulous all over the undersurface, the hairs with a manifestly thickened base which persists when the proper hair is gone as a sort of minute wart, no proper glandular hairs present. Style glabrous . . . . . **85. V. subulisepalum**
12. Leaves softly hispidulous exclusively along the midrib underneath, the base of the hairs not thickened, otherwise laxly clad with short, appressed, dark glandular hairs. Style hairy to nearly the top . . . . . **86. V. eymae**

74. Vaccinium schlechterianum SLEUM. Bot. Jahrb. 71 (1941) 425; *ibid.* 72 (1942) 240; Blumea 11 (1961) 38. — *Disiphon papuanum* SCHLTR, Bot. Jahrb. 55 (1918) 166, f. 8.

Epiphytic shrub, *c.* 1 m. Branchlets slender, subterete, younger parts densely clothed with ± patent, soft, longish hairs, older ones glabrescent, subdensely leaved. *Leaves* ovate, apex subcaudate-acuminate, base rounded to subcordate, subcoriaceous, glabrescent above, sparsely hispidulous beneath, entire, (3–)4–5(–6) by (1.5–)2–2.3(–3) cm, midrib rather strong below, much narrowed upwards, one pair of basal nerves anastomosing with 3 higher inserted pinnate pairs; petiole *c.* 3 by 1 mm. *Racemes* from the upper axils, laxly 2–3(–5)-flowered, ± patently hispidulous-villous in all parts; rachis slender, 1–1.5 cm. Pedicels slender, 1.3–2 cm, the basal bracteoles very early caducous. *Calyx* tube short-obconical or campanulate, 2 mm, limb 5-partite to the base into lanceolate-subulate 6 mm long acute laciniae. *Corolla* ellipsoid-urceolate or ventricose, rather densely hairy outside, glabrous inside, membranous, translucent-whitish, *c.* 1.4 cm long in all, *c.* 0.7 mm wide in the middle, 5-lobed at the contracted mouth, lobes obtuse, 1 mm, spreading or reflexed. *Filaments* filiform, patently long-hairy; anther-cells oblong, rather smooth, 1 mm; tubules subcylindrical, forming a wide angle with the cells, sparsely set with substipitate glands, the pore truncate, marginate, strictly apical. *Disk* hairy. *Style* said to be 1.2 cm long in the original diagnosis, only 0.75 cm in the added figure, hairy to nearly the top.

Distr. *Malesia*: New Guinea (Abrupt Mt = 'Etappenberg', Sepik Distr., April R. region), at 850 m. Once found. *Fl.* Oct.

75. Vaccinium kostermansii SLEUM. Blumea 11 (1961) 38; *ibid.* 12 (1963) 127.

Much branched, epiphytic or terrestrial shrub, (0.5–)1–4(–6) m, with pendent twigs. Branchlets laxly leaved, terete, slender and flexible, tips patently hispidulous hairy (1–2 mm), older parts glabrescent and early corticate. *Leaves* broadly to more narrowly ovate, apex rather abruptly

caudate-acuminate, acute, ending with a minute gland, base broadly attenuate or mostly rounded to slightly cordate, subcoriaceous, hairy on both faces when young, ± glabrescent above and laxly hairy on the undersurface, more densely so on the midrib and the edge beneath, the hairs long, hispidulous and erect, hardly thickened at the base, mixed with more sparse and shorter subappressed glandular hairs beneath, entire, ± revolute especially towards the base, olivaceous and dull above, brownish and a little shining beneath when dry, (2.5–)3–4(–5.5) by 1–1.8(–2.2) cm, midrib slightly impressed above, prominent beneath, lateral basal nerves in 1–2 pairs, high ascending, other upper and pinnate, irregular and curved nerves *c.* 4 pairs, all nerves curved-anastomosing, not or hardly prominent above, slightly so beneath, reticulation dense, fine, well visible beneath only; flush reddish or pink; petiole pubescent, 1–2 mm. *Racemes* axillary, much reduced, (2–)3–8-flowered, densely clothed with hispidulous patent hairs (0.5–1 mm) and more laxly with other shorter subappressed, brownish glandular hairs or stalked glands on rachis, pedicels and calyces; rachis 0.5–1 cm. Pedicels greenish, slender, 1–1.5 cm. *Calyx* greenish pinkish, tube obtusely obconical or subcampanulate-subglobose in the anthesis, 2–2.5 mm long, *c.* 3 mm ø, laciniae gradually subulate-attenuate, erecto-patent, 5(–6) by almost 1 mm at the base, hairy on both sides. *Corolla* elongate-urceolate, 10(–11) mm long in all, widest in the lower third (4–5 mm ø), constricted towards the opening to 1.5–2 mm ø, rather fleshy, red to deep pink, laxly long-hairy and glandular along 5 vertical lines or angles, which alternate with the calyx lobes, glabrous otherwise outside, lobes obtuse, reflexed, *c.* 1 mm. *Filaments* linear-subulate, glabrous at the very base, villous otherwise, 4 mm; anther-cells oblong, base obtuse, 0.7 mm; tubules cylindric, set with several stalked glands, 0.5–0.6 mm, the pore round, strictly terminal. *Disk* hispidulous-hairy. *Style* subdensely subappressedly long-hairy below, glabrous and papillose for *c.* 2 mm below the stigma, *c.* 9 mm, a little exserted at the end of the anthesis.

Distr. *Malesia*: NNW. New Guinea (Tohkiri and Arfak Mts).

Ecol. In swampy forest, or generally undershrub in light ± mossy *Nothofagus* forest, 1250–2100 m, locally common. *Fl.* Oct.–Jan.

76. Vaccinium insigne (KOORD.) J. J. S. Nova Guinea 12 (1917) 533, *in text*; SLEUM. Bot. Jahrb. 72 (1942) 240; Blumea 11 (1961) 39. — *Neojunghuhnia insignis* KOORD. Nova Guinea 8 (1909) 184, t. 48.

Epiphytic shrub. Branchlets very slender, densely clad with spreading hirsute longish (1–2 mm) non-glandular hairs in young, glabrescent in older parts, densely but not properly imbricately leaved. *Leaves* ovate, very similar in form and size to those of *V. subulisepalum*, apex subcaudate-acuminate, acute, base rounded to subcordate, with a dark basal gland on each side near the petiole, subcoriaceous, glabrescent above except the impressed midrib, ± densely set with longish suberect basally not thickened hairs beneath especially on the prominent midrib and on the edge, less so on the intervenium, the latter bearing no fine puberulence (as is found in *V. subulisepalum*), but laxly clad with numerous fine, short, subappressed glandular hairs (which are absent in *V. subulisepalum*), rather glossy on both surfaces, entire, margin ± strongly revolute especially in the lower half of the lamina (the leaf thus seemingly subrhomboid in dry specimens), 3–5.5 by (1.5–)1.8–3.5 cm, sub-3–5-plinerved, with 3–4 pairs of upper pinnate nerves, all faintly prominent on both sides and anastomosing, reticulation dense and fine, conspicuous beneath, less dense (veins only) above; petiole hispid, 1–2 mm. *Racemes* axillary, 4–8-flowered, up to 10 mm long in the immature state known up to date; outer perulae ovate or suborbicular, glabrous, 1–2 mm, inner ones ovate-acuminate, set with long hairs and very short stalked glands on the dorsal, somewhat keeled midrib and on the edge, up to 4 by 1.5 mm. Pedicels (only 3 mm long in the very young material at hand) and calyx densely villous-hirsutulous, moreover set with some stalked glands. *Calyx* lobes or laciniae seen up to 3 mm long in bud, hairy outside and in the upper part inside, no apical gland found (which is present in *V. subulisepalum*). *Corolla* glabrous except some hairs at the apex, apparently elongate-urceolate, said to be white. *Filaments* linear, glabrous below, hairy upwards; anther-cells oblong, narrowed into a cylindric tube, which bears some stalked glands, the pore strictly apical, rightly cut. *Style* glabrous except some weak hairs below, papillose below the stigma.

Distr. *Malesia*: New Guinea (crest of Mt Resi, Oranje Mts), *c.* 500 m in primeval forest, once found. *Fl.* Sept.

Note. Description enlarged on base of a more developed flower in the Leyden isotype than KOORDERS has investigated in the Bogor holotype. The anthers are of the type found in *V. schlechterianum*.

77. Vaccinium malacothrix SLEUM. Bot. Jahrb. 72 (1942) 241; Blumea 11 (1961) 39.

Climbing shrub, *c.* 15 m, with slender, densely leaved branches, pendent from lower limbs of support tree. Branchlets and petioles densely set with spreading, rather soft hispid hairs (1–2 mm). *Leaves* subimbricate, *i.e.* partly covering each other, narrowly elliptic-ovate, apex subabruptly caudate-acuminate, acute, base broadly cuneate, said to be reddish when very young, mature ones pale olivaceous in dry specimens, chartaceous initially, covered on both sides with longish fine hispidulous, but soft and ± erect hairs, glabrescent above with age, the midrib excepted, more persistently hairy all over beneath especially at midrib and edge, the undersurface moreover laxly set with short glandular ± appressed hairs, entire, margin revolute, 2.5–4 by 1–1.5 cm, midrib and one pair of basal, high ascending nerves slightly sunken above, a little raised beneath, other higher

nerves and veins ± obsolete, hardly visible beneath; petiole 2–3 by 1 mm. *Flowers* solitary or rarely in twos in the upper axils, perulae minute (2–3 mm), glabrous dorsally, ciliate. Pedicels very slender, densely patently hairy (*c.* 2 mm) as is the calyx, 1–1.5 cm. *Calyx* tube subcampanulate, 2–2.5 mm, the erecto-patent laciniae subulate or elongate-deltoid, *c.* 7 by 1 mm at base, hairy on both faces and moreover set with sparse stalked glands particularly at the margin. *Corolla* elongate-urceolate, (pale) pink with reddish lobes, glabrous besides some long hairs at and a little below the lobes, 1.2 cm long in all, *c.* 3 mm ø in the lower third. *Stamens c.* 7 mm; filaments linear-subulate, villous except the very base and top; anther-cells subovate-oblong, granular, 1 mm; tubules a little divergent, cylindric, slightly dilated distally, 1.3 mm, sparsely set with stalked glands, the pore transversely cut, orbicular, the margin wavy. *Disk* glabrous except the laxly hairy inner margin. *Style* columnar, subappressedly long-hairy in the lower ¾, papillose for the rest. *Fruit* globose, *c.* 5 mm ø, densely patently hairy, crowned by the calyx lobes.

Distr. *Malesia*: E. New Guinea (near Mafulu, Central Distr.), mountain crest forest, *c.* 1700 m, one collection.

78. Vaccinium oreites SLEUM. Bot. Jahrb. 72 (1942) 239; Blumea 11 (1961) 39.

Large shrub or small tree, 1.5–4 m. Branches stiff, down-turned. Branchlets densely covered with a ± soft tomentum of horizontally spreading short brownish hairs in the youngest, early glabrescent in the older parts, densely subimbricately leaved. *Leaves* ovate, ovate-oblong or shortly ovate-lanceolate, apex subcaudate-acuminate, bluntish by a small terminal gland, base broadly attenuate to rounded, subcoriaceous, hairy on both faces initially, ± glabrescent with age, but still laxly set with fine glandular bristle-like dark hairs beneath, entire, marginate, edge revolute, or the whole lamina ± convex above in fresh specimens, 2.5–3.3 by (0.8–)1–1.4 cm, midrib impressed above, prominent beneath, nerves in 4–5 pairs, rather faintly raised beneath as is the very fine, almost obsolete reticulation; petiole hairy initially, *c.* 2 mm. *Racemes* from the upper axils, laxly 6–8-flowered; rachis slender, 1–1.5 cm, covered by a rather dense pubescence of fine, ± patent hairs, and more laxly by thicker and shorter, dark, glandular hairs as is equally found on the pedicels and calyx. Pedicels rather slender, 0.8–1 cm, bracteoles basal, minute and early gone. *Calyx* subglobose as far as adnate to the ovary, 2–2.5 mm across, limb formed by narrow-deltoid or broadly subulate, ± gradually attenuate or acuminate laciniae which are hairy in the upper part inside, (2–)2.5–3(–3.5) mm. *Corolla* cylindric-urceolate, contracted at the opening, fleshy, glaucous pink to rose red, or red, glabrous, 8–9 mm long in all, *c.* 3 mm ø in the lower third, lobes rounded, reflexed, 1 mm. *Filaments* 2.5 mm, dilated and long-haired in the lower third, glabrous and almost filiform distally; anther-cells oblong, 1.5 mm; tubules nearly as wide as the cells, 1 mm, the back wall of each tubule extending into a short tooth. *Disk* conspicuous, glabrous. *Style* columnar, glabrous, as long as the corolla. *Fruit* globose, *c.* 5 mm ø, bluish blackish at full maturity.

Distr. *Malesia*: West New Guinea (Oranje Mts, Lake Habbema-Mt Wilhelmina area).

Ecol. In subalpine mossy forest or low thickets of higher ridges, also common on shores of lake, 3225–3400 m. *Fl. fr.* Aug.–Sept.

79. Vaccinium timonioides WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 93; SLEUM. Bot. Jahrb. 72 (1942) 239; Blumea 11 (1961) 39.

Slender shrub. Branchlets very slender, youngest parts densely patently hairy (1 mm), oldest ones glabrescent, minutely verruculose. *Leaves* lax, lanceolate-ovate, rather gradually subcaudate-acuminate upwards, the very apex bluntish, base ± rounded, the basal pair of marginal glands hardly visible, firmly chartaceous, glabrous except very short appressed glandular hairs scattered over the whole undersurface, entire, revolute in the lower third (and thus becoming ovate-rhomboid) in dry specimens, (2–)2.5–3(–3.5) by 0.8–1.2(–1.3) cm, midrib faintly impressed above, raised beneath, nerves and veins ± inconspicuous; petiole 1–2 mm. *Racemes* very lax, 3–5-flowered, glabrous in all outer parts; rachis slender, 0.5–1 cm. Pedicels slender, 1–1.3 cm, thickened distally. *Calyx* tube subglobose, shining, 1.5 mm ø, lobes or laciniae ± abruptly subulate from an ovate, membranous, wing-like base, keeled, 1.5–2 mm, ciliate below. *Corolla* narrow-urceolate, thin, glabrous at both sides, 6–7 mm long, 2–2.5 mm ø below, *c.* 1 mm ø distally, lobes ovate, reflexed, 0.5 mm. *Filaments* subulate, villous below only, 2.5 mm; anther-cells broad-oblong, 0.7 mm; tubules as wide as the cells, *c.* 0.3 mm, obliquely cut apically. *Disk* glabrous. *Style* slender, glabrous, 6 mm.

Distr. *Malesia*: New Guinea (ascent from Utakwa R. to Mt Carstensz), 1900 m, once found.

80. Vaccinium longisepalum J. J. S. Med. Rijksherb. *n.* 25 (1915) 14; Nova Guinea 12 (1917) 535; *ibid.* (1918) t. 223; SLEUM. Bot. Jahrb. 72 (1942) 239; Blumea 11 (1961) 39.

Epiphytic, much branched shrub, 1–2 m. Branchlets slender, youngest parts patently hirsutulous, older ones early glabrescent. *Leaves* rather lax, elliptic-ovate, apex gradually long-acuminate, base broadly attenuate, obtuse to nearly rounded, entire, edge ± revolute especially towards the base, with a blackish gland on each side of the apex of the petiole, thin-coriaceous, ± convex and corrugate above in dry specimens, laxly hispid-hirsutulous on both faces, moreover set with sparse and short, weak, glandular, bristle-like hairs beneath, glabrescent and ± glossy above with age, 1.8–3.1 by 0.6–1.2 cm, midrib sharply sunken above, prominent beneath, nerves in 4–6 pairs, curved-ascending and anastomosing, mostly rather inconspicuous, reticulation

very fine, ± obsolete, or visible beneath only; petiole slender, 1–2 mm. *Racemes* from the upper axils, abbreviate and ± sessile, laxly 3–6-flowered; rachis slender, hirsute, 0.6–1.2 cm. Pedicels slender, laxly patently hirsutulous initially, 6–8 mm. *Calyx* deeply 5-partite, tube subglobose, 2 mm ø, laxly hirsutulous initially, laciniae elongate, erecto-patent, ± abruptly long subulate-acuminate, irregularly serrulate and ciliolate, 2.5 (–3) by hardly 1 mm at the base. *Corolla* elongate, tubular-urceolate, contracted in the upper third, glabrous outside, dark vine red, 8(–9) mm by *c.* 3 mm ø at the base, lobes patent or reflexed, 1 mm. *Filaments* ± sigmoid or wavy, rather abruptly dilated above the base and patently villous there, glabrous at the very base and in the upper subulate part, *c.* 3 mm; anther-cells oblong, *c.* 0.9 mm; tubules broad, *c.* 0.6 mm, the back wall of each tubule extended into a long subulate tooth (0.5 mm). *Disk* laxly hirsutulous. *Style* glabrous, 8 mm.

Distr. *Malesia*: New Guinea (crest of the Treub Mts), at *c.* 2400 m. Once found. *Fl.* Febr.

81. Vaccinium imbricans J. J. S. Med. Rijksherb. *n.* 25 (1915) 13; Nova Guinea 12 (1917) 534; *ibid.* (1918) t. 222; SLEUM. Bot. Jahrb. 72 (1942) 240; Blumea 11 (1961) 39.

Epiphytic shrub, *c.* 2 m. Branchlets elongate, pendulous, sparsely ramose, youngest parts covered with a soft tomentum of dense, patent, longish (*c.* 2 mm) and yellowish hairs. *Leaves* imbricately arranged, cordate, apex rather abruptly and shortly subcaudate-acuminate, acute, basal lobes rounded (each lobe with 1 or 2 blackish glands near the petiole), reddish when young, subcoriaceous, glabrous above, the undersurface set both with sparse, longish hairs especially at midrib, nerves and edge, and ± densely with numerous short, ± appressed, glandular, bristle-like hairs, entire, edge subrevolute in dry specimens, 5–7(–8.2) by 2.5–4.2 cm, midrib and nerves but little prominent on both sides, the latter in 2–3 basal, much curved and high-ascending, and 2–4 higher, pinnate and more straight pairs, all ± anastomosing along the edge, reticulation fine and dense, well visible beneath only; petiole hirsutulous-villous, 2–3 by 1–1.5 mm. *Racemes* abbreviate, subsessile, (1–)2–5-flowered, axillary, ± densely covered in all parts with shorter subpatent and longer ± villous yellowish hairs, the corolla excepted; rachis *c.* 3 mm. Pedicels rather slender, *c.* 1.5 cm. *Calyx* 5-partite to nearly the very short, cup-shaped basal part or tube, laciniae elongate, erecto-patent, subulate, acute, *c.* 9 by *c.* 2 mm at the base. *Corolla* urceolate-cylindrical, gradually contracted towards the opening, red, very laxly hairy in its uppermost part outside, glabrous otherwise, *c.* 1.4 cm long in all, *c.* 4.5 mm ø at the lower, *c.* 2 mm ø in the upper part, lobes ± spreading or reflexed, obtuse, *c.* 1 mm. *Filaments* dilated and hairy in the lower, linear-narrowed and glabrous in the upper part, *c.* 3 mm; anther-cells oblong, papillose, *c.* 1.3 mm; tubules broad-cylindric, erect, 1.2 mm, the back wall of each tubule prolonged into 2 very short teeth. *Disk* villous. *Style* slightly pubescent, *c.* 1.4 cm.

Distr. *Malesia*: New Guinea (Perameles Mts, S of the Oranje Mts), once found at 1100 m in forest. *Fl.* Dec.

82. Vaccinium hispidulissimum WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 92; SLEUM. Bot. Jahrb. 72 (1942) 241; Blumea 11 (1961) 39.

Shrub. Branchlets slender, densely covered with patent hispidulous, initially gland-tipped hairs (*c.* 1.5 mm). *Leaves* lax, ovate-lanceolate, apex caudate-acuminate (1.5–2 cm), acumen subacute, not rarely a little curved, base broadly attenuate, firmly chartaceous in dry specimens, glabrescent with age above, persistently and subdensely long-hispid-hairy all over beneath, especially on the midrib, entire, edge ± revolute in dry specimens, (3.5–)4–5 by (1–)1.2–1.6 cm, midrib slightly impressed above, rather sharply prominent beneath, nerves in 1–2 basal and suprabasal, high curved-ascending pairs, ± obscure above, more visibly raised beneath as are other shorter nerves from the upper part of the midrib, reticulation rather dense, mostly finely raised beneath on the younger leaves; petiole slender, hispid-hairy, *c.* 3 mm. *Racemes* from the upper axils, lax, subcorymbose, densely patently hispid-hairy in all parts except the corolla, *c.* 5-flowered; rachis slender, 1–1.5 cm. Pedicels slender, 0.8–1.2 cm, bracteoles not seen. *Calyx* tube campanulate, 2 mm, laciniae subulate, (5–)6–7 by *c.* 1 mm at the base, apex obtuse by a minute gland. *Corolla* elongate-urceolate, gradually narrowed distally, apparently red, *c.* 10 by 2.5 mm, glabrous at both sides, lobes obtuse, much reflexed, 1 mm. *Filaments* subulate-linear, densely hairy to almost the top, 3.5–4 mm; anther-cells oblong, 0.8 mm; tubules as wide as the cells, 0.7 mm, obliquely cut apically, the back wall of each tubule ending in one or two irregular erect teeth, which may bear a very minute apical gland. *Disk* glabrous. *Style* slender, glabrous, 9 mm.

Distr. *Malesia*: New Guinea (ascent from Utakwa R. to Mt Carstensz), once found, 1675 m.

83. Vaccinium cardiophorum SLEUM. Bot. Jahrb. 72 (1942) 240; Blumea 11 (1961) 39.

Low, straggling, epiphytic shrub, 1–1.5 m. Branchlets slender, terete, youngest parts subdensely clad with soft, ± spreading, whitish hairs (1–1.5 mm), older ones glabrescent and greyish corticate. *Leaves* lax, ovate, apex caudate-acuminate (2–3 cm), acute, base slightly cordate, firmly subcoriaceous, glabrescent above with age, the midrib and sometimes also the nerves excepted, laxly clothed with suberect, soft hairs (*c.* 1 mm) all over beneath, more densely so on the midrib, furthermore with sparse, short, ± appressed, glandular hairs beneath, entire, edge somewhat revolute, or the entire lamina convex above in dry specimens, (5–)6–8 by 3–4 cm, midrib faintly sunken above, prominent beneath, nerves 2–3 basal, much curved-ascending, and 4–5 upper, more straight pairs, all anastomosing, very slightly

impressed above, a little raised beneath, reticulation fine and dense, mostly subinconspicuous above, well visible beneath; petiole (3–)4–5 by 1 mm, pubescent. *Racemes* axillary, laxly 8–10-flowered, subsessile, known only in not yet fully developed state, covered in all parts by rather soft hispidulous and ± spreading hairs (0.5 mm); perulae small, 3–4 mm, ± glabrous; rachis (1–)1.5–2 cm, rather slender. Pedicels slender, 0.8–1 cm. *Calyx* tube subcampanulate, *c.* 2.5 mm, lobes subulate, hairy also inside, no glandular hairs. *Corolla* seen in bud only, apex laxly hairy, colour not known. *Stamens* seen in young stage, apparently of the type found in *V. oreites* and *V. imbricans*; tubules ± obliquely cut apically, bearing no stalked glands; filaments apparently quite glabrous. *Fruit* obconical, pubescent, 5 mm long, 4–5 mm ø at the limb; disk thick, prominent beyond the calyx tube, densely hairy; calyx lobes or laciniae long-subulate, 8 mm; fruit-pedicel slender, 1.2–1.8 cm.

Distr. *Malesia*: New Guinea (Lake Habbema-Bele R. area), in forest, 2350–2950 m, twice found.

84. Vaccinium spaniotrichum SLEUM. Blumea 11 (1961) 39; *ibid.* 12 (1963) 127.

Shrub. Branchlets very slender, much branched, youngest parts clad with a dense tomentum of spreading, eglandular (0.5–1 mm) and minutely subclavate-glandular hairs, early glabrescent below, blackish in dry specimens. *Leaves* lax, ovate to sublanceolate-ovate, apex shorter or longer caudate-acuminate, acute, base rounded to subcordate, subcoriaceous, rather glossy on both faces, quite glabrous above, laxly set with long hispidulous hairs at the midrib and sometimes at the margin but not on the intervenium beneath, moreover with sparse, short, subappressed and ± caducous glandular hairs all over the undersurface, entire, margin shortly revolute, 2.5–3.5 by 1–1.5 cm, midrib grooved above for its total length, prominent beneath, nerves in form of a basal high curved-ascending pair, and other 3–4 pairs which come pinnately from the upper part of the midrib and are less distinct, all anastomosing, obscure above, minutely raised beneath, reticulation found only beneath and rather inconspicuous; petiole hirsutulous for some time, 1–2 by 0.5 mm. *Racemes* from the upper axils, short, laxly (3–)4–6-flowered, clothed with spreading, eglandular and subcapitate-glandular hairs on rachis and pedicels, whilst the calyces exclusively bear dense subvillous hairs; rachis very slender, 0.5–1 cm. Pedicels very slender, 0.7–1(–1.2) cm. *Calyx* tube semiglobose or campanulate, 2 mm long and ø, laciniae broadly subulate, erecto-patent, 4–5 mm by 1–1.5 mm at the base, glabrous dorsally, laxly hairy at the margin, which bears some stalked glands in its upper part. *Corolla* elongate-urceolate, rather fleshy, glabrous, 8(–9) mm by 2.5–3 mm ø below, 1.5 mm distally, red, lobes obtuse, reflexed, 1 mm. *Filaments* subulate, glabrous at the base, villous otherwise, 2.5–3 mm; anther-cells broad-oblong, 0.5 mm, smooth, base obtuse; tubules almost as wide as the cells, hardly 0.5 mm, obliquely cut apically, the posticous wall of each tubule extending into one, or sometimes into two teeth. *Disk* rather villous. *Style* minutely papillose, not hairy, *c.* 7 mm.

Distr. *Malesia*: New Guinea (Wissel Lakes region).

Ecol. In secondary forest on peaty soil, 1630–2300 m, two collections. *Fl.* Jan., May.

Vern. *Pamokieta*, Kapauku.

85. Vaccinium subulisepalum J. J. S. Med. Rijksherb. *n.* 25 (1915) 13; Nova Guinea 12 (1917) 532; *ibid.* (1918) t. 221; SLEUM. Bot. Jahrb. 72 (1942) 240; Blumea 11 (1961) 40.

Epiphytic shrub, with pendulous branches, *c.* 3 m. Branchlets slender, much branched again, patently villous-hirsutulous in the younger, glabrescent or corticate in the older parts. *Leaves* rather dense, ovate, apex ± abruptly and rather long (1–1.5 cm) caudate-acuminate, acute, base rounded, subcoriaceous, of a firm texture, with a basal marginal impressed gland on each side near the petiole, laxly and shortly hispid-hairy, though early glabrescent above, more densely and longer hispid-hairy beneath, especially on the midrib, moreover subdensely clad with erect, fine, soft hairs, each of which comes from a gland-like, thickened foot (which persists when the proper hair is gone, and then looks like a minute gland), no proper glandular hairs present, 2.7–4.1 by (1.2–)1.5–2.3 cm, margin much revolute especially in the lower part of the lamina, which thus becomes ± rhombic at least in dry specimens, midrib narrowly sunken above for the whole length, prominent beneath, nerves 5–6 rather obscure pairs, reticulation none; petiole hirsutulous-villous, 2–3(–4) by *c.* 1 mm. *Racemes* from the upper axils, laxly 3–5-flowered, shortly pedunced, covered with dense patent yellowish hairs (1 mm) in all parts except the corolla; rachis 0.7–1.5 cm, slender. Pedicels slender, 8–10(–12) mm. *Calyx* tube subglobose, *c.* 2.5 mm ø, laciniae subulate, erecto-patent, 6–7 by 1–1.5 mm at the base, hairy on both sides, each with a sessile, glabrous, terminal gland. *Corolla* tubular-conical or -urceolate, elongate, contracted distally, glabrous, apparently red, *c.* 1 cm long in all, 4 mm ø in the lower, *c.* 2 mm ø in the upper part, lobes reflexed, 1 mm. *Filaments* wavy, linear and glabrous at the base, villous above, again glabrous and filiform for one mm from the top; anther-cells oblong, 1 mm; tubules 1 mm, very obliquely cut distally, the back wall of each tubule thus protracted into an elongate tooth, which again is shortly bifid. *Disk* hirsutulous. *Style* glabrous, *c.* 12 mm. Immature *fruit* subglobose, 4–5 mm ø, mature one said to be blackish.

Distr. *Malesia*: New Guinea (Hellwig Mts), 1900 m, once found. *Fl. fr.* Dec.

86. Vaccinium eymae SLEUM. Blumea 11 (1961) 40. — **Fig. 94.**

Epiphytic shrublet? Branchlets very slender, 1–1.5 mm ø, tips densely and subpatently long-haired. *Leaves* lax, lanceolate-ovate, apex caudate-

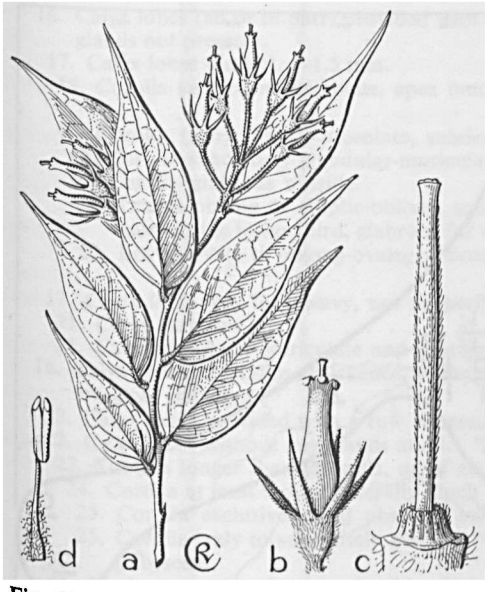

Fig. 94. *Vaccinium eymae* SLEUM. *a.* Habit, × ⅔, *b.* flower, × 1⅓, *c.* disk and style, × 4, *d.* stamen, × 4 (*a–d* EYMA 5194).

acuminate, acute, base rounded, with 2 minute marginal basal glands, subcoriaceous, glabrous above with full age, with long hispidulous hairs in the lower part of the midrib and moreover with sparse, shorter, subappressed brownish glandular ones on the intervenium beneath, entire, edge ± revolute in dry specimens, 3–5 by 1–1.6 cm, midrib slightly sunken above, a little prominent beneath, nerves 2 basal and slightly suprabasal, and 3–5 upper irregular, shorter pairs, all high-ascending, anastomosing before the edge, faintly impressed above, slightly raised beneath, reticulation rather obscure above, dense and slightly prominent beneath; petiole pubescent initially, or early glabrescent, 2–3 by 2 mm. *Racemes* axillary, subsessile, laxly 5–8-flowered, sometimes reduced to 3–4-flowered fascicles, clothed in all parts besides the corolla with dense, soft, spreading hairs (0.5 mm); rachis slender, up to 1 cm; perulae several, minute, glabrous. Pedicels slender, 0.8–1.3 cm. *Calyx* tube obconical or subcampanulate, 2.5–3 mm, laciniae subulate, clothed with long hairs at the base and the middle outside, ditto with shorter hairs towards the apex outside and all over inside, 6–7 by *c.* 1 mm wide at the base, acute. *Corolla* elongate-urceolate, somewhat fleshy, colour not known, 11–12 mm long in all, *c.* 3 mm ø below, hardly 2 mm ø distally, glabrous, lobes obtuse, reflexed, 1 mm. *Filaments* subulate, 3 mm, glabrous at the base, villous per *c.* 1.5 mm above, again glabrous towards the apex; cells oblong, base obtuse, 1.3 mm; tubules almost as wide as the cells, 0.9 mm, obliquely cut distally, the back wall of each tubule protracted in one tooth (or sometimes in two short teeth). *Disk* prominent, pubescent. *Style* puberulous at the apex, otherwise appressed-hairy.

Distr. *Malesia*: New Guinea (Wissel Lakes area), 1750 m, once found. *Fl.* Sept.

6. Section Bracteata

NAKAI, Trees Shrubs Japan ed. 2 (1927) 241; SLEUM. Bot. Jahrb. 71 (1941) 420, 467; *ibid.* 72 (1942) 265; Blumea 11 (1961) 41. — *Vaccinium sect. Nesococcus* COPEL. *f.* Philip. J. Sc. 42 (1930) 549; SLEUM. Blumea 11 (1961) 57. — *Vaccinium sect. Euepigynium* SCHLTR, Bot. Jahrb. 55 (1918) 174, *p.p., nom. subnud.*; SLEUM. *ibid.* 71 (1941) 420; *ibid.* 72 (1942) 241, *non Vaccinium sect. Epigynium* (KL.) HOOK. *f.* (1876) *p.p.* — **Fig. 95–115.**

Racemes few- to many-flowered, very rarely in part in the same specimen reduced to a solitary flower; each flower whether or not subtended by a bract, the latter whether or not foliaceous or persistent; each pedicel whether or not provided with 2 ± caducous bracteoles. Anthers whether or not 2-spurred dorsally; tubules opening by introrse ± oblique or terminal pores.

Distr. About 163 *spp.*, 10 of which are found in SE. Asia (S. India to Assam, Burma, S. China, Hainan, Indochina, Formosa, Riu-Kiu and Bonin Is., 1 *sp.* (*V. bracteatum* THUNB.) distributed from Upper Burma, Indochina, S. China, Formosa, Korea to Siam, Japan and W. Malesia, 1 *sp.* (*V. macgillivrayi* SEEM.) in New Caledonia and the New Hebrides, the rest confined to Malesia. Fig. 95.

KEY TO THE SPECIES

1. Subtending bract of each flower conspicuous, ± foliaceous, persisting at least for some time during the anthesis, mostly so to the fruiting stage.
2. Leaves manifestly cren(ul)ate or cren(ul)ate-serrate all along the margin.
3. Leaves acuminate at apex.
4. Leaves chartaceous to subcoriaceous at maturity, crenulate-serrate, the apex ending with a sharp point. Tubules ± twice as long as the anther-cells . . . . . **87. V. bracteatum**
4. Leaves coriaceous at maturity, remotely impressedly crenulate, the very apex bluntish. Tubules ± as long as the anther-cells . . . . . **88. V. kjellbergii**
3. Leaves (crenate or crenulate) obtusely attenuate to rounded at apex.

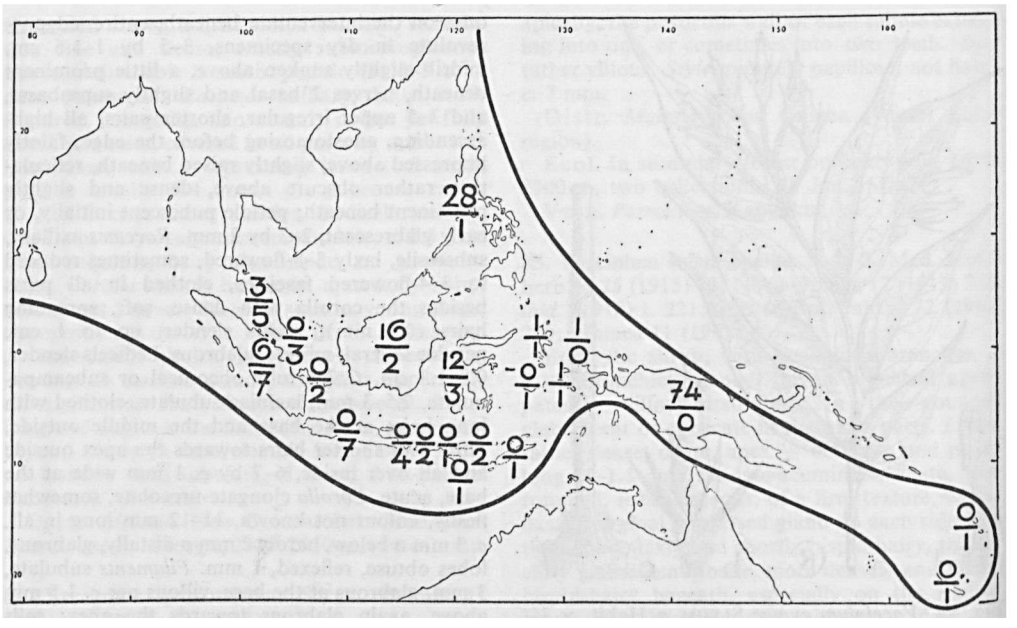

Fig. 95. Distribution of *Vaccinium sect. Bracteata* in Malesia. The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

5. Calyx lobes with a distinct callose, apical gland (marginal glands not present).
6. Leaves oblong or elliptic-oblong, sometimes lanceolate or subobovate-oblong, crenulate by a few remote depressed glands . . . . . **89. V. timorense**
6. Leaves oblong- to elliptic-obovate, rather deeply and much more densely subserrate-crenate. **90. V. centrocelebicum**
5. Calyx lobes not callose-thickened at apex, whether or not provided with a row of rather numerous marginal, sessile glands.
7. Calyx lobes provided with a row of rather numerous sessile, marginal glands. **155. V. coriaceum**
7. Calyx lobes without any apical or marginal glands. . . . . **91. V. gitingense**
2. Leaves entire or practically so (faint crenulations or subimpressed marginal glands, if any, generally restricted to the lower half of the lamina).
8. Leaves initially hairy all over the upper- and/or undersurface, tardily glabrescent.
9. Corolla laxly to densely pubescent.
10. Corolla *c.* 1.5 cm. Stamens at least 1 cm. . . . . **92. V. indutum**
10. Corolla up to 1.1 cm. Stamens up to 5.5 mm.
11. Corolla (ampullaceous) 1–1.1 cm . . . . . **93. V. ampullaceum**
11. Corolla up to 7.5 mm.
12. Corolla subcylindric, 7–7.5 mm. Anthers provided with 2 dorsal spurs. Style hairy **94. V. glabrescens**
12. Corolla 4–5 mm. Anthers not spurred. Style glabrous.
13. Leaves deeply cordate at the base. Corolla broadly or almost subglobular-urceolate. **95. V. auriculifolium**
13. Leaves ± rounded to subcordate at the base. Corolla narrowly campanulate to cylindric-urceolate.
14. Leaves elliptic, apex obtuse to rounded. . . . . **96. V. trichocarpum**
14. Leaves ovate or ovate-oblong, shortly obtusely acuminate. **163. V. molle *var.* mollissimum**
9. Corolla glabrous.
15. Leaves ovate to oblong-ovate, base slightly cordate. . . . . **97. V. wisselianum**
15. Leaves elliptic to oblong, sometimes subovate- or subobovate-oblong, base subtruncate-rounded or broadly attenuate . . . . . **110. V. korinchense *var.* korinchense**
8. Leaves glabrous or practically so from the beginning (some puberulence may be found underneath at the base).

16. Calyx lobes (all or in part) provided with a distinct thickened or callose apical gland (marginal glands not present).
17. Calyx lobes distinct, 1–1.5 mm.
18. Corolla subglobose-urceolate, apex much contracted, densely hairy outside. **98. V. thibaudifolium**
18. Corolla (sub)cylindric-urceolate, subdensely glandular-muriculate or glabrous outside.
19. Corolla subdensely glandular-muriculate outside at least initially . **220. V. acrobracteatum**
19. Corolla glabrous outside.
20. Leaves oblong or elliptic-oblong, sometimes lanceolate or subobovate-oblong. Style laxly hairy in the lower third, glabrous for the rest, *c.* 6 mm. . . . . **89. V. timorense**
20. Leaves ovate to oblong-ovate, or broad-elliptic. Style quite glabrous, *c.* 3 mm. **111. V. myrtoides**
17. Calyx limb very low, wavy, not properly lobed (the lobe merely indicated by a gland).
21. Calyx glabrous . . . . . **197. V. fraternum**
21. Calyx glandular-muriculate and short-pubescent. . . . . **172. V. amphoterum**
16. Calyx lobes not callose-thickened at the apex, whether or not provided with a row of sessile marginal glands.
22. Calyx lobes provided with a row of sessile yellowish marginal glands . . **156. V. stapfianum**
22. Calyx lobes without any glands at all.
23. Tubules longer than the cells, or, if as long as, then much narrower than the cells.
24. Corolla at least 9 mm, generally much longer.
25. Corolla exclusively and properly hairy . . . . . **92. V. indutum**
25. Corolla laxly to subdensely glandular-muriculate, furthermore whether or not finely short-pubescent.
26. Leaves subcoriaceous, flexible. Style laxly hairy in the lower half . **99. V. epiphyticum**
26. Leaves coriaceous, firm. Style quite glabrous . . . . . **100. V. barandanum**
24. Corolla 5–6(–7) mm.
27. Tubules ± double as long as the cells . . . . . **87. V. bracteatum**
27. Tubules ± as long as the cells . . . . . **88. V. kjellbergii**
23. Tubules shorter than the cells, or, if as long, then ± as wide as the cells.
28. Anthers with 2 distinct (shorter or longer) dorsal spurs.
29. Leaves 0.8–1.5 by 0.4–1 cm.
30. Leaves with the pair of marginal glands near to the petiole. One or two racemes from the ultimate axil, seemingly terminal . . . . . **101. V. scortechinii**
30. Leaves with the pair of marginal glands in the lower third of the lamina, *i.e.* in a marked distance from the petiole. Racemes in the upper 3 or 4 axils . **109. V. miquelii** *var.* **miquelii**
29. Leaves much larger.
31. Leaves ± broadly attenuate or subacuminate at the apex. Corolla at least 7 mm. **115. V. varingiaefolium** *var.* **calcaratum**
31. Leaves distinctly acuminate to subcaudate at the apex. Corolla up to 6 mm.
32. Corolla (densely hairy outside) subglobose-urceolate, apex much contracted, 3.5–4 mm. **98. V. thibaudifolium**
32. Corolla tubular- to broad-urceolate, 4–6 mm.
33. Corolla puberulous outside, 2.5–3 mm ø. Tubules obliquely cut distally, the pore oval. **102. V. agusanense**
33. Corolla glabrous outside. Tubules transversely cut apically, the pore round.
34. Corolla 5–6 by 4–4.5 mm . . . . . **103. V. philippinense**
34. Corolla 4 by 2–2.5 mm . . . . . **104. V. dubiosum**
28. Anthers with no trace of dorsal spurs.
35. Posticous wall of each tubule ending in 2 distinct teeth.
36. Leaves 8–11 by 2.5–4 cm. Corolla 8–10 mm . . . . . **105. V. grandibracteatum**
36. Leaves up to 7 by 3 cm.
37. Leaves (1–)1.2–1.7 by 0.5–0.8 cm . . . . . **106. V. dominans**
37. Leaves larger.
38. Leaves 4.5–5.5 by 2–3 cm. Corolla glabrous. Calyx lobes with an apical tuft of hairs. **107. V. montis-ericae**
38. Leaves (2.4–)4–6(–7) by (1–)2–2.5(–3) cm. Corolla subdensely set with muriculate glands and sometimes furthermore sparsely with a fine puberulence (sometimes rather early glabrescent). Calyx lobes not barbate at apex . . . . . **220. V. acrobracteatum**
35. Posticous wall of each tubule ending in one ± broad tooth or obtuse.
39. Leaves (5–)6–14 by (3–)3.5–5(–7) cm.
40. Leaves elliptic or oblong-elliptic, sometimes subovate, base ± broadly attenuate. **108. V. platyphyllum**
40. Leaves ovate, base deeply cordate and auriculate . . . . . **204. V. hooglandii**
39. Leaves much smaller in general.

41. Flowers sessile or very shortly pedicelled (up to 2 mm in anthesis, slightly longer in fruit).
42. Calyx lobes obtuse. Corolla urceolate . . . . . **109. V. miquelii**
42. Calyx lobes acute or subacute. Corolla ampullaceous or narrow-urceolate. **110. V. korinchense**
41. Flowers pedicelled (at least for 3 mm in anthesis).
43. Corolla 4(–4.5) mm (shortly cylindric-urceolate). Style *c.* 3 mm. **111. V. myrtoides**
43. Corolla at least 7 mm. Style at least 6 mm.
44. Corolla elongate-urceolate or ampullaceous, gradually or mostly rather abruptly narrowed in the upper half, membranous. Branchlets rather slender.
45. Leaves (4–)4.5–7(–10) by (1.8–)2–3 cm (subovate or lanceolate, sometimes elliptic or oblong-elliptic, shortly subcaudate-acuminate).
46. Style glabrous . . . . . **112. V. glandellatum**
46. Style ± densely patently hairy. . . . . **215. V. capillatum**
45. Leaves up to 2.5 by 1.2 cm.
47. Leaves ovate, coriaceous, 0.6–1(–1.2) by (0.4–)0.5–0.8 cm . **113. V. paludicolum**
47. Leaves oblong-elliptic to obovate, thin-coriaceous, (1–)1.5–2.5 by 0.6–1.2 cm. **114. V. lucidum**
44. Corolla urceolate-cylindric, gradually or hardly narrowed towards the apex, fleshy. Branchlets stoutish . . . . . **115. V. varingiaefolium**

1. Subtending bract of each flower small and early caducous in general, rarely persistent up to the beginning of the anthesis.
48. Corolla partite to *c.* ½ or more into 5(–7) erect or slightly reflexed lobes.
49. Corolla lobes rather broad, ovate to deltoid.
50. Anthers provided with two distinct dorsal spurs (1 mm) . . . . . **116. V. latissimum**
50. Anthers with minute or no dorsal spurs.
51. Filaments and style glabrous.
52. Racemes contracted; rachis up to 5 mm . . . . . **117. V. contractum**
52. Racemes not contracted; rachis at least 1.5 cm.
53. Leaves 5–8 by 3–4.5 cm. Rachis 4–6(–7) cm. . . . . **118. V. warburgii**
53. Leaves 11–16 by (4.5–)5–6.5 cm. Rachis 1.5–2 cm . . . . . **119. V. aucupis**
51. Filaments and style hairy . . . . . **120. V. minuticalcaratum**
49. Corolla lobes narrow to almost subulate.
54. Corolla subdensely hairy outside . . . . . **121. V. quinquefidum**
54. Corolla practically glabrous outside.
55. Leaves obovate to elliptic-obovate, apex obtuse to rounded . . . . . **122. V. brachygyne**
55. Leaves other than obovate, apex ± acuminate.
56. Leaves subovate-oblong to lanceolate, apex subcaudate-acuminate . . **123. V. paradisearum**
56. Leaves elliptic to oblong-elliptic, apex shortly acuminate.
57. Corolla glabrous inside. Tubules less than half as long as the cells. **124. V. megalophyes**
57. Corolla densely short-hairy inside. Tubules as long as the cells . . **125. V. stenolobum**
48. Corolla shortly (up to ⅓, or mostly less deeply) 5(–7, rarely 8)-lobed, lobes (± broad and obtuse) generally conspicuously reflexed in anthesis.
58. Anthers (cells and/or tubules) provided with a few ± spreading gland-tipped hairs, or with shortly stalked glands, or with a few sessile, point-like, generally dark coloured glands.
59. Corolla (broad-urceolate or ± campanulate) distinctly constricted in the middle or lower third. Tubules elongate, as long as or mostly longer than the cells, pipe-like, gradually slightly dilated upwards or flaring distally; cells with elongate dorsal spurs.
60. Leaves cuneate to rounded at base.
61. Leaves elliptic, 7–15.5 by (2.6–)3–6 cm, shortly ± gradually attenuate or subacuminate towards the bluntish apex . . . . . **126. V. daphniphyllum**
61. Leaves ovate or oblong-ovate, caudate-acuminate and acutish at the apex, 5–8 by (1.5–)1.8–3 cm . . . . . **127. V. convallariiflorum**
60. Leaves cordate and ± auriculate at base.
62. Inflorescence quite glabrous. (Leaves 7–12 by 3.5–5.5 cm.) . . . . **128. V. appendiculatum**
62. Inflorescence short-pubescent, the corolla excepted.
63. Leaves 2.8–3.5(–4.3) by 2–2.8 cm . . . . . **203. V. amplexicaule**
63. Leaves 6–8 by 3.5–4.5 cm . . . . . **129. V. otophyllum**
59. Corolla not constricted in the lower half. Tubules, if elongate, not flaring distally; dorsal spurs of cells, if any, relatively short.
64. Leaves ± distinctly cordate.
65. Inflorescences densely short-pubescent, the 5–6 mm wide corolla excepted. **130. V. cordifolium**
65. Inflorescences glabrous. Corolla 3–4 mm wide . . . . . **131. V. cercidifolium**
64. Leaves occasionally or in part in the same specimen subcordate, generally cuneate to rounded at the base.

66. Style glabrous or practically so.
67. Calyx lobes (all, or rarely at least for their greater number) provided with a generally distinct (mostly thick) apical gland, and/or with a row of smaller, sessile or subsessile (sometimes rather early caducous) marginal glands.
68. Calyx 4–6 mm long in all, 5–6 mm ø at the limb at anthesis. Mature fruit 1–1.3 cm ø. **132. V. korthalsii**
68. Calyx up to 3.5 mm long in all and up to 4 mm ø at the limb at anthesis. Mature fruit as far as known up to 6 mm ø.
69. Pedicels *c.* 2 cm at anthesis . . . . . **133. V. tentaculatum**
69. Pedicels up to 1.5 cm at anthesis.
70. Calyx tube densely glandular-muriculate . . . . . **134. V. muriculatum**
70. Calyx tube pubescent or glabrous, sometimes also very sparsely glandular-muriculate.
71. Tubules transversely cut apically, their back wall not extended into one or two teeth, the pore round.
72. Leaves crenulate, 0.6–2 by 0.3–0.8 cm . . . . . **155. V. coriaceum**
72. Leaves entire, 3.5–5.5 by 1.5–2 cm . . . . . **135. V. elegans**
71. Tubules (very) obliquely cut distally, their back wall ± extended into one or two teeth, the pore elliptic to subovate.
73. Back wall of each tubule extended distally into an erect beak which is as long as or mostly longer than the proper tube of the tubule.
74. Calyx limb very low, wavy, lobes irregular, hardly properly indicated as such, *i.e.* merely represented as apical glands . . . . . **136. V. goodenoughii**
74. Calyx limb at least 0.5 mm high, lobes regular, markedly distinct as such.
75. Calyx lobes broadly ovate-deltoid, apex roundish-obtuse. **137. V. hellwigianum**
75. Calyx lobes ± deltoid, apex subacute.
76. Calyx lobes *c.* 0.5 mm. Leaves elliptic or subovate-elliptic, apex shortly, subacutely or obtusely acuminate, 4.5–6 by 2.3–3 cm . . . . . **138. V. psammogenes**
76. Calyx lobes *c.* 1 mm. Leaves lanceolate or rarely elliptic-lanceolate, apex caudate-acuminate, 5–7 by 1.4–2 cm . . . . . **139. V. longiporum**
73. Back wall of each tubule extended distally into a short, sometimes bifid, erect or not rarely horizontally directed or even reflexed tooth.
77. Marginal glands of the leaves restricted to 1 or 2 basal (or a little suprabasal) pair(s).
78. Leaves 2–3 by 1–1.7 cm . . . . . **140. V. acutissimum *var.* acutissimum**
78. Leaves (4–)5–9(–10) by (1.5–)2–3(–4) cm.
79. Leaves 5–7(–9)-plinerved. Corolla elongate, narrowly urceolate. **141. V. carneolum *var.* carneolum**
79. Leaves sub-5-plinerved. Corolla subventricose-urceolate. **141. V. carneolum *var.* nesophilum**
77. Leaves provided with several remote, distinctly or more obscurely impressed glands or glandular points along the whole margin or at least its lower half. **142. V. albicans**
67. Calyx lobes showing no such glands.
80. Corolla at least 9 mm . . . . . **143. V. viridiflorum**
80. Corolla up to 7 mm.
81. Corolla *c.* 7 mm long . . . . . **139. V. longiporum**
81. Corolla 3.5–4 mm long . . . . . **144. V. aitapense**
66. Style hairy at least in the lower third.
82. Axillary buds generally very conspicuous.
83. Axillary buds almost globular, 2–3 mm ø, the perulae broadly ovate and obtuse, or suborbicular.
84. Rachis and pedicels glabrous . . . . . **145. V. simulans**
84. Rachis and pedicels generally subdensely, rarely laxly short-pubescent, or subtomentose.
85. Inflorescence 3–3.5 cm. Corolla 4(–5) mm. . . . . **146. V. mjoebergii**
85. Inflorescence 4–6(–9) cm. Corolla 8–9 mm . . . . . **147. V. pachydermum**
83. Axillary buds ± ovoid-oblongoid, at least 2 mm long, the perulae stipule-like, ovate-lanceolate or subsubulate, ± acute.
86. Corolla 9–12 mm.
87. Leaves 2–4 by 1.3–2.5(–3) cm . . . . . **148. V. elliptifolium**
87. Leaves 4.5–9.5 by 2.5–4.3 cm . . . . . **149. V. endertii**
86. Corolla 6–8 mm.
88. Petiole much flattened, 1–4 by 2–4 mm. . . . . **150. V. camiguinense**
88. Petiole less or hardly flattened, more slender, 1–6 by 1–1.5 mm.
89. Leaves at apex broadly attenuate and obtuse, or rounded . . . **151. V. clementis**
89. Leaves at apex more narrowly subacuminate-attenuate, the very tip obtuse. **152. V. palawanense**
82. Axillary buds, if any, very small.

90. Calyx lobes provided with a conspicuous, thick, apical gland, but with no row of smaller marginal sessile glands.
91. Corolla (9–)10–12 mm . . . . . **153. V. cornigerum**
91. Corolla up to 8 mm.
92. Leaves ovate-acuminate, coriaceous, 2.3–3 by 1–1.7 cm. **140. V. acutissimum** *var.* **pilosistylum**
92. Leaves oblong or elliptic-oblong, sometimes lanceolate- or subovate-oblong, apex obtuse to rounded, subcoriaceous, 2–4 by (0.5–)0.8–1(–1.5) cm . . . . **89. V. timorense**
90. Calyx lobes whether or not provided with a small or inconspicuous apical gland and/or a row of small, sessile marginal glands, or without any such glands at all.
93. Leaves (oblong-obovate, 1.8–3 by 0.6–1.1 cm) retuse for *c.* 1 mm. **154. V. besagiense**
93. Leaves faintly or generally not retuse.
94. Leaves (0.6–)0.7–1.5(–2) by (0.3–)0.4–0.7(–0.8) cm.
95. Leaves distinctly crenulate along the whole margin . . . . . **155. V. coriaceum**
95. Leaves entire, or with 1 or 2 pairs of marginal glands at intervals in the lower half of the lamina . . . . . **156. V. stapfianum**
94. Leaves in part in the same specimen at least 2.5 by 1 cm.
96. Corolla 9–10 mm . . . . . **157. V. horizontale**
96. Corolla (5–)6–7(–8) mm.
97. Leaves narrow-elliptic to lanceolate, oblong or elliptic (4–8 cm long then), rarely ovate-elliptic . . . . . **158. V. bancanum**
97. Leaves elliptic- or oblong-obovate, or obovate, rarely elliptic (and 2–4 cm long then).
98. Leaves 2–4 by 0.8–2 cm. Corolla 3–4 mm ø. . . . . **151. V. clementis**
98. Leaves 3.5–6 by (1.5–)2–4.5 cm. Corolla 2–2.5 mm ø . . . . **159. V. stenanthum**
58. Anthers (cells and tubules) bearing no such glands or gland-tipped hairs.
99. Rachis provided with gland-tipped, horizontally spreading, almost bristle-like hairs (which are mostly found also on the branchlets, but rarely on the pedicels).
100. Leaves elliptic or oblong-elliptic, apex shortly obtusely acuminate. Racemes 7–9(–10) cm. **160. V. luzoniense**
100. Leaves ovate to lanceolate, apex shortly (sub)caudate-acuminate. Racemes (2–)3–5 cm. **161. V. tenuipes**
99. Rachis (and branchlets) never bearing such hairs (though they may be laxly set with short, muriculate or club-shaped glands).
101. Corolla exclusively laxly glandular-muriculate outside.
102. Leaves 0.8–1.3 by 0.4–0.7 cm . . . . . **223. V. tomicipes**
102. Leaves exceeding 3.5 by 1 cm.
103. Leaves lanceolate to elliptic-lanceolate, apex long subcaudate-acuminate. **162. V. filipes**
103. Leaves obovate to obovate-subspathulate, sometimes suborbicular- or oblong- or elliptic-obovate, apex ± rounded . . . . . **220. V. acrobracteatum**
101. Corolla hairy, or hairy *and* glandular-muriculate, or glabrous outside.
104. Corolla at least initially ± densely short-hairy and may be glandular-muriculate outside.
105. Corolla distinctly widened towards the mouth, *i.e.* campanulate or subcylindric-campanulate. **163. V. molle**
105. Corolla equally wide at both ends or narrowed towards the mouth, *i.e.* urceolate to tubular.
106. Style completely glabrous.
107. Anthers (cells plus tubules) 1–1.5 mm. . . . . **237. V. striicaule** *var.* **publiflorum**
107. Anthers (cells plus tubules) 2.2–3 mm.
108. Leaves 1.8–2.5(–3.5) by 1.1–1.5(–2) cm. . . . . **164. V. summifaucis**
108. Leaves larger, at least in part in the same specimen.
109. Leaves elliptic to oblong, generally 5–8 by 2–3.5 cm . . . . . **165. V. costerifolium**
109. Leaves obovate or oblong-obovate, 6–8.5 by 2.5–5 cm . . . . . **166. V. adenotrichum**
106. Style hairy at least in the basal part.
110. Leaves 3–5(–6.5) by 2–3.3 cm . . . . . **167. V. rigidifolium**
110. Leaves 2.5–3.5 by 1–1.8(–2) cm . . . . . **168. V. brachytrichum**
104. Corolla glabrous outside or practically so (some hairs may occur on the corolla in early stage, or at the lobes).
111. Filaments completely glabrous.
112. Leaves 9–13 by 5–10 cm. Anthers with 2 dorsal spurs . . . . . **116. V. latissimum**
112. Leaves up to 9 by 5 cm. Anthers not dorsally spurred.
113. Leaves (3–)4–6 by 2–3(–3.5) cm. Corolla 5 by 2.5 mm . . . . . **169. V. cuneifolium**
113. Leaves 6–9 by (2.5–)3–5 cm. Corolla 7 by 2.5 mm . . . . . **170. V. ambivalens**
111. Filaments hairy at least at the base.
114. Calyx lobes bearing a distinct, generally thick apical gland (which sometimes may be covered by hairs) and/or a row of several minor (± sessile) marginal glands.
115. Calyx lobes bearing a ± thick apical gland, but no row of minor marginal glands.

116. Leaves remotely (sub)crenulate, *i.e.* with several conspicuous glands along the whole margin or at least in the lower ⅔ of the margin on each side.
117. Style pubescent . . . . . **89. V. timorense**
117. Style glabrous.
118. Anthers provided with 2 very distinct dorsal spurs . . . . . **171. V. vidalii**
118. Anthers provided with very short, subinconspicuous dorsal spurs or knobs, or generally without any trace of them.
119. Calyx tube densely set with short hairs and muriculate glands.
120. Leaves elliptic or subovate-elliptic, apex subabruptly acuminate for 0.5–1 cm, 2–2.5(–2.8) cm wide . . . . . **172. V. amphoterum**
120. Leaves elliptic to oblanceolate-elliptic, apex shortly and broadly attenuate or subacuminate, generally obtuse, rarely subacute, (0.8–)1–1.6 cm wide. **173. V. banksii**
119. Calyx tube glabrous.
121. Disk glabrous.
122. Corolla (8–)9–10(–11) by 3–4 mm . . . . . **142. V. albicans *var.* albicans**
122. Corolla 5 by 2.5 mm.
123. Petiole 4–5(–6) mm. Racemes generally many-flowered. . . . **174. V. crenatifolium**
123. Petiole 1–2 mm. Racemes 3–5-flowered . . . . . **175. V. apophysatum**
121. Disk sparsely or mostly ± densely short-hairy.
124. Leaves elliptic to obovate-elliptic, sometimes obovate, apex ± obtuse. **176. V. woodianum**
124. Leaves narrow-elliptic, elliptic-oblong or narrowly elliptic-obovate, apex ± acuminate . . . . . **177. V. cumingianum**
116. Leaves practically entire, *i.e.* set with 1 or 2 (rarely 3) basal or suprabasal marginal ± impressed glands on each side, which are restricted to the lower third, or very rarely to the lower half of the lamina.
125. Style pubescent at least in the lower part.
126. Leaves 2–4 by (0.5–)0.8–1(–1.5) cm . . . . . **89. V. timorense**
126. Leaves larger.
127. Corolla tubular, elongate-conical or suburceolate, 1.1–2 cm.
128. Leaves ovate, apex caudate-acuminate, 6.5–10 by 1.8–3.7 cm . . . **178. V. gracile**
128. Leaves elliptic, (3–)4–7 by (1.3–)2–3 cm . . . . . **179. V. tubiflorum**
127. Corolla campanulate, 7–8(–9) mm . . . . . **120. V. minuticalcaratum**
125. Style quite glabrous.
129. Calyx tube winged, the 5 wings or ribs extending into the calyx lobes. **180. V. debilescens**
129. Calyx tube obscurely or mostly not winged or angled.
130. Anthers distinctly 2-spurred dorsally, the spurs almost as long as the tubules. **181. V. minusculum**
130 Anther spurs, if any, mostly rudimentary, or certainly much shorter than the tubules.
131. Tubules slender, (much) narrower than, and as long as or longer than the cells.
132. Leaves ± obovate, with thickish glandular or almost resinous points underneath.
133. Pedicels rather slender, (3–)4–6 mm. Apical gland of the calyx lobes (if any) minute, subglobular . . . . . **182. V. viscifolium *var.* viscifolium**
133. Pedicels robust, 1.5–2(–3) mm. Apical gland of the calyx lobes thick, broadly subglobular or mostly somewhat broadened marginally to each side. **183. V. loranthifolium**
132. Leaves of other shape, *i.e.* not decidedly obovate, underneath with caducous glandular-muriculate hairs or their bases, or with minute glandular points, or quite glabrous.
134. Rachis, pedicels and calyx tube short-pubescent . . . . **231. V. pseudocaudatum**
134. Rachis, pedicels and calyx tube quite glabrous.
135. Corolla subdensely short-hairy in the lower half inside. (Leaves (5–)6–10 by (1.5–)2–3(–4.8) cm.) . . . . . **232. V. benguetense**
135. Corolla quite glabrous inside.
136. Leaves 7–15 by (1–)1.2–3 cm . . . . . **184. V. scandens**
136. Leaves up to 7 by 3.5 cm.
137. Reticulation of the leaves rather conspicuous. Apical gland of the calyx lobes thick, well perceptible. Stamens remaining included at full anthesis. **185. V. littoreum**
137. Reticulation of the leaves rather faint or obscure. Apical gland of the calyx lobes (if any) minute. Stamens a little exserted at full anthesis. **233. V. caudatum**
131. Tubules ± as wide and rarely as long as, generally (much) shorter than the cells, or if slender, distinctly shorter than the cells.
138. Pedicels very slender to almost filiform, (1–)1.4–1.6 cm.

139. Rachis ± densely, base of the pedicels laxly hairy. (Leaves 1.5–2.5 by 0.5–0.9 cm.) . . . . . 186. V. artum
139. Rachis and pedicels completely glabrous . . . . . 187. V. habbemae
138. Pedicels slender to robust, and shorter in general (rarely up to 2 cm).
140. Petiole robust (1.5–2 mm ø), at least 1 (and up to 2) cm.
141. Corolla 0.9–1(–1.2) cm . . . . . 188. V. perrigidum
141. Corolla 0.6 cm . . . . . 189. V. retivenium
140. Petiole shorter, rarely robust, mostly more slender.
142. Corolla abruptly saccate-widened at the base . . . . . 190. V. angulatum
142. Corolla not or hardly widened at the base.
143. Leaves small, up to 4 by 2.2 cm.
144. Leaves lanceolate to narrow-oblong or -elliptic, (0.5-)0.7–1.5 cm wide. 177. V. cumingianum
144. Leaves of other form, or at least in part in the same specimen wider than 1.5 cm.
145. Leaves manifestly, *i.e.* densely and prominently reticulate on both faces, or at least beneath.
146. Leaves subcaudate-acuminate . . . . . 172. V. amphoterum
146. Leaves obtuse at apex . . . . . 195. V. dictyoneuron
145. Leaves less distinctly, *i.e.* widely and much less prominently reticulate, or not reticulate at all.
147. Calyx tube pubescent *and* glandular-muriculate . . 200. V. roseiflorum
147. Calyx tube exclusively hairy, or with sparse muriculate glands, or glabrous.
148. Calyx tube pubescent . . . . . 192. V. cruentum
148. Calyx tube sparsely muriculate or glabrous.
149. Corolla (5–)6 by *c.* 2 mm . . . . . 191. V. angiense
149. Corolla (7–)8(–9) by 3–4 mm.
150. Petiole 2–3 mm . . . . . 192. V. cruentum
150. Petiole 4–6(–10) mm . . . . . 227. V. gjellerupii
143. Leaves generally larger, at least for the greater part in the same specimen.
151. Calyx tube pubescent *and* glandular-muriculate . . . 172. V. amphoterum
151. Calyx tube exclusively pubescent, or exclusively and very laxly glandular-muriculate, or glabrous.
152. Leaves ± shortly and broadly, in general ± obtusely attenuate or acuminate at the apex.
153. Corolla subventricose-cylindric or barrel-shaped, 10–11 by *c.* 5 mm. 193. V. alvarezii
153. Corolla urceolate-cylindric, 4–10 by 2–4 mm.
154. Corolla 4(–5) mm . . . . . 194. V. cavendishioides
154. Corolla 7–10 mm.
155. Anthers spurred dorsally. . . . 228. V. laurifolium *var.* glanduligerum
155. Anthers without dorsal spurs.
156. Leaves ± densely and prominently reticulate on both faces or at least on the undersurface. 195. V. dictyoneuron *var.* dictyoneuron
156. Leaves may be finely reticulate above, never so beneath. 227. V. gjellerupii
152. Leaves ± caudate-acuminate and ± acute at the apex.
157. Corolla 4(–5) mm . . . . . 194. V. cavendishioides
157. Corolla 6–8 mm.
158. Corolla cylindric below, subabruptly contracted and much narrower in the upper third . . . . . 196. V. irigaense
158. Corolla urceolate or cylindric-urceolate, gradually narrowed upwards.
159. Corolla thin, greenish white . . . . . 197. V. fraternum
159. Corolla fleshy, deep pink to purple. 237. V. striicaule *var.* adenodes
115. Calyx lobes besides a small or rather inconspicuous (or no) apical gland bearing a row of minor, sessile or subsessile, yellowish marginal glands.
160. Anther-cells free but for the very base. Leaves (6–)8–13(–14) by (3–)4–7.5(–8.5) cm 198. V. claoxylon
160. Anthers bipartite halfway or less.
161. Leaves 6–9(–11) by 2–3.5(–4) cm . . . . . 199. V. halconense
161. Leaves 0.7–5(–6.5) cm long.
162. Pedicels very slender, 1–1.5 cm. (Leaves (2.5–)3–4.5 by 1–1.5 cm.). 187. V. habbemae *var.* pluriglandulosum
162. Pedicels slender or more robust, up to 0.7 cm.

163. Calyx tube and lobes densely puberulous *and* laxly glandular-muriculate. (Leaves 2.4–3.4 by 1.3–2.2 cm.) . . . . . **200. V. roseiflorum**
163. Calyx tube and lobes exclusively pubescent.
164. Leaves (0.7–)0.8–1 by 0.25–0.3 cm . . . . . **201. V. leptocladum**
164. Leaves much larger.
165. Leaves 2.2–3(–3.5) by 0.5–0.8(–1) cm . . . . . **202. V. phillyreoides**
165. Leaves 3–5(–6.5) by 2–3.3 cm . . . . . **167. V. rigidifolium**
114. Calyx lobes mostly without any apical or marginal glands, rarely bearing a minute and inconspicuous apical gland.
166. Leaves deeply cordate.
167. Anther-cells dorsally set with 2 elongate spurs; tubules slenderly elongate-cylindric, longer than the cells . . . . . **203. V. amplexicaule**
167. Anther-cells not spurred dorsally; tubules shorter than the cells.
168. Corolla subglobose-urceolate, *c.* 5 mm long . . . . . **204. V. hooglandii**
168. Corolla cylindric-urceolate, 11–12 mm long . . . . . **205. V. schoddei**
166. Leaves shallowly cordate (the basal lobes never amplexicaul), or cuneate to rounded at base.
169. Corolla subglobose, or subglobular- or conical-urceolate.
170. Corolla 8–10(–12) mm.
171. Leaves ± elliptic, slightly retuse, 1.5–2.3 by (0.8–)1–1.5 cm. **206. V. stellae-montis**
171. Leaves obovate, apex rounded-obtuse, 6.5–7.3 by 3.1–3.4 cm. . **207. V. lageniforme**
170. Corolla up to 6 mm.
172. Leaves (1.5–)2–3 cm wide. Branchlets quite glabrous . . . . . **208. V. crassistylum**
172. Leaves 0.7–1.4 cm wide. Branchlets ± densely and shortly (hispid-)pubescent in the younger parts.
173. Racemes reduced to an umbel-like inflorescence with 2–3 flowers, or even a solitary flower, on top of a very short (*c.* 2 mm) peduncle . . . **209. V. brevipedunculatum**
173. Racemes laxly 10–15-flowered; rachis 4–6 cm . . . . . **210. V. longepedicellatum**
169. Corolla (narrowly to broadly) urceolate, or barrel-shaped, or tubular (cylindric), or tubular-urceolate, very rarely subcampanulate-cylindric (if campanulate, *cf.* 134. *V. muriculatum*).
174. Style entirely or partly distinctly pubescent.
175. Leaves apex ± rounded, or broadly attenuate and obtuse, or slightly retuse.
176. Corolla 11(–12) mm . . . . . **211. V. retusifolium**
176. Corolla up to 9 mm.
177. Leaves up to 5.5 by 2.5 cm.
178. Leaves (1–)1.5–2.5 by 0.6–1.2 cm . . . . . **114. V. lucidum *var.* lucidum**
178. Leaves 3–5.5 by 1.5–2.5 cm. . . . . **212. V. xerampelinum**
177. Leaves 6–9(–11) by 2–3.5(–4) cm . . . . . **199. V. halconense**
175. Leaves apex ± acuminate, acute, or at least subacute.
179. Corolla broadly cylindric, but slightly narrowed below the lobes, or even subcampanulate-cylindric, 7–8 by 5–6 mm . . . . . **213. V. brassii**
179. Corolla tubular-urceolate, up to 4(–5) mm wide.
180. Leaves 2.5–3.5 by (0.7–)0.9–1.4 cm . . . . . **214. V. leptomorphum**
180. Leaves 3.5–10(–12) by (1.5–)2–2.5(–5.5) cm.
181. Pedicels stoutish.
182. Calyx exclusively short-pubescent. Disk hairy . . . . . **215. V. capillatum**
182. Calyx short-pubescent and densely glandular-muriculate. Disk glabrous. **170. V. ambivalens**
181. Pedicels (rather) slender.
183. Rachis and pedicels short-pubescent to finely patent-puberulous.
184. Corolla 10(–11) mm . . . . . **216. V. reticulato-venosum**
184. Corolla (5–)6–7 mm . . . . . **199. V. halconense**
183. Rachis and pedicels quite glabrous.
185. Calyx tube cylindric, base truncate, lobes quite glabrous, 0.5 mm. **178. V. gracile**
185. Calyx tube cup-shaped, base rounded, lobes penicillate apically, *c.* 1.3 mm. **229. V. turfosum**
174. Style quite glabrous.
186. Corolla (1.6–)2–2.5(–3) cm long.
187. Disk hairy to various degree.
188. Leaves ovate to oblong-ovate . . . . . **217. V. pilosilobum**
188. Leaves narrowly oblong-obovate, more rarely obovate . . . **218. V. sclerophyllum**
187. Disk glabrous. (Leaves elliptic to elliptic-obovate.) . . . . **190. V. angulatum**
186. Corolla up to 1.4 cm long.
189. Leaves obovate or oblong- or elliptic-obovate or -spathulate.

190. Tubules ± as wide and as long as or mostly shorter than the cells.
191. Leaves small, 0.7–2.5 by 0.4–2 cm.
192. Leaves (1–)1.5–2.5 by 0.6–2 cm . . . . . **114. V. lucidum *var.* lucidum**
192. Leaves 0.7–1.2 by 0.4–0.6(–0.7) cm . . . . . **219. V. bartlettii**
191. Leaves generally larger, at least in part in the same specimen.
193. Corolla 6–8(–10) by 3–4(–5) mm . . . . . **220. V. acrobracteatum**
193. Corolla 8 by 8 mm . . . . . **207. V. lageniforme**
190. Tubules ± half as wide and as long as or longer than the cells.
194. Stamens about half as long as the corolla . . . . . **221. V. nitens**
194. Stamens as long as and finally a little exserted from the corolla. **182. V. viscifolium**
189. Leaves other than predominantly obovate or spathulate.
195. Leaves generally up to 3.5, rarely in part in the same specimen up to 4 cm long.
196. Tubules about half as wide and as long as or longer than the cells.
197. Leaves elliptic or oblong-elliptic, minutely crenulate in the upper third. Flowers in racemes . . . . . **222. V. apiculatum**
197. Leaves ovate, quite entire. Flowers solitary on an elongate peduncle. **223. V. tomicipes**
196. Tubules ± as wide and long as or mostly shorter than the cells.
198. Pedicels slender to filiform.
199. Leaves (1–)1.5–2.5 by 0.6–2 cm . . . . . **114. V. lucidum *var.* lucidum**
199. Leaves 0.7–1.2 by 0.4–0.6(–0.7) cm . . . . . **219. V. bartlettii**
198. Pedicels slender or generally more robust.
200. Corolla broadly urceolate, 6–8 mm ø. Leaves retuse for 0.5–1 mm. **206. V. stellae-montis**
200. Corolla more narrowly urceolate, up to 4.5 mm wide.
201. Leaves (± reticulate) ± rounded at apex. Small-leafed glabrescent forms of **220. V. acrobracteatum**
201. Leaves ± acuminate or broadly attenuate at apex, tip generally blunt.
202. Leaves manifestly, *i.e.* densely (narrowly) and prominently reticulate on both faces, or at least on the undersurface . . . . . **195. V. dictyoneuron**
202. Leaves faintly or not reticulate.
203. Calyx tube pubescent. Corolla 7.5 mm . . . . . **224. V. ligustrifolium**
203. Calyx tube very laxly glandular-muriculate or practically glabrous. Corolla 5–8 mm.
204. Leaves quite entire. Corolla 5–6 mm . . . . . **191. V. angiense**
204. Leaves crenulate in the upper third. Corolla 7–8 mm . **222. V. apiculatum**
195. Leaves larger at least for the greater part in the same specimen.
205. Leaves obovate to obovate-spathulate or elliptic-obovate.
206. Tubules as long as or mostly shorter and not or not much narrower than the anther-cells.
207. Corolla 6–8(–10) by 3–4(–5) mm . . . . . **220. V. acrobracteatum**
207. Corolla 8 by 8 mm . . . . . **207. V. lageniforme**
206. Tubules elongate, longer and much narrower than the cells.
208. Stamens about half as long as the corolla . . . . . **221. V. nitens**
208. Stamens as long as and finally a little exserted from the corolla. **182. V. viscifolium**
205. Leaves of other shape than predominantly obovate.
209. Leaves provided at intervals with several impressed marginal glands or faint crenulations up to the top of the lamina.
210. Calyx tube and disk glabrous. Leaves shortly petioled or almost subsessile. **225. V. jagori**
210. Calyx tube and disk pubescent. Leaves distinctly petioled . . **226. V. sylvaticum**
209. Leaves provided with 1 or 2 (or at most 3) pairs of marginal glands at or near the base, *i.e.* certainly within the lower third of the lamina.
211. Leaves ± shortly and broadly, in general ± obtusely attenuate or acuminate at apex.
212. Corolla subventricose-cylindric or barrel-shaped, 1–1.1 by *c.* 0.5 cm. **193. V. alvarezii**
212. Corolla urceolate-cylindric, 4–6(–10) by 2–3(–5) mm.
213. Corolla 4(–5) mm.
214. Tubules shorter than the cells, the back wall of each cell extending into 1 or 2 short teeth . . . . . **194. V. cavendishioides**
214. Tubules longer than the cells, the back wall of each cell extending into 1 elongate tooth . . . . . **144. V. aitapense**
213. Corolla (5–)6–9(–10) mm.

215. Leaves predominantly pli-nerved, *i.e.* all main nerves steeply curved-ascending.
216. Leaves sub-5-plinerved . . . . . **165. V. costerifolium**
216. Leaves 9–11-plinerved . . . . . **170. V. ambivalens**
215. Leaves besides 1 or 2 pairs of (sub)-basal ascending nerves provided with one or several upper, more spreading and generally ± straight ones.
217. Leaves 3.5–6.5(–7.5) by (1–)1.5–2.5 (rarely in part in the same specimen up to 3) cm, with 1–2 basal, high-ascending, and 1–2 upper, shorter and more spreading pairs of nerves . . . . . **227. V. gjellerupii**
217. Leaves larger, especially wider in general, with (3–)4–6 upper pairs of nerves . . . . . **228. V. laurifolium**
211. Leaves ± caudate-acuminate and ± acute at the apex.
218. Corolla 1.2–1.3(–1.4) cm . . . . . **229. V. turfosum**
218. Corolla up to 9 mm.
219. Tubules distinctly longer than (and generally but half as wide as) the cells.
220. Pedicels 10–15(–17) mm, (very) slender. (Corolla hairy below inside.) **230. V. gracilipes**
220. Pedicels up to 6 mm.
221. Rachis, pedicels and calyx tube short-pubescent . . **231. V. pseudocaudatum**
221. Rachis, pedicels and calyx tube quite glabrous.
222. Corolla subdensely short-hairy in the lower half inside. Calyx limb ± fleshy, low, wavy or shortly (up to 0.5 mm) and bluntly lobed. Leaves (5–)6–10 by (1.5–)2–3(–4.8) cm . . . . . **232. V. benguetense**
222. Corolla quite glabrous inside. Calyx limb membranous, lobes more conspicuous (0.5–0.8 mm) and generally subacute. Leaves (3–)4–6 by (1–)1.3–2 cm . . . . . **233. V. caudatum**
219. Tubules distinctly shorter than (and generally ± as wide as) the cells.
223. Corolla 4(–5) mm.
224. Leaves ovate-elliptic, 5–8 by 2.5–4 cm . . . . . **234. V. steinii**
224. Leaves elliptic to narrowly oblong or lanceolate.
225. Leaves long caudate-acuminate, 4–7 by 1.3–2 cm . **235. V. blepharocalyx**
225. Leaves more shortly subcaudate-acuminate, 3–5.5(–7) by (1.3–)1.5–2.5 (–3) cm . . . . . **194. V. cavendishioides**
223. Corolla 6–9 mm.
226. Calyx tube glandular-muriculate, or glandular-muriculate *and* hairy.
227. Calyx tube exclusively glandular-muriculate . . . . . **236. V. sparsum**
227. Calyx tube glandular-muriculate *and* hairy . . . . . **170. V. ambivalens**
226. Calyx tube glabrous.
228. Leaves oblanceolate or elliptic-oblanceolate, the base ± cuneate. **196. V. irigaense**
228. Leaves lanceolate, ovate-oblong or -lanceolate, the base broadly attenuate to almost rounded.
229. Pedicels stoutish, 6–8 mm . . . . . **237. V. striicaule *var.* striicaule**
229. Pedicels (very) slender, 1.2–2 cm.
230. Leaves 3.5–6 by 0.9–1.9 cm . . . . . **238. V. gracillimum**
230. Leaves 3–4.5 by 0.5–0.9(–1) cm . . . . . **239. V. rubroviolaceum**

87. **Vaccinium bracteatum** THUNBG, Fl. Jap. (1784) 156; G. DON, Gen. Syst. 3 (1834) 854; DUNAL in DC. Prod. 7 (1839) 573; MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 29; *ibid.* 2 (1865) 160; DOP, in Fl. Gén. I.–C. 3 (1930) 710; FLETCHER, Fl. Siam. En. 2 (1938) 312; SLEUM. Bot. Jahrb. 71 (1941) 470 (*with further synonymy*); STEEN. Act. Hort. Berg. 15, 2 (1949) 40, f. 1 (*distr. map*); MAKINO, Ill. Fl. Japan (1954) 240, fig.; SLEUM. Blumea 11 (1961) 44. — *V. malaccense* WIGHT, Calc. J. Nat. Hist. 8 (1847) 172; Ic. Pl. 4 (1848) t. 1186 ('*malacca*'); MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 251; KURZ, Nat. Tijd. N.I. 27 (1864) 215; SCHEFFER, *ibid.* 31 (1870) 363; CLARKE in Fl. Br. Ind. 3 (1882) 454; RIDL. J. Str. Br. R. As. Soc. *n.* 23 (1891) 146; Trans. Linn. Soc. II, Bot. 3 (1893) 315; J. Str. Br. R. As. Soc. *n.* 33 (1900) 103; K. & G. J. As. Soc. Beng. 74, ii (1905) 67; KOORD. Exk. Fl. Java 3 (1923) 19; RIDL. J. Fed. Mal. St. Mus. 7 (1916) 45; Fl. Mal. Pen. 2 (1923) 211; HEYNE, Nutt. Pl. (1927) 1218; REHD. J. Arn. Arb. 15 (1934) 285; BURK. Dict. (1935) 2217; CORNER, Wayside Trees (1940) 219, f. 59; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 3; HENDERS. Mal. Nat. J. 6 (1950) 259. — *V. malaccense* WIGHT *var. bancanum* MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 587; Ann. Mus. Bot. Lugd.-Bat. 1 (1864) 221; KURZ, Nat. Tijd. N. I. 27 (1864) 215. — *V. pubicarpum* RIDL. J. Linn. Soc. Bot. 38 (1908) 313, repr. J. Fed. Mal. St. Mus. 2 (1908) 119; *ibid.* 6 (1915) 156; Fl. Mal. Pen. 2 (1923) 211.

Shrub or small terrestrial tree, up to 6 m. Branchlets slender, tips greyish puberulent, older parts mostly early glabrescent. *Leaves* lax, lanceolate-oblong to elliptic- or ovate-lanceolate, variable in shape and size, rather long acuminate, acute, the

tip with a sharp point, often somewhat curved, base acutely attenuate to the petiole, chartaceous to subcoriaceous, in erect reddish pink flushes when young, old ones withering red, light green, glabrous, finely though distinctly crenulate-serrate in general, rarely subentire, (3–)4–8 by (1.5)–2–3(–3.5) cm, midrib and nerves slightly prominent on both faces, sometimes puberulent as is the petiole, nerves 6–7 pairs, rather steeply ascending and anastomosing, reticulation lax, not much visible; petiole slender, 2–4 mm. *Racemes* from the upper axils, many-flowered, mostly greyish and shortly pubescent in all outer parts, glabrescent towards the fruiting stage; rachis slender, (2.5–)3–8 (in fruit up to 15) cm. *Flowers* fragrant, all set in a row and facing down. Pedicels 1–2(–4, in fruit rarely up to 6) mm, bract foliaceous, small, subpersistent. *Calyx* tube cup-shaped, 1–1.5 mm, lobes triangular, acute, 1–1.5 mm. *Corolla* urceolate-cylindric, slightly 5-angular, pink or white, pubescent on both sides, 5–6(–7) by 2.5 mm, lobes recurved, 1 mm. *Filaments* subulate, hairy below, 2–2.5 mm; anther-cells broad-oblong, base obtuse, almost 1 mm, whether or not minutely 2-spurred at the back; tubules slender, cylindric, *c.* 1.8 mm, opening by oblique short slits. *Disk* densely grey-pubescent. *Style* slender, glabrous, *c.* 5.5 mm. *Berry* globose, pubescent at the top, glabrescent elsewhere, reddish or finally dull purple or blackish, *c.* 4 mm ø.

Distr. In SE. Asia from Upper Burma, Siam and Indochina, China (Yunnan to Kiangsu), Formosa, Riu Kiu Is. and Korea to S. Japan (Kiushiu, Shikoku, Hondo), in *Malesia*: Sumatra (Palembang: Indragiri Highland, Mt Pesagi), Malay Peninsula, Banka, Billiton, Lingga Arch., Java (Karimun I.) and Karimata Arch.

Ecol. Common locally on sandy coasts, also in shady ravines on sandstone or granite mountain tops (where the leaves are slightly tougher), in moist places, said to occur also in padang vegetation, from the sea-shore up to 1830 m, always on acid soil. *Fl. fr.* Jan.–Dec.

Vern. *Ais, inai (enai) batu, kělampadang, mata kěli, měmpadang, rangkas, rěmpadang*, M, *kěndalu, progadang*, Banka, *kěmsěnting padang*, Lingga, *pěrai, pěrangkas*, Billiton.

Uses. Fruit rather hard and not much juicy, edible when quite ripe.

88. Vaccinium kjellbergii J. J. S. Bot. Jahrb. 68 (1937) 211; SLEUM. Blumea 11 (1961) 44. — *V. malaccense* WIGHT *var. celebense* J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 48.

Terrestrial shrub or treelet. Branchlets patent-puberulous in the youngest, glabrescent in the older parts. *Leaves* scattered, subovate-elliptic, apex gradually to subcaudately acuminate, often a little curved, tip bluntish, base ± cuneate into the petiole, coriaceous at full age, patent-puberulous initially on both faces, rather early glabrescent except the base and the petiole which remain puberulous for a longer time, remotely crenulate by a number of impressed small glands within the slightly thickened margin, rarely subentire, (3–)3.5–8.5 by (1.5–)2–2.7(–3.3) cm, 5(-sub-7)-plinerved, moreover with several shorter upper nerves, all ± steeply curved-ascending and inarching near the edge, prominent on both faces, or sometimes impressed above in old leaves, reticulation rather dense, more distinct beneath, raised on both sides; petiole puberulous initially, (2.5–)5–7(–11) by 0.5–1 mm. *Racemes* axillary, laxly 8–12-flowered, ± densely patently short-pubescent in all outer parts at anthesis; rachis subangular, slender, 4.5–8(–10) cm. Pedicels very slender 6–8(–12) mm, bract foliaceous, subpersistent, membranous, ovate- to lanceolate-oblong, crenulate, 1–2.5(–3) by 0.3–0.7(–1.3) cm, shortly petioled. *Calyx* tube subglobose, *c.* 2 mm ø, limb spreading, its lobes triangular, obtuse by a small dark apical gland, 1 mm. *Corolla* urceolate-cylindric, white or pinkish, 5-angular, a little fleshy, densely short-pubescent outside, laxly so or almost glabrous inside, 6 by 3 mm, lobes obtuse, recurved, 1 mm. *Filaments* subulate, long-hairy or nearly villous to the top, *c.* 2.5 mm; anther-cells broad-oblong, 1.2 mm, whether or not provided with 2 very short dorsal spurs; tubules slender, *c.* 1.2 mm, obliquely cut apically, the posticous wall of each very shortly and irregularly bifid. *Disk* subvelutinous. *Style* pubescent at the base, glabrous otherwise, slender, 6–7 mm, finally exserted. *Berry* globose, *c.* 5 mm ø, short-pubescent, crowned by the somewhat swollen disk.

Distr. *Malesia*: Central and SE. Celebes, also on Kabaena I.

Ecol. Both in forest and rather dry shrub formation, on phyllites or crystal schistes, from sea-shore to 900 m. *Fl. fr.* Aug.-Oct.

89. Vaccinium timorense FAWC. in Forbes, Wand. (1885) App. 6, p. 509, *incl. var. denticulatum* FAWC. *l.c.*; SLEUM. Blumea 11 (1961) 45. — *V. cf. varingiaefolium* (BL.) MIQ., MEIJER DREES, Comm. *n.* 33 For. Res. Inst. Bogor (1951) 49.

Straggling bushy shrub, 1–2 m, rarely treelet up to 8 m. Branchlets angular, puberulous, rather densely leaved; young shoots reddish. *Leaves* oblong or elliptic-oblong, sometimes lanceolate- or subobovate-oblong, apex obtuse to rounded, base cuneate or attenuate into the somewhat flattened petiole, the basal pair of glands distant from the petiole and minutely depressed, subcoriaceous, glabrous, shining above, entire or remotely crenulate by a few impressed, minute, marginal glands, 2–4 by (0.5–)0.8–1(–1.5) cm (smaller at higher altitudes), midrib and 4–5 ascending pairs of nerves slightly raised on both faces, reticulation rather dense and finely prominent on both faces, or sometimes subinconspicuous; petiole pubescent initially, (1–)1.5–3 by 0.5–1 mm. *Racemes* from the uppermost axils, 8–15 (–20)-flowered, laxly to subdensely pubescent or glabrous at rachis, pedicels and calyces; rachis angular, rather slender, (1–)2.5–5 cm. Pedicels slender, 0.5–1 cm, bract similar to though smaller than the leaves, up to 1.5 by 0.5 cm, ± caducous in the course of the anthesis, rarely persistent for a longer time especially in specimens of higher

altitudes. *Calyx* tube obconical to subsemiglobose, 1–1.5 by 2 mm, limb spreading, 5-lobed almost to the base, lobes deltoid, 1 mm, the apical gland distinct though sometimes ± hidden by the hairs. *Corolla* subcylindric-urceolate, whitish or pink or in shades of a vivid red or even scarlet, glabrous outside, pubescent inside, 6–7 by 2.5–3 mm, lobes obtuse, reflexed, 1 mm. *Filaments* subulate, densely hairy to the top, 2.5–3 mm; anther-cells broad-oblong, 1–1.2 mm, whether or not provided with 2 short dorsal spurs (which are shorter than the tubules); tubules sometimes with some sparse very shortly stalked glands or glandular points, cylindric, a little narrower than the cells, 0.3–0.5 mm, ± transversely cut apically, the pore round. *Style* slenderly cylindric, *c.* 6 mm, laxly hairy to the lower third, glabrous for the rest. *Disk* laxly hairy. *Berry* globose, glabrous, bluish-blackish at maturity, *c.* 5 mm ø.

Distr. *Malesia*: Lesser Sunda Is. (Flores, Sumba, Timor, Alor) and S. Celebes.

Ecol. In Timor in (secondary) *Eucalyptus* and *Podocarpus* forest as well as in shrubberies, often along forest borders from 520–2950 m, in the other islands in scrubby low forest on exposed slopes or ridge crests, also on volcanic rocks, on stony ground, edge of craters, locally common, 950–2850 m. *Fl.* Jan.—Dec.

Vern. *Torovara*, Flores, *aipada*, Sumba, *kewán, tali*, Alor, *kunkole*, Timor: Dawang, *tjampaga romang*, S. Celebes: Makassar.

Uses. After MEIJER DREES (1951) fairly resistant against fire and cattle, but unsuitable for silviculture owing to its small dimensions.

Note. *V. timorense* on Sumba is the cause of a column-like erosion in the places where its extensive root-system prevents the softer layers of sandstone from becoming early eroded (*cf.* GREVENSTUK. Trop. Natuur 28, 1939, 61, f. 2–4, *sub V.? bancanum*).

90. Vaccinium centrocelebicum SLEUM. Blumea 11 (1961) 45.

var. **centrocelebicum.**

Shrub. Branchlets angular, blackish purplish when dry, glabrous. *Leaves* rather dense, oblong- to elliptic-obovate, broadly attenuate towards the apex, which is subobtuse and provided with a small gland, base cuneate and a little decurrent into the petiole, thin-coriaceous, glabrous, laxly punctate beneath, edge regularly subserrate-crenate (crenations ending in a gland, 1–2 mm spaced, 0.3 mm high), 1.4–1.9 by (0.5–)0.6–0.8 cm, nerves 4–5 steeply ascendent pairs, raised on both sides as is the midrib, reticulation indistinct above, subinconspicuous beneath; petiole 1(–2) by 0.5–1 mm. *Racemes* axillary, puberulous except the corolla, 10–15-flowered; rachis slender, angular, 3–4(–6) cm. Pedicels slender, 4–7 mm, bract foliaceous, *c.* 7 by 2–3 mm, persistent to the end of the anthesis. *Calyx* tube cupular-campanulate, 1.5 by *c.* 2 mm, base rounded-obtuse, limb spreading, lobes ovate-deltoid, 1 mm, callose-apiculate. *Corolla* tubular, 5 by *c.* 2.5 mm, white, glabrous outside, very shortly pubescent all over inside, lobes obtuse, reflexed, 0.8 mm. *Filaments* subulate, hairy to the top; anther-cells broadly oblong, 0.9 mm, manifestly bicalcarate dorsally; tubules broad-cylindric, a little narrower than the cells, 0.5 mm. *Disk* laxly hairy. *Style* slender, glabrous, *c.* 4.5 mm, slightly exserted at anthesis.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Ra.: between Pintealón, Pokapindjang and Tinábang ridge), 2600–3000 m. Once found. *Fl.* June.

var. **maius** SLEUM. Blumea 11 (1961) 46.

Leaves broader and more obovate or rhombic-elliptic, 1.5–2 by 1–1.3 cm, more distinctly veined beneath. *Fruit* subglobose, *c.* 4 mm ø in submature state.

Distr. *Malesia*: Central Celebes (Masamba Subdistr.), in forest, 2400 m. Once found. *Fr.* Nov.

91. Vaccinium gitingense ELM. Leafl. Philip. Bot. 4 (1912) 1490; MERR. En. Philip. 3 (1923) 249; COPEL. *f.* Philip. J. Sc. 42 (1930) 559, t. 1, f. 6–8; SLEUM. Blumea 11 (1961) 46.

Spreading shrub, 1–3 m, branched from the base. Branchlets slender, faintly cinereous-puberulent at the tips, glabrescent below. *Leaves* scattered, ovate to elliptic-ovate, short-acuminate towards the bluntish apex, base rounded, coriaceous, glabrous, regularly minutely to more deeply subserrate-crenulate, (1.5–)2–3(–3.5) by 0.8–1.5 (–1.8) cm, midrib and 3–4(–5) of rather steeply ascending nerves hardly raised above, ± distinctly so beneath, reticulation lax, a little prominent beneath; petiole compressed, initially puberulous, 2(–3) by 1 mm. *Racemes* lax, 5–10-flowered; rachis slender, glabrous or slightly puberulous, 4–6 cm. Pedicels slender, (0.7–)1–1.5 cm, glabrous, bract leafy, lanceolate, rather coriaceous, still persistent in fruiting time, up to 2 by 1 cm. *Calyx* glabrous, tube obconical or cup-shaped, *c.* 2 by 3 mm, limb a little spreading, 5-lobed to almost the base, lobes deltoid, subacute, ciliate, 1 mm. *Corolla* broadly tubular-urceolate, white or (deep) red, glabrous at both sides, but sometimes with some hairs at the throat, 6 by 3 mm at the base and 2 mm ø at the opening, lobes subacute, 1 mm. *Filaments* subulate, densely hairy or villous, 1.5–2 mm; anther-cells oblong, base subacute, 1.5 mm, provided with 2 short dorsal spurs; tubules much more slender than the cells, cylindric, obliquely cut apically, 1.5 mm. *Disk* pubescent. *Style* slender, glabrous, *c.* 6 mm, slightly exserted at full anthesis. *Berry* becoming blackish at maturity, said to attain up to 1 cm ø. *Seeds* few, fusiform, 1 mm.

Distr. *Malesia*: Philippines (Mindanao, Sibuyan, Dinagat I.).

Ecol. On hot, dry, gravelly river bottom (probably washed down from mountain forest, showing minor leaves) or along streams and on ridges at low altitude, ascending to 450 m.

Vern. *Pagangpang*, P. Bis.

Uses. Fruits said to be of sweet taste and edible.

92. Vaccinium indutum VIDAL, Rev. Pl. Vasc. Filip. (1886) 169; MERR. Philip. J. Sc. 3 (1908) Bot. 376; *ibid.* 7 (1912) Bot. 96; En. Philip. 3 (1923) 249; COPEL. *f.* Philip. J. Sc. 42 (1930) 553, t. 2, f. 1–3; SLEUM. Blumea 11 (1961) 46. — *V. macgregorii* MERR. Philip. J. Sc. 10 (1915) Bot. 53; En. Philip. 3 (1923) 250. — *V. sorsogonense* ELM. Leafl. Philip. Bot. 10 (1939) 3730.

Shrub, sometimes epiphytic, 1–4 m. Branchlets puberulous at the ends, early glabrescent and greyish corticate. *Leaves* distant from each other, ovate, ovate-elliptic to elliptic-oblong or oblong-ovate, apex rather abruptly or subcaudately acuminate (*c.* 2 cm), subacute, base broadly attenuate to rounded and even subcordate, coriaceous, (7–)8–14(–18) by 4–6(–7) cm, entire, initially soft-hairy on both faces, glabrescent except the midrib and nerves beneath, rarely glabrous from the beginning, prominently 7-plinerved, reticulation ± dense, raised on both faces; petiole 4–6(–8) by 1.5–2 mm, flattened, pubescent at first. *Racemes* from the uppermost axils, sparingly to densely short-hairy in all outer parts, 5–12(–15)-flowered; rachis stoutish, angular, 3–7(–9) cm, even longer in fruit. Pedicels robust, 1–1.5 cm, bract leafy, up to 2(–3) by 0.8 cm, caducous towards the end of the anthesis. *Calyx* tube hemispherical, slightly constricted above, 2–2.5 by 3 mm, limb ± spreading, lobes broadly triangular, acute or acuminate, *c.* 2 mm, ciliate. *Corolla* tubular-subcampanulate, *c.* 1.5 cm long in full anthesis, *c.* 4 mm ø below, widened to 6 mm across the mouth, red, lobes obtuse, *c.* 4 by 2 mm. *Filaments* linear, ± densely set with long white hairs, 7–9 mm; anther-cells narrow-oblong, base slightly curved inward and apiculate, not spurred, 3.5–4 mm; tubules cylindric, narrower than the cells, 3–3.5 mm, pores somewhat oblique. *Disk* densely white-pubescent. *Style* slender, rather glabrous, 1.5 cm. *Fruit* pubescent, *c.* 5 mm ø.

Distr. *Malesia*: Philippines (Luzon).

Ecol. In rocky ground of densely wooded steep slopes, also in mossy forest, apparently generally above 1000 m, rarely down to 600 m. *Fl.* Febr.–Aug.

Vern. *Banudi, paluai, bunudi, malabanudi*, Bon.

93. Vaccinium ampullaceum SLEUM. Bot. Jahrb. 72 (1942) 266; Blumea 11 (1961) 46; *ibid.* 12 (1963) 127.

Scandent or epiphytic shrub. Branchlets patently pubescent or tomentulose distally, slender, subimbricately leaved. *Leaves* ovate to elliptic-ovate, apex broadly acuminate or attenuate, bluntish, base mostly cordate, sometimes in part subtruncate-rounded, subcoriaceous to coriaceous, shortly tomentulose on both faces initially, glabrescent, remaining pubescent on the midrib beneath, entire, 2–4 by (1.5–)2–3.5(–4) cm, the lowest 2(–3) pairs of nerves oriented from the base, the upper 3–4 ones ± steeply ascending and rather straight from the midrib, obscurely anastomosing, slightly raised on both sides, reticulation visible beneath; petiole *c.* 2 by 1.5–2 mm. *Racemes* from the upper axils, suberect, softly short-tomentose in all outer parts, 6–12-flowered; rachis stoutish, (3–)5–7 cm. Pedicels rather slender, 4–5 mm, bract leafy, thin, pubescent, oblong to ovate-oblong, up to 2 by 0.8 cm, persistent at least during the anthesis, the 2 bracteoles subulate and early caducous. *Calyx* tube campanulate-obconical, 1.5(–2) mm, limb spreading, lobes narrow-deltoid, subacute, *c.* 2 mm. *Corolla* ampullaceous or elongate-urceolate, 1–1.1 cm by 3 mm at the base and 2 mm ø above, again slightly dilated at the opening, densely hairy outside, glabrous inside, white, tinged with rose, or red, lobes obtuse, spreading, 1.5 mm. *Filaments* subulate, densely hairy below, 2.5 mm; anther-cells oblong, 1.6 mm, not spurred; tubules as wide as the cells, obliquely cut, 0.5 mm, the back-wall of each tubule ending in a ± sharp tooth. *Disk* hairy on the inner angle. *Style* columnar, 9 mm, laxly hairy to nearly the top.

Distr. *Malesia*: E. New Guinea (Main Range from the Central Distr. to the Eastern Highlands).

Ecol. In mountain forest, 1900–2550 m. *Fl.* Nov.–Dec.

94. Vaccinium glabrescens K. & G. J. As. Soc. Beng. 74, ii (1905) 63; RIDL. Fl. Mal. Pen. 2 (1923) 208; SLEUM. Blumea 11 (1961) 46. — *V. longibracteatum* RIDL. J. Linn. Soc. Bot. 38 (1908) 313, repr. J. Fed. Mal. St. Mus. 2 (1908) 119; *ibid.* 6 (1915) 49, 156; Fl. Mal. Pen. 2 (1923) 208; HENDERS. J. Fed. Mal. St. Mus. 13 (1927) 5.

Shrub or treelet, 3–5 m, sometimes epiphytic. Branchlets rather robust, laxly or mostly subdensely leaved, at first with a short grey tomentum also found on the leaves and the inflorescences, ± glabrescent. *Leaves* ovate to oblong-ovate or ovate-elliptic, apex obtuse or mostly shortly subacuminate, the very tip blunt, base rounded-truncate to slightly cordate, coriaceous, stiff, flat, entire, with 1 (or 2) small impressed marginal gland(s) at some distance from the petiole, glabrescent and smooth except the base underneath and the petiole, (1.5–)2–3.5(–5) by (1.2–)2–2.5(–3.5) cm, midrib sunken above, obtusely raised beneath, nerves 2–3(–4) basal and slightly suprabasal and 2–3 upper pairs, all rather steeply curved-ascending and anastomosing, faintly impressed above, ± visibly prominent beneath, reticulation somewhat raised above, or subinconspicuous on both faces; petiole 1.5–2(–2.5) by 1–1.5 mm. *Racemes* from the uppermost axil, seemingly terminal, suberect, densely flowered, all over with a yellowish soft and short tomentum; rachis stout, 3–6(–8) cm by 1.5–2 mm ø at base. Pedicels curved, 3–6 mm at anthesis, up to 12 mm in fruit, stoutish, bract lanceolate to ovate-oblong, subacuminate, up to 1.5 by 1 cm, subpersistent. *Calyx* tube subglobose, 2 mm ø, lobes narrow-deltoid, subacute, 1.5 mm, no apical gland. *Corolla* subcylindric, slightly narrowed towards the lobes, rose or pink, 7–7.5 by 2.5 mm, somewhat 5-angled, densely hairy outside, less so inside, lobes suberect, rather acute, 1.3 mm. *Filaments* subulate, subdensely hairy, *c.* 3 mm; anther-cells oblong, granular, 1.5 mm, with 2 distinct dorsal

spurs; tubules with a few shortly stalked or sessile glands, narrow-cylindric, 1.3 mm, slightly dilated distally, pore round. *Disk* shortly hairy. *Style* rather slender, 6 mm, hairy. *Fruit* subglobose or nearly ellipsoid, softly pubescent, *c.* 4 by 3 mm, rather hard, pink or green with reddish cheeks when ripe, crowned by the inflexed triangular calyx teeth, 5-celled, each cell with several angled seeds.

Distr. *Malesia*: Malay Peninsula (Main Range in Perak, Pahang, Selangor, and on Mt Tahan).

Ecol. In summit scrub, open country and ridge forest, common locally, 1000–2165 m. *Fl. fr.* Jan.–Dec.

95. Vaccinium auriculifolium SLEUM. Blumea 12 (1963) 131.

Shrub, 1.2–3 m, sometimes scrambling; stems shortly branched distally. Branchlets at least initially densely set with short spreading soft hairs as are the young leaves, the inflorescences and the infructescences. *Leaves* imbricate, ovate or elliptic-ovate, apex broadly and shortly attenuate or subacuminate, acutish or obtuse, base deeply auriculate-cordate, basal lobes not amplectent, 1–1.5 cm ø, the pair of basal marginal glands small and found close to the petiole, coriaceous, tardily glabrescent, mature ones still pubescent on the basal part of the midrib beneath and on the petiole, entire, flat, (2.5–)3–6 by (2–)2.5–4.5 (–5) cm, irregular in size, upper ones generally decrescent, 7–9-plinerved, other (upper) nerves from the midrib 3–4, all nerves inarching before the edge and prominent, reticulation dense, slightly raised on both faces; flush pink; petiole slightly depressed, 1.5–3 by 1.5–2 mm. *Racemes* from the upper 1–2 axils, condensed, almost umbelliform, (3–)4–8(–12)-flowered; rachis short, rarely up to 1 cm. Pedicels stoutish, 3–5 mm, bract foliaceous and persistent to fruiting time, broad-ovate to ovate-elliptic, 0.5–1 by 0.5–1 cm. *Calyx* tube cup-shaped, 1–1.5 mm, lobes erect, deltoid, 1–1.5 mm, apical gland small, glabrous. *Corolla* subglobose-urceolate, depressed, *c.* 4 by 5–6 mm, opening *c.* 2 mm ø, fleshy, pale to more intense pink, hairy outside and in the upper part inside, lobes reflexed, 0.7 mm. *Filaments* subulate, villous, 1.5 mm; anther-cells broad-oblong, almost smooth, 1–1.2 mm; tubules as wide as the cells, 0.3–0.4 mm, pore oblique. *Disk* prominent, hairy. *Style* 3 by 1 mm, glabrous. *Fruit* subglobose, truncate at apex, 7–8 mm ø, the prominent disk exceeding the non-accrescent calyx lobes, blackish purple, pedicel 5–7 mm.

Distr. *Malesia*: New Guinea (Western and Southern Highlands).

Ecol. In *Nothofagus* forest, in boggy area covered with (also secondary) low forest or shrubs, or in *Miscanthus* grass swamp, 1980–2860 m. *Fl. fr.* July–Sept.

Vern. *Orsar*, Mendi, *porr*, Merimanta, *gulwaneh*, Ialibu.

96. Vaccinium trichocarpum SLEUM. Blumea 11 (1961) 47.

Treelet, 2–4 m. Branchlets (very) slender, patently hirsutulous in the youngest, glabrescent in the older parts, rather densely to laxly leaved. *Leaves* elliptic, apex rounded-obtuse, sometimes faintly emarginate, the apical gland hardly visible, base broadly attenuate or almost rounded, the pair of basal marginal glands minute and much distant from the petiole, young ones membranous and hirsutulous especially along the midrib beneath and at the petiole, shorter and less densely so beneath, ciliate, glabrous above, mature ones subcoriaceous and glabrous except some hairs on the midrib beneath, dull, entire, 2–2.8 by 0.8–1.3 cm, midrib slightly impressed above, prominent beneath, nerves ± pinnate, 4–5 not much conspicuous pairs, reticulation lax and subobscure; petiole rather slender, 1.5–2 mm. *Racemes* axillary and subterminal, short, laxly remotely 2–4-flowered; rachis slender, densely patently set with a soft hirsutulous tomentum as are pedicel and calyx, 1–3(–4) cm, accrescent during anthesis, the flowers restricted to its upper part. Pedicels 0.5 mm, up to 2 mm in fruit, bract leafy, ovate to ovate-elliptic, persistent, membranaceous and densely hairy at first, subchartaceous and glabrescent in fruit, up to 1 by 0.9 cm; bracteoles subulate, *c.* 1.5 mm, very early caducous. *Calyx* tube subcylindric, *c.* 2 mm, limb erecto-patent, 1 mm, 5-lobed halfway, lobes deltoid, obtuse, sometimes with an apical gland which is ± covered by the hairs. *Corolla* cylindric-urceolate, pink, laxly long-hairy outside, glabrous inside, *c.* 4 by 2 mm, shortly 5-lobed. *Filaments* broadly linear, laxly short-pubescent, 1 mm; anther-cells narrow-oblong, 1.2 mm, no spurs; tubules cylindric, erect, half as wide as the cells, slightly divergent, *c.* 1 mm, opening by an elongate introrse slit. *Disk* glabrous. *Style* rather robust, glabrous, ± as long as the corolla. *Fruit* globose, apex truncate, crowned by the inflexed calyx lobes, *c.* 5 mm ø (submature), subdensely hirsutulous.

Distr. *Malesia*: Philippines (Mindanao: Mt Hilong-Hilo, Mt Mayo).

Ecol. In summit vegetation, 1300–1750 m. *Fl. fr.* April.

97. Vaccinium wisselianum SLEUM. Blumea 11 (1961) 47; *ibid.* 12 (1963) 127.

Shrub, 1–2.5 m. Branches terete, robust. Branchlets rather slender, tips covered with a soft, spreading yellowish tomentum, older parts glabrescent and cinereous-corticate, subimbricately leaved. *Leaves* ovate to oblong-ovate, apex gradually attenuate or subacuminate, bluntish, base slightly cordate, the pair of basal marginal glands a little distant from the petiole, subcoriaceous, initially shortly and softly hairy on both faces, especially at the midrib underneath, ± glabrescent, remaining hairy for a longer time at the midrib and nerves beneath, entire, edge ± revolute, 2–3 by 1.5–2.5 cm, midrib much impressed above, prominent beneath, nerves 4–5 pairs, the lower 2 pairs ascending from the base, the upper ones ± pinnately from the midrib, all curved-ascending and anastomosing, slightly

sunken above or raised beneath, reticulation obscure; flush light pink; petiole tomentulose, *c.* 2 by 1 mm. Racemes pseudoterminal from the uppermost axil, in form of a shoot with decrescent leaves and a solitary flower in the axil of each leaf, softly and patently tomentulose in all outer parts except the corolla; rachis rather robust, 4–6 cm. Pedicels rather slender, 3–5 mm, accrescent to 1 cm in fruit, bract similar to the leaves, though smaller and thinner, up to 1.5 by 1.2 cm; bracteoles subulate, early caducous. *Calyx* tube semiglobose, *c.* 2 mm, contracted apically, limb erecto-patent, 5-lobed to almost the base, lobes ovate-deltoid, acute, 2 mm. *Corolla* elongate-urceolate, rather fleshy, glabrous at both sides, deep red or purplish, 9–10 mm long, *c.* 2.5 mm ø below, lobes obtuse, reflexed, *c.* 1 mm. *Filaments* subulate, quite glabrous, 2 mm; anther-cells oblong, 1 mm; tubules nearly as wide as the cells, 0.5 mm, obliquely cut apically, the pore large. *Disk* glabrous. *Style* glabrous, 8 mm. *Fruit* subglobose, pubescent, *c.* 5 mm ø when dry, black when ripe.

Distr. *Malesia*: West New Guinea (Wissel Lakes).

Ecol. In secondary (*Dacrydium*) forest or heath vegetation, or in swamps, temporarily covered by water, on peaty soil, locally not rare, 1750–1800 m. *Fl. fr.* March–Nov.

Vern. *Bommo, koglè, kore, wodik*, Kapauku.

98. Vaccinium thibaudifolium WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 93; SLEUM. Bot. Jahrb. 72 (1942) 267; Blumea 11 (1961) 48; *ibid.* 12 (1963) 127.

Shrub, up to 4 m, with spreading branches. Branchlets glabrous or puberulent, rather slender. *Leaves* scattered, elliptic or ovate-elliptic, apex (sub)caudate-acuminate (2–2.5 cm), subacute, base broadly attenuate into the petiole, the basal pair of marginal glands conspicuous, rather close to the petiole, coriaceous, quite glabrous, entire, flat, 6–9 by (2.5–)3–4 cm, 7-plinerved from and from above the base, midrib slightly impressed above, prominent beneath, nerves a little sunken or sometimes raised above, always prominent beneath, reticulation ± dense, conspicuously raised beneath; petiole 5–8 by 1–1.3 mm. *Racemes* axillary, laxly 6–8-flowered, glabrous or finely puberulous (and sometimes furthermore laxly glandular-muriculate) at rachis, pedicels and calyces; rachis slender to stoutish, (4–)6–9 cm. Pedicels (very) slender, 1–2 cm, bract ± persistent to fruiting time, foliaceous, thin, ovate-oblong, acuminate, 6–8(–10) by 3–5 mm; bracteoles subulate, 2 mm, very early caducous. *Calyx* tube cup-shaped, 1.5 by 2 mm, limb erect, deeply 5-lobed, lobes ovate-deltoid, subacute, whether or not provided with an apical gland, hardly 1 mm. *Corolla* subglobose-urceolate, ± contracted into an apiculus distally, pink or greenish white, densely grey-pubescent outside, more laxly so in the lower half inside, 3.5–4 by 2.5 mm, lobes very short, white or cream. *Filaments* subulate, villous except the very base, *c.* 1.5 mm; anther-cells oblong, 1.2 mm, granular, with 2 very short dorsal spurs, slightly narrowed to the tubules (0.3 mm), which open by oblique pores. *Disk* glabrous. *Style* columnar, glabrous, 2.5 mm. *Fruit* subglobose, apex truncate, crowned by the much swollen disk which surpasses the calyx lobes, *c.* 5 mm ø when dry, becoming purple when ripe.

Distr. *Malesia*: New Guinea (ascent to Mt Carstensz via the Utakwa R.; from the Sibil R. and Minam-Bon R. valley, and Telefomin in Sepik Distr.).

Ecol. In forest, on white impervious clay or peaty soil, 760–1500 m, locally frequent. *Fl. fr.* April–Dec.

99. Vaccinium epiphyticum MERR. Philip. J. Sc. 7 (1912) Bot. 322; En. Philip. 3 (1923) 249; COPEL. *f.* Philip. J. Sc. 42 (1930) 555; SLEUM. Blumea 11 (1961) 48.

Epiphytic shrub, 2–3 m. Branchlets very slender, papillose-puberulous at the tips, glabrous below. *Leaves* laxly arranged, ovate-oblong or -elliptic, apex caudate-acuminate (acumen 1.5–2 cm), subacute, base broadly attenuate into the petiole to almost rounded, the basal pair of minutely impressed marginal glands remote from the petiole, subcoriaceous, flexible, seemingly glabrous but in fact very sparsely set with minute, reddish-brownish, appressed glandular hairs beneath (lens!), ± glossy, entire, 10–12 by 4–5.5 cm, 5(-sub-7)-plinerved, midrib and nerves slightly raised above, much more so beneath, other upper pinnate nerves less distinct, reticulation fine and dense, well visible on both faces; petiole 5–8 by 1–1.5 mm. *Racemes* from the uppermost axil, slender, 6–8-flowered, subpendent; rachis slender, as the pedicels, calyx, corolla and disk with a fine, very short, non-glandular puberulence and laxly set with thicker minute gland-tipped hairs. Pedicels rather stoutish, 1–1.5 cm, much thickened distally, bract foliaceous, membranous, acuminate, up to 1 by 0.5 cm, subpersistent; bracteoles subulate, very early caducous. *Calyx* tube cup-shaped, 2 by 3 mm, limb short, deeply 5-lobed, lobes deltoid, subacute, ciliate, 1.5 mm. *Corolla* tubular, (1–)1.1–1.2 cm long in all and 4–5(–6) mm ø below, slightly dilated or subcampanulate distally, thin, glabrous inside, lobes obtuse, reflexed, 2 mm. *Filaments* subulate to almost filiform, subdensely pubescent, 5–5.5 mm; anther-cells oblong, echinulate, base obtusely apiculate and inflexed, 2.5 mm, no spurs; tubules cylindric, a little narrower than the cells, 1.5–1.8 mm, transversely cut at the apex, pore round, somewhat flaring. *Disk* hairy. *Style* filiform, laxly hairy in the lower half, 1.2 cm.

Distr. *Malesia*: Philippines (Mindanao: Sax R. Mts, Zamboanga Prov.), at *c.* 900 m. Once found. *Fl.* Nov.

Vern. *Maladúsong.*

100. Vaccinium barandanum VIDAL, Rev. Pl. Vasc. Filip. (1886) 169; MERR. Philip. J. Sc. 3 (1908) Bot. 376; *ibid.* 5 (1910) Bot. 372; En. Philip. 3 (1923) 248; COPEL. *f.* Philip. J. Sc. 42 (1930) 556, t. 2, f. 4–6; SLEUM. Blumea 11 (1961) 48.

See for synonym under the variety.

KEY TO THE VARIETIES

1. Leaves broadly elliptic-ovate, 5.5–7 cm wide. Rachis and pedicels quite glabrous. (Disk puberulous.) . . . . . 2. *var.* **hutchinsonii**
1. Leaves lanceolate, ovate-lanceolate or ovate-elliptic or -oblong, (2.5–)3.5–4.5(–5.5) cm wide. Rachis and pedicels minutely pubescent and/or laxly glandular-muriculate.
2. Disk glabrous . . . . . 1. *var.* **barandanum**
2. Disk pubescent . . . . 3. *var.* **cagayanense**

1. *var.* **barandanum.**

Tree or shrub, 2–8 m, glabrous except the filaments. Branchlets striate and angular, flexuous, early covered with ashy cork. *Leaves* scattered, rather variable in shape, generally lanceolate or ovate-lanceolate, apex longish and subabruptly acuminate to subfalcate, the very tip bluntish, base acutely cuneate into the petiole, the basal glands conspicuous, other marginal glands few, minute, scattered along the somewhat wavy or subrevolute edge, practically entire, coriaceous, firm, (6–)8–15 by (2.5–)3.5–4.5(–5.5) cm, 5–7(–9)-plinerved, midrib and nerves a little sunken above, prominent beneath, reticulation lax, conspicuous beneath only; petiole 0.5–1 cm by 1–2 mm, ± flattened. *Racemes* from the upper 2–3 axils, erect, many-flowered; rachis sparsely pubescent and whether or not glandular-muriculate, 4–6(–10) cm. Pedicels rather slender, laxly glandular-muriculate, 4–8 (–10) mm, bract foliaceous, thin, persistent up to the fruiting time, lanceolate, acute, up to 1.5 by 0.5 cm; 2 bracteoles subulate, minute, caducous. *Calyx* tube campanulate, glandular-muriculate, 2 by 2.5 mm, limb low, 5-denticulate, the teeth ciliolate, *c.* 0.6 mm. *Corolla* tubular or more ample, *i.e.* tubular-subcampanulate in the upper half, (9–)10–12(–15) by *c.* 2.5 mm ø below, 3–5 mm ø distally, blood red, subdensely glandular-muriculate by stalked, appressed glandular hairs outside, glabrous inside, lobes 1.5 mm. *Filaments* filiform, *c.* 5 mm, shortly pubescent at least below; anther-cells narrow-oblong, 3.5 mm, echinulate, base minutely rostrate, shortly 2-spurred dorsally; tubules elongate-cylindric, smooth, ± half as wide as the cells, 3.5 mm, the pore round, *i.e.* strictly terminal. *Disk* glabrous. *Style* rather slender, ± as long as the corolla, glabrous. *Fruit* globose, *c.* 6 mm ø, dark red when ripe, pedicel up to 1.5 cm. *Seeds* fusiform, minutely rugose, blackish, 1 mm.

Distr. *Malesia*: Philippines (Luzon).

Ecol. In damp shaded ravines and in mossy forest, also in pine-oak association, reported to be tree-like on cliffs, 1300–2600 m, locally not rare. *Fl. fr.* Jan.–Dec.

Vern. *Dusóng, loso, lusong*, Ig.

2. *var.* **hutchinsonii** (MERR.) COPEL. *f.* Philip. J. Sc. 42 (1930) 558; SLEUM. Blumea 11 (1961) 49. — *V. hutchinsonii* MERR. Philip. J. Sc. 2 (1907) Bot. 294; En. Philip. 3 (1923) 249.

Leaves broadly elliptic-ovate, 8–11 by 5.5–7 cm, 9–11-plinerved; petiole 1–1.5 cm. *Racemes* 8–14 cm; rachis and pedicels quite glabrous, bract up to 2 by 0.5 cm. *Corolla* 1.4–1.7 cm; filaments 6–7 mm. *Disk* puberulous.

Distr. *Malesia*: Philippines (Mindoro: Mt Halcon), epiphytic in mossy ridge forest, 1600–2000 m. *Fl.* Nov.

3. *var.* **cagayanense** COPEL. *f.* Philip. J. Sc. 42 (1930) 557; SLEUM. Blumea 11 (1961) 49.

Differs from *var. barandanum* by a pubescent calyx and disk. Sometimes a short puberulence is found between the glands on the corolla. *Leaves* ovate-lanceolate.

Distr. *Malesia*: Philippines (Luzon).

101. Vaccinium scortechinii K. & G. J. As. Soc. Beng. 74, ii (1905) 62; RIDL. J. Fed. Mal. St. Mus. 4 (1909) 41; *ibid.* 6 (1915) 156; Fl. Mal. Pen. 2 (1923) 207; HENDERS. Mal. Nat. J. 6 (1950) 259, f. 243; SLEUM. Blumea 11 (1961) 49.

Shrub or sometimes a small tree. Branchlets slender, tips angled and puberulous. *Leaves* dense, elliptic or obovate-elliptic, rarely suborbicular, apex ± rounded, with an obscure terminal gland underneath, base broadly attenuate, the pair of basal glands small, dark, close to the petiole, coriaceous, stiff, glabrous, laxly punctate beneath, edge ± recurved, entire, 0.8–1.5 by (0.4–)0.5–0.8 (–1) cm, midrib depressed above, raised beneath, nerves 1–2 basal or slightly suprabasal pairs, curved-ascending and faintly visible, reticulation subinconspicuous beneath; flush and old leaves reddish; petiole *c.* 1 mm. *Racemes* 1(–2) from the uppermost axil, seemingly terminal, erect, many-flowered, 2–4 cm; rachis angular, pubescent. Pedicels 0.5–1 mm, up to 2 mm in fruit, pubescent, bract similar to the leaves, but generally only about half as large and often rather narrow, ± persistent, up to 0.8 by 0.5 cm; bracteoles subulate, up to 3 times as long as the pedicel, finally caducous. *Calyx* pubescent, tube cup-shaped, 1.5 mm, limb 5-lobed to the base, lobes ovate-deltoid, erect, subacute, 1 mm. *Corolla* subcylindric, inflated below, tapering to the mouth, somewhat 5-angular, 5 by 2 mm, white or rose-pink, densely grey-pubescent at both sides, lobes suberect, *c.* 1 mm. *Filaments* subulate-linear, 2 mm, densely short-hairy up to the connective; anther-cells oblong, *c.* 1.3 mm, with 2 distinct dorsal spurs; tubules nearly half as wide as the cells, cylindric, 0.6–0.7 mm, the pore oblique. *Disk* slightly pubescent. *Style* glabrous, or pubescent below, 4 mm. *Fruit* globular, crowned by the inflexed calyx lobes, ± densely pubescent, *c.* 5 mm ø.

Distr. *Malesia*: Malay Peninsula (Main Range: between Mt Kerbau and Mt Batu Puteh, and on Mt Tahan).

Ecol. In open forest or summit vegetation, on top of rocks, (915–)1900–2275 m. *Fl. fr.* Jan.–Dec.

102. Vaccinium agusanense ELM. Leafl. Philip. Bot. 7 (1915) 2630; MERR. En. Philip. 3 (1923) 247; COPEL. *f.* Philip. J. Sc. 42 (1930) 551, t. 1, *f.* 3–5; SLEUM. Blumea 11 (1961) 49.

Epiphytic or terrestrial shrub, up to 4 m.

Branchlets angular, glabrous. *Leaves* scattered, lanceolate to ovate-lanceolate or -oblong, apex subcaudate-acuminate and ± falcate (acumen 1–2 cm), the very tip subacute, base broadly attenuate or rounded and somewhat decurrent into the petiole, basal pair of glands minute as are the few other remote glands impressed along the edge on each side, entire, ± coriaceous, glabrous, (6–)7–10 by 3–4(–4.5) cm, margin very slightly revolute, 5-plinerved from and from above the base, midrib and nerves slightly sunken above, prominent beneath, reticulation subdense and finely, though well visibly raised on both faces; petiole 5–8(–10) by 1–1.5 mm. *Racemes* from the upper axils, somewhat pendulous, puberulent in all external parts, many-flowered; rachis angular, rather slender, 5–7(–10) cm. Pedicels slender, *c.* 1 cm, recurved, bract foliaceous, rather fugacious during anthesis, absent in fruit. *Calyx* tube depressedly cup-shaped, nearly rim-like, *c.* 1 by 2.5–3 mm, limb low, spreading, lobes broad-deltoid, obtuse, ciliate, 1 mm. *Corolla* broad-urceolate, cream or pink, 5 by 2.5–3 mm, puberulous outside, said to be pubescent inside, lobes obtuse, reflexed, 0.8 mm. *Filaments* subulate, densely long-hairy, 2.5 mm; anther-cells broad-oblong, granular, 1 mm, with 2 dorsal erect spurs, (0.7 mm); tubules cylindric, slender, *c.* 0.8 mm, obliqely cut apically, the pore oval. *Disk* bulky, much raised above the calyx lobes, glabrous. *Style* glabrous, 3 mm. *Fruit* subglobose, apex truncate, *c.* 5 mm ø.

Distr. *Malesia*: Philippines (Mindanao).

Ecol. In semi-open mountain forest, or in mossy forest, 1100–1800 m. *Fr.* Febr., Sept.

Vern. *Dulingagan*, Mbo.

Note. The above given description of the bracts and flowers is based on the original diagnosis and on COPELAND *f.* comments, as in the specimens at hand with rather developed inflorescences no flowers have been found.

103. Vaccinium philippinense WARB. in Perk. Fragm. Fl. Philip. (1905) 174; MERR. Philip. J. Sc. 3 (1908) Bot. 377; En. Philip. 3 (1923) 251; COPEL. *f.* Philip. J. Sc. 42 (1930) 550, t. 1, f. 1–2; SLEUM. Blumea 11 (1961) 49.

Terrestrial shrub, 2–5 m. Branchlets glabrous, striate, early covered with cork. *Leaves* lax, elliptic to ovate-elliptic, apex obliquely and ± caudately acuminate (1–2 cm), the very tip subacute, base broadly attenuate or cuneate and a little decurrent into the petiole, coriaceous, glabrous, shining above, the pair of basal marginal glands minute, edge slightly revolute and provided with a few impressed glands similar to the basal ones on each side, practically entire, 5-plinerved from and from above the base, midrib slightly impressed above, prominent beneath, additional nerves coming from the upper part of the midrib few, all nerves initially raised a little on both faces, finally faintly sunken in fully mature leaves, reticulation rather dense, slightly but well visibly elevated on both sides, 5–8(–10) by (2.5–)3–5 cm; petiole grooved above, 5–7(–10) mm. *Racemes* from the upper 1–3 axils, erect, sparsely puberulent except calyx and corolla; rachis rather robust, (6–)8–12 cm. Pedicels curved, stoutish, 6–10(–12) mm, bract leafy, thin, lanceolate, acute, 1–1.5 by 0.3–0.8 cm, subpersistent; bracteoles subulate, basal, 2 mm, early caducous. *Calyx* glabrous, tube low, broadly cup-shaped, 2 by 3 mm, limb spreading ±, lobes ovate-deltoid, subacute, ciliolate, 0.8 mm, no apical glands. *Corolla* broadly urceolate, 5–6 by 4–4.5 mm, quite glabrous outside, densely hairy inside, lobes obtuse, reflexed, 1 mm. *Filaments* subulate, almost villous to the top, 2 mm; anther-cells broad-oblong, granular, *c.* 1.5 mm, with 2 dorsal spurs, curved upwards, almost 1 mm; tubules cylindric, slender, 1 mm, apex transversely cut, the pore round. *Disk* bulky, glabrous. *Style* slender, glabrous, 5 mm. *Fruit* subglobose, glabrous, *c.* 5 mm ø, blackish when ripe, pedicel *c.* 1.5 cm.

Distr. *Malesia*: Philippines (Luzon).

Ecol. On forested slopes and ridges, 800–1200 m. *Fl. fr.* April–Dec.

Vern. *Tengé*.

104. Vaccinium dubiosum J. J. S. Bot. Jahrb. 68 (1937) 214; SLEUM. Blumea 11 (1961) 50.

Small tree, 7–15 m, trunk up to 40 cm ø breast height. Branchlets angular, puberulous. *Leaves* lax, elliptic, or subovate- or elliptic-lanceolate, apex shortly or mostly subcaudately acuminate, tip blunt, base attenuate into the petiole, provided with a few minute impressed marginal glands in the lower half, glabrous except the midrib, which is puberulent above, and the scattered glandular-muriculate hairs or points underneath, subcoriaceous, ± shining, entire, the very edge slightly revolute towards the base of the lamina, (3.5–)4–6 by (1.3–)1.5–2.3 cm, midrib narrowly sunken above, rather prominent beneath, nerves *c.* 2 basal, steeply ascending, and 2–3 upper, shorter, more spreading pairs, all anastomosing and but slightly or hardly raised above, more distinctly so beneath, reticulation dense, raised on both faces or beneath only; petiole ± flattened, puberulous initially, 2–3 by *c.* 1 mm. *Racemes* from the upper 2–5 axils, subdensely 8–15-flowered; rachis rather slender, puberulous, 2–3(–3.5) cm, eperulate in anthesis. Pedicels rather slender, puberulous, 3–4 (–5) mm, bract foliaceous, firm, oblong, subacuminate, up to 1.5 by 0.4 cm, persistent at least in part into the fruiting time; bracteoles not seen. *Calyx* tube cup-shaped, short-pubescent and sparsely clavate-glandular, 1.5 mm, limb erect, 0.7 mm, 5-lobed to almost the base, lobes triangular, subacute, subglabrous dorsally, ciliate, no proper apical gland. *Corolla* cylindric-urceolate, membranous, red, glabrous outside, subdensely pubescent in the lower part inside, *c.* 4 by 2.5 mm, lobes reflexed, 0.5 mm. *Filaments* subulate, glabrous at the very base, subvillous above, again glabrous in the upper third, *c.* 1.5 mm; anther-cells oblong, 0.5 mm, shortly 2-spurred dorsally; tubules cylindric, almost as wide as the cells below, slightly widened upwards, transversely cut, pore a little flaring. *Disk* rather prominent, pubescent.

Style slender, quite glabrous, *c.* 4 mm. Submature fruit subglobose, *c.* 3.5 mm ø, with small appressed calyx lobes, on slender fruit pedicel 6–8 mm; mature fruit black.

Distr. *Malesia*: Central Celebes, twice found.

Ecol. In rain-forest, on limestone, 800–1200 m, locally abundant. *Fl.* March, July.

Vern. *Buli*, Malili: Torongkong.

Note. The flowers in the original material are anomalous (probably due to thrips). The above given description of the inflorescence is based on flowering and fruiting material from Porehu, Subdiv. Malili, 1200 m.

105. Vaccinium grandibracteatum SCHLTR, Bot. Jahrb. 55 (1918) 180; SLEUM. *ibid.* 72 (1942) 267; Blumea 11 (1961) 50.

Shrub. Branchlets glabrous. *Leaves* lax, obovate-elliptic, apex blunt, base long-cuneate, coriaceous, glabrous, edge recurved, 8–11 by (2.5–)3–4 cm. *Racemes* up to 10 cm, erecto-patent, glabrous, laxly 15–20-flowered. Pedicels slender, curved, 3 mm, subtending bract oblong-lanceolate, acute, *c.* 1 cm long, rather long persistent. *Calyx* cup-shaped, *c.* 2.5 mm, lobes triangular, acute. *Corolla* narrowly-urceolate, ventricose below, white, glabrous outside, puberulous towards the base inside, 8–10 by 3 mm, lobes ovate, bluntish, *c.* 1 mm. *Filaments* subulate, puberulous, *c.* 1.5 mm; anther-cells oblong, 1.5 mm including the tubules, the latter narrower than the cells, obliquely cut distally, the posticous wall of each tubule bicuspidate, the pore oblong. *Disk* glabrous. *Style* as long as the corolla.

Distr. *Malesia*: New Guinea (upper course of the Sepik R.), twice found. *Fl.* Oct.

Note. The above given description is a translation of the original diagnosis, as the type material is lost and the species has not yet been recollected.

106. Vaccinium dominans SLEUM. Bot. Jahrb. 72 (1942) 268; Blumea 11 (1961) 50.

Erect shrub, 2–4 m, or treelet up to 10 m, with erect branches. Branchlets densely to subdensely leaved in the upper part or towards the tips, minutely pubescent initially, subterete, glabrescent. *Leaves* on thick leaf-cushions, subovate-oblong or elliptic, more rarely elliptic-oblong, subcoriaceous to rather coriaceous, apex broadly attenuate and obtuse or almost rounded, base rounded-truncate, the 2 basal glands distinct, impressed at the margin, in 1–1.5 mm distance from the petiole, glabrous, shining above, ± convex, entire, edge slightly revolute, (1–)1.2–1.7 by (0.5–)0.6–0.8 cm, midrib slightly sunken above and raised beneath, nerves 2(–3) pairs from and a little from above the base, high curved-ascending to the leaf-apex, indistinct above, often well visible beneath, as is the reticulation; petiole 1–1.5 mm. *Racemes* dense, erect, many-flowered, from the upper axils, flowers nodding to one side; rachis angular, stoutish, patent-puberulous, 3–4 cm. Pedicels robust, curved, puberulous, 3–4 mm, bract foliaceous, similar in shape to the leaves though smaller, up to 0.8 by 0.5 cm, persistent for a while, caducous towards the end of the anthesis; bracteoles subulate, minute, early caducous. *Calyx* tube subcylindric-campanulate, puberulous, 2.5 by 2.5 mm, limb erect, deeply 5-lobed, ± glabrescent, lobes ovate-deltoid, obtuse, ciliate, *c.* 1.5 mm. *Corolla* suburceolate-cylindric, fleshy, colour variable, glaucous-pink at first, red, purplish, bluish, dark greenish violet or yellowish green with red lobes in later stages, glabrous at both sides, papillose at the lobes inside, 6–7 by 3–4 mm, lobes obtuse, reflexed, 1 mm. *Filaments* almost linear, a little narrowed and glabrous at both ends, dilated and densely white-hairy between, 2–2.5 mm; anther-cells oblong, 1–1.3 mm, base obtuse; tubules cylindric, a little narrower than the cells, *c.* 1.3 mm, obliquely cut apically, the posticous wall of each tubule ending with 2 sharp irregular teeth. *Disk* glabrous. *Style* glabrous, *c.* 6 mm. *Fruit* subglobose, nearly blackish when ripe, *c.* 4 mm ø.

Distr. *Malesia*: New Guinea (Mt Wilhelmina-Lake Habbema area).

Ecol. In the upper subalpine forest, in mossy thickets of ridges, in forest patches of moist hollows or in timber clumps in grassland, often locally dominant, 3225–3800 m. *Fl. fr.* Aug.–Sept.

107. Vaccinium montis-ericae SLEUM. Bot. Jahrb. 72 (1942) 267; Blumea 11 (1961) 50.

Shrub, up to 4 m. Branchlets subangular, laxly set with very short stalked glands. *Leaves* sub-obovate-oblong or -elliptic, apex broadly attenuate or subacuminate, obtuse, base cuneate and somewhat decurrent into the petiole, the pair of basal glands at the end of the petiole, thick and ± prominent, coriaceous, firm, lustrous above, glabrous, laxly glandular-punctate beneath, 4.5–5.5 by 2–3 cm, margin much revolute, entire, 5-plinerved from and a little from above the base, with 1–2 pairs of upper nerves from the midrib which is slightly sunken above and obtusely prominent beneath, nerves somewhat raised and distinct on both faces, reticulation dense, finely prominent on each side; petiole flattened, stout, 3–4 by 1.5 mm. *Racemes* subterminal, erect, many-flowered; rachis acutangular, laxly set with minute gland-tipped hairs, 8–10 cm. Pedicels rigid, 5–7 mm, bract foliaceous, oblong, subacute, laxly clad with gland-tipped hairs beneath, up to 1 by 0.5 cm; bracteoles very early caducous. *Calyx* broadly campanulate, tube 1 mm, minutely ± densely muriculate, limb spreading, deeply 5-lobed, lobes deltoid, subacute, ciliate or even almost bearded apically, *c.* 1.5 mm. *Corolla* subovate-urceolate (not known in fully mature state), attenuate distally in bud, fleshy, light red, quite glabrous, at least 6 by 3 mm (probably longer in full-grown state). *Filaments* linear-subulate, densely long-hairy, 2 mm; anther-cells oblong, 0.8 mm; tubules cylindric, narrower than the cells, *c.* 0.6 mm, very obliquely cut distally, the posticous wall of each tubule biaristate. *Disk* glabrous. *Style* glabrous, as long as the corolla.

Distr. *Malesia*: West New Guinea (Ericatop, Wichmann Mts), in heath vegetation, 1520 m. Once found. *Fl.* Dec.

108. Vaccinium platyphyllum MERR. Philip. J. Sc. 12 (1917) Bot. 294; En. Philip. 3 (1923) 251; COPEL. *f.* Philip. J. Sc. 42 (1930) 573, t. 5, f. 1–2; SLEUM. Blumea 11 (1961) 50. — *V. ilocanum* MERR. Philip. J. Sc. 14 (1919) 441; En. Philip. 3 (1923) 294. — *V. rizalense* MERR. Philip. J. Sc. 27 (1925) 43.

Shrub or small tree, glabrous except the sparingly pubescent inflorescences. Branchlets reddish brown, stout, subangular. *Leaves* scattered, elliptic or oblong-elliptic, or sometimes subovate, apex subabrupt, shortly (0.5–1.5 cm) and bluntly acuminate, base ± broadly attenuate and decurrent into the flattened petiole, the 2 basal marginal glands distinct and in some distance from the petiole, coriaceous, stiff, (6–)7–11(–14) by (3–)3.5–5(–7) cm, entire, recurved at the very edge, brownish blackish punctate beneath, midrib broadened and a little sunken in the lower part above, obtusely raised beneath, 5(–7)-plinerved from and from above the base, with additional upper and shorter nerves ± spreading from the midrib, all nerves equally slightly prominent on both faces, reticulation lax, visibly raised beneath only; petiole 5–8(–10) by 2–3 mm, grooved above. *Racemes* from the upper axils, many-flowered, shortly patent-pubescent on rachis, pedicels and disk, more densely so on calyx and filaments; rachis firm, 4–6(–8) cm. Pedicels robust, (3–)5–7 mm, bract oblong-lanceolate, subpersistent, usually acute, up to 8 by 5 mm; bracteoles ovate-acuminate, 2 mm, very early caducous. *Calyx* tube very short, lobes triangular, acute, 1–1.5 mm. *Corolla* oblong-ovoid or ovoid-urceolate, red or purple, rather fleshy, glabrous or laxly appressedly glandular-muriculate and pubescent outside, longer and more densely hairy in the lower half inside, 5(–6) by 3–3.5 mm in the lower, *c.* 1.5 mm ø in the upper third, lobes broadly ovate, recurved, hardly 1 mm. *Filaments* subulate, densely long hairy, 1.5–2 mm; anther-cells oblong, not spurred, 1–1.3 mm; tubules slightly narrower than the cells, *c.* 0.5 mm, obliquely cut apically, the backwall of each tubule forming an upright tooth. *Style* stout, glabrous, 3–4 mm.

Distr. *Malesia*: Philippines (Luzon).

Ecol. Whether or not epiphytic in primary forest at medium altitude or in moss forest, 200–1100 m. *Fl.* June–Aug.

Vern. *Dusóng-ilóko, dusóng-lapáran.*

109. Vaccinium miquelii BOERL. in Veth, Midden-Sumatra 4, 2 (1884) 22; RIDL. J. Fed. Mal. St. Mus. 8 (1917) 56; JACOBS, Reinwardtia 3 (1958) 68; SLEUM. Blumea 11 (1961) 50. — *V. myrtoides var. β*, MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 38. — *V. forbesii* FAWC. in Forbes, Wand. (1885) 278, fig., *non* HOOK. 1841. — *V. dempoense* FAWC. J. Bot. 23 (1885) 254; SP. MOORE, *ibid.* 63 (1925) Suppl. 57; FREY-WYSSLING, Trop. Natuur 22 (1933) 7, f. 6. — **Fig. 96.**

var. **miquelii.**

Large shrub or tree up to 6 m, though often

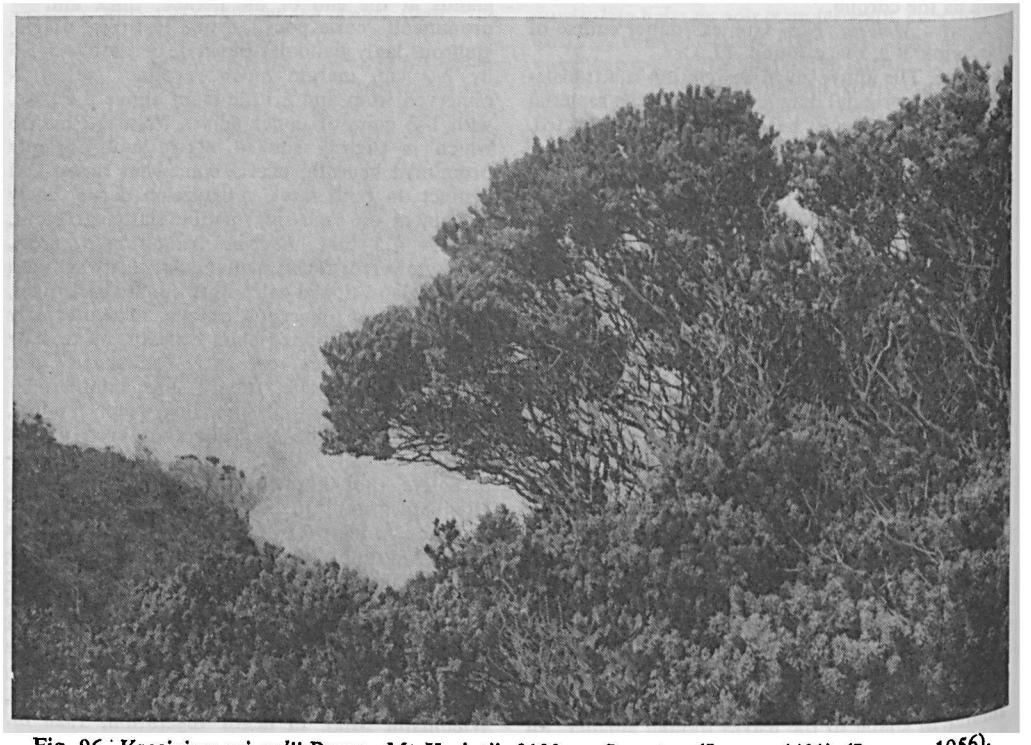

Fig. 96. *Vaccinium miquelii* BOERL. Mt Kerintji, 3100 m, Sumatra (JACOBS 4401) (JACOBS, 1956).

stunted according to altitudes; trunk up to 40 cm ø. Branchlets relatively short and robust, subangular, densely clothed with short, spreading, hirsute hairs, densely to subimbricately leaved, defoliate parts remarkable by their dense leaf-cushion scars. *Leaves* elliptic-oblong in general, apex shortly attenuate or subacuminate, bluntish, base ± rounded, the 2 basal marginal glands distinctly impressed in the lower third of the lamina, always distant from the petiole (red when young, dark green at full age when fresh), coriaceous, glabrous, laxly brownish punctate beneath, entire or practically so, edge slightly revolute, 1–1.5(–2) by (0.4–)0.5–0.8 cm, midrib sunken above, prominent beneath, nerves 2–3(–4) pairs which are oriented from and from somewhat above the base, steeply ascending and anastomosing, ± obscure above, a little raised beneath, reticulation rather faint beneath; petiole flattened, 0.5–1 mm. *Racemes* from the upper 3–5 axils or subterminal, densely 10–20-flowered, the flowers ± nodding to one side, scented; rachis stoutish, angular, 2–5 (–10) cm, densely patently hirsutulous to subtomentose as are pedicels and calyces. Pedicels robust, 1–2 mm in anthesis, bract foliaceous, subcoriaceous and persistent for a long time, up to 1 by 0.5 cm. *Calyx* tube obconical, 1.5–2 mm, limb erecto-patent, 5-lobed almost to the base, lobes ovate-deltoid, obtuse, 1.5–2 mm, more densely hairy at margin and apex. *Corolla* urceolate, rather fleshy, bright scarlet, red or pink, glabrous at full anthesis outside, laxly hairy inside, 5–6(–7) by 2.5–3 mm, lobes subpatent or recurved, often paler than the corolla tube or even whitish, 1 mm. *Stamens* 8 or 10, alternately subequal; filaments subulate, villous to nearly the top, 2–2.5 mm; cells broad-oblong, granular, base mostly with a distinct thickened knob or apiculus, 0.8–1.2 mm, not or rarely shortly spurred dorsally; tubules a little more slender than the cells, cylindric, 0.3–0.6 mm, subobliquely or almost transversely cut apically. *Disk* subtomentose. *Style* robust, villous below, gradually less densely hairy upwards in the lower half, 4–5 mm. *Fruit* globular, pubescent, dark blue-blackish and juicy when fresh, 4–5 mm ø, crowned by the hairy disk, pedicel 2–3 mm.

Distr. *Malesia*: Sumatra.

Ecol. In summit vegetation, alpine scrub, on rocky or volcanic soil, 1700–3400 m (vegetation limit), common locally. *Fl.* Jan.–Dec.

Uses. The fruit is said to be edible.

Vern. *Pandjang umur*, Dempo, *bunga karang*, Kerintji.

Note. The form with shortly spurred anthers is known from Mt Merapi.

var. **atjehense** SLEUM. Blumea 11 (1961) 51.

Small shrub, sometimes dwarf and almost creeping. *Leaves* 0.7–1.2 by 0.4–0.6(–0.8) cm. *Corolla* narrow-urceolate, 4(–5) by *c.* 2.5 mm, subdensely hairy outside, similarly so at the base, more laxly towards the opening inside. *Stamens* 10, alternately subequal; filaments 2–2.4 mm, densely hairy; cells 0.8–0.9 mm; tubules 0.2–0.3 mm, obliquely cut apically. *Style* 3.5–4 mm, densely hairy below.

Distr. *Malesia*: Sumatra (Gajo Lands: Mt Losir and neighbouring mountains).

Ecol. In ericoid scrub forest on ridges, summits or top plateaus, locally common, 2250–3500 m. *Fl.* Jan.–Febr.

Vern. *Kaju katjar*, Gajo.

110. Vaccinium korinchense RIDL. J. Fed. Mal. St. Mus. 8 (1917) 56; SLEUM. Blumea 11 (1961) 51. — *V. eugenioides* SP. MOORE, J. Bot. 63 (1925) Suppl. 56. — *V. parvibaccatum* J. J. S. in Merr. Contr. Arn. Arb. 8 (1934) 128. — *V. dempoense* (*non* SP. MOORE) DE VOOGD, Trop. Natuur 23 (1934) 82, 83, *in text.* — **Fig. 97.**

***var.* korinchense. – Fig. 97.**

Much branched shrub, 1–2.5(–5) m, rarely epiphytic, flush red. Branchlets rather slender, juvenile parts angular and mostly shortly patently hairy, glabrescent, rarely subglabrous from the beginning, laxly to subdensely leaved. *Leaves* elliptic to oblong, sometimes subovate-, rarely subobovate-oblong in the same specimen, apex gradually attenuate, obuse, rarely faintly retuse,

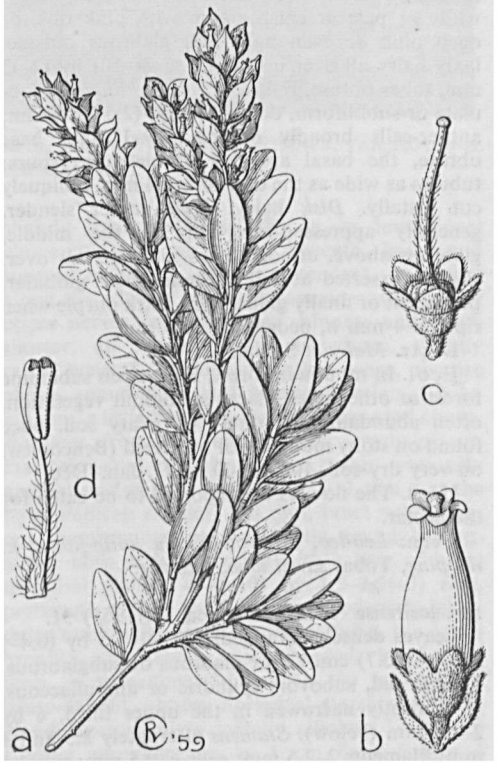

Fig. 97. *Vaccinium korinchense* RIDL. *var. korinchense*. *a.* Habit, × ⅔, *b.* flower, × 3⅓, *c.* ovary and style, × 3⅓, *d.* stamen, × 6 (*a–d* ALSTON 14153).

base broadly attenuate or generally subtruncate-rounded, the pair of basal marginal glands small and in some distance from the petiole, thin-coriaceous, entire, edge ± recurved, mostly ± pubescent on both faces initially, early glabrescent except the basal part of the lamina, the petiole and the midrib beneath which remain patently hairy for a rather long time, finally glabrescent also there, sparsely punctate beneath, (1.2–)1.8–3.5(–4) by (0.8–)1–1.5 (–1.8, rarely up to 2) cm, midrib sunken above, prominent beneath, nerves 4–6(–7) pairs, the lowest 2 from and from above the base, the other higher from the midrib, all steeply ascending, obscurely anastomosing, slightly raised on both faces, reticulation dense, generally faintly raised beneath only; petiole (1–)2–3 by 1 mm. *Racemes* from the upper 1–3 axils, seemingly terminal, (2–)2.5–8 cm, many-flowered, in general ± densely short-pubescent to hirsutulous in all outer parts, the corolla excepted. Pedicels, if any, robust, 0–2 mm, bract foliaceous, subpersistent, much thinner, smaller and paler green than the normal leaves, elliptic to oblong, the upper ones more acuminate, up to 1(–1.5) by 0.5 cm; bracteoles narrowly ovate-acuminate to subulate, caducous, 2–3(–5) by 0.5 mm. *Calyx* tube obconical, 2–2.5 mm, limb spreading, 1.3–1.5 mm, 5-lobed to the base, lobes deltoid, acute or subacute, ciliate. *Corolla* elongate-urceolate, *i.e.* markedly narrowed upwards, fleshy, white or pale greenish cream with pink tips, or deep pink or even light red, glabrous outside, laxly hairy all over inside, (5–)6–8(–10) by (2–)3 mm, lobes obtuse, reflexed, 1 mm. *Filaments* subulate or subfiliform, densely hairy, (2.5–)3–4 mm; anther-cells broadly oblong, 0.9–1 mm, base obtuse, the basal apiculus obsolete, no spurs; tubules as wide as the cells, 0.3–0.4 mm, obliquely cut distally. *Disk* hairy. *Style* rather slender, generally appressed-hairy up to the middle, glabrous above, or sometimes glabrous all over, slightly exserted at full anthesis. *Fruit* globular, pubescent or finally glabrescent, dark purple when ripe, *c.* 4 mm ø, pedicel up to 3 mm.

Distr. *Malesia*: Sumatra.

Ecol. In mountain forest, in ± open subalpine forest or other open places in summit vegetation, often abundant, not rarely on peaty soil, once found on stony mud flow of Mt Beriti (Bencoolen) on very dry soil, 1000–2600 m. *Fl.* Jan.–Dec.

Uses. The flowers are reported to be eaten for the nectar.

Vern. *Leo-leo*, Siborong, *kaju kotip-kotip*, *k. taloping*, Toba, *sawai ibao*, Lebong.

var. **losirense** SLEUM. Blumea 11 (1961) 51.

Leaves densely arranged, (0.8–)1–1.5 by (0.4–) 0.5–0.6(–0.7) cm. *Calyx* glabrous or subglabrous. *Corolla* red, subovoid-cylindric or ampullaceous, ± abruptly narrowed in the upper third, 6 by 2–2.5 mm (below). *Stamens* alternately 2.5 and 3 mm; filaments 2–2.5 mm; cells *c.* 0.5 mm; tubules 0.3 mm, obliquely cut apically. *Style* glabrous, 5 mm.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Mt Losir).

Ecol. In mountain scrub, 2950–3500 m. *Fl.* Febr.

111. Vaccinium myrtoides (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1062; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 38; KOORD.-SCHUM. Syst. Verz. 3 (1914) 100; J. J. S. Med. Rijksherb. *n.* 30 (1916) 7, *incl. var. celebicum* J. J. S. *l.c.* 8; MERR. Philip. J. Sc. 12 (1917) Bot. 293; BROWN, Min. Prod. Philip. For. 2 (1921) 362, f. 77; MERR. En. Philip. 3 (1923) 250; HEYNE, Nutt. Pl. (1927) 1218 (*var. celebicum*); COPEL. *f.* Philip. J. Sc. 42 (1930) 596, t. 7, f. 1–2; SLEUM. Blumea 11 (1961) 51; *ibid.* 12 (1963) 127. — *Thibaudia myrtoides* BL. Bijdr. (1826) 861. — *Agapetes myrtoides* (BL.) G. DON, Gen. Syst. 3 (1834) 863 ('*myrtoidea*'); DUNAL in DC. Prod. 7 (1839) 555. — *V. microphyllum* (*non* REINW. *ex* BL.) F.-VILL. Nov. App. (1880) 121, *p.p.*; KOORD. Minah. (1898) 514. — *V. varingiaefolium* [(*non* BL.) MIQ.] VIDAL, Sinopsis Atl. (1883) 30, t. 60, f.D. — *V. sp.*, VIDAL, Phan. Cum. Philip. (1885) 27, 123. — *V. villarii* VIDAL, Rev. Pl. Vasc. Filip. (1886) 166; ROLFE, J. Bot. 24 (1886) 348; MERR. Philip. J. Sc. 2 (1907) Bot. 294; *ibid.* 3 (1908) Bot. 374; *ibid.* 5 (1910) Bot. 372; ELM. Leafl. Philip. Bot. 3 (1911) 1092. — Fig. 98.

Shrub or small tree, 0.3–2 m. Branchlets slender, erect, shortly patently pubescent. *Leaves* ± densely to subimbricately arranged, ovate to oblong-ovate or broad-elliptic, apex gradually attenuate or subacuminate, obtuse, base rounded or slightly cordate, with 1–2 minute, impressed, marginal glands in the lower third on each side, (sub) coriaceous, fugaciously puberulous when very young, glabrous at maturity, though remaining ± puberulous and ciliate at the very base, the petiole and the very apex, sparsely glandular-punctate beneath, 1.3–2(–2.5) by (0.6–)0.7–1.3(–1.8) cm, entire, edge marginate, midrib slightly sunken at least in the lower part above, prominent beneath, nerves 4–5(–6) pairs (the lowest pair from the base), spreading, anastomosing, raised beneath only, reticulation subdense and mostly well recognizable beneath; petiole 1–1.5 by *c.* 0.8 mm. *Racemes* from the upper axils, laxly (4–)6–8(–12)-flowered; rachis angular, finely puberulous or mostly glabrous, (1–)1.5–4 cm. Pedicels nodding at anthesis, puberulous or mostly glabrous, 0.5–1(–1.4) cm, bract foliaceous, small and but partly persistent, up to 0.8 cm. *Calyx* tube cup-shaped, base ± truncate, glabrous, *c.* 1.5 mm long and wide, lobes triangular, ± acute, not rarely in part (1 or 2) minutely gland-apiculate, ciliolate, *c.* 1 mm. *Corolla* shortly cylindric-urceolate, red, pink or white to cream, glabrous at both sides, 4(–4.5) by *c.* 2.5 mm, lobes obtuse, recurved, *c.* 0.8 mm. *Filaments* linear, dilated below, curved, villous especially below, 1.5 mm; anther-cells broad-oblong, echinulate-papillose, 1–1.3 mm including the tubules, the latter as wide and almost half as long as the cells, obliquely cut at apex. *Disk* densely hairy. *Style* glabrous, *c.* 3 mm. *Fruit* globose, glabrous, finally bluish blackish, 4–5 mm ø.

Distr. *Malesia*: Philippines (Mindanao, Min-

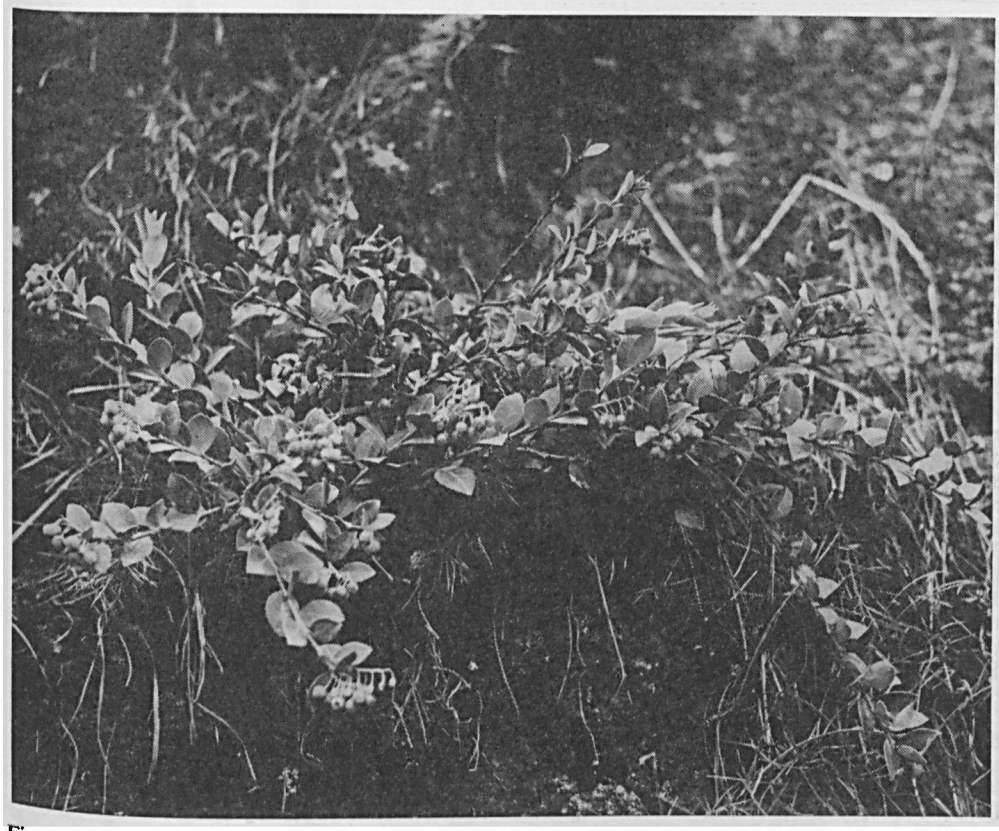

Fig. 98. *Vaccinium myrtoides* (BL.) MIQ. Mt Data, 2000 m, Luzon, Philippines (STEINER, VAN ROYEN & SLEUMER 2216) (SLEUMER, 1961)

doro, Luzon), N. Celebes (Minahasa), Moluccas (Peak of Tidore).

Ecol. On steep rocky, open and bare slopes, under pine trees in mossy forest undergrowth, summit vegetation, open grassland, on sandy or volcanic soil, locally (Benguet) abundant, 1000–3200 m. *Fl.* Jan.–Dec.

Uses. Berries edible, with excellent taste, making fine preserves and pies.

Vern. *Tente-in-talun*, Tt., Minahasa, *alimáni*, Ilk., *ayumani*, *panlina*, *tenge*, Bon., *dungal*, Bag., *gatmo*, *gutmo*, Ig.

112. Vaccinium glandellatum SLEUM. Blumea 11 (1961) 52.

Shrub up to 1.5 m. Branchlets slender, young parts glabrous and striate, older ones early blackish corticate. *Leaves* rather lax, subovate- or lanceolate-, sometimes oblong-elliptic, apex shortly (c. 1 cm) subcaudate-acuminate, somewhat curved, bluntish, base broadly attenuate into the petiole, the very base protracted for 2–4 mm and set with a gland on each side of the petiole, subcoriaceous, glabrous, undersurface much paler, laxly glandular-muriculate or -punctulate beneath, entire, (4–)4.5–5.5(–7) by (1.8–)2–3 cm, 7–9-plinerved from and a little from above the base, midrib slightly impressed especially in its lower part above, obtusely prominent beneath, basal and suprabasal nerves steeply ascendent, excurrent along the edge or obscurely anastomosing, other upper nerves (or veins) few, pinnate and much shorter, all hardly prominent above, slightly raised beneath, reticulation rather dense, obscure above, somewhat raised beneath; petiole 4–6 by *c.* 1 mm, a little flattened, markedly grooved above. *Racemes* from the upper axils, erecto-patent, many-flowered to the base; rachis variously angular and striate, (4–)5–9 cm, *c.* 1 mm ø at the base. Pedicels slender, 5–8 mm, bract subfoliaceous, membranous, narrow-elliptic, acutely attenuate at both ends, provided with a pair of basal marginal glands, 4–7(–10) by 1.5–2.5(–3) mm, persistent during the anthesis, subdensely glandular-muriculate as is the *calyx* tube; the latter broadly cup-shaped, base rounded, 1–1.2 mm, limb ± spreading, 5-lobed to the base, lobes ovate-deltoid, obtuse, no apical gland, very laxly glandular-muriculate dorsally, ciliolate, 1–1.5 mm. *Corolla* ampullaceous, *c.* 1 cm by 4–5 mm ø below, *c.* 2 mm ø at the rather abruptly narrower upper part, membranous, pink at the tube, laxly minutely puberulous or more densely subappressedly glandular-muriculate outside, glabrous

inside, lobes obtuse, white to cream, reflexed, *c.* 1.5 mm. *Filaments* linear, dilated towards the base, densely short-hairy, *c.* 2 mm; anther-cells broad-oblong, no spurs, 1.3–1.5 mm including the tubules, the latter as wide as the cells, very short, obliquely cut distally, the large pore oval. *Disk* glabrous or puberulous. *Style* thickish, glabrous, 6–7 mm.

Distr. *Malesia*: Central New Guinea (Sibil R. valley), on poor, white, impervious clayey soil, rather common, at 1260 m. Twice found. *Fl.* May.

113. Vaccinium paludicolum SLEUM. Blumea 11 (1961) 53.

Terrestrial shrub. Branchlets slender, terete, densely subpatently hirsutulous both in the younger and older parts. *Leaves* dense, ovate, apex shortly attenuate or subacuminate, blunt, base rounded, the pair of basal marginal glands distinct and much distant from the petiole, coriaceous, glabrous, blackish punctulate beneath in dry specimens, entire, edge very shortly or not recurved, 0.6–1(–1.2) by (0.4–)0.5–0.8 cm, midrib slightly impressed above, very obtusely and minutely prominent beneath, nerves and veins subinconspicuous; petiole thickish, hirsutulous, *c.* 1 mm. *Racemes* from several of the upper axils, 5–10-flowered and secund; rachis rather stoutish, ± densely yellowish hirsutulous as are the pedicels, (1–)1.5–2(–3) cm. Pedicels 3 mm, bract foliaceous, thin, much smaller than the normal leaves, caducous after the anthesis. *Calyx* laxly to very laxly set with straight hairs, tube campanulate, 1.5 by 2 mm, limb spreading or reflexed, lobes deltoid, subacute, 0.5–0.8 mm, no apical gland. *Corolla* subampullaceous-cylindric, rather abruptly attenuate in the upper third, deep red, glabrous outside, laxly hairy inside, 7–8 by 2 mm below, or 1–1.3 mm distally, lobes suberect or ± reflexed, *c.* 0.5 mm. *Filaments* subulate, densely hairy, alternately 2 and 2.7 mm; anther-cells subquadrate, ecalcarate, *c.* 1 mm including the tubules, the latter very short, transversely cut apically, the pore large. *Disk* glabrous. *Style* slender, glabrous, almost 7 mm.

Distr. *Malesia*: Central Celebes.

Ecol. On peaty quartzite plateau, 1700–2000 m. *Fl.* Aug.–Nov.

114. Vaccinium lucidum (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1061; O. KTZE, Rev. Gen. Pl. 2 (1891) 385, *incl. f. terrestre* O. KTZE *et f. epiphyticum* O. KTZE, *l.c.*; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 110; KOORD. Exk. Fl. Java 3 (1912) 12; J. J. S. in K. & V. Bijdr. 13 (1914) 148; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 9; SP. MOORE, J. Bot. 63 (1925) Suppl. 55; HOCHR. Candollea 2 (1925) 499, *incl. var. typicum* HOCHR. *et var. micranthum* HOCHR. *l.c.* 500; J. J. S. in Fedde, Rep. 30 (1932) 177; MALM, in *ibid.* 34 (1934) 284; DOCTERS VAN LEEUWEN, Pangrango (1933) 209; J. J. S. Bot. Jahrb. 68 (1937) 211; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 3; SLEUM. Blumea 11 (1961) 54. — *Glaphyria nitida* JACK, Trans. Linn. Soc. 14 (1823) 128, reimpr. Calc. J. Nat. Hist. 4 (1843) 306; *cf.* STEEN. Blumea 12 (1963) 18, *non V. nitidum* ANDR. 1807. — *Thibaudia lucida* BL. Bijdr. (1826) 860; HASSK. Cat. Hort. Bog. (1844) 161. — *Agapetes lucida* (BL.) G. DON, Gen. Syst. 3 (1834) 863; DUNAL, in DC. Prod. 7 (1839) 555; MOR. Syst. Verz. (1846) 42; HASSK. Pl. Jav. Rar. (1848) 471; ZOLL. Syst. Verz. 2 (1854) 137. — *Agapetes microphylla* JUNGH. Nat. Geneesk. Arch. N. I. 2 (1845) 35; HASSK. Flora 5 (1847) 524; WALP. Ann. 1 (1848–49) 475. — *Epigynium lucidum* (BL.) KL. Linnaea 24 (1851) 52. — *V. rollinsoni* HOOK. Bot. Mag. (1851) t. 4612; WALP. Ann. 5 (1858) 440; MIQ. Fl. Ind. Bat. 2 (1859) 1062; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 37; HALL. *f.* Med. Rijksherb. *n.* 12 (1912) 29. — **Fig. 99.**

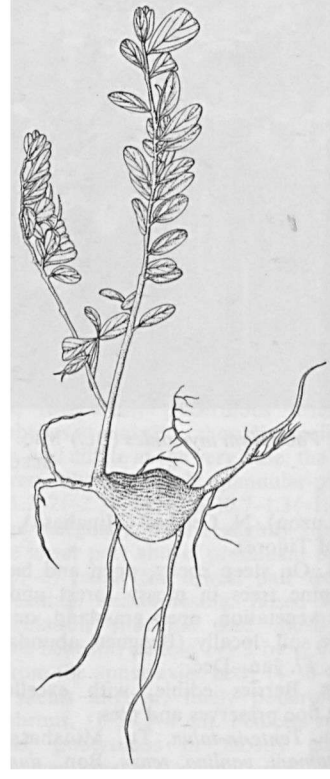

Fig. 99. *Vaccinium lucidum* (BL.) MIQ. Young epiphytic plant with swollen hypocotylar base, Java (drawing after photograph).

var. **lucidum. Fig. 99.**

Shrub, 0.5–6(–12) m, often epiphytic, much-branched; stem up to 8 cm ø. Branchlets slender, subtrigonous, grooved lengthwise, tips puberulous, pale green suffused with red when fresh, laxly to subdensely leaved. *Leaves Buxus*-like, obovate or sometimes oblong-elliptic, apex rounded to subacuminate, mostly obtuse, sometimes subretuse, rarely acutish, base cuneate, with 1 (rarely more) impressed marginal glands in some distance from the petiole on each side, thin-coriaceous, glabrous except the petiole and the midrib above, which

may be puberulent, laxly glandular-punctate beneath, reddish when very young, dark to almost blackish green and shining above, paler beneath at maturity, edge ± recurved, entire, (1–)1.5–2.5 by 0.6–1.2 cm, midrib sunken above, prominent beneath, nerves 3–4 pairs, ascendent, a little raised or obsolete on both faces, reticulation dense, fine, sometimes rather inconspicuous; petiole flattened, pale green or reddish, 2–3 mm. *Racemes* from the upper axils or subterminal, 6–10-flowered, very shortly peduncled; rachis 1.3–3 cm, slender, angular, glabrous or puberulous to hirtellous, greenish suffused with red. Pedicels slender, glabrous or puberulous, 0.4–1 cm, bract foliaceous, oblong to lanceolate-ovate, generally caducous in the course of the anthesis, sometimes subpersistent, rarely early caducous, 5–9 by 2–5 mm. *Calyx* pale green, tube cup-shaped, somewhat constricted distally, 2 mm, lobes ± spreading, triangular, acutish, ciliate, glabrous or sometimes puberulous, 1.5–2 by 1–1.5 mm, no apical gland. *Corolla* elongate-urceolate, gradually or not rarely subabruptly narrowed in the upper half, obtusely 5-angular, glabrous outside, long white-pubescent hairy especially towards the base inside, dark purple to vine red (occasionally white or pink), in general 8–9 mm long and 3–4.5 mm ø below, lobes suborbicular-ovate, *c.* 1 mm, recurved. *Filaments* subulate, hairy, white or pale rose, 2–2.5 mm; anther-cells broad-oblong, base obtuse, 1 mm, no spurs; tubules nearly as wide as the cells, short or very short, *c.* 0.5 mm, obliquely cut distally. *Disk* glabrous or mostly hirtellous, light green. *Style* slenderly columnar, glabrous or laxly hairy at and a little above the base, white, *c.* 7.5 mm, slightly exserted at full anthesis. *Fruit* globose, glabrous or laxly pubescent, dark blue or purple, about 5(–6) mm ø. *Seeds* few, compressed, *c.* 1.5 mm.

Distr. *Malesia*: Sumatra, Java, Lesser Sunda Is. (Bali, Lombok, W. Flores), Central and SW. Celebes.

Ecol. Mostly epiphyte in primary (also mossy) forest (and thus not gregarious as the predominantly terrestrial *V. varingiaefolium*, though sometimes difficult to distinguish from narrow-leaved forms of the latter), terrestrial in more open places as dry slopes or rocks, (500–)1500–2500 (–3150) m, locally common especially in Java. *Fl.* Jan.–Dec. (*cf.* SCHIMPER-FABER, Pflanzengeogr. 1935, 25, *f.* 5).

Pollination. DOCTERS VAN LEEUWEN has noticed repeatedly that the flowers were visited by *Bombus rufipes*.

Vern. *Sauwogi kri, suwago létik, tjantigi, tj. areuj, tj. lentiek*, S, *manis redjo, mértigi, pitjisan, pulasari, purwiot ajarito, srintil*, J, *kajupanda*, Bali, *kadju tè*, Madur., *kaju inei*, M.

var. **roseitinctum** SLEUM. Blumea 11 (1961) 55. Corolla dark dull rose, all over subdensely pubescent.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Mts Losir, Kemiri, Lembuh), in summit scrub, 1850–3300 m. *Fl.* March.

115. Vaccinium varingiaefolium (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1061; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 38, *excl. specim. borneense, incl. f. parvifolia et f. sublanceolata* MIQ. *l.c.*; BL. Fl. Jav. Pl. inéd. (1863–83) t. 19; O. KTZE, Rev. Gen. Pl. 2 (1891) 385, *incl. var. angustifolium* O. KTZE *et var. erythrinum* (HOOK.) O. KTZE, *l.c.*; KOORD. Junghuhn Gedenkb. (1910) 185; DOCTERS VAN LEEUWEN, De Levende Natuur 16 (1911) 106, fig.; KOORD. Exk. Fl. Java 3 (1912) 14, f. 3; HALL. *f.* Med. Rijksherb. *n.* 12 (1912) 29; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 112; J. J. S. in K. & V. Bijdr. 13 (1914) 152 ('*varingifolium*'); KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 8; SP. MOORE, J. Bot. 63 (1925) Suppl. 56; HOCHR. Candollea 2 (1925) 497, *incl. var. typicum, var. racemosum et var. pilosiusculum* HOCHR. *l.c.*; HEYNE, Nutt. Pl. (1927) 1219; DOCTERS VAN LEEUWEN, Pangrango (1933) 209, t. 20; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 3; SLEUM. Blumea 11 (1961) 55. — *Thibaudia varingiaefolia* BL. Bijdr. (1826) 860; HASSK. Cat. Hort. Bog. (1844) 161. — *Agapetes vulgaris* JUNGH. Nat. Geneesk. Arch. N.I. 2 (1845) 34; HASSK. Flora 5 (1847) 524; WALP. Ann. 1 (1848–49) 475; JUNGH. Java ed. 2 (1853) 578, 580. — *V. obversum* MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1864) 220. — *Agapetes varingiaefolia* (BL.) G. DON, Gen. Syst. 3 (1834) 862; DUNAL, in DC. Prod. 7 (1839) 555; MOR. Syst. Verz. (1846) 42; ZOLL. Syst. Verz. 2 (1854) 137. — *V. erythrinum* HOOK. Bot. Mag. (1852) t. 4688; PLANCH. Fl. Serres II, 1 (1856) t. 1115; WALP. Ann. 5 (1858) 440; RIDL. Fl. Mal. Pen. 2 (1923) 211. — *Epigynium varingiaefolium* (BL.) KI. Linnaea 24 (1851) 52. — *V. ellipticum* MIQ. Fl. Ind. Bat. 2 (1859) 1060, *p.p., cf.* MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 38, *nota.* — *Diplycosia erythrina* (HOOK.) K. & G. J. As. Soc. Beng. 74, ii (1905) 72; RIDL. J. Fed. Mal. St. Mus. 5 (1914) 39; *ibid.* 10 (1920) 146. — *V. schimperi* KOORD. Exk. Fl. Java 3 (1912) 15, *p.p.*; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 111. — *V. sp.*, KOORD. Nat. Tijd. N. I. 60 (1901) 264; *ibid.* 63 (1904) 41. — **Fig. 100–105.**

See for further synonyms under the varieties.

KEY TO THE VARIETIES

1. Anthers without dorsal spurs.
   2. Leaves laxly to subdensely arranged, with 5–8 pairs of nerves, ovate to obovate- or rhombic-, rarely more lanceolate-elliptic, variable in shape and size, in general larger than 2 by 1 cm. Branchlets glabrous or pubescent. **1. *var.* varingiaefolium**
   2. Leaves densely to subimbricately arranged, ± elliptic, with 3–4 pairs of nerves, the reticulation mostly more distinctly visible, 1–1.5(–2) by 0.5–1 cm. Branchlets ± densely hairy to subtomentellous . . . . . **3. *var.* orientale**
1. Anthers distinctly 2-spurred dorsally **2. *var.* calcaratum**

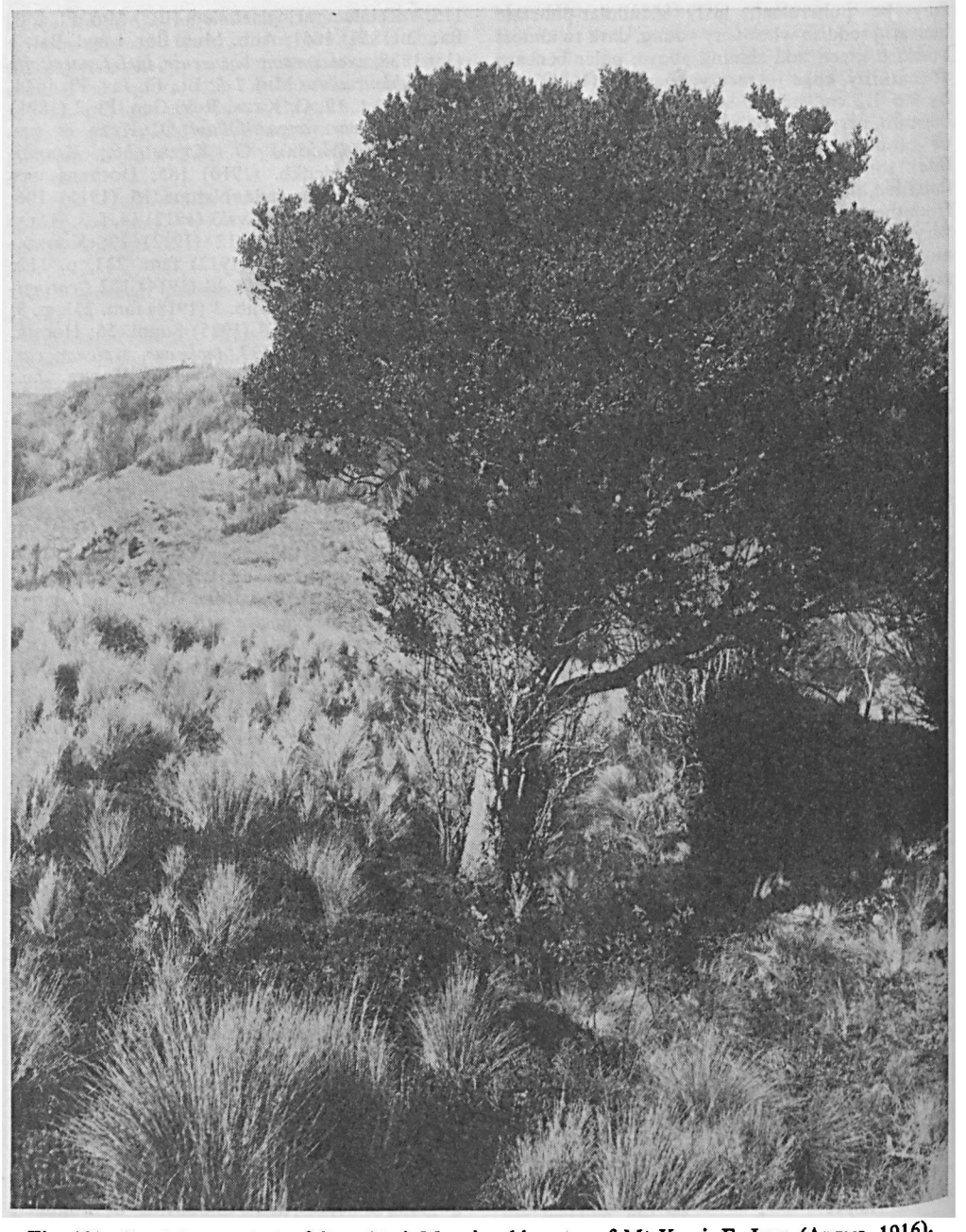

Fig. 100. *Vaccinium varingiaefolium* (BL.) MIQ. in old crater of Mt Kawi, E. Java (ARENS, 1916).

1. *var.* varingiaefolium.

Polymorphous, from dwarfed shrub (1–)3–5 m to tree usually up to 8 (occasionally up to 20) m, mostly with a crooked trunk (up to 0.5 m ø), generally terrestrial (rarely epiphytic?), regularly branched; bark dark, with many cracks; crown dense. Branchlets ± angular, grooved lengthwise, purplish, glabrous or pubescent. *Leaves* laxly to subdensely arranged, very variable in shape and size, from ovate to oblong, elliptic-rhomboid to obovate, more rarely lanceolate, apex ± acuminate to attenuate, obtuse or subacute, base subspathulate-attenuate or obtuse, rarely rounded, often ± decurrent into the petiole, with a pair of impressed marginal glands in a short distance from the petiole, newly expanded ones a brilliant blood red or purple, mature ones ± coriaceous, of a dark glossy green above, paler and dull

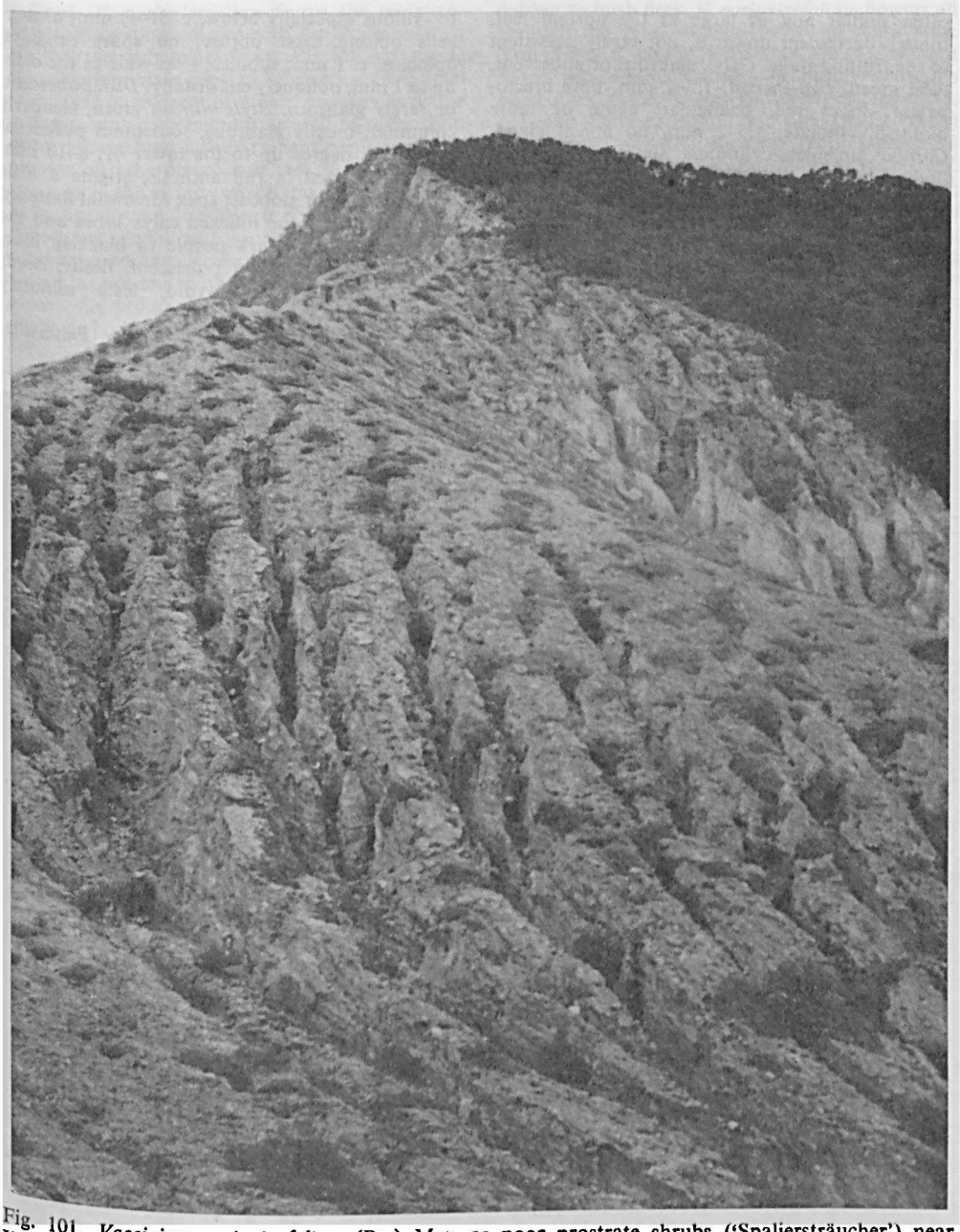

Fig. 101. *Vaccinium varingiaefolium* (BL.) MIQ. as poor prostrate shrubs ('Spaliersträucher') near Kawah Idjen, E. Java, *c.* 2000 m. Exceedingly poor, eroded, very young volcanic soil. This species also grows in the mountain forest on the ridge behind as 3–6 m tall trees.

beneath, entire, sparsely glandular-punctate beneath, glabrous or practically so, (1.5–)2.5–6 by (0.5–)1–2.5 cm, midrib red, slightly sunken above or raised beneath, nerves (5–)6–8 spreading pairs, curved and ± irregularly inarching before the edge, not much prominent on both faces or exclusively beneath, reticulation mostly rather indistinct; petiole purplish, ± flattened, glabrous or pubescent, 2–4 by 1–2 mm. *Racemes* axillary and subterminal, few- to many-flowered; rachis stout, angular, glabrous or pubescent, 3–8.5 cm. *Flowers* turned to one side, obliquely drooping, almond-scented. Pedicels robust, glabrous or pubescent, 5–9 mm at anthesis, bract foliaceous,

often similar and as large as the normal leaf, though decrescent upwards, not rarely persistent to the fruiting stage. *Calyx* glabrous or pubescent, tube green, cup-shaped, 1.5–2 mm, limb erecto-patent, lobes red, triangular, acute or more bluntish, ciliolate, 1.5–2 mm, no apical gland. *Corolla* urceolate-cylindric, slightly 5-angular, fleshy, white in the Malay Peninsula, cream to rose and dark blood red in Sumatra, uniformly deep red or purple in Java and Bali, not rarely with a glaucous-pruinose or waxy surface, always glabrous outside, pubescent inside, (7–)9–11 mm long, 3–4(–5, sometimes –7) mm ø below, 2.5–3.5 mm ø at the lobes, the latter spreading or slightly recurved, ovate-triangular, obtuse, *c.* 1.5 mm. *Filaments* white, linear-subulate, white-pubescent to -villous especially below, *c.* 3(–4) mm; anther-cells oblong, base obtuse, no spurs or basal apiculus, *c.* 1 mm; tubules ± as wide as the cells, up to 1 mm, obliquely cut distally. *Disk* pubescent, or rarely glabrous. *Style* whitish green, slenderly columnar, mostly glabrous, sometimes pubescent to various degree up to the lower ¾, 8–10 mm, slightly exserted in full anthesis, stigma a little broadened. *Fruit* globose, apex somewhat flattened and crowned by the inflexed calyx lobes and the conspicuous disk, dark purple to blackish blue, *c.* 8 mm ø, glabrous or pubescent, fleshy. *Seeds* compressedly trigonous-ovoid, testa minutely reticulate, *c.* 1.5 mm.

Distr. *Malesia*: Sumatra, Malay Peninsula, Java, Bali.

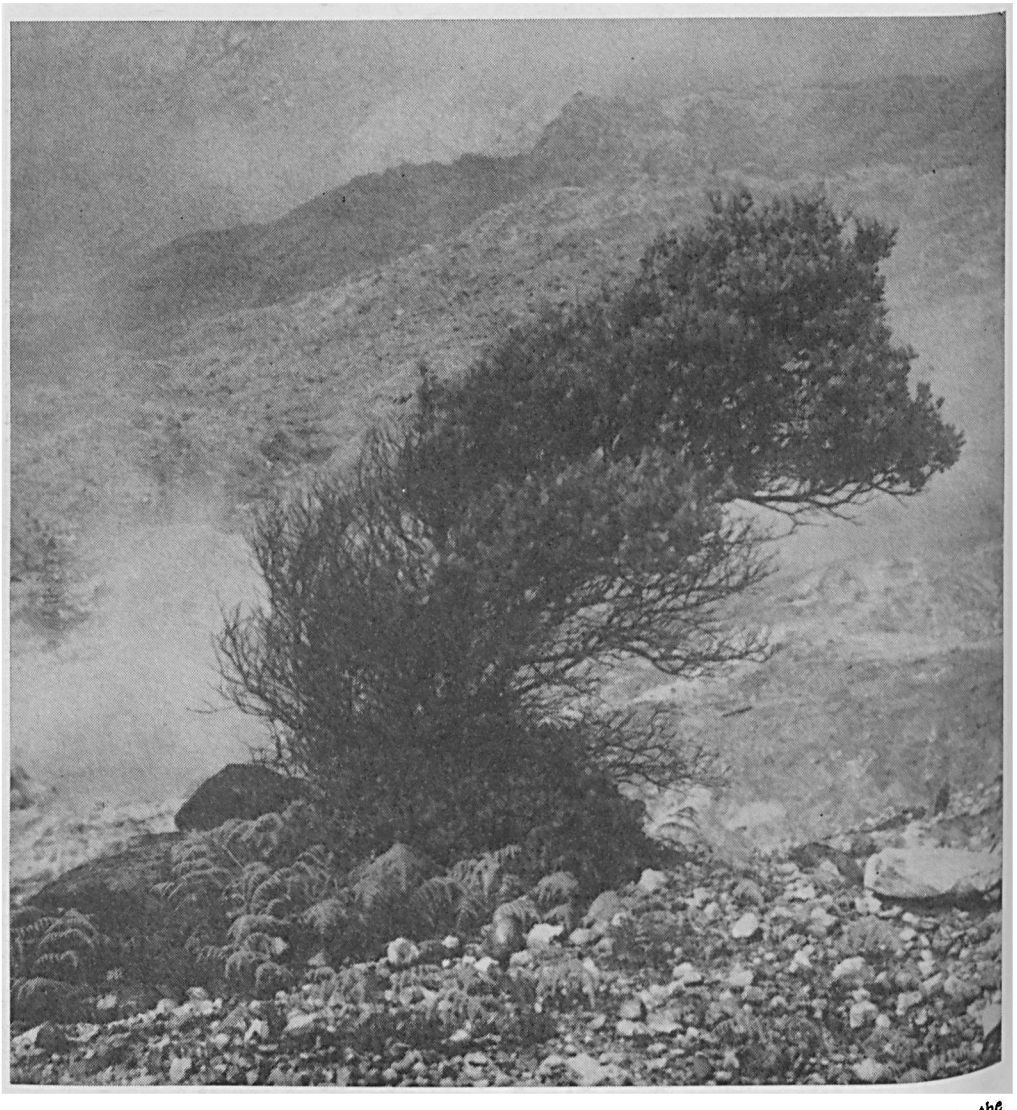

Fig. 102. *Vaccinium varingiaefolium* (BL.) MIQ. Oblique growth caused by sulphureous gases in the crater of Mt Papandajan, W. Java, *c.* 2000 m, *c.* 1 m high.

Ecol. *V. varingiaefollum* forms the main co-dominant in stands mixed with *Eurya*, *Symplocos*, *etc.* of the subalpine forest on all (or most) Javanese mountain tops, chiefly above 1800–2000 m, not rarely in form of a belt, growing as a tree in forest with rich humous as well as a shrub in open, extremely stony and rather dry places. It is a pioneer on ashy or volcanic soil of crater ridges, common in the vicinity of solfataras and hot mud-wells, and in such localities it descends to 1400 m. It becomes a small and ± prostrate shrub in high, wind-exposed bare slopes up to 3340 m, growing closely appressed to the ground. As a tree it is almost fire-proof; even when the whole trunk is charred, buds at the base of the stem may still sprout, thus holding its ground even in large numbers on mountains which are continually subject to bush fires. *V. varingiaefolium* flowers all through the year, though mainly in April-May. Young shoots, also in April-May, are of a brilliant blood red, which contrasts beautifully with the older dark green foliage and is visible from far.

Liter. SEIFRIZ, Bull. Torr. Bot. Cl. 50 (1923) 300; DOCTERS VAN LEEUWEN, Trop. Natuur 16 (1927) 191; SCHRÖTER, Vierteljahresschr. Naturf. Ges. Zürich 73 (1928) Beibl. 15, p. 584, f. 7; DOCTERS VAN LEEUWEN, Tangkoeban Prahoe (Botany) Excursion-guide for the 4th Pac. Sc. Congr., Exc. B 4 (1929) 11; Bull. Jard. Bot. Btzg III, 11 (1930) 28–56, t. 5, 6, 9, 10; Pangrango (1933) 209, t. 20; SCHIMPER-FABER, Pflanzengeogr. (1935) 75, 286, 294, 553, f. 19, 55, 60, 172; STEEN. Trop. Natuur 24 (1935) 142, f. 2, 3 & 5 (*phot.*); Fl. Mal. I, 4 (1948) XXXIII, f. 21, 24.

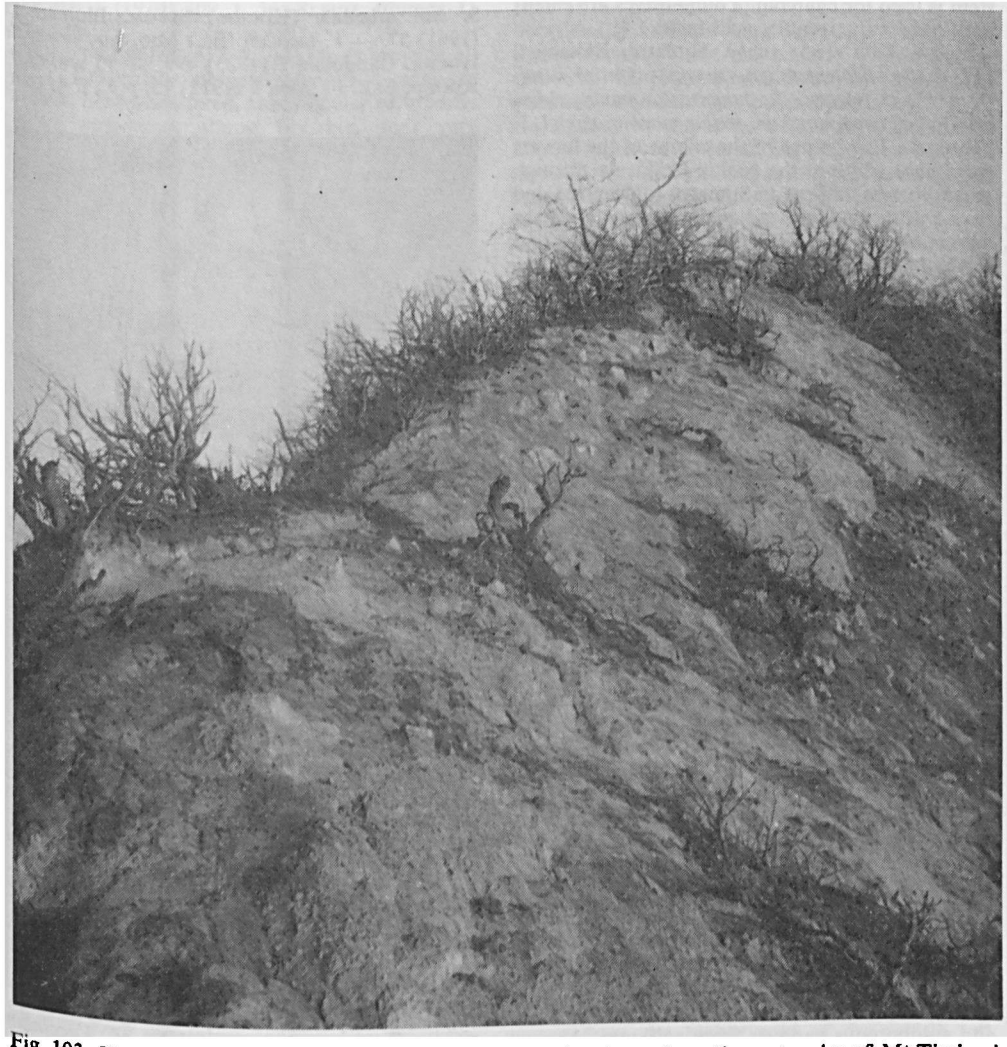

Fig. 103. *Vaccinium varingiaefolium* (BL.) MIQ. Subalpine brushwood on the crater rim of Mt Tjerimai, Central Java, *c.* 3000 m, half buried by volcanic ash; small red sprouts burst forth from twigs and branches, but forest will die (VAN STEENIS, 1940).

Pollination (after DOCTERS VAN LEEUWEN). The pollen is often already shed upon the stigma and on the bottom of the corolla before the opening of the flower. The stigma is enlarged as to fit precisely into the mouth of the corolla tube. After flowering the corolla falls away and during this process the anthers and the pollen on the inner side of the corolla can come in contact with the stigma. Self-pollination therefore may readily take place. The flowers are not regularly visited by insects. The nectar is sought by birds as *Oreosterops* in Java and *Zoosterops* in Sumatra. All flowers produce fruits, as far as not attacked by caterpillars, which is often the case.

Uses. The berries are a little juicy and edible, and one of the principal sources of food for fruit-eating birds and rats in the mountains of Java. They are apparently not sought by the natives. The stem is used for charcoal. Young leaves are eaten; they have an agreeable, acid taste.

Vern. *Kaju rimbe rimbe*, Sumatra, Eastcoast, *balé katjè, beulenkentjen, suwagi, tjantigi bětul, tj. gědé, tj. wungu*, S, *manarasa, manis rědja, měntigi, njampo nangkan, patjar gunung, těmigi*, J.

Notes. The change of the colour of the flowers from pure white in the Malay Peninsula through cream to rose and red in Sumatra to deep red and dark purple in Java lead me to suspect that the colour may be based on multiple alleles and that gradual elimination of these has occurred from the East to the West.

V. varingiaefolium is understood here in a broad sense, comprising both the glabrous form (which is predominant in W. Java, Sumatra and the Malay Peninsula) and the pubescent form (predominant in Central and Eastern Java), and the forms with more lanceolate leaves (Central and Eastern Java). The peculiar form with small elliptic leaves, limited to the eastern part of Java, is kept as *var. orientale*. The other *var. calcaratum*, only known from N. Sumatra, corresponds in all characters to the normal form except by the presence of short spurs on the anthers; these are perhaps due to earlier local hybridisation with a species in N. Sumatra, which possesses such dorsal spurs.

Found as subfossil leaf-impressions in volcanic tuff deposits on Mt Papandajan, W. Java, *cf.* STEEN. Trop. Natuur 21 (1932) 191, f. 3 & 4.

2. *var.* calcaratum SLEUM. Blumea 11 (1961) 57.

Leaves ± broadly attenuate or subacuminate, ± obtuse at the apex. *Corolla* pink. Anthers long or more shortly 2-spurred dorsally; base of the cells often ending in an obtuse gland-like apiculus. Tubules often narrower than in *var. varingiaefolium*.

Distr. *Malesia*: Sumatra (Atjeh; Eastcoast).

Ecol. In ridge forest and summit scrub, 1850–3450 m.

3. *var.* orientale (HOCHR.) SLEUM. Blumea 11 (1961) 57. — *V. lucidum* (BL.) MIQ. *var. orientale* HOCHR. Candollea 2 (1925) 499. — *V. schimperi* KOORD. Exk. Fl. Java 3 (1912) 15, *p.p.*, f. 4, repr.

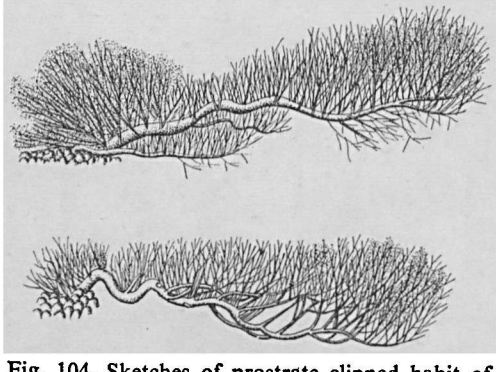

Fig. 104. Sketches of prostrate clipped habit of shrubs in the crater of Mt Papandajan, W. Java, *c.* 2000 m, through the combined action of wind and sulphureous vapours from solfatara. Above: *Vaccinium varingiaefolium* (BL.) MIQ., below: *Rhododendron retusum* (BL.) BENN. (drawn after photographs).

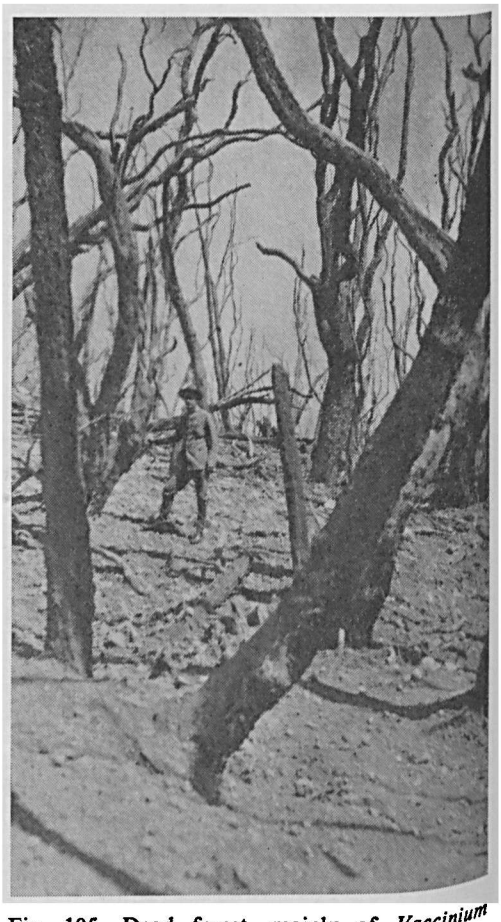

Fig. 105. Dead forest, mainly of *Vaccinium varingiaefolium* (BL.) MIQ. after Kawa Baru, a new vent of Mt Papandajan, W. Java, originated (F. C. VAN HEURN).

from SCHIMPER, Pflanzengeogr. (1898) 767, f. 426, *sub V.* '*myrtoides*'.

Leaves more densely (to subimbricately) arranged than in *var. varingiaefolium*, elliptic, 1–1.5(–2) by 0.5–1 cm, with 3–4 pairs of nerves, the reticulation more distinct beneath than in *var. varingiaefolium*. Branchlets and inflorescences ± densely hairy to subtomentellous, the (glabrous) corolla excepted.

Distr. *Malesia*: E. Java (from Mt Smeru and Mt Ardjuno to the Idjen high-plateau).

Ecol. Forming a mass vegetation of low (up to 2 m), rather small-leaved dense shrubs on bare rocks, barren edges of solfataras, generally at the upper limit of the vegetation, (1800–)2250–3090 m.

116. Vaccinium latissimum J. J. S. Bull. Jard. Bot. Btzg III, 1 (1920) 409, t. 56; SLEUM. Blumea 11 (1961) 66.

Shrub or small tree, 2–8(–15) m, glabrous in all parts. Branchlets obtusangular, 3–4 mm ø, reddish. *Leaves* scattered, suborbicular or broadly elliptic, sometimes almost obovate, apex very shortly obtusely apiculate-acuminate or mostly ± rounded, base very broadly attenuate or rounded, sometimes in part in the same specimen subcordate, ± coriaceous, though rather flexible, with 3 or 4 minute, marginal, remote, impressed glands on each side, entire, edge slightly revolute, very sparsely glandular-muriculate or -punctate on both faces, 9–13 by 5–10 cm, midrib as stout as the petiole below, gradually decreasing distally, flat or a little sunken above, much prominent beneath, nerves 6–7 pairs, the lowest 2 ones from the base, the other ones starting from the midrib at an angle of *c.* 45° in subequal distances, all rather straight and anastomosing, slightly raised above, markedly so beneath, reticulation lax, not much prominent on both faces, or often beneath only; petiole (2–)3–7 by 2–3 mm. *Racemes* mostly from the axils of lower (often fallen) leaves, or slightly supra-axillary, ± patent, rather densely 8–15-flowered, perulae numerous, membranous, oblong to suborbicular, up to 10 by 5 mm, very early caducous; rachis robust, 0.5–1.5(–2) cm, with several early caducous imbricate basal bracts. Pedicels stoutish, a little curved, *c.* 1.5 cm at anthesis. *Calyx* tube broadly cup-shaped, 2 mm, limb expanded, *c.* 2 mm high, 5–7-lobed to *c.* ⅔, lobes broad-triangular, obtuse, with a broadened marginal gland on top. *Corolla* campanulate, fleshy, white or greenish yellowish white, sometimes reddish, 7-fid to ⅕ or in part a little more, *c.* 8 by 6–8 mm (at the limb), lobes subovate-triangular, obtuse, *c.* 3(–4) by 2 mm. *Stamens* 14, 6–7 mm long; filaments linear, a little wavy, *c.* 3 mm; cells oblong, echinulate, 2–2.5 mm, with 2 dorsal distal erect spurs (1 mm); tubules cylindric, half as wide as the cells, *c.* 2 mm, obliquely cut distally. *Disk* prominent. *Style* slenderly columnar, *c.* 8 mm. *Fruit* subglobose, crowned by the thick disk, blackish, 5–6 mm ø in dry specimens, said to attain *c.* 1 cm ø at full maturity when fresh.

Distr. *Malesia*: Central Celebes.

Ecol. In primary and secondary forest, also principal overgrowing on open bare slopes or peat plateaus, '*blukar*' and grass vegetation, on quartz, slate, granite or sandy soil, also reported as primary regenerator, locally common, often sterile, (600–)1000–1800 m. *Fl.* Febr.–July, *fr.* April–July.

Vern. *Podon-podon*, Toradja, *palla*, Toradja: Uluway, *lepong-lepong*, *podoh-podoh*, Toradja: Tai, *ohoo*, Rampisch.

117. Vaccinium contractum SLEUM. Bot. Jahrb. 71 (1940) 160; Blumea 11 (1961) 66.

Shrub, glabrous in all parts. Branchlets greyish. *Leaves* scattered, lanceolate-oblong, apex rather shortly (1.5–2 cm) subcaudate-acuminate, acute, base attenuate and decurrent for 1–2 mm on the petiole, with a small gland on each side at the very base of the lamina or almost on the petiole, and occasionally another marginal gland above at *c.* 8 mm distance from the petiole, ± coriaceous, somewhat lustrous on both faces, laxly glandular-punctate or -muriculate beneath, 8–11 by 2.5–3.5 cm, entire, the very edge a little revolute, midrib faintly impressed or flat above, prominent beneath, nerves 2 distinct basal and 2–3 upper, less manifest pairs, all high-ascending and anastomosing, slightly prominent above, more distinctly so beneath as is the lax reticulation; petiole 7–8 by *c.* 1 mm. *Flowers* in much abbreviated racemes or almost in fascicles, these rather dense-flowered in the axils of the upper leaves; rachis up to 0.5 cm, subtended by several close, firm and subpersistent perulae up to 8 by 4 mm. Pedicels robust, erect, a little winged, 6–10 mm; bracts and bracteoles not seen. *Calyx* tube *c.* 2.5 mm, subglobose-campanulate, limb 5-denticulate, lobes or teeth broadly triangular, each provided with a thick bluntish apical gland. *Corolla* tubular, *c.* 5 mm, rather fleshy, white, very deeply 5-lobed, lobes rather broad. *Filaments* linear, 1.6 mm; anther-cells elongate-oblong, alternately 1.2 and 1.4 mm, no dorsal spurs; tubules as wide as the cells, 0.7 and 1 mm, subobliquely truncate distally. *Disk* conspicuous, 5-gibbous. *Style* thickish, glabrous, ± as long as the corolla.

Distr. *Malesia*: Central Celebes (Ponáa Mts), 1630 m, once found. *Fl.* Sept.

118. Vaccinium warburgii SLEUM. Bot. Jahrb. 71 (1940) 167; Blumea 11 (1961) 66.

Shrub or small tree, glabrous in all inner and outer parts. Branchlets subangular. *Leaves* lax, ovate to oblong-ovate, apex for 1–2 cm acuminate or subcaudate, acutish, base rounded to broadly attenuate, rather indistinctly biglandular at the base, subcoriaceous, laxly glandular-subsetulose or -muriculate beneath, entire, the very edge a little revolute, 5–7(–8) by 3–4.5 cm, midrib a little sunken above, well raised beneath, 5–7-plinerved, with some additional pairs of shorter nerves from the higher part of the midrib, all rather steeply curved-ascending and anastomosing, slightly prominent on both faces, reticulation rather lax above, more dense beneath, slightly

though conspicuously raised on both sides; petiole 4–6 by 1 mm. *Racemes* solitary from the upper axils, 4–6(–7) cm, ± secund, laxly many-flowered; rachis subangular, slender, *c.* 1 mm ø at the base, which bears numerous ovate-acuminate perulae *c.* 5 mm. Pedicels slender, 4–7 mm; bracteoles not seen. *Calyx* tube subglobose, *c.* 1.5 mm, limb obsoletely 5-denticulate or wavy, surpassed by the annular glabrous disk. *Corolla* tubular-suburceolate, a little fleshy, white (?), *c.* 7 by 2 mm, 5-lobed to a little more than halfway, lobes rather broad. *Filaments* linear, 0.8–1 mm; anther-cells elongate, 1 mm, no spurs; tubules as wide as the cells, *c.* 0.8 mm, with a terminal subоblique large pore. *Style* thick-filiform, *c.* 2 mm. *Disk* glabrous. *Fruit* bluish blackish, subglobular, *c.* 3 mm ø (dry), slightly longitudinally 5-costulate, contracted at the limb; pedicel 1 cm.

Distr. *Malesia*: Central Celebes, twice found.

Ecol. In forest, 2200–3000 m, apparently rare. *Fl.* May.

119. Vaccinium aucupis SLEUM. Bot. Jahrb. 71 (1940) 160; Blumea 11 (1961) 66.

Shrub or low tree, glabrous in all parts. Branchlets obtusangular, youngest parts reddish when dry. *Leaves* scattered, ample, oblong or subovate-oblong, apex ± abruptly and shortly (1–1.5 cm) acuminate and often ± curved, tip bluntish, base broadly attenuate and a little decurrent into the petiole, no basal marginal glands visible, coriaceous, very laxly set with minute appressed glands or glandular hairs beneath, a little lustrous on both faces, entire, the very edge revolute, 11–16 by (4.5–)5–6.5 cm, midrib impressed above, much prominent beneath, nerves 1–2 basal, and 2–3 upper, similarly curved and high-ascending pairs, all slightly sunken above, conspicuously raised and ± anastomosing beneath, other much shorter nerves or veins much less conspicuous as is the lax reticulation; petiole 7–10 by *c.* 2 mm. *Racemes* both from the upper and lower axils, 7–12-flowered; rachis angular, rather slender, 1.5–2 cm long, 1–1.5 mm ø at the base, which is provided with several small scarious perulae. Pedicels suberect, 0.7–1(–1.2) cm by 0.5 mm, the 2 basal bracteoles minute, subulate, early caducous. *Calyx* tube subsemiglobose to subcylindric, *c.* 1.7 mm, base ± truncate, limb 5-denticulate, teeth 0.8 mm, ending in a small bluntish gland. *Corolla* cylindric, 5-lobed to nearly the base, somewhat fleshy, white (?), 4–5 mm. *Filaments* linear, 2 mm; anther-cells elongate-oblong, 1.5 mm, no spurs; tubules as wide as the cells, 1.2 mm, the apical pore suboblique. *Disk* rather bulky, 5-gibbous. *Style* robust, 4–5 mm. Submature *fruit* subglobose, crowned by the prominent disk, *c.* 3 mm ø.

Distr. *Malesia*: SE. Celebes (Mengkoka Mts), twice found.

Ecol. In rain-forest, 1400–1500 m. *Fl.* Jan., *fr.* Oct.

120. Vaccinium minuticalcaratum J. J. S. Nova Guinea 12 (1914) 160, t. 46; SLEUM. Bot. Jahrb. 72 (1942) 254; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 481; SLEUM. Blumea 11 (1961) 67; *ibid.* 12 (1963) 128. — **Fig. 106.**

f. **minuticalcaratum.**

Shrub or shrub-like tree, (1–)3–8(–16) m, with ± erect branches and greyish brown bark. Branchlets slightly angular, glabrous. *Leaves* rather lax, oblong- to subovate-elliptic or lanceolate, rarely ovate-elliptic, apex gradually longer or more shortly acuminate or subcaudate, tip subacute, base cuneate to shortly attenuate, rarely subrotundate, a little decurrent into the petiole and provided with a minute impressed gland on each side, coriaceous, ± stiff, somewhat lustrous, glabrous except the laxly set and very short glandular hairs beneath, (3.8–)5–8(–9.5) by 1.7–3 (–3.3, rarely –5) cm, entire, margin but slightly or not revolute, 7–9-plinerved, main nerves ascending to the top of the lamina and ± anastomosing, other shorter pinnate ones in 3–4 pairs from the upper part of the midrib more spreading, midrib, nerves and the rather dense reticulation faintly raised above, more conspicuously so beneath; petiole grooved above, 4–6 by 1–1.5 mm. *Racemes* from the upper 2–4 axils, 10–15-flowered, flowers nodding and ± secund; rachis stoutish, angular, glabrous, 2–3 cm, basal bracts (or perulae) scarious, minute, very early caducous. Pedicels green, rather slender, glabrous, 5–7 mm in anthesis. *Calyx* greenish or cream, tube subsemiglobose, base truncate to rounded, puberulous, 2 by 3 mm, limb subpatent, 2 mm, 5-lobed to *c.* ⅔, lobes triangular, with a mostly rather inconspicuous, sometimes hardly visible apical gland, ciliate, subglabrous dorsally. *Corolla* campanulate when fully expanded except the very shortly contracted base, 5-lobed ± halfway (sometimes or in part lobed but for ⅓), 7–8(–9) mm, glabrous outside, densely hairy at least in the lower half inside, fleshy, pale or bright red, pink or white, lobes paler, ovate-triangular, obtuse, subcarinate-obtusangular outside, laxly ciliolate distally, 3.5–4 mm long, 4–4.5 mm ø at the base. *Filaments* linear, base dilated, curved, all over long-hairy, *c.* 3.5 mm; anther-cells yellow, elongate, base obtuse, 2.5 mm, whether or not with a pair of minute dorsal spurs; tubules much narrower than the cells, *c.* 1.5 mm, obliquely and irregularly cut or erose and ± flaring distally, the back wall often ending in 2 irregular minute teeth. *Disk* prominent, glabrous. *Style* robust, whitish villous except the very apex, slightly exserted, 9–10 mm. Immature *fruit* green, subglobular, glabrous, *c.* 4 mm ø; pedicel 8–15 mm.

Distr. *Malesia*: West New Guinea (Arfak Mts and Wissel Lakes area).

Ecol. In mossy forest, 1770–2000 m. *Fl.* April-May, *fr.* Oct.

Vern. *Korè*, Kapauku.

f. **glabrum** J. J. S. Nova Guinea 12 (1917) 527; SLEUM. Bot. Jahrb. 72 (1942) 254; Blumea 11 (1961) 67; *ibid.* 12 (1963) 128. — *V. minuticalcaratum* J. J. S. *f. latifolium* J. J. S. Nova Guinea 12 (1917) 528; SLEUM. Bot. Jahrb. 72 (1942) 254. — **Fig. 106.**

Calyx tube glabrous, otherwise as in *f. minuticalcaratum*.

Distr. *Malesia*: New Guinea (Arfak and Oranje Mts; Owen Stanley Ra.).

Ecol. In forest edge or undergrowth, occasionally plentiful, (1350–)2350–3225 m.

Vern. *Mĕgoi*, Hattam.

121. Vaccinium quinquefidum J. J. S. Med. Rijksherb. *n.* 25 (1915) 11; Nova Guinea 12 (1917) 529; *ibid.* (1918) t. 218; SLEUM. Bot. Jahrb. 72 (1942) 250; Blumea 11 (1961) 67. — *V. nycteroides* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 92; SLEUM. Bot. Jahrb. 72 (1942) 257 ('*nyctericoides*').

***var.* quinquefidum.**

Tree or much-branched shrub, 2–3 m. Branchlets rigid, angular, puberulous, ± densely leaved. *Leaves* on thick leaf-cushions, ovate to oblong-ovate or ovate-lanceolate, apex gradually acuminate or subcaudate for 0.6–1 cm, tip bluntish, base broadly attenuate to nearly rounded, the 2 completely basal glands thick and ± protruding, coriaceous, stiff, convex above, very laxly glandular-muriculate beneath and whether or not clothed with some short hairs at the margin in the upper half of the lamina, glabrous for the rest, 1.5–2.7 by (0.6–)0.7–1 cm, entire, edge slightly or not revolute, midrib narrowly sunken above, obtusely prominent beneath, nerves inconspicuous above, rather indistinct as to the 2–3 ascendent pairs beneath, reticulation fine and visible beneath only, or mostly ± obsolete; petiole finely puberulous, 2(–3) mm. *Racemes* from the upper 3–5 axils, erect, subdensely 10–20-flowered; rachis stoutish, 1.2–2 cm, with several concave small perulae, as the pedicels with fine ± spreading hairs and some club-shaped ascending or subappressed glands or glandular hairs. Pedicels nodding at anthesis, ± erect in fruit, rather slender, 7–9 mm; bracteoles not seen. *Calyx* tube semiglobose-campanulate, base rounded, glabrous or hairy, *c.* 1.5 mm, limb spreading, 2–2.5 mm, deeply 5-lobed, lobes deltoid, glabrous, ciliate, the subacute apex bluntish by a small gland. *Corolla* elongate-ovoid-conical, attenuate distally, obtusely 5-gonous, 5-lobed ± halfway, ± patently subdensely hairy outside, especially in the lower half, glabrous inside, white to pink, 9–11(–12) by *c.* 5 mm below, lobes narrow, erect. *Stamens* 8 or 10; filaments linear, base dilated, wavy, densely hairy or almost villous especially below, *c.* 4 mm; cells broad-oblong, *c.* 1.3 mm, no spurs; tubules nearly as

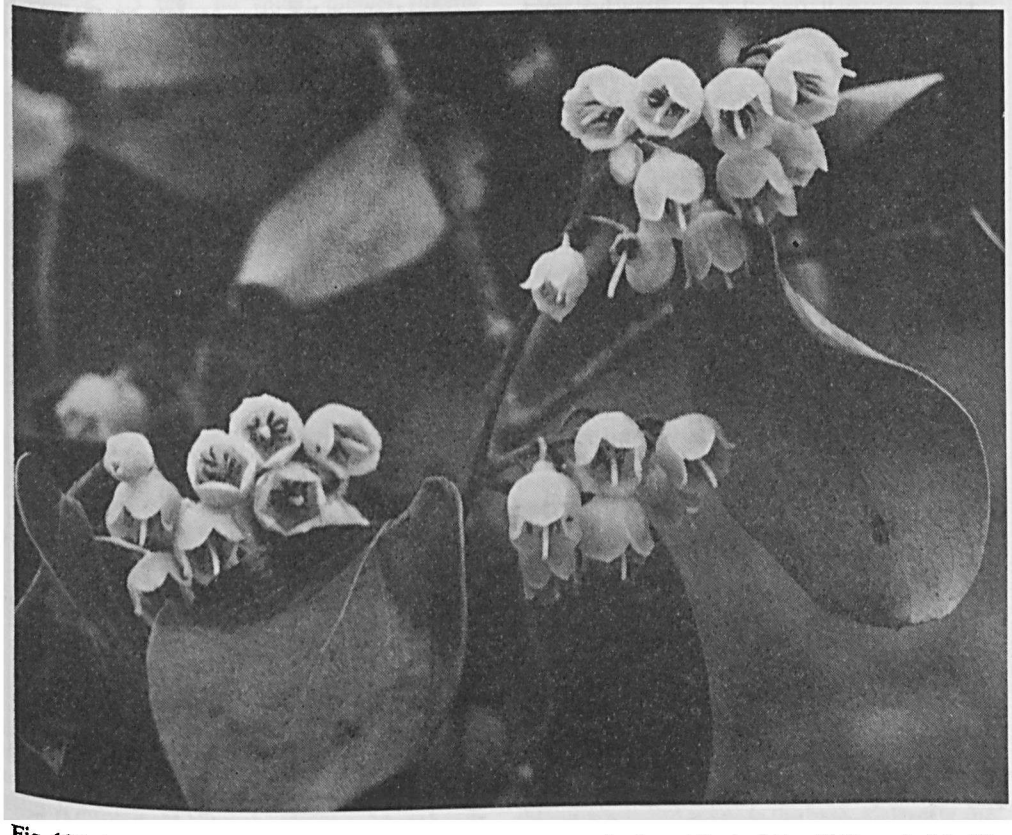

Fig. 106. *Vaccinium minuticalcaratum* J. J. S. *f. glabrum* J. J. S. above Warjori R., 1350 m, Arfak Mts, NW. New Guinea (SLEUMER & ZIECK 4491) (SLEUMER, 1962).

wide as the cells, 0.5 mm, obliquely cut distally, the posticous wall protracted into 2 distinct teeth. *Disk* glabrous. *Style* rather slender, glabrous, 1.1–1.2 cm. *Fruit* subglobose, glabrous, red-greenish, *c.* 5 mm ø when almost ripe, crowned by the suberect calyx lobes.

Distr. *Malesia*: West New Guinea (Mt Carstensz, Wichmann Mts and Star Mts).

Ecol. In summit vegetation, in swamp, locally not rare, 2530–3350 m. *Fl.* Jan.–Febr.

var. **oranjense** J. J. S. Nova Guinea 12 (1917) 530; SLEUM. Bot. Jahrb. 72 (1942) 250; Blumea 11 (1961) 67.

Inflorescence more densely hairy and glandular, and disk hirsutulous, otherwise hardly different from *var. quinquefidum*.

Distr. *Malesia*: New Guinea (Oranje Mts).

Ecol. In subalpine forest, locally common on forest edges, on sandstone, 3400–3600 m. *Fl.* Febr., Sept.

122. Vaccinium brachygyne J. J. S. Med. Rijksherb. *n.* 25 (1915) 11; Nova Guinea 12 (1917) 528; *ibid.* (1918) t. 217; SLEUM. Bot. Jahrb. 72 (1942) 249; Blumea 11 (1961) 67. — *V. obovalifolium* SLEUM. Bot. Jahrb. 72 (1942) 249.

Shrub or small tree, 2–8 m. Branches erect. Branchlets striate, obtusangular, glabrous, reddish in the youngest parts, subdensely leaved. *Leaves* obovate to elliptic-obovate, apex broadly attenuate and obtuse or ± rounded, base ± cuneate into the petiole, the 2 basal glands impressed, though often not much conspicuous, coriaceous, firm, glabrous except the rather sparse appressed muriculate glands or points on the undersurface, entire, flat or but slightly revolute at the margin, (2–)2.5–4.5 (–5) by (0.8–)1.2–2.5(–2.8) cm, midrib sunken above, prominent beneath, nerves 3–4 pairs, steeply curved-ascending and anastomosing, faintly impressed above, slightly raised beneath, reticulation fine and dense, perceptible beneath only; petiole grooved above, (2–)3–5(–6) by *c.* 1 mm. *Racemes* short, (2–)3–6-flowered, from the upper 1–3 axils; rachis angular, glabrous or sparsely glandular-muriculate as are the pedicels, (0.5–)1–1.5 cm, base involucrate initially by several ovate to suborbicular membranous perulae (5–6 mm ø), which are rather early caducous. Pedicels stoutish, nodding, 4–7 mm. *Calyx* tube broadly cup-shaped, glabrous, rugulose, 1–1.5 mm, limb spreading, 1–1.5 mm, 5-lobed to nearly the base, lobes deltoid, obtuse, ciliolate, sometimes bearing a minute or rather indistinct apical gland. *Corolla* suburceolate, ventricose in the lower part, gradually attenuate distally, said to be a little angular and fleshy, pale pink, glabrous at both sides, 9–10(–11) by *c.* 4 mm, 5-lobed, ± halfway, lobes narrow, erect or but slightly recurved. *Filaments* linear, broadened and glabrous below, very densely patently hairy above the base, 2–2.5 mm; anther-cells a little curved, broad-oblong, *c.* 1.5 mm, no spurs; tubules as wide as the cells, 0.5 mm, broadly obliquely or sublaterally cut distally. *Disk* glabrous. *Style* slenderly columnar, 1–1.1 cm, glabrous, finally exserted. *Fruit* globose, *c.* 3.5 mm ø, blackish, soft and wrinkled at full maturity, crowned by the prominent annular disk; pedicel *c.* 1 cm.

Distr. *Malesia*: New Guinea (Oranje and Wichmann Mts).

Ecol. In forest opening of long standing or in mossy low forest, common locally, 2800–3225 m. *Fl.* Febr., Aug., Oct., *fr.* Aug.

123. Vaccinium paradisearum BECC. Malesia 1 (1878) 209; SLEUM. Bot. Jahrb. 72 (1942) 255; Blumea 11 (1961) 67; *ibid.* 12 (1963) 128. — *V. profusum* J. J. S. Nova Guinea 12 (1914) 164, t. 50; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 482. — *V. psittacobium* SLEUM. Bot. Jahrb. 72 (1942) 255. — Fig. 107.

Shrub, rarely treelet, 1–3(–5) m. Branchlets reddish, glabrous or minutely puberulous in the youngest, thinly greyish corticate and striate in the older parts, subdensely leaved. *Leaves* ± reflexed, subovate-oblong or mostly -lanceolate, apex for 1–3 cm subcaudate-acuminate, not rarely ± falcate, tip bluntish, base in general attenuate into the petiole, rarely almost rounded, the basal 2 marginal glands rather small, though well visibly impressed, coriaceous, ± stiff, glabrous except for scattered glandular hairs or dots on the undersurface of very young leaves, entire, edge slightly



Fig. 107. *Vaccinium paradisearum* BECC. Mt Sensenemés, 2600 m, Anggi Gigi Lake, NW. New Guinea (SLEUMER & VINK 4314) (SLEUMER, 1962).

revolute, (2.5–)3.5–7 by (0.7–)1–1.8(–2.5) cm, midrib narrowly sunken above, slightly and obtusely raised beneath, 5-plinerved, nerves faintly raised on both faces or only beneath, sometimes even ± obscure, reticulation, if any, lax and mostly visible beneath only; petiole (4–)5–7 by 1 mm. *Racemes* from numerous upper axils, suberect or spreading, rather dense together, many-flowered, flowers ± laxly arranged; rachis greenish, angular, rather slender, though stiff, glabrous, (2–)4–7(–9) cm, perulae not seen, apparently very early caducous. Pedicels pale purple, nodding, slender, glabrous, (5–)6–8(–12) mm; bracteoles not seen. *Calyx* tube campanulate, 1–1.5 mm, glabrous or with a few short glandular hairs, or laxly muriculate at the very base, limb spreading, 1–1.5 mm, deeply 5-lobed, lobes triangular, subacute, glabrous or ciliolate, the apex often penicillate. *Corolla* elongate-urceolate, ventricose below, gradually contracted in the upper part, thin-fleshy, purplish to pink, light pink or white, 1–1.2(–1.3) by 0.25–0.3(–0.4) cm, split ± halfway 5-lobed, glabrous at both sides except some very short hairs occasionally found along the inner margin of the lobes, the latter narrow, suberect or but slightly divergent, subacute. *Filaments* linear-subulate, villous and purple below, 3.5–4 mm; anther-cells broad-oblong, *c.* 1.3 mm, no spurs; tubules slightly narrower than the cells, *c.* 0.4 mm, obliquely cut distally, the back wall extending to a simple or bifid tooth. *Disk* purple, prominent, glabrous. *Style* slenderly columnar, glabrous, 1–1.2 cm. Fresh *fruit* blue at full maturity, globose, 6(–7) mm ø; pedicel up to 2 cm.

Distr. *Malesia*: New Guinea (Arfak and Weyland Mts; Wissel Lakes region; Mt Antares).

Ecol. In edge of forest and in semi-alpine shrub vegetation, on granite or on clayey or humous soil, 1900–3300 m, locally common. *Fl. fr.* Jan.–Dec.

Vern. *Dennokwanie*, Manikiong, Arfak.

Note. The berries are reported to be eaten by parrots (*Oreopsittacus, Charmosyne*). In the Arfak Mts specimens with purplish, pink or white flowers occur in the same place.

124. Vaccinium megalophyes SLEUM. Bot. Jahrb. 72 (1942) 253; Blumea 11 (1961) 68; *ibid.* 12 (1963) 128.

Shrub or slender tree, up to 13 m, trunk up to *c.* 25 cm ø, crown fairly small; bark 1 mm, brown, smooth, scaly. Branchlets slender, tips angular and quite glabrous, dark red-brown when dry. *Leaves* lax, oblong-elliptic or elliptic, apex shortly subabruptly and ± obtusely acuminate, base ± cuneate to and a little decurrent into the petiole, the pair of marginal glands strictly basal and conspicuous, coriaceous, sparsely glandular-punctate beneath, otherwise glabrous, entire, edge hardly revolute, 5–8(–10) by 2.3–3(–3.5, occasionally –4) cm, midrib impressed above, markedly and obtusely prominent beneath, nerves *c.* 3 basal and (up to 1.5 cm) suprabasal, rather steeply curved-ascending, and some upper, much shorter, ± spreading pairs, all nerves anastomosing and slightly raised above, more distinctly so beneath, reticulation rather dense, faintly prominent above, conspicuous beneath; petiole 4–6 by *c.* 1 mm. *Racemes* from the upper, partly defoliate axils, ± patent, sparsely set with club-shaped glandular or muriculate hairs on rachis and pedicels, more densely muriculate on the calyx tube, not properly hairy at all, patently and laxly 10–15-flowered; rachis slender, (1.5–)2–3 cm, eperulate in flowering time. Pedicels slender, 8–11 mm; bracts and bracteoles not seen. *Calyx* tube cup-shaped, *c.* 1 mm, limb low, ± spreading, lobes irregularly ovate-deltoid, bluntish, ciliolate, 0.5 mm, no proper apical gland. *Corolla* urceolate-tubular, base swollen in the lower third, gradually attenuate upwards, obscurely 5-angular, somewhat fleshy, glabrous at both sides, pink or white, 8–10 by 3–4 mm (at base), lobes erect, narrow, papillose-ciliolate, 4–5 mm. *Filaments* subulate-linear, woolly above the glabrous base, *c.* 2 mm; anther-cells broad-oblong, ecalcarate, 0.7–1 mm; tubules broad-cylindric, a little narrowed distally, hardly 0.3 mm, obliquely cut distally. *Disk* glabrous. *Style* slenderly columnar, glabrous, *c.* 1 cm. Submature *fruit* depressed-globose, 4–5 mm ø, dark red, with a warty or rugose surface, the disk prominent beyond the calyx lobes.

Distr. *Malesia*: New Guinea (Bernhard camp: Idenburg R.; Balim R. valley; near Habbema Lake in the Oranje Mts).

Ecol. Rare substage tree in mossy forest, or frequent in forest openings or in low open (also secondary) forest, on sandy slopes, 1800–2720 m.

Vern. *Dowakka*, Dani.

125. Vaccinium stenolobum SCHLTR, Bot. Jahrb. 55 (1918) 177, f. 10; SLEUM. *ibid.* 72 (1942) 257; Blumea 11 (1961) 68.

Erect tree, 12–20 m, glabrous in all outer parts. Branchlets erecto-patent, subterete, ± densely leaved. *Leaves* elliptic or narrow-elliptic, apex shortly acuminate, subacute, base cuneate, coriaceous, entire, margin a little wavy, not properly revolute, 5–8 by 2–3 cm, midrib somewhat sunken above, strongly prominent in the lower part, gradually decreasing upwards beneath, nerves in 1 basal and 4–5 upper pinnate pair(s), anastomosing, reticulation apparently (*l.c.* fig. 10) inconspicuous; petiole 5–8 by 1.5–2 mm. *Racemes* in the upper 2 or 3 axils, close to each other, erecto-patent, laxly 8–14-flowered; rachis subangular, 4–5 cm, eperulate in anthesis. Pedicels rather stoutish, 7–10 mm; bracts and bracteoles not known. *Calyx* tube cup-shaped, base rounded, 2 mm, lobes subpatent, ovate, obtuse, 1 mm, the apical gland very distinct. *Corolla* urceolate, somewhat fleshy, pink, glabrous outside, subdensely short-hairy inside, 9–10 by *c.* 6 mm, 5-partite to about the middle, lobes first erect, finally spreading, narrow-lanceolate, acute. *Filaments* subulate, densely long patently hairy, *c.* 4 mm; anther-cells oblong, narrowed towards the base, ecalcarate, 1.5 mm; tubules erect, divergent, *c.* 1.5 mm as wide as the cells at the base, very obliquely cut apically or

almost laterally, the posticous wall of each tubule extended into a long tooth, the pore narrow-oblong. *Disk* glabrous, prominent. *Style* slenderly cylindric, glabrous, *c.* 1 cm.

Distr. *Malesia*: New Guinea (West Ra., Sepik Distr.), mountain forest, 1400–1500 m. Once found. *Fl.* Aug.

Note. The description given above is based on the original diagnosis and figure, the herbarium material being completely lost.

126. Vaccinium daphniphyllum SCHLTR, Bot. Jahrb. 55 (1918) 181; SLEUM. *ibid.* 72 (1942) 264; Blumea 11 (1961) 71; *ibid.* 12 (1963) 129. — *V. piroliflorum* J. J. S. Nova Guinea 18 (1936) 115, t. 30, f. 1.

Shrub, terrestrial or epiphytic or sometimes scandent. Branchlets subterete, glabrous, subdensely to laxly leaved. *Leaves* elliptic or oblong- to lanceolate-elliptic, apex shortly obtusely acuminate, base cuneate to broadly attenuate, a little widened or swollen at the very base, where the rather thick pair of prominent marginal glands can be easily noticed, coriaceous, very laxly glandular-punctate beneath, glabrous, entire, 7–15.5 by (2.6–)3–6 cm, manifestly 5–7-plinerved, with a few shorter, less steeply ascending nerves coming from the upper part of the midrib, the latter slightly sunken above, rather thick-prominent beneath, nerves anastomosing, slightly raised on both sides, reticulation lax above, more dense and more conspicuously raised beneath; petiole 3–6(–8) by *c.* 1.5 mm. *Racemes* both from the upper and lower foliate axils, laxly 15–25-flowered, suberect or spreading; perulae ovate-acuminate, 2–4 mm, ± caducous; rachis angular, rather stoutish, glabrous except some sparse muriculate glands, 4–8(–11) cm. Pedicels stoutish, glabrous, 7–10(–14) mm. *Calyx* tube broadly cup-shaped, subdensely very shortly muriculate, *c.* 1 mm, limb spreading or finally reflexed, *c.* 1.5 mm, deeply 5-lobed, lobes deltoid, bluntish, glabrous dorsally, ciliolate, whether or not provided with an apical gland. *Corolla* shortly and broadly urceolate or subcampanulate, conspicuously contracted at the middle or somewhat below, glabrous at both sides, thin-fleshy, light green to white, 5–7 mm long, 3–4 mm ø below, 4–6(–8) mm ø distally, lobes triangular, obtuse, revolute, *c.* 1.6 mm. *Filaments* linear, wavy, densely long-hairy in the lower, less so in the upper part, *c.* 2 mm; anther-cells oblong, echinulate, 1.5 mm, with 2 dorsal spurs (1–1.5 mm); tubules cylindric, divergent, nearly as wide as the cells below, ± transversely cut and flaring distally, 2–2.2 mm, each bearing 2 or 3 short thickly gland-tipped hairs or stalked glands. *Disk* glabrous. *Style* slenderly columnar, glabrous, 5–6 mm. Immature *fruit* subglobose, *c.* 5 mm ø, crowned by the prominent disk; pedicel *c.* 2.5 cm.

Distr. *Malesia*: New Guinea (Rouffaer R. at 175–250 m; Hunstein Ra. in Sepik Distr. and Torricelli Mts at 850–1370 m), in dense thin-stemmed, partly marshy forest. *Fl.* Aug.–Sept.

Vern. *Sele*, Wapi.

127. Vaccinium convallariiflorum J. J. S. Nova Guinea 18 (1936) 116, t. 20, f. 2; SLEUM. Bot. Jahrb. 72 (1942) 264; Blumea 11 (1961) 71.

Large scrambling epiphytic shrub, 1.5 m or more. Branchlets angular, tips puberulous, early glabrescent and greyish corticate below, laxly to subdensely leaved. *Leaves* ovate to oblong-ovate, apex subcaudate-acuminate for *c.* 2 cm, subacute, base broadly attenuate or mostly ± rounded, the pair of marginal glands minute, found in some distance from the petiole, coriaceous, laxly set with fine, appressed, dark glandular muriculate hairs beneath, otherwise glabrous, entire, 5–8 by (1.5–)1.8–3 cm, midrib slightly sunken above, obtusely prominent beneath, nerves 2 basal, high curved-ascending, and several shorter pairs from upper part of the midrib, all anastomosing and slightly raised on both faces, reticulation rather obscure above, mostly ± dense and finely raised beneath; petiole 4–7 by 1 mm. *Racemes* from the upper axils, ± recurved and secund, laxly 8–12(–15)-flowered; rachis slender, laxly short-pubescent and sparsely glandular-muriculate, as are the pedicels, (1–)1.5–2.5(–3.5) cm, bract subulate, 3–4 mm, persistent for a while, but hardly through the flowering time. Pedicels slender, 1–1.5 cm. *Calyx* tube cup-shaped, subdensely very shortly glandular-muriculate, *c.* 1.5 mm, limb spreading or finally reflexed, 1.5 mm, 5-lobed to almost the base, lobes ovate-acuminate, apiculate, ciliolate, no apical gland. *Corolla* shortly and broadly campanulate-urceolate, constricted in the lower third initially, thin-fleshy, greenish whitish, glabrous at both sides, 7–8 by 6–8 mm (at the limb), lobes obtuse, reflexed, 1.5–2 mm. *Filaments* broadly linear, densely patently hairy or even lanate below, less so upwards, *c.* 2 mm; anther-cells oblong, echinulate, 1.5 mm, with 2 dorsal ± spreading spurs (1.5 mm); tubules narrow-cylindric, a little dilated distally, *c.* 2 mm, subobliquely cut apically, each provided with 2 or 3 stalked glands or thick gland-capitellate hairs in their lower half. *Disk* prominent, glabrous. *Style* thick-filiform, glabrous or with some sparse hairs below.

Distr. *Malesia*: New Guinea (Doormantop and near Bernhard Camp, Idenburg R.).

Ecol. In mossy forest, 1800–2150 m. *Fl.* Nov., Febr.

128. Vaccinium appendiculatum SCHLTR, Bot. Jahrb. 55 (1918) 180, f. 12; SLEUM. *ibid.* 72 (1942) 263; Blumea 11 (1961) 68.

Branched high climber, stem (root?) as thick as an arm. Branchlets rather densely leaved, minutely puberulous in the young parts. *Leaves* oblong-elliptic or -ovate, apex subacutely acuminate, base cordate, subcoriaceous, glabrous, entire, margin somewhat recurved, 7–12 by 3.5–5.5 cm, *c.* 9-plinerved, with several shorter upper nerves from the midrib, all nerves anastomosing; petiole 3–4 by 2 mm. *Racemes* subdensely many-flowered, glabrous; rachis rather slender, 6–10 cm. Pedicels slender, *c.* 1.3 cm. *Calyx* patelliform, tube *c.* 2 mm, limb spreading, 5-lobed to almost the base, lobes triangular to semiorbicular, obtusely acuminate, 1 mm. *Corolla* urceolate, distinctly constricted in

the middle, glabrous at both sides, *c.* 7.5 by 4–5 mm, 5-lobed to the upper third, lobes ovate, erect, subacute. *Filaments* subulate, long patent-hairy, *c.* 1.5 mm; anther-cells oblong, *c.* 2 mm, with 2 distinct dorsal spurs (*c.* 1 mm) distally; tubules cylindric, narrow, slightly widened upwards, provided with several hair-like gland-tipped appendices in the lower half, which are also found on the spurs; pore round. *Disk* glabrous. *Style* columnar, swollen in the upper half, glabrous, *c.* 5 mm.

Distr. *Malesia*: New Guinea (West Ra. in Sepik Distr.), in mountain forest at 1400–1500 m. Once found. *Fl.* Aug.

Note. The description given above is based exclusively on the original description and figure, the herbarium material having been lost completely.

129. Vaccinium otophyllum SLEUM. Bot. Jahrb. 72 (1942) 263; Blumea 11 (1961) 68.

Shrub 1–1.5 m. Branchlets shortly soft-tomentose at the youngest parts. *Leaves* densely subimbricately arranged, ovate, apex acuminate, subacute, base deeply cordate and auriculate, lobes 1–1.5 cm ø, amplexicaul and imbricate, subsessile, firmly subcoriaceous, rather densely soft-tomentose at the much raised midrib and the lower part of the nerves beneath and on the petiole, glabrous elsewhere besides some glandular points beneath, a little shining especially beneath, entire, 6–8 by 3.5–4.5 cm, nerves 4–5(–6) pairs, the lowest ones from the base, all anastomosing, slightly raised above, more distinctly so beneath as is the dense reticulation; petiole 1–2 by 1.5–2 mm. *Racemes* from the upper axils, (4–)5–12-flowered; rachis stoutish, densely patently short-pubescent, (1–)2–4 cm. Pedicels rather robust, pubescent, 1–1.3(–1.5) cm, bract minute and early caducous; bracteoles 2, subulate, inserted in the lower third, *c.* 2 mm, caducous. *Calyx* broadly campanulate, pubescent at the base, laxly glandular-muriculate or glabrous elsewhere, tube obconical, hardly 1.5 mm, limb spreading, 5-lobed to nearly the base, lobes broadly ovoid-deltoid, acute, 1.5 mm, ciliate, the apical gland subinconspicuous. *Corolla* depressedly subglobose-urceolate, a little constricted in the middle, rather fleshy, glabrous at both sides, green, 5–6 by 6–7 mm, lobes *c.* 1 mm. *Filaments* linear, long-hairy above the glabrous very base, 1.6 mm; anther-cells oblong, granular, *c.* 2 mm, with 2 dorsal, upwards curved papillate spurs (1.6) mm, which are provided with a few gland-tipped hairs (*c.* 1 mm) such as are found also at the base of the tubules, the latter narrow-cylindric, slightly curved, *c.* 2.2 mm, the pore terminal, almost round, flaring. *Disk* thick-annular, glabrous. *Style* columnar, glabrous, 6 mm.

Distr. *Malesia*: New Guinea (Habbema Lake in Oranje Mts). One collection.

Ecol. In open, very heavily mossed forest of crests, common, at 2860 m. *Fl.* Oct.

130. Vaccinium cordifolium STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 189, t. 15, f. D 7–11; GIBBS, J. Linn. Soc. Bot. 42 (1914) 101; MERR. En. Born. (1921) 466; SLEUM. Blumea 11 (1961) 68.

Shrub, 1–2(–3) m, consisting of a few straggling branches or woody stems. Branchlets densely patently greyish or yellowish-brownish tomentose in the younger, glabrescent and grey-corticate in the older parts; young shoots red-tinged. *Leaves* crowded, dense and subimbricate at the tips of the branchlets, ovate, subsessile, apex bluntly attenuate, base deeply cordate, rather slightly or not amplexicaul, coriaceous, dark green and somewhat glossy above, paler and reddish green beneath at maturity, patently short-pubescent on both faces initially, early glabrescent except the basal part of the lamina and the midrib beneath, finally quite glabrous, 2.4–4.5 by 1.5–3(–4) cm, flat, entire, midrib rather flat above, prominent beneath, nerves 6–7(–8) pairs, the lowest 2–3 from the base, upper ones from the midrib, curved-ascending towards the edge, rather indistinctly anastomosing, slightly raised above, more conspicuously so beneath, reticulation dense, finely prominent especially beneath; petiole 2–3 by 1.5–2 mm, pubescent for a long time. Stipule-like perulae in the sterile upper axils subulate, 3–4 mm, subpersistent. *Racemes* from the uppermost axils or subterminal, solitary or rarely in pairs, laxly 5–10 (–12)-flowered, flowers nodding to one side; rachis 2–5(–6) cm and pedicels (0.8–1.3 cm) rather slender, both densely white soft-pubescent; bracts ovate, foliaceous, up to 8 by 2 mm, very early caducous; bracteoles not seen. *Calyx* reddish or purplish, tube widely campanulate, tomentulose, 1–1.5 mm, limb erecto-patent, 5-lobed to nearly the base, lobes ovate-acuminate, with salient subparallel dorsal nerves, laxly pubescent and ciliate, *c.* 3 by 2 mm, no proper apical gland. *Corolla* oval in bud, tubular-urceolate when fully expanded, thin-fleshy, a delicate pink, varying to white, with creamy tips, glabrous at both sides, (10–)12–15 by 5–6 mm, lobes ovate, obtuse, reflexed, 1.5 mm. *Stamens* 10, subequal, not rarely incompletely developed (♀ flowers?); filaments linear-subulate, slightly dilated above the base, densely long hairy except the very base, 6–7 mm; cells oblong, *c.* 2 mm, with 2 very short dorsal spurs; tubules cylindric, much narrower than the cells, *c.* 1.5 mm, divergent, laxly set with short gland-tipped hairs, the pore nearly round, ± flaring. *Disk* densely clothed with longish erect hairs. *Style* red, columnar, densely subappressedly hairy in the lower ⅔, 1–1.1 cm. *Fruit* a globose berry, 6–8 mm ø, white or greenish red, crowned by the slightly accrescent calyx lobes.

Distr. *Malesia*: Borneo (Mt Kinabalu).

Ecol. In dwarf scrub forest or open ridge jungle, (1525–)2400–2900 m, on granite and serpentine, common. *Fl.* Jan.–Dec.

131. Vaccinium cercidifolium J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 463; SLEUM. Blumea 11 (1961) 68.

Shrub, terrestrial or thick-stemmed woody climber. Branchlets angular, patently short-pubescent, rather stoutish, laxly to subdensely

leaved. *Leaves* orbicular- or elliptic- or ovate-cordulate, apex blunt to almost rounded, base distinctly though slightly cordate, basal lobes not amplectant, the pair of marginal impressed glands at a short distance from the petiole and rather conspicuous, subsessile, coriaceous, somewhat succulent, flat or but slightly revolute, initially puberulous on both faces, early glabrescent except the base of the lamina beneath, laxly muriculate or punctate beneath, entire, (3–)3.5–6 (–7) by 2.5–4(–5) cm, midrib rather flat above, prominent beneath, 7–9-plinerved, with a few additional short pinnate upper nerves, all curved-ascending, slightly raised above, more distinctly so beneath, reticulation rather coarse, more dense beneath, ± prominent on both sides; petiole 1–2(–3) by *c.* 2 mm. *Racemes* from the upper axils, patent, equally laxly many-flowered, glabrous in all outer parts, flowers ± nodding to one side; rachis angular, stout, 4.5–7(–9) cm. Pedicels reddish, stoutish, curved, 0.5–1(–1.5) cm; bracts and bracteoles not seen. *Calyx* cup-shaped, tube 2 mm, limb somewhat spreading, 5-lobed to nearly the base, lobes ovate, obtuse, 1–1.5 mm, the distal part ± swollen, bearing no proper apical gland nor marginal glands. *Corolla* oblong-urceolate, contracted distally, fleshy, blood red or creamy white, glabrous outside, puberulous at the base inside, 10–12 by 3–4 mm, lobes obtuse, recurved, 1 mm. *Filaments* linear-subulate, wavy, hairy, 3.5–5 mm; anther-cells broad-oblong, echinulate, *c.* 1 mm, with 2 dorsal spurs (0.3 mm); tubules cylindric, divergent and forming an almost right angle with the cells, with a few gland-tipped hairs, 0.4–0.5 mm, pore round. *Disk* annular, laxly pubescent. *Style* stoutish, densely appressed-hairy to the lower ¾, glabrous for the rest, 9 mm.

Distr. *Malesia*: Borneo (Central Borneo: Mt Batu Tiban, with blood red corollas; Sarawak: Mt Dulit, with creamy white, translucent corollas).

Ecol. In open or shady moss forest, or exposed peak, 1300–1700 m. Fl. Sept.–Dec.

132. Vaccinium korthalsii MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 40; STEEN. Bull. Jard. Bot. Btgz III, 17 (1948) 388; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 4; SLEUM. Blumea 11 (1961) 68. — *Arbutus coriacea* BL. Cat. (1823) 67, *cf.* Flora 8 (1825) 140. — *Thibaudia coriacea* (BL.) BL. Bijdr. (1826) 860; HASSK. Cat. Hort. Bog. (1844) 161. — *Agapetes coriacea* (BL.) G. DON, Gen. Syst. 3 (1834) 863; DUNAL, in DC. Prod. 7 (1839) 555; MOR. Syst. Verz. (1846) 42; HASSK. Pl. Jav. Rar. (1848) 471, *sub Agapetes floribunda*. — *Epigynium coriaceum* (BL.) KL. Linnaea 24 (1852) 52. — *V. coriaceum* (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1062; BL. Fl. Jav. Pl. inéd. (1863–83) t. 23; KOORD. Exk. Fl. Java 3 (1912) 19; KOORD.–SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 108; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 10; J. J. S. in K. & V. Bijdr. 13 (1914) 142; SP. MOORE, J. Bot. 63 (1925) Suppl. 57, *non* HOOK. *f.* 1852.

Shrub, mostly epiphytic, all over glabrous except the filaments. Branchlets pendent, stout, striate, shining. *Leaves* lax, lanceolate, sometimes oblong or ovate-lanceolate, rarely elliptic, apex long (sometimes subulate-)caudate-acuminate, the tip subacute, base cuneate to broadly attenuate, with a pair of small, dark, subimpressed marginal glands at some distance from the petiole, coriaceous, fleshy when fresh, often perpendicular, reddish and glabrous when young, dark green at maturity, purplish tinged before falling off, minutely punctulate beneath, entire, margin ± revolute, 6–10(–12) by 2–3.5(–6.5) cm, 5-plinerved, basal nerves steeply ascending and anastomosing with 3 or 4 pairs of shorter similar nerves from the upper part of the midrib, midrib and nerves slightly though distinctly raised above, mostly much less so beneath, reticulation lax, ± inconspicuous; petiole reddish, grooved above, 6–15 by 1–1.5 mm. *Racemes* from the upper axils, spreading, shortly peduncled, laxly 6–8-flowered, flowers secund; rachis angular, red, 4–7(–8, sometimes –10) cm. Pedicels stoutish, red, 1–2 cm, bract and bracteoles very early caducous. *Calyx* tube subsemiglobose or obconical, 2–3(–4) mm long, 5–6 mm ø at the base of limb and somewhat contracted there, limb spreading, 2(–3) mm high, shallowly 5-lobed, lobes depressed-ovate, distinctly apiculate by a rather small gland, 1–1.5 mm. *Corolla* subglobose-conical or conical-cylindric, or ventricose-urceolate, fleshy, white or rose, with a scent of vanilla, *c.* 12 by 5–6 mm, lobes obtuse, reflexed, *c.* 1 mm (ciliate in the Sumatran specimens!). *Filaments* subulate, densely hairy below, less so upwards, *c.* 3 mm; anther-cells oblong, 1.5 mm, dorsal spurs minute or practically absent; tubules erect, cylindric, much narrower than the cells, *c.* 2.5 mm, ± transversely cut apically, the posticous wall of each tubule sometimes extended into 1 or 2 minute, ± reflexed teeth, laxly provided with clavate glands or gland-tipped hairs or appendices. *Disk* glabrous. *Style* thick, glabrous, *c.* 1 cm. *Berry* subglobose, 1–1.3 cm ø when fresh, fleshy, yellow or orange or greenish yellow with red face initially, finally purplish-blackish, shining, crowned by the large cup-shaped calyx-limb; pedicel 2–2.5 cm. *Seeds* ovoid, often curved, *c.* 2.5 mm.

Distr. *Malesia*: Sumatra, West Java, Bali.

Ecol. Epiphytic in mixed or depleted rain-forest or high slope forest, sometimes terrestrial on rocks, forest borders, cold solfataras, 600–1500(–2000) m. *Fl.* March–July, *fr.* April–Nov.

Vern. *Kilagiday, tjantigi*, S.

133. Vaccinium tentaculatum J. J. S. in Fedde, Rep. 30 (1932) 175; SLEUM. Blumea 11 (1961) 69.

Shrub, glabrous in all outer parts. Branchlets slender. *Leaves* lax, ovate to elliptic-ovate, apex long caudate-acuminate, the very tip bluntish, base shortly acuminate into the petiole, the basal marginal glands obsolete, subcoriaceous, shining, entire, flat, 4.2–7 by 1.7–2.6 cm, 5-plinerved, midrib and nerves faintly raised above, more distinctly so beneath, reticulation dense, slightly prominent beneath only; petiole 6–8 by 1 mm. *Racemes* laxly several-flowered; rachis slender, *c.* 3.5 cm. Pedicels slender, *c.* 2 cm, sometimes sub-

tended by a persistent foliaceous lanceolate bract 1.5 cm long; bracteoles not seen. *Calyx* patellar, low, tube *c.* 2 mm, limb much spreading, *c.* 1.5 mm, shallowly 5-lobed, lobes broadly ovate-triangular, apiculate by a small obtuse gland. *Corolla* urceolate, rather fleshy, white with light red at the base, glabrous outside, laxly hairy inside, *c.* 8 by 3 mm, lobes obtuse, recurved, *c.* 1.5 mm. *Filaments* linear-subulate, villous by longish patent hairs below, less densely so distally, *c.* 1.5 mm; anther-cells oblong, *c.* 0.8 mm, no dorsal spurs; tubules slightly narrower than the cells, cylindric, erect, ± divergent, with several gland-tipped hairs in the lower part, apex truncate, the pore a little flaring and provided with several minute teeth-like appendices. *Disk* prominent, glabrous. *Style* glabrous, 6 mm.

Distr. *Malesia*: Moluccas: Central Ceram, 1100 m. One collection.

134. Vaccinium muriculatum J. J. S. Nova Guinea 12 (1914) 161, *incl. var. albidum* J. J. S. *l.c.*; SLEUM. Bot. Jahrb. 72 (1942) 259; Blumea 11 (1961) 69; *ibid.* 12 (1963) 128.

Shrub to branched small tree, 1–5 m. Branchlets quite glabrous, shining. *Leaves* scattered, oblong to lanceolate-ovate, apex rather shortly or mostly longer subcaudate-acuminate, ± curved, tip bluntish, base cuneate to broadly attenuate, rarely almost rounded, the pair of small, marginal glands impressed at end of petiole, coriaceous, glabrous, pale brownish-red when very young, dark green at full maturity, lustrous on both faces, entire, ± flat, (4–)5–8(–10) by (1.2–)1.5–2.5(–3.5) cm, midrib slightly grooved above, obtusely raised beneath, main nerves in 3(–4) basal and a little suprabasal pairs, steeply ascending, slightly curved and anastomosing, other shorter, more spreading nerves from the upper part of the midrib, all faintly raised or subinconspicuous above, slightly but distinctly prominent beneath as is the rather dense and fine reticulation; petiole 2–5 by 1 mm. *Racemes* from the upper 2–4 axils, suberect or spreading, laxly many-flowered; rachis angular, slender, glabrous, 3–6.5 cm; perulae ovate, thin, 3 mm, early caducous. Pedicels slender, glabrous or with some sparse muriculate glands, 3–6 mm; bracts and bracteoles apparently very early caducous. *Calyx* tube subcampanulate or almost obconical, ± densely covered with muriculate brownish glands, *c.* 1 mm, limb spreading, 5-lobed nearly to the base, lobes ovate, obtuse or apiculate by a small distinct gland, ciliate, 1 mm. *Corolla* urceolate, contracted distally, dirty pale rose or white or greenish white, rather thin, glabrous on both sides, 6–7 by 2.5–3.5 mm, lobes subtriangular, obtuse, recurved, *c.* 1 mm. *Filaments* almost linear, densely hairy especially in the lower part, 2–2.5 mm; anther-cells oblong, *c.* 1 mm; tubules cylindric, nearly as wide as the cells, suberect, 0.5 mm, obliquely cut apically, the back wall of each tubule extending into 1 or 2 small teeth, provided with a few short gland-tipped hairs or stalked glands in upper part. *Disk* glabrous. *Style* rather slender, glabrous, (5–)6–7 mm. *Fruit* depressed-globose, *c.* 6 mm ø.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: Tamrau, Nettoti and Arfak Mts).

Ecol. Epiphytic or terrestrial in forest and forest edge, 1800–2250 m. *Fl. fr.* Jan.–Dec.

135. Vaccinium elegans ELM. Leafl. Philip. Bot. 3 (1911) 1093; MERR. En. Philip. 3 (1923) 249; COPEL. *f.* Philip. J. Sc. 42 (1930) 569, t. 4, f. 1–2; SLEUM. Blumea 11 (1961) 69.

Small tree, 4–10 m, stem 7–30 cm ø. Bark dark brown, coarsely shredded longitudinally. Branchlets slender, glabrous, laxly leaved. *Leaves* lanceolate or oblong, more rarely elliptic-lanceolate, gradually tapering into an acuminate or caudate apex, the very tip bluntish, base cuneate to attenuate, with 1 or 2 pairs of minute impressed marginal glands at some distance from the petiole, entire, sparsely glandular-punctate beneath, glabrous, mature ones shining and deep-green above, much paler green beneath, young ones reddish and pendulous, 3–5.5 by 1.5–2 cm, midrib a little depressed above, prominent beneath, nerves in 1–2 basal and 4–5 upper, more pinnately spreading nerves, all anastomosing, faintly raised above, more distinctly so beneath, reticulation fine and dense, conspicuously prominent on both faces or mostly beneath only; petiole grooved above, 2–3 by *c.* 1 mm. *Racemes* from the upper 4–6 axils, suberect or somewhat recurved, laxly 8–15-flowered; rachis very slender, glabrous, 3–5 cm, eperulate in flowering time. Pedicels slender, usually recurved, glabrous or very sparsely glandular-hairy, 4–7 mm; bracts and bracteoles not seen. *Calyx* tube broadly cup-shaped, glabrous, 1 mm, limb spreading, 1 mm, lobes broad-ovate, blunt, ciliate, 1 mm, with a callous apical gland. *Corolla* broadly cylindrical-urceolate, glabrous outside, laxly hairy in the lower half inside, whitish, thin, faintly honey scented, 5–6 by *c.* 2.5 mm, lobes obtuse, recurved, 1 mm. *Stamens* 8–12, mostly 10; filaments linear, broadened towards the base, densely hairy, 2.5 mm; cells oblong-ovoid, 0.5 mm, with 2 short or very short dorsal spurs; tubules nearly as wide as the cells, cylindric, 0.3 mm, with a few subsessile or shortly stalked glands or gland-tipped hairs (which may occur also on the cells), transversely cut apically, the pore round, a little flaring. *Disk* laxly pubescent. *Style* columnar, glabrous, finally somewhat exserted. Immature *fruit* subglobose, green, *c.* 3 mm ø, crowned by the pubescent disk.

Distr. *Malesia*: Philippines (Mindanao: Mt Apo, Mt Katanglad), twice found.

Ecol. On ridges in the mossy forest, 1980–2370 m. *Fl.* April, Sept.

Vern. *Mandalágong*, Bag.

136. Vaccinium goodenoughii SLEUM. Blumea 11 (1961) 69.

High climbing large liana, branches subpendent. Branchlets obtusangular and papillose-puberulous in the youngest, early glabrescent and corticate in the older parts. *Leaves* scattered, lanceolate or oblong-elliptic, apex subcaudate-acuminate for

1–1.5 cm, the very tip bluntish, base ± broadly attenuate into the petiole, basal pair of marginal glands small and found near the petiole, subcoriaceous, rather firm, glabrous, somewhat lustrous beneath, entire, flat or minutely revolute at the very edge, (4–)4.5–6.5 by (1.5–)2–3 cm, midrib narrowly sunken above, prominent beneath, nerves in 2 basal or slightly suprabasal, high curved-ascendent, and 1–2 upper shorter pairs, all anastomosing and equally raised on both faces, reticulation dense, slightly prominent above, often more distinctly so beneath; petiole rather slender, flattened, grooved above, 3–4 by by *c.* 1 mm, initially puberulous. *Racemes* from the upper 2 or 3(–5) axils, suberect or more spreading, rather laxly 8–15-flowered, eperulate in anthesis; rachis angular, slender, quite glabrous, 2.5–4(–5) cm. Pedicels rather slender, glabrous, 4–6 mm; bract generally caducous in anthesis, oblong, membranous, 6–8 by 2–3 mm; bracteoles not seen. *Calyx* tube broadly cup-shaped, base rounded, glabrous, shining, 1 mm, limb very low, hardly properly lobed, or wavy, ciliate, with 5 rather thick glands instead of the lobes. *Corolla* tubular-urceolate, gradually narrowed towards the apex, white, membranous, glabrous on both sides, 5–6 mm long, below 3 mm, distally 2 mm ø, lobes reflexed, hardly 1 mm. *Filaments* subulate, hairy, *c.* 2 mm; anther-cells broadly subovate-oblong, 0.8 mm; tubules cylindric, tube 0.2–0.3 mm, with a few short glandular hairs or here and there with a subsessile gland, obliquely cut apically, back wall of each tubule extended into an erect beak, 0.3–0.4 mm. *Disk* thick, glabrous. *Style* columnar, glabrous, 4–5 mm.

Distr. *Malesia*: NE. New Guinea (Goodenough I.), once found in ridge forest, 1600 m. *Fl.* Oct.

137. Vaccinium hellwigianum SLEUM. Bot. Jahrb. 72 (1942) 260; Blumea 11 (1961) 70. — *V. acutissimum* (*non* F. v. M.) WARB. Bot. Jahrb. 16 (1892) 15; K. SCH. & LAUT. Fl. Schutzgeb. (1900) 488; SCHLTR, Bot. Jahrb. 55 (1918) 182.

Small shrub or treelet, sometimes epiphytic. Branchlets divaricate, rather slender, striate and glabrous, early greyish corticate. *Leaves* lax, ovate-lanceolate to ovate-oblong, apex long and rather gradually caudate-acuminate, tip subacute or bluntish, base broadly attenuate to almost rounded, provided on each side with one marginal small gland at the very base and another one 1–3 mm higher, subcoriaceous, glabrous, entire, edge slightly revolute, 4–5.5 by 1.2–1.8(–2) cm, midrib slightly or not immersed above, always a little raised beneath, nerves in 2–3 basal and slightly suprabasal, high curved-ascendent pairs, another 2 or 3 shorter, more pinnate, spreading ones from the upper part of the midrib, all anastomosing, mostly rather obscure above, generally slightly raised beneath, reticulation rather fine and dense, only prominent beneath; petiole *c.* 3 by 0.7 mm. *Racemes* from several upper axils, ± spreading, 8–12-flowered; rachis slender, glabrous, 2.5–3 cm, eperulate at anthesis. Pedicels rather slender, 4–6 mm; bracts and bracteoles not seen. *Calyx* tube subcampanulate, base often ± truncate, rugulose, shining, glabrous, 1–1.5 mm, limb 0.5(–0.7) mm, 5-lobed almost to the base, lobes broadly ovate-deltoid, erect, apex roundish obtuse, whether or not ciliolate, apical gland distinct. *Corolla* subcylindric, gradually narrowed upwards, fleshy, glabrous, 6–7 by 1.5–2 mm, pink to red, lobes obtuse, very short. *Filaments* linear-subulate, hairy, 2 mm; anther-cells oblong, 0.7 mm, no spurs; tubules in all ± as long as but much narrower than the cells, cylindric, divergent, obliquely cut apically, pore elliptic, back wall of each tubule protracted into a kind of hollow, obtuse beak, which equals the proper tube of the tubule in length and bears a few stalked or subsessile glands. *Disk* glabrous. *Style* slenderly columnar, glabrous, *c.* 5.5 mm, not exserted. *Fruit* depressed-globose, 5–6 mm ø at full maturity, blackish-purplish, crowned by the annular disk and the very short tooth-like and appressed calyx lobes.

Distr. *Malesia*: East New Guinea (Finisterre Mts and Mt Saruwaged-Sattelberg area).

Ecol. In forest, 1400–2300 m. *Fl.* Febr., Oct.

138. Vaccinium psammogenes SLEUM. Bot. Jahrb. 72 (1942) 260; Blumea 11 (1961) 70.

Scandent shrub or canopy liana, bark reported to be fibrous. Branchlets slender, dark reddish when dry, glabrous, striate lengthwise. *Leaves* lax, elliptic or subovate-elliptic, apex shortly subabruptly and subacutely or obtusely acuminate for 1–1.5 cm, base generally ± rounded, marginal gland on each side very close to the petiole and not much conspicuous, subcoriaceous or thin-coriaceous, glabrous, shining on both faces, entire, margin showing here and there a minute glandular, not impressed point, flat or subrevolute on the very edge, 4.5–6 by 2.3–3 cm, midrib faintly sunken above, obtusely prominent beneath, nerves *c.* 6 pairs, 3–4 of them from and a little from above the base, rather steeply ascending, the other ones from the upper part of the midrib, ± subparallel to the basal ones, all anastomosing and slightly raised on both faces, reticulation dense and finely raised beneath, not much perceptible above; petiole flattened, 5–6 by *c.* 1 mm. *Racemes* from the upper 4–6 axils, rather laxly 10–15-flowered; rachis slender, quite glabrous, (3–)4–5 cm, eperulate at anthesis. Pedicels very slender, glabrous, 5–6(–7) mm, bract ovate-acuminate, thin, very early caducous, bracteoles not seen. *Calyx* tube cup-shaped, base truncate, glabrous, 1 mm, limb 0.5–0.7 mm, deeply 5-lobed, lobes deltoid, subacute, ciliate, small apical gland generally distinct. *Corolla* tubular-urceolate, thin, white, 5–6 by 2 mm, glabrous or papillose outside, short-hairy in the lower part inside, lobes obtuse, reflexed, *c.* 1 mm. *Filaments* filiform, hairy especially in the lower part, *c.* 3 mm; anther-cells broad-oblong, *c.* 0.7 mm, no spurs; tubules cylindric, erect, *c.* 1 mm in all, very obliquely cut apically, pore oval, back wall of each tubule extended into a kind of tooth or beak which is ± twice as long as the proper very short tube of the

tubule, and bears a few stalked or subsessile glands. *Disk* much prominent, glabrous. *Style* slender, glabrous, 5 mm, finally a little exserted. *Fruit* globular, *c.* 5 mm ø, crowned by the very short inflexed calyx lobes and the low disk.

Distr. *Malesia*: East New Guinea (Morobe Distr.: Sattelberg region), 600–1220 m; once found at the Fly R. near the d'Albertis junction at a very low altitude.

139. Vaccinium longiporum SCHLTR, Bot. Jahrb. 55 (1918) 178, f. 11; SLEUM. *ibid.* 72 (1942) 259; Blumea 11 (1961) 70.

Erect shrub, 50–90 cm, laxly branched. Branchlets very slender, glabrous, laxly leaved. *Leaves* lanceolate, or rarely elliptic-lanceolate, apex caudate-acuminate, sometimes a little curved, tip bluntish, base broadly attenuate, with a rather conspicuous marginal gland at *c.* 1 mm from the petiole on each side, subcoriaceous, glabrous, rather glossy on both faces, entire, edge slightly recurved, 5–7 by 1.4–2 cm, 5-plinerved, nerves curved-ascending to the top of the lamina, other shorter nerves, raising more pinnately from the upper part of the midrib, much less conspicuous, all slightly prominent on both faces, reticulation dense, equally, though more finely raised on both sides; petiole slender, *c.* 3 mm. *Racemes* solitary from the upper 2 axils, laxly 5–10-flowered, flowers nodding to one side; rachis very slender, laxly set with muriculate glands or short gland-tipped, subappressed hairs, otherwise ± puberulent, 4–6 cm, eperulate. Pedicels slender, showing the indument found on the rachis, 4–7 mm. *Calyx* tube obconical or subcampanulate, glabrous, hardly 1 mm, limb spreading, 1 mm, 5-lobed to nearly the base, lobes ovate-acuminate, ciliate, whether or not provided with a small apical gland. *Corolla* elongate-urceolate, 6–7 mm long, 2.5 mm ø below, 1.5 mm ø distally, glabrous at both sides, membranous, pale pink, lobes ovate, recurved, *c.* 1 mm. *Filaments* subulate, hairy in the lower dilated half, 2 mm; anther-cells broad-oblong, 0.8 mm, no spurs; tubules gradually narrower than the cells, *c.* 0.7 mm, divergent, very obliquely cut distally, the upper ½ to ¾ of each tubule extending into a tooth-like, erect, shortly bifid end, which bears a few stalked glands and also an apical minute sessile gland, the pore elongate. *Disk* glabrous. *Style* slender, glabrous, 5.5–6 mm.

Distr. *Malesia*: East New Guinea (Finisterre Mts), once found.

Ecol. Terrestrial on rocks, epiphytic on solitary trees, on open slopes, *c.* 1100 m. *Fl.* July.

140. Vaccinium acutissimum F. v. M. Trans. R. Soc. Vict. 1, 2 (1889) 15; WRIGHT, Kew Bull. (1889) 102; SLEUM. Bot. Jahrb. 72 (1942) 259; Blumea 11 (1961) 70.

var. **acutissimum.**

Shrub or small tree, 2–4 m. Branchlets angular, striate, glabrous, early greyish corticate, subdensely leaved. *Leaves* ovate to oblong- or lanceolate-ovate, apex subabruptly subcaudate-acuminate, bluntish by a minute apical gland, base very broadly attenuate or mostly rounded, the pair of basal marginal glands thickish, impressed, found rather near the petiole, coriaceous, stiff, bright and pale red when young, laxly glandular-muriculate beneath, otherwise glabrous, 2.3–3 by 1–1.7 cm, entire, edge mostly much revolute in the lower part, midrib strongly impressed above, prominent beneath, nerves 2 basal or somewhat suprabasal, high curved-ascending pairs, and several shorter, ± pinnate upper pairs, all nerves obscure above, faintly raised beneath as is the rather lax reticulation; petiole (2–)3–4(–5) by 1–1.5 mm. *Racemes* from the upper 2 or 3 axils, close together, suberect, laxly 5–8-flowered, glabrous; rachis angular, stoutish, (2–)3–4 cm, with several ovate-acuminate stiff small perulae. Pedicels curved, rather slender, but firm, 6–10 mm. *Calyx* often shining, tube almost hemispheric, base subtruncate, 1–1.5 mm, limb 5(–6)-lobed nearly to the base, erecto-patent, lobes ovate-triangular, obtuse, ciliolate, thick apical gland well visible, *c.* 1.5 mm, inflexed after anthesis. *Corolla* urceolate, fleshy, glabrous outside, laxly hairy below inside, deep red, paler inside, 5–6 by *c.* 2.5 mm, lobes obtuse, 1–1.5 mm. *Filaments* linear, dilated towards the base, subdensely hairy below, glabrescent upwards, 1.5 mm; anther-cells oblong, 1–1.3 mm, no spurs; tubules cylindric, a little narrower than the cells, 0.5–0.7 mm, obliquely cut apically, back wall extending into 1 or 2 ± short, ± reflexed teeth and set with a few stalked glands or gland-tipped short hairs, which are sometimes also found on the cells. *Disk* glabrous. *Style* slender, glabrous, finally much exserted.

Distr. *Malesia*: East New Guinea (SE. part of the Main Range: Mts Musgrave, Albert Edward and Scratchley).

Ecol. In forest, on slopes, 2800–3960 m. *Fl.* May–July.

var. **pilosistylum** SLEUM. Blumea 11 (1961) 70.

A bushy shrub, *c.* 1 m high, with red flowers. *Disk* hairy and *style* laxly so up to almost the middle, otherwise hardly different from *var. acutissimum*. Similar in habit to *V. cruentum* which, however, has a glabrous disk and style, and no subsessile glands or gland-tipped short hairs at the tubules.

Distr. *Malesia*: East New Guinea (Mt Otto), once in alpine grassland on the summit, 3540 m. *Fl.* Aug.

141. Vaccinium carneolum SLEUM. Bot. Jahrb. 72 (1942) 262; Blumea 11 (1961) 70.

var. **carneolum.**

Small tree or shrub, terrestrial and sometimes scandent, or epiphytic, up to 5 m. Branchlets glabrous, obtusangular and longitudinally striate in the youngest, subterete in the older parts. *Leaves* lax, lanceolate to lanceolate-ovate, apex ± long (1.5–3 cm) caudate-acuminate, the tip bluntish or subacute, base cuneate to rather broadly attenuate into the petiole, lower pair of basal glands at or very near the apex of the petiole,

upper one 5–8 mm higher, ± coriaceous, firm, glabrous, shining especially above, entire, flat or but slightly revolute at the very edge, (4.5–)5–9 (–10) by (1.5–)2–3(–3.5, rarely –4) cm, midrib a little prominent or impressed above, obtusely raised in the lower part, ± evanescent upwards beneath, 5–7(–9)-plinerved, with a few upper and shorter nerves from the midrib, all anastomosing and somewhat raised on both faces, or sometimes subobscure above, reticulation fine and dense, raised on both sides or certainly so beneath; petiole 5–7(–8) by *c.* 1 mm. *Racemes* from the upper 3–5 axils, suberect or spreading, laxly (8–)10–15(–18)-flowered; rachis angular, glabrous or minutely puberulent as are the pedicels, rather slender, (3.5–)5–7(–8) cm, eperulate at anthesis. Pedicels rather slender and curved, 6–8(–11) mm, bracteoles not seen. *Calyx* tube broadly campanulate, base ± truncate, glabrous or minutely puberulous, sometimes with sparse muriculate glands especially at the base, *c.* 1 mm, limb ± patent, 5-lobed almost to the base, lobes ovate, apex rounded, sometimes subretuse, apical gland conspicuous, ± glabrous dorsally, ciliolate, 1.5–2 mm. *Corolla* elongate, narrowly subabruptly attenuate for 2–3 mm distally, rather fleshy, glabrous or practically so outside, laxly hairy in the lower part inside, 7–8(–9) by 2.5 mm, white or greenish white, or mostly pink or rose red, lobes obtuse, reflexed, *c.* 1 mm. *Filaments* linear-subulate, densely hairy, 2.5–3 mm; anther-cells broad-oblong, 0.8(–1) mm, no dorsal spurs; tubules broad-cylindrical, ± as wide as the cells, 0.5 mm, at a distinct angle with the cells, with some sparse short gland-tipped hairs or subsessile glands, obliquely cut apically, back wall of each tubule extending into a short simple or bifid tooth or bristle, which is spreading or reflexed and bears an apical gland. *Disk* glabrous or very laxly pubescent. *Style* slenderly columnar, glabrous, 1–2 mm exserted at full anthesis. *Fruit* globular, *c.* 6 mm ø.

Distr. *Malesia*: East New Guinea (Morobe, Central and Milne Bay Distr.).

Ecol. In mountain forest or on forest edges, 915–2895 m, also in ravines and as secondary growth on old garden clearings, locally abundant. *Fl.* Jan.–Dec.

Vern. *Kez*, Ueli: Movoi.

Uses. Timber hard, used as fence stakes and as a piece of wood upon which to beat out bark cloth pubic girdles (Kunimaipa valley).

var. **nesophilum** SLEUM. Blumea 11 (1961) 70.

Leaves slightly smaller than in *var. carneolum*, 4–6.5 by 1.5–2.5 cm, sub-5-plinerved, nerves more spreading. *Corolla* subventricose-urceolate, slightly and gradually narrowed upwards, 7–8 by *c.* 3 mm.

Distr. *Malesia*: SE. New Guinea (Louisiade Arch.: Misima I., Mt Sisa), in rain-forest, 350 m.

142. Vaccinium albicans SLEUM. Bot. Jahrb. 72 (1942) 261; Blumea 11 (1961) 71; *ibid.* 12 (1963) 129.

KEY TO THE VARIETIES

1. Corolla (8–)9–10(–11) mm. Calyx and pedicel glabrous. . . . . **1. *var.* albicans**
1. Corolla up to 7 mm.
2. Calyx and pedicels glabrous **2. *var.* pseudopsammogenes**
2. Calyx and pedicels laxly short-pubescent **3. *var.* pubens**

1. *var.* albicans.

Dense shrub or bushy treelet, up to 12 m. Branchlets slender, angular, striate, shining, glabrous, sometimes pendent, laxly or subdensely leaved. *Leaves* ovate-elliptic to ovate-lanceolate, sometimes lanceolate-oblong, apex subabruptly shorter or longer subcaudate-acuminate, tip bluntish, base gradually narrowed into the petiole, with a pair of distinct, marginal, impressed glands at the very base, and few to rather many less conspicuous, though markedly impressed glands along the thus subentire or remotely subcrenulate margin, coriaceous to subcoriaceous, glabrous and ± lustrous, edge a little or not revolute, (5–)6–9 (–10) by (2–)2.5–3.5(–4.5) cm, midrib rather flat above, obtusely prominent beneath, nerves 2(–3) basal and 2–3 suprabasal or upper pairs (the latter from up to the middle of the midrib), all steeply curved-ascending and subparallel, anastomosing, slightly raised at both faces, reticulation subdense, faintly visible above, more conspicuous beneath; petiole flattened, 5–7(–8) by *c.* 1 mm. *Racemes* from the upper 3–5 axils, suberect, generally laxly many-flowered; rachis angular, glabrous, 4–6(–7) cm, eperulate at anthesis. Pedicels rather slender, glabrous, 0.8–1.1(–1.3) cm, bract oblong, thin, 8–12 by 3 mm, very early caducous; bracteoles not seen. *Calyx* tube cup-shaped, glabrous, 1.5 mm, limb ± spreading, deeply 5-lobed, lobes subdeltoid, obtuse, ciliate, *c.* 1 mm, apical gland mostly callose. *Corolla* tubular-urceolate, white, sometimes with greenish or pink tinge, membranous, (8–)9–10(–11) by 3–4 mm, glabrous at both sides, lobes obtuse, suberect to reflexed, 1–1.3 mm. *Filaments* subulate, densely hairy, *c.* 3 mm; anther-cells broad-oblong, *c.* 1.2 mm, no dorsal spurs; tubules cylindric, a little narrower than the cells, ± erect and divergent, 0.5–0.7 mm, with several (rarely but 2 or even 1, hardly recognizable) substipitate glands or short gland-tipped hairs, ± obliquely cut apically, back wall extending into 1 or 2 short, ± reflexed teeth. *Disk* glabrous. *Style* columnar, glabrous, equalling the corolla. *Fruit* subglobose, blackish purple when ripe, up to 6 mm ø, pedicel up to 1.5 cm.

Distr. *Malesia*: East New Guinea (Main Range: from the Western Highlands to the Owen Stanley Ra., and in the Mt Saruwaged-Sattelberg region).

Ecol. In lower montane forest, also in exposed secondary grass-covered spurs or slopes and in fringes of secondary forest, in *Miscanthus* regrowths, also found on creek side overhanging stream, 1065–2200 m, locally common. *Fl.* Jan.–Dec.

Vern. *Teteve*, Bulolo area.

Note. Fruits said to be not palatable in the Chimbu R. valley, but they are eaten by birds and opossum.

2. *var.* **pseudopsammogenes** SLEUM. Blumea 11 (1961) 71.

Calyx and pedicels glabrous. *Corolla* 6–7 mm, not rarely laxly hairy in the lower half inside. *Stamens* 3–3.5 mm; filaments 2 mm. *Leaves* with few subimpressed or flattish glandular points at least in the lower half of the margin.

Varietal characters possibly due to introgression of *V. psammogenes*.

Distr. *Malesia*: East New Guinea (Morobe and Central Distr.).

Ecol. In regrowth areas and near forest edges, also along stream side, 760–1615 m.

3. *var.* **pubens** SLEUM. Blumea 11 (1961) 71; *ibid.* 12 (1963) 129.

Leaves provided with a few remote distinctly impressed glands along the whole margin. *Calyx* and pedicels laxly subpatently short-hairy. *Corolla* 6–7(–8) mm, laxly hairy all over or at least on the lower half inside. *Stamens* 3–3.5 mm; filaments 2–2.5 mm; tubules very short.

Distr. *Malesia*: New Guinea (Morobe Distr.: Bulolo-Wau area).

Ecol. In grassland or on exposed sunny talus among grasses, 1065–1525 m.

143. Vaccinium viridiflorum J. J. S. Nova Guinea 18 (1936) 117, t. 13, f. 1; SLEUM. Bot. Jahrb. 72 (1942) 253; Blumea 11 (1961) 71.

Scandent shrub or liana. Branchlets elongate, subterete, densely short-pubescent. *Leaves* lax, ovate, apex subabruptly caudate-acuminate for 1.5–2.5 cm, subacute, base rounded, sometimes in part subcordate in the same specimen, with 1–2(–3) minute glands on each side impressed at the margin at some distance from the petiole, coriaceous, glabrous above, subdensely shortly and patently hairy on the midrib, less densely and still more shortly so on the whole intervenium beneath, though finally ± glabrescent, moreover sparsely glandular-muriculate beneath, entire, (4.5–)5–8 by (2–)2.5–4 cm, midrib slightly impressed above, markedly prominent beneath, nerves 2–3 basal, high curved-ascending, and a few upper, irregular, more spreading pairs, all ± anastomosing and faintly raised above, more distinctly so beneath; petiole rugulose, ± pubescent, 6–8 by 1 mm. *Racemes* from the 2 or 3 uppermost axils, erecto-patent, laxly many-flowered, perulae small, ovate-acuminate, rather early caducous; rachis angular, practically glabrous, 6–8 cm. Pedicels robust, a little thickened distally, glabrous, *c.* 5 mm. *Calyx* quite glabrous, tube cup-shaped or semiglobose, 2 mm, limb suberect, 1–1.5 mm, 5-lobed to nearly the base, lobes deltoid, obtuse, no apical gland. *Corolla* (immature) narrow-conical, fleshy, glabrous at both sides, green, at least 9 by 3 mm (at the base), lobes apparently short and obtuse. *Filaments* linear-subulate, long patently hairy except the glabrous very base, *c.* 4 mm; anther-cells (perhaps not fully developed) minute, oblong, 1 mm, no dorsal spurs; tubules erect, narrow-cylindric, 1 mm, very obliquely cut resulting in an oblong pore, back wall of each tubule extended into 2 teeth-like divergent appendices ending in a terminal capitate gland and thus similar to a gland-tipped hair. *Disk* prominent, glabrous. *Style* cylindric, glabrous, 8 mm.

Distr. *Malesia*: West New Guinea (Rouffaer R.), in thin-stemmed primary forest at *c.* 250 m. One collection. *Fl.* Sept.

144. Vaccinium aitapense SLEUM. Blumea 12 (1963) 128.

Treelet, glabrous in all outer parts. Branchlets subterete, slender. *Leaves* lax, lanceolate-oblong, mostly widest just below the middle, apex caudate-acuminate for 2–3 cm and mostly slightly falcate, subacute, base cuneate, the very base contracted and somewhat revolute for 2–3 mm, the strictly basal gland on each side thickish and a little prominent, subcoriaceous, ± shining, entire, flat, 5–8 by (1.5–)1.8–2.5(–3) cm, 5–7-plinerved from and from up to 1.3 cm above the base, midrib prominent beneath, basal and subbasal nerves high-ascending and curved, other upper nerves or veins from the midrib few, shorter and less curved, all nerves anastomosing, hardly prominent above in mature leaves, visibly so beneath, reticulation rather dense and slightly raised, especially beneath; petiole slender, 4–5 by *c.* 1 mm. *Racemes* from several upper, leaf-bearing, and lower, already defoliate axils, erecto-patent, rather many-flowered; rachis slender, 2.5–4 cm, perulae not known. Pedicels slender, 3–4(–5) mm, bract and bracteoles apparently very early caducous. *Calyx* tube broadly cup-shaped, hardly 1 mm, limb spreading, lobes triangular-ovate, ciliolate, 0.5 mm, no apical gland. *Corolla* urceolate-tubular, thin, pink, glabrous at both sides, (3.5–)4 by *c.* 2 mm, lobes reflexed, 0.5 mm. *Filaments* subulate, villous in the lower third, glabrous otherwise, 2 mm; anther-cells narrow-oblong, papillose, 0.5–0.6 mm; tubules almost as wide as the cells, ± divergent, very obliquely cut apically, back wall extended into a long beak, *c.* 1 mm long in all, sometimes or in part with a single stipitate minute gland. *Disk* glabrous, thick, 0.5 mm high. *Style* slender, glabrous, 4 mm, a little exserted at full anthesis.

Distr. *Malesia*: East New Guinea (Sepik Distr.: Aitape), in tall forest, 245 m. One collection. *Fl.* Aug.

Vern. *Wali*, Orne: Wantipi.

145. Vaccinium simulans SLEUM. Bot. Jahrb. 71 (1940) 165; Blumea 11 (1961) 72; *ibid.* 12 (1963) 129.

var. **simulans.**

Tree, 10–15(–30) m, 30–60 cm ø, scandent shrub, or occasionally epiphytic. Branchlets stoutish, young parts angular and striate, laxly leaved; axillary buds subglobular, 2–3 mm ø, perulae

broadly ovate or suborbicular, apex rounded-obtuse. *Leaves* oblong-elliptic or mostly subobovate-elliptic, apex very broadly attenuate and obtuse, or rounded, base ± cuneate, the pair of basal marginal glands remote from the petiole and subinconspicuous, coriaceous, rather stiff, glabrous except the sparse glandular-muriculate hairs beneath, which are reduced to glandular points in mature leaves, a little shining, entire, edge subrevolute, (4–)5–8 by (2–)2.5–4(–4.5) cm, midrib sunken above, thick-prominent and as wide as the petiole beneath, gradually narrowed and less prominent upwards beneath, nerves 1–2 basal and 4–5(–6) more spreading and pinnate upper pairs, all rather steeply ascending, anastomosing and faintly raised on both faces, or not rarely rather inconspicuous or even obscure especially beneath, reticulation lax, mostly but faintly visible; petiole flattened, grooved above, rugulose, (4–)5–8 by 1.5–2 mm. *Racemes* from the upper 4–6 axils, spreading, subdensely many-flowered, flowers ± secund; rachis rather stoutish, angular, glabrous, (4–)5–8(–11) cm, eperulate in flowering time. Pedicels rather robust, glabrous, (1–)1.5–2(–3) mm, bracts and bracteoles not seen. *Calyx* tube subsemiglobose, 1–1.5 mm, limb spreading, deeply 5-lobed, lobes deltoid, obtuse, 1 mm, the apical gland rather small, furthermore provided with a row of several (2 or 3 on each side) marginal sessile, not rarely early caducous glands. *Corolla* urceolate, rather fleshy, white or pink, often with greenish tinge, glabrous outside, very shortly hairy in the lower part inside, 4–5 by 2.5 mm, lobes obtuse, reflexed, almost 1 mm. *Filaments* subulate, villous, 1.8 mm; anther-cells oblong, very granular, 0.6 mm, with 2 short dorsal spurs; tubules divergent, cylindric, narrower than the cells, 0.5 mm, subobliquely cut apically, with several subsessile dark glands or very short gland-tipped hairs. *Disk* mostly densely hairy, sometimes ± glabrescent. *Style* thickish, 4 mm, densely subpatently hairy in the lower half. Submature *fruit* subglobular, *c.* 4 mm ø.

Distr. *Malesia*: Borneo (Mt Kinabalu).

Ecol. A tree in primary forest ridge, or strangler on forest trees as *Horsfieldia*, or climbing and/or epiphytic on high trees as *Shorea*, 1220–1830 (–2750?) m, not rare. *Fl.* March–May.

var. **leptopodum** SLEUM. Blumea 11 (1961) 72.

Pedicels more slender, almost filiform, (3–)4–6 mm at anthesis. *Calyx* smaller than in *var. simulans*, its limb lower, more shortly 5-lobed or wavy. *Corolla* 5 mm.

Distr. *Malesia*: Borneo (Mt Kinabalu) with *var. simulans*, 1065–1585 m. *Fl.* June.

146. Vaccinium mjoebergii J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 461; SLEUM. Blumea 11 (1961) 72.

Large epiphytic, ± climbing shrub. Branchlets rather robust, angular, ± densely short-pubescent, subdensely leaved; axillary buds subglobular, 2–3 mm ø, perulae broadly ovate, obtuse. *Leaves* oblong or obovate-elliptic, apex obtuse to rounded, base cuneately narrowed into the petiole, the pair of basal marginal glands obscure, coriaceous, glabrous except the very base, which is sometimes pubescent, laxly glandular-muriculate or -punctate beneath, margin entire, ± revolute, 5–7.2 by 2–3.2 cm, midrib narrowly impressed especially towards the base above, strongly obtusely prominent beneath, nerves 1–2 basal, and 5–6 upper pinnate, suberect to almost spreading pairs, anastomosing, a little raised on both faces, reticulation lax and faintly visible; petiole somewhat flattened, grooved above, puberulous initially, 3–4 by 1–1.5 cm. *Racemes* in the upper 2–4 axils, erect, subdensely 15–25-flowered; rachis rather slender, densely short-pubescent as are the pedicels, 3–3.5 cm, perulae suborbicular to ovate, up to 5 by 4 mm. Pedicels rather robust, curved, *c.* 1.5 mm. *Calyx* small, tube campanulate, laxly hairy at the base, 1 mm, limb spreading, 1 mm, lobes deltoid, with a rather callous apical gland. *Corolla* urceolate, thin, colour not known, glabrous outside, laxly hairy in the lower half inside, 4(–5) by 2 mm, lobes recurved, very short. *Filaments* linear, dilated below, subdensely hairy, 1.8 mm; anther-cells oblong, 0.5 mm, with 2 short dorsal spurs; tubules cylindric, as long and wide as or a little longer than the cells, with a few short gland-tipped hairs, ± transversely cut apically, back wall of each tubule sometimes extended into a minute tooth. *Disk* hirtellous. *Style c.* 2.5 mm, hairy in the lower half.

Distr. *Malesia*: Central Borneo (Mts Batu Tiban and Kemul).

Ecol. In primary forest, 1700–1850 m.

147. Vaccinium pachydermum STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 189; MERR. En. Born. (1921) 467; Sarawak Mus. J. 3 (1928) 543; SLEUM. Blumea 11 (1961) 72; *ibid.* 12 (1963) 129; *ibid.* 12 (1964) 343. — **Fig. 108.**

Erect straggly or compact shrub or small tree, up to 6 m and with bole up to 2 m and 20 cm ø, bark fissured, flaky. Branchlets very robust, tips obtusangular and puberulent, older parts terete and glabrous; axillary buds ovoid to suborbicular, perulae ovate, up to 2 mm. *Leaves* laxly to subdensely arranged, oblong- to obovate-elliptic, sometimes ovate, apex rounded or obtuse in general, more rarely shortly broad-attenuate or even subacuminate, base ± cuneate and decurrent into the upper part of the flattened petiole, with one pair of thickish marginal glands at some distance from the petiole, coriaceous and stiff, glabrous, laxly glandular-muriculate or -punctate beneath, entire, edge slightly recurved especially towards the base of the lamina, (3–)5–10(–12, rarely –15) by 2.5–5(–7, rarely –10) cm, midrib ± sunken above, much convex-prominent beneath, nerves 2(–3) basal and a little suprabasal, and 2 or 3 equally high curved-ascending though shorter pairs, all anastomosing and slightly raised on both faces, if not ± obscure above, reticulation lax, sometimes a little raised above and/or beneath, often subinconspicuous; petiole transversely rugose, 5–8(–12) by 2–3(–4) mm. *Racemes*

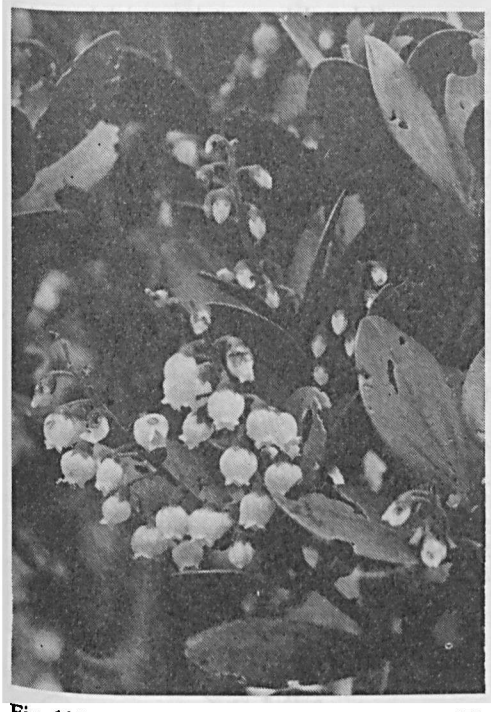

Fig. 108. *Vaccinium pachydermum* STAPF. Mt Kinabalu, 2450 m, North Borneo (SLEUMER 4701) (SLEUMER, 1963).

from the upper 2–3 (rarely more) axils, ± spreading, laxly many-flowered, with some small perulae; rachis (as are the pedicels and the calyx) generally subdensely hirtellous to subtomentose, rarely but laxly pubescent (the calyx even glabrescent then!), stoutish, 4–6(–9) cm, flowers ± secund. Pedicels relatively slender, curved, 6–12 mm, bract lanceolate, ± glabrous, up to 8 by 3 mm, very early caducous, bracteoles minute, slightly suprabasal, subulate. *Calyx* tube cup-shaped or semiglobose, green or pinkish, 2 mm, limb much spreading, 2–2.5 mm, 5-lobed almost to the base, lobes ovate-triangular, less pubescent than the calyx tube, ciliate, provided with a small apical gland and/or some sessile marginal glands. *Corolla* tubular-urceolate, fleshy, pink or white, fragrant, glabrous or sometimes initially laxly pubescent in the lower part outside, laxly hairy in the lower part and again at the top inside, 8–9 by (3–)4–6 mm, lobes recurved, often flushed pink, 1.5 mm. *Filaments* linear, densely hairy, *c.* 3 mm; anther-cells oblong, echinulate, 1.5 mm, with 2 short dorsal spurs, tubules cylindric, as wide as the cells, erect, *c.* 1 mm, transversely cut apically, set with several gland-tipped hairs. *Disk* densely hairy. *Style* slender, hairy in the lower ¾, *c.* 8 mm. Mature *fruit* depressed-globose, 6–7 mm ø, dark green, finally blue, all over pubescent, crowned by the erect calyx lobes and the prominent disk, pedicel up to 2 cm.

Distr. *Malesia*: Borneo (Mt Kinabalu; Mts Kalulong, Dulit, Mulu and Murud in Sarawak).

Ecol. In open moss forest, on exposed peak or dry ridge, on barren and stony open places, or in scrub forest, (1200–)1800–3000(–3350) m, with smaller and sometimes glabrescent leaves in high altitudes. *Fl. fr.* Jan.–Dec.

Vern. *Kongkong bela*, Kenyah: Mt Kalulong.

148. Vaccinium elliptifolium MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 104; En. Born. (1921) 467; SLEUM. Blumea 11 (1961) 72; *ibid.* 12 (1963) 129.

Erect shrub or small tree. Branchlets subterete, densely clad with a short tomentum, subdensely to laxly leaved; axillary buds consisting of a few subsubulate perulae, 3–4 mm. *Leaves* elliptic, or sometimes in part obovate-elliptic in the same specimen, apex obtuse or not rarely minutely emarginate, base broadly attenuate to rounded, basal marginal glands in 2–5 mm from petiole, coriaceous, a little shining, pubescent at the very base and the lower half of the midrib, and laxly glandular-punctate beneath, otherwise glabrous, entire, margin ± revolute, 2–4 by 1.3–2.5(–3) cm, midrib markedly sunken above, prominent beneath, nerves 3–4 sharply ascending and anastomosing pairs (the lower 1 or 2 from the base), faintly impressed above, raised beneath, reticulation obscure above, very fine, rather dense and mostly well visible beneath; petiole rugose, 2–3 by 1.5 mm. *Racemes* from the upper 1 or 2 axils, laxly 6–10-flowered; rachis rather slender, ± densely cinereous-villous as are the pedicels and the calyx tube, 2–3 cm. Pedicels stoutish, *c.* 5 mm in anthesis, up to 7 mm in fruit, with 2 basal, subpersistent, acicular bracteoles, 1–1.5 mm; bract not seen. *Calyx* tube subglobose-cylindric, *c.* 1.5 mm, limb erect, deeply 5-lobed, lobes narrow-deltoid, acute, glabrescent, reddish, ciliate and set with a few marginal, yellowish, thickish, partly caducous glands, but no proper apical gland. *Corolla* urceolate, 7–9 by 3 mm, glabrous outside, somewhat villous inside, carmine, lobes recurved, ovate, obtuse, 1 mm. *Filaments* subulate, villous, 3 mm; anther-cells oblong, not spurred, 1 mm; tubules stout, as wide as the cells, hardly 0.5 mm, truncate distally, with a few gland-tipped hairs, pore round, its margin subrevolute. *Disk* hairy. *Style* villous in the lower ½–⅔, 8–9 mm. Submature *fruit* ovoid-subglobose, rather densely pubescent, crowned by the erect calyx lobes, said to be green with purplish tinge.

Distr. *Malesia*: Borneo (Mt Kinabalu).

Ecol. In ridge forest, 1220–2285 m. *Fl.* July.

149. Vaccinium endertii J. J. S. Bull. Jard. Bot. Btzg III, 13 (1935) 462; SLEUM. Blumea 11 (1961) 72.

Large shrub, up to 6 m, more or less epiphytic. Branchlets stoutish, young parts a little flattened or obtusely angular, quite glabrous, laxly leaved; axillary buds ovoid-oblongoid, perulae ovate-lanceolate, acute, 5–6 mm. *Leaves* obovate-elliptic, sometimes almost obovate, apex very broadly attenuate, obtuse, not rarely nearly rounded, base rounded to subcordate, marginal glands at a short

distance from petiole, coriaceous, rigid, glabrous, laxly glandular-muriculate or -punctate beneath, shining above, entire, 4.5–9.5 by 2.5–4.3 cm, 7–9-plinerved, midrib ± sunken above, strongly prominent beneath, nerves 3(–4) basal and slightly suprabasal, steeply ascending pairs, with a few shorter ones from the upper part of the midrib, all anastomosing and slightly prominent on both faces, reticulation lax, not much conspicuous, raised especially beneath; petiole 4–5 by *c.* 1.5 mm. *Racemes* axillary, shortly peduncled, laxly 8–15-flowered, flowers secund; rachis angular, quite glabrous, 5–8.3 cm. Pedicels curved, terete, robust, glabrous, 9–12 mm, bracts and bracteoles not seen. *Calyx* glabrous, tube cup-shaped, rugulose, 2 mm, limb subpatent, fleshy, deeply 5-lobed, lobes subdeltoid, 1.5 mm, obscurely or not ciliate, apex blunt by a thickish gland. *Corolla* tubular-urceolate, fleshy, greenish white with red base, glabrous outside, subdensely pubescent in the lower half inside, 10–12 by 3–4 mm, lobes reflexed, obtuse, 1.5 mm. *Filaments* linear, base dilated, almost villous, 3–4 mm; anther-cells oblong, echinulate, 1.5 mm, manifestly 2-spurred dorsally; tubules cylindric, narrower than the cells and at a wide angle with them, 1 mm, nearly transversely cut apically, provided with several gland-tipped hairs. *Disk* pubescent. *Style* columnar, rather densely pubescent to the lower ¾, 9–10 mm. *Fruit* globular, *c.* 8 mm ø (dry).

Distr. *Malesia*: Central Borneo (Amai Ambit, Mt Kemul) and Sarawak (Ulu Mujong).

Ecol. In primary ridge forest, on stony, humus-covered ground, *c.* 1000 m. *Fl.* Oct.

150. Vaccinium camiguinense MERR. Philip. J. Sc. 7 (1912) Bot. 321; En. Philip. 3 (1923) 248; COPEL. *f.* Philip. J. Sc. 42 (1930) 578; SLEUM. Blumea 11 (1961) 72.

Small glabrous tree. Branchlets 3–5 mm ø, subterete, subdensely leaved; axillary buds oblongoid, 4–6 mm, perulae subulate. *Leaves* oblong to obovate-elliptic, or narrowly oblong-obovate, apex shortly subacuminate-attenuate, obtuse, base gradually attenuate into the very short and broadened petiole, subsessile, with a pair of thick and prominent basal and another much smaller and impressed one at a few mm distance on the margin, coriaceous, rather rigid, glabrous, laxly glandular-muriculate or -punctate beneath, entire, very edge subrevolute, (3.5–)5–8 by (1.5–)2–3.5 cm, midrib sunken above, broadly and obtusely prominent in the lower part, less so upwards beneath, nerves 2–3 basal and somewhat suprabasal, rather straight and steeply ascending pairs, and a few much shorter ones, which leave the midrib at above the middle, all anastomosing and faintly sunken above, ± prominent beneath, reticulation lax, mostly rather inconspicuous; petiole much flattened, 1–4 by 2–4 mm. *Racemes* from the upper 3 or 4 axils, spreading or suberect, glabrous, subdensely 10–15(–20)-flowered; rachis stoutish, (4–)5–6 cm, perulae ovate, 2 mm. Pedicels robust, curved, *c.* 1 cm; bract and bracteoles not seen. *Calyx* glabrous, tube semiglobose, 1.5 mm, limb ± spreading, 2 mm, 5-lobed almost to the base, lobes ovate-acuminate, subacute, no apical gland. *Corolla* tubular-urceolate, glabrous outside, laxly hairy below inside, *c.* 7 by 3 mm, lobes short. *Filaments* linear-subulate, subdensely hairy, *c.* 3 mm; anther-cells oblong, 1.5 mm, with a pair of dorsal spurs (0.3 mm); tubules cylindric, at an angle with and distinctly narrower than the cells, 0.6 mm, with a few sessile and/or shortly stalked glands, apex ± transversely cut, pore a little flaring. *Disk* hairy. *Style* slender, hairy to the lower ¾, *c.* 6 mm. Submature *fruit* subglobose, glabrous, *c.* 4 mm ø, crowned by the erect calyx lobes.

Distr. *Malesia*: Philippines (Mindanao: near the summit of Mt Mahinog on Camiguin).

Ecol. In mossy forest, *c.* 1000 m. *Fl. fr.* March–April.

Vern. *Manalâli.*

151. Vaccinium clementis MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 102; En. Born. (1921) 466; SLEUM. Blumea 11 (1961) 72; *ibid.* 12 (1963) 129; *ibid.* 12 (1964) 343. — **Fig. 109.**

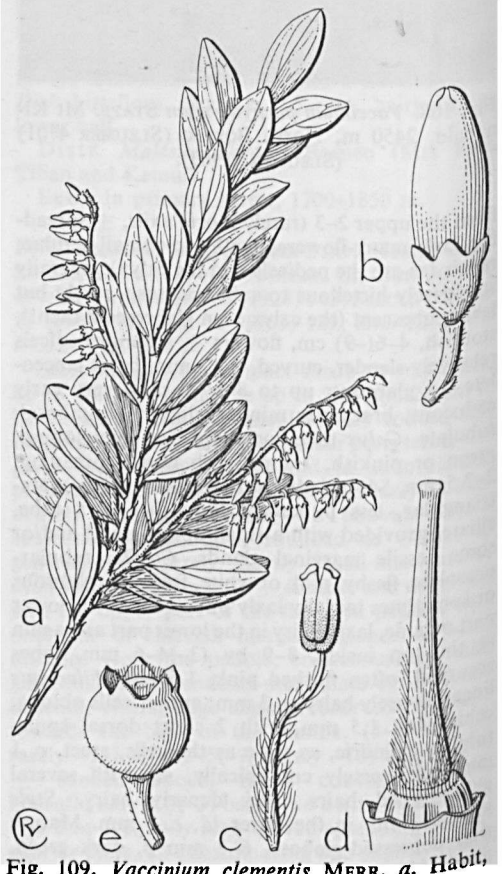

Fig. 109. *Vaccinium clementis* MERR. *a.* Habit, × ⅔, *b.* flower, late bud stage, × 4, *c.* stamen, × 8, *d.* ovary, disk and style, × 8, *e.* fruit, × 4 (*a–e* CLEMENS 32470).

Shrub or small tree, up to 12 m, sometimes epiphytic. Branchlets slender, youngest parts red, angular, clothed with a very fine patent puberulence (lens!), subdensely leaved, older parts ± defoliate, terete, greyish brownish, early covered with a dark thin cork; axillary buds generally present, ovoid-oblongoid, perulae few, subulate, (2–)3(–5) mm. *Leaves* oblong-obovate in general, sometimes elliptic-obovate or more rarely elliptic, variable in shape and size, apex obtusely attenuate to rounded, base gradually cuneate from the middle into the petiole, with a small marginal gland on each side at 2–3 mm from the petiole, coriaceous, rather firm, glabrous, laxly minutely glandular-muriculate or -punctate beneath, entire, edge narrow-cartilagineous, slightly or not revolute, (2–)2.5–3.5(–4) by (0.8–)1.2 cm, 5-plinerved from and from a little above the base, and with 2 or 3 pairs of shorter, more spreading nerves from the upper part of the midrib, the latter mostly sunken above, raised beneath, nerves anastomosing, generally obsolete above, slightly prominent beneath, reticulation lax and mostly perceptible beneath only, not rarely almost inconspicuous on both sides; petiole 1–2 by 1(–1.5) mm. *Racemes* solitary in the upper axils, suberect or spreading, subdensely (3–)5–10(–12, rarely –15)-flowered; rachis angular, slender, finely patent-puberulent as are the pedicels at anthesis, glabrescent, 1.5–3(–4) cm, eperulate. Pedicels stoutish, mostly somewhat recurved, 3–5 mm, bract and bracteoles not seen. *Calyx* tube cup-shaped, base subtruncate or rounded, puberulent, 1.5 mm, limb suberect, deeply 5-lobed, lobes ovate, obtuse, *c.* 1 mm, with an apical gland and (2–)3 sessile, thick, dark, marginal glands on each side. *Corolla* tubular-urceolate, narrowed upwards, rather fleshy, white or cream, often with pink or purplish tinge, glabrous outside, hairy in the lower half inside, (6–)7–8 by 3–4 mm, lobes recurved, *c.* 1 mm. *Filaments* alternately 2.5 and 3 mm, subulate, densely hairy or villous; anther-cells broadly oblong-elliptic, 0.6–0.8 mm, with 2 short or sometimes almost obsolete dorsal spurs; tubules cylindric, 0.3 mm, with a few very short gland-tipped hairs, obliquely cut apically, pore almost round. *Disk* densely hairy. *Style* rather robust, as long as the corolla, densely hairy to the lower ¾, glabrous for the rest. *Fruit* globular, 4–5 mm ø, blackish at maturity, crowned by the short inflexed calyx lobes and the disk, pedicel up to 1 cm.

Distr. *Malesia*: Borneo.

Ecol. In ridge jungle or summit vegetation in Sarawak and North Borneo at 600–1830 m, at 700 m in *Agathis* and *Quercus* forest on acid, waterlogged sand in East Borneo; in Brunei found both in stunted heath ('*kerangas*') forest or in low scrubby vegetation on almost bare sandstone rock or knife-edge sandstone ridge at 550–820 m, and gregarious in mossy forest ('elfin woodland') at 1430–1550 m. *Fl. fr.* Jan.–Dec.

Vern. *Obah ribu*, Brunei: Iban.

152. Vaccinium palawanense MERR. Philip. J. Sc. 3 (1908) Bot. 373; ELM. Leafl. Philip. Bot. 3 (1911) 1099; MERR. En. Philip. 3 (1923) 251, *p.p.*; COPEL. *f.* Philip. J. Sc. 42 (1930) 581, t. 5, f. 8–9; SLEUM. Blumea 11 (1961) 73.

var. **palawanense.**

Small tree or shrub, up to 6 m, sometimes epiphytic. Branchlets angular, laxly puberulent and glandular-muriculate, rather laxly leaved; axillary buds lanceolate to ellipsoid, perulae subulate, *c.* 3 mm. *Leaves* elliptic- or oblong-oblanceolate, apex shortly and obtusely acuminate or attenuate, base gradually narrowed or cuneate and somewhat decurrent into the petiole, with 1 or 2 pairs of basal marginal glands impressed at some distance from the petiole, coriaceous, glabrous, laxly glandular-punctate beneath, entire, subrevolute especially towards the base of the lamina, (4–)5–7 by 1.5–2(–3) cm, midrib a little sunken above, obtusely prominent beneath, nerves 2 basal or a little suprabasal high-ascending, and a few upper, more spreading and shorter pairs, all anastomosing, mostly slightly prominent on both faces, reticulation lax, less visible than the nerves, or rather obscure above; petiole somewhat flattened, pubescent, initially, 2–4(–6) by 1–1.5 mm. *Racemes* from the upper 3–5 axils, laxly 6–14-flowered; rachis slender, laxly to subdensely short-pubescent as are the pedicels, 3.5–4.5 cm, eperulate at anthesis. Pedicels slender, (4–)5–8 mm, bract and bracteoles not seen. *Calyx* glabrous, tube subsemiglobose, 2 mm, limb spreading, deeply 5-lobed, lobes deltoid-ovate, subacute, 1–1.5 mm, ciliate, provided with a fine apical gland and/or some sessile marginal glands. *Corolla* tubular, glabrous outside, laxly hairy in the lower part inside, 6–7(–8) by *c.* 2.5 mm, white to light pink or waxy red, fragrant, lobes deltoid, obtuse, reflexed, *c.* 1 mm. *Filaments* almost filiform, subdensely hairy, 2.5 mm; anther-cells broad-oblong, 1 mm, with 2 dorsal spurs curved upwards (0.5 mm); tubules broad-cylindric, as wide as the cells, 0.6 mm, subobliquely cut apically, with a few gland-tipped hairs or subsessile glands, which may occur also on the cells. *Disk* laxly hairy. *Style* slender, hairy in the lower ⅓–½, 7–8 mm, finally a little exserted.

Distr. *Malesia*: Philippines (Palawan: Mt Victoria; Mindanao: Mt Apo).

Ecol. On exposed ridges in mossy forest, 1000–1800 m.

Vern. *Iualus, kayaupang*, Bag.

var. **foxworthii** (COPEL. *f.*) SLEUM. Blumea 11 (1961) 73. — *V. foxworthii* COPEL. *f.* Philip. J. Sc. 42 (1930) 580, *p.p.*

Leaves (2.5–)3–4.5 by (1–)1.2–1.5 cm. Rachis, pedicels and *calyx* tube densely yellowish short-pubescent. *Stamens c.* 3 mm.

Distr. *Malesia*: Philippines (Palawan: once found together with *var. palawanense* on Mt Victoria), 1750 m.

Vern. *Dusóng*.

153. Vaccinium cornigerum SLEUM. Bot. Jahrb. 72 (1942) 259; Blumea 11 (1961) 73.

Shrub or small tree, up to 5 m, sometimes epiphytic. Branchlets subterete, youngest parts shortly greyish pubescent to subtomentose, older ones glabrescent and early covered with cork, laxly to subdensely leaved. *Leaves* ovate or elliptic-ovate, rarely more elliptic, apex rather shortly and abruptly obtusely acuminate, base broadly attenuate to almost rounded, the pair of basal marginal glands small, dark, hardly impressed, at 1–2 mm from the petiole, thin-coriaceous, ± densely pubescent to subhirsutulous initially, glabrescent with age except the midrib and/or the base of the lamina beneath, finally even lustrous above, furthermore laxly glandular-punctate on the undersurface, becoming lustrous at full age above, entire, edge subrevolute in dry specimens, (2.5–)4–6.5 by (1.5–)2–3.5(–4) cm, midrib slightly sunken above, obtusely raised beneath, nerves 2–3 curved-ascending, basal and slightly suprabasal, and in 1–2(–3) upper and shorter, more spreading pairs, all faintly visible above and prominent beneath, reticulation subdense, inconspicuous above, finely raised beneath; petiole subterete, ± hirsutulous initially, glabrescent, (3–)4–6 by 1–1.5 mm. *Racemes* solitary from the upper axils, laxly 5–10-flowered; rachis slender, (1.5–)2–4 cm, densely patently yellowish hirsutulous or -subvillous as are the pedicels and the calyx tubes. Pedicels rather slender, mostly recurved, (4–)6–9(–11) mm, subtending bract ovate-acuminate, glabrous, 3–4 mm, early caducous; bracteoles not seen. *Calyx* tube campanulate, 1–1.5 mm, limb ± spreading, *c.* 2 mm, deeply 5-lobed, lobes deltoid, subacute, much less hairy than the tube, ciliate, the apical gland present, though sometimes less conspicuous. *Corolla* elongate-urceolate, rather fleshy, shell pink with white tip or white, laxly pubescent at the base and/or the tip initially, later glabrous outside, laxly hairy in the lower half inside, (0.9–)1–1.2 cm by *c.* 4(–5) mm, lobes obtuse, finally reflexed, *c.* 1 mm. *Filaments* subulate, densely hairy below, more laxly so distally, 4–5 mm; anther-cells oblong to ovate-oblong, granular, 1–1.5 mm, no spurs; tubules cylindric, much narrower than the cells and at an angle with them, 0.5 mm, with several short gland-tipped hairs, back wall of each tubule extended into 1 or 2 irregular, ± reflexed teeth. *Disk* subdensely hairy. *Style* rather thick, laxly long-hairy to at least the lower ⅔, papillose for the rest, 9–10 mm.

Distr. *Malesia*: SE. New Guinea (Owen Stanley Ra. to Mt Simpson and the Daga country).

Ecol. In mossy forest on summits, edge of clearings, narrow ridges or rocky precipices, 1525–1685(–2285) m. *Fl.* Aug.–Dec.

Note. Specimens from Mt Obree, 2285–2470 m, differ slightly by having muriculate glands on pedicels and calyces besides the pubescence, and by deep red flowers; they are reported to cover a great portion of the summit there.

154. Vaccinium besagiense J. J. S. Med. Rijksherb. *n.* 30 (1916) 4, f. 2; SP. MOORE, J. Bot. 63 (1925) Suppl. 55; SLEUM. Blumea 11 (1961) 73.

Erect shrub, 2–3 m. Branchlets angular, striate lengthwise and early corticate, glabrous. *Leaves* subdense, oblong-obovate, apex retuse (1 mm), base gradually cuneate into the petiole, with 1–2 pairs of basal marginal minute impressed glands at some distance from the petiole, coriaceous, glabrous, laxly glandular-punctate or -muriculate beneath, entire, edge a little wavy and revolute in dry specimens, 1.8–3 by 0.6–1.1 cm, midrib rather deeply impressed above, obtusely prominent beneath, nerves 3–4(–5) pairs, the lower 2 from and from a little above the base, the others from the upper part of the midrib, all steeply ascending and anastomosing, hardly perceptible above, faintly raised beneath as is the subinconspicuous reticulation; petiole flattened, 1–2.5 by *c.* 1 mm. *Racemes* from the upper axils, laxly many-flowered, shortly peduncled, 2–3 cm, flowers nodding; rachis rather slender, angular, laxly short-pubescent as are the pedicels. Pedicels slender, 3–5 mm; bract and bracteoles not seen. *Calyx* tube obconical, base subtruncate and sparsely pubescent, 1–1.5 mm, limb suberect, deeply 5-partite, glabrous, *c.* 1.5 mm, lobes ovate-triangular, subacute, ciliolate, no apical gland. *Corolla* broadly urceolate, membranous, glabrous outside, laxly hairy inside, 4–5 by *c.* 3 mm, lobes obtuse, recurved, 0.6 mm. *Filaments* dilated above the base, narrowed distally, densely subpatently hairy in the lower part, laxly so upwards, wavy, *c.* 2 mm; anther-cells broad-oblong, almost horizontal, echinulate, 0.7 mm, with 2 dorsal spurs (*c.* 0.5 mm); tubules at a right angle with the cells, slenderly cylindric, 1–1.3 mm, ± obliquely cut apically, provided with several gland-tipped patent hairs. *Disk* short-pubescent. *Style* slenderly columnar, hairy in the lower third, glabrous above, *c.* 3 mm. Submature *fruit* depressed-globose, *c.* 3.5 mm ø, crowned by the inflexed calyx lobes.

Distr. *Malesia*: S. Sumatra (Bencoolen: Mt Pesagi), 2135 m.

155. Vaccinium coriaceum HOOK. *f.* in Hook. Ic. Pl. (1852) t. 892; WALP. Ann. 5 (1858) 440; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 189; GIBBS, J. Linn. Soc. Bot. 42 (1914) 101; MERR. En. Born. (1921) 466; SLEUM. Blumea 11 (1961) 73; *ibid.* 12 (1963) 130.

Shrub or small tree. Branchlets angular, tips pubescent, lower parts early glabrescent, greyish, densely to very densely leaved, the persistent leaf-cushions as conspicuous as in the closely related *V. stapfianum*. *Leaves* elliptic or obovate- to narrowly oblong-elliptic, sometimes linear-oblong or -obovate, apex blunt or rounded, base attenuate to the petiole, stiff-coriaceous, glabrous, the glandular points beneath mostly inconspicuous, regularly distantly cren(ul)ate by (3–)4–5 impressed crenations on each side up to the top of the blade, edge conspicuously marginate and slightly or not recurved, (6–)7–13 by (3–)4–5 mm, midrib faintly sunken above, rather indistinct beneath, nerves 2–3 basal and suprabasal, high ascending pairs, sometimes a little raised above as is the lax reticulation, ± obsolete beneath, or inconspicuous

on both faces; petiole *c.* 2 by 0.7 mm, puberulous initially. *Racemes* subterminal, erect, subdensely many-flowered, flowers nodding; rachis rather stoutish, red, patent-puberulous, 2–4(–5) cm. Pedicels rather robust, finely puberulous or glabrous, 2–3(–4) mm, bract foliaceous, membranous to subcoriaceous, smaller than the leaves, generally very early caducous, bracteoles suprabasal, subulate, 1 mm, early caducous. *Calyx* glabrous, shining, tube widely cup-shaped, rugulose, 1 mm, limb suberect, lobes ovate, obtuse or rounded, *c.* 1.3 mm, margin with scattered, sessile, thick, yellowish glands but no single thick apical gland. *Corolla* cylindric-urceolate, rather fleshy, pink or white, 4.5–5 by *c.* 3 mm, glabrous outside, puberulous in the lower third inside, lobes reflexed, obtuse, 1 mm. *Filaments* subulate-linear, densely hairy, *c.* 1.8 mm; anther-cells broad-oblong, 1 mm, with 2 short dorsal spurs and a few short gland-tipped hairs or subsessile glands; tubules much narrower than the cells, cylindric, erect, *c.* 1 mm, almost transversely cut apically, pore flaring. *Disk* with very short erect hairs. *Style* slender, laxly hairy at the base, or glabrous, *c.* 4 mm. *Fruit* subglobose, *c.* 4 mm ø.

Distr. *Malesia*: Borneo (Mt Kinabalu).

Ecol. In scrub forest, (2135–)2440–3350 m. *Fl. fr.* Jan.–Dec.

156. Vaccinium stapfianum SLEUM. Bot. Jahrb. 71 (1940) 168; Blumea 11 (1961) 73; *ibid.* 12 (1963) 130. — *V. buxifolium* HOOK. *f.* in Hook. Ic. Pl. (1852) t. 891, *non* SALISB. 1805; WALP. Ann. 5 (1858) 440; STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 189; GIBBS, J. Linn. Soc. Bot. 42 (1914) 101; MERR. En. Born. (1921) 466.

var. **stapfianum**

Bushy shrub or small slender tree, up to 7 m, sometimes epiphytic. Branchlets stoutish, subterete, young parts purplish and densely to subimbricately leaved, minutely puberulent, older parts defoliate, with the remaining thick leaf-cushions, glabrescent. *Leaves* obovate to obovate-oblong, or oblong, not rarely narrow-oblong, apex obtuse or short-rounded, sometimes faintly retuse, base broadly attenuate to rounded, with 1 or 2 (occasionally 3) dark minute marginal glands impressed at intervals on each side, remote from the petiole and restricted to the lower half of the lamina, coriaceous, stiff, laxly glandular-muriculate or -punctate beneath, otherwise glabrous, entire, narrowly marginate, ± revolute in dry specimens, blade often convex above, 0.8–1.5(–2) by 0.4–0.7 (–0.8) cm, midrib slightly sunken above, obtusely prominent beneath, nerves 3–4 pairs from and from above the base, faintly impressed or raised above as is the lax reticulation, mostly inconspicuous beneath; petiole (1–)2 by almost 1 mm. *Racemes* from the uppermost 1–3 axils, erect, ± secund, dense, many-flowered; rachis stoutish, angular, short-pubescent, 1.5–2.5(–4) cm. Pedicels robust, curved, glabrous, 1–2 mm in anthesis, bract membranous, ± oblong, up to 6 by 3 mm, very early caducous, as are the 2 basal or slightly suprabasal minute bracteoles. *Calyx* glabrous, tube broadly cup-shaped, 1–1.5 mm, limb deeply 5-partite, suberect, lobes deltoid, subacute or mostly obtuse, 2 mm, margin with rather numerous, thick, sessile, yellowish glands, but no proper single apical gland. *Corolla* subcylindric-urceolate, slightly 5-angular, a little fleshy, red to pinkish or white, occasionally greenish ivory, with strong sweet scent, glabrous outside, puberulous above the base inside, 5–6 by *c.* 3 mm, lobes obtuse, finally reflexed, 1 mm. *Filaments* linear, dilated above the base, densely hairy or villous, 2–2.5 mm; anther-cells oblong, 1 mm, with 2 generally short, rarely rudimentary dorsal spurs distally, and provided with a few gland-tipped hairs or subsessile minute glands near the spurs; tubules erect, cylindric, narrower than the cells, 1–1.3 mm, transversely cut distally, pore flaring. *Disk* subdensely erect-pubescent. *Style* rather slender, laxly hairy in the lower half, 5 mm. *Fruit* globose, 3–4 mm ø.

Distr. *Malesia*: North Borneo (Mt Kinabalu).

Ecol. On the open serpentine ridge to the subsummit (mossy) dwarf forest which abuts on to the granite core, (1830–)2440–3600 m. *Fl.* Jan.–Dec.

var. **minus** SLEUM. Blumea 11 (1961) 74; *ibid.* 12 (1963) 130.

Generally epiphytic, rarely terrestrial. *Leaves* more laxly arranged than in *var. stapfianum*, and more distinctly obovate. *Flowers* subsessile, corolla but 2.5–3 mm long. *Stamens* shorter; filaments *c.* 1.3 mm; cells subelliptic, *c.* 0.5 mm; tubules 1 mm.

Distr. *Malesia*: North Borneo (Mt Kinabalu), together with *var. stapfianum*, but generally epiphytic in the ericaceous moss forest, 1525–2440 (–2745) m, locally very common.

157. Vaccinium horizontale SLEUM. Blumea 11 (1961) 74; *ibid.* 12 (1963) 130. — **Fig. 110.**

Erect terrestrial, or rarely epiphytic shrub. Branchlets acutangular, or even winged at the tips, quite glabrous, finally covered with ashy cork in the older parts; flush bright golden brown. *Leaves* subdense, obovate or elliptic-obovate, apex shortly obtusely attenuate or subacuminate, base cuneate to the petiole, with 2 pairs of impressed glands at 1 or 2 mm from the petiole, coriaceous, light green when dry, shining, glabrous, not punctate underneath, entire, margin ± revolute especially towards the base, 2.5–3.5(–4) by (1–)1.2–1.6(–2) cm, midrib impressed above, prominent beneath, nerves 2 basal or slightly suprabasal curved-ascending, and 3–4 upper and shorter pairs, all anastomosing, rather obscure above, slightly raised beneath, reticulation rather lax, conspicuous beneath only; petiole flattened, grooved above, 2–3 by *c.* 1 mm. *Racemes* from the upper 1 or 2 axils, laxly 5–8(–12)-flowered; rachis rather slender, angular, glabrous, 3–4.5 cm, eperulate in anthesis. Pedicels rather slender, glabrous, 8–10(–12) mm, bract and bracteoles not seen. *Calyx* glabrous, tube obconical, rugulose,

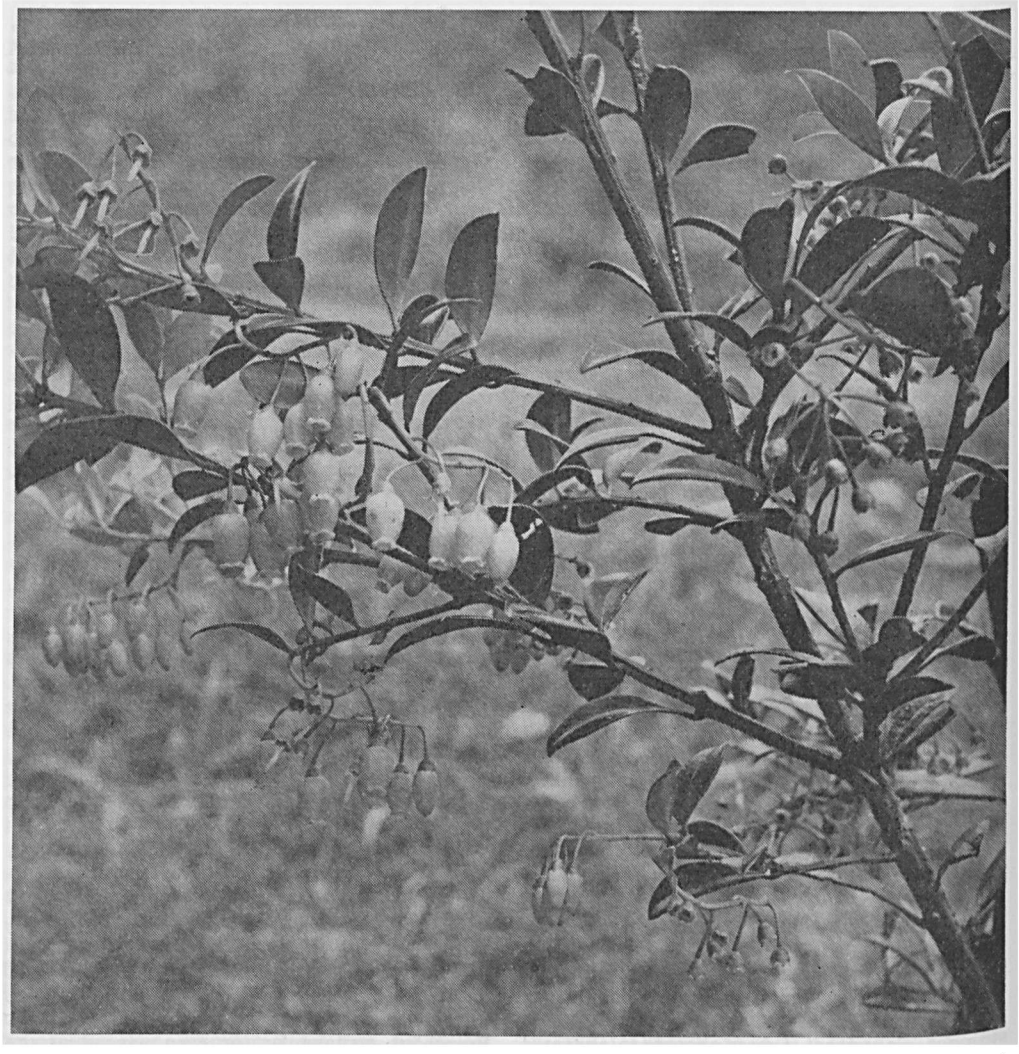

Fig. 110. *Vaccinium horizontale* SLEUM. Edie Creek near Wau, 1800 m, E. New Guinea (NGF 13486 WOMERSLEY & SLEUMER) (SLEUMER, 1961).

1.5 mm, limb spreading, 5-lobed to ¾, lobes deltoid, subacute, glabrous dorsally, densely ciliate, *c.* 1.5 mm, no apical gland. *Corolla* broadly cylindric-urceolate, membranous, shell or coral pink, very sparsely hairy at the base, otherwise glabrous, subdensely white-hairy in the lower half inside, 9–10 by 3–4(–5) mm, lobes obtuse, reflexed, *c.* 1.5 mm. *Filaments* filiform, densely villous below, less so upwards, 4 mm; anther-cells oblong, 1–1.2 mm, echinulate, no dorsal spurs; tubules cylindric, much narrower than the cells, dilated and almost transversely cut apically, 1 mm, with a few patent glandular hairs. *Disk* prominent, glabrous. *Style* cylindric, subdensely ± patently white-hairy except the glabrous apex, *c.* 9 mm. *Fruit* black.

Distr. *Malesia*: New Guinea (Morobe Distr.: Edie Creek; Central Distr.: Mt Tafa).

Ecol. Epiphytic in mossy forest, or growing horizontally from eroded cliff face, 1615–2300 m. *Fl.* Aug.–Sept.

158. Vaccinium bancanum MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 587; SCHEFF. Nat. Tijd. N.I. 31 (1870) 363; GIBBS, J. Linn. Soc. Bot. 42 (1914) 101; MERR. En. Born. (1921) 465; DUNSELMAN, Trop. Natuur 28 (1939) 73, f. 3; SLEUM. Blumea 11 (1961) 74; *ibid.* 12 (1963) 130. — *V. suluense* COPEL. *f.* Philip. J. Sc. 42 (1930) 568. — *V. adenurum* C. E. C. FISCHER, Kew Bull. (1932) 293. — **Fig. 111, 112.**

See for further synonyms under the varieties.

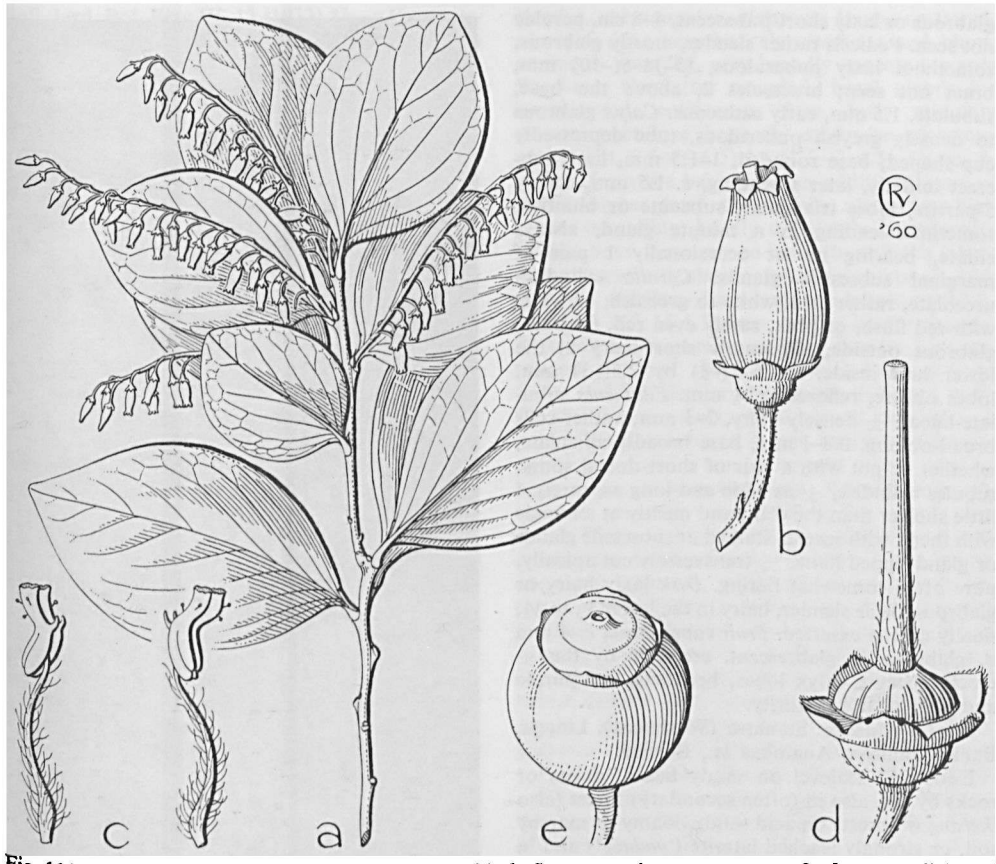

Fig. 111. *Vaccinium bancanum* MIQ. *a*. Habit, × ⅔, *b*. flower, × 4, *c*. stamens, × 8, *d*. ovary, disk and style, × 8, *e*. fruit, × 4 (*a–d* BROOKE 10587, *e* SAN 17352 NICHOLSON).

KEY TO THE VARIETIES

1. Calyx lobes very short and obtuse, fleshy, limb often merely wavy, hardly properly lobed. Leaves narrow-elliptic to lanceolate, apex longer or shorter acuminate. **2. *var.* kunstleri**
1. Calyx lobes distinct, ovate-deltoid, rather thin.
2. Calyx lobes rarely bearing one marginal caducous gland on each side, or mostly no such glands at all. Leaves in general elliptic or oblong-, rarely subovate-elliptic. **1. *var.* bancanum**
2. Calyx lobes bearing a row of several sessile, rather persistent marginal glands on each side.
3. Leaves generally elliptic- to oblong-lanceolate, apex subcaudate-acuminate. Disk glabrous or almost so . . . . . **3. *var.* tenuinervium**
3. Leaves elliptic to obovate- or ovate-elliptic or -oblong, apex shortly obtusely acuminate or attenuate, or rounded. Disk ± densely hairy . . . . . **4. *var.* kemulense**

1. ***var.* bancanum. — Fig. 111, 112.**
Spreading shrub or small tree, 2–4(–6, rarely –10) m, up to 25 cm ø, bark grey. Branchlets angular, glabrous, or with sparse glandular dots. *Leaves* lax, elliptic to oblong-elliptic, more rarely subobovate-elliptic or oblong- or subovate-lanceolate, apex mostly broadly attenuate or subacuminate, obtuse, base broadly attenuate or cuneate to petiole, with 1 or 2 minute impressed marginal glands on each side at a short distance from the petiole, ± coriaceous, light to dark green and glossy above, paler beneath, red in young shoots, glabrous, laxly glandular-muriculate or -punctate beneath, entire, edge slightly revolute especially towards the base, (3.5–)4–6(–8) by (2–)2.5–4 cm, midrib slightly impressed above, obtusely prominent beneath, 5–7-plinerved from and from a little above the base, with 3–4 pairs of shorter and more spreading nerves from the upper ⅔ of the midrib, nerves anastomosing and slightly raised on both faces, or not rarely beneath only, reticulation ± lax, perceptible to various degree, often beneath only, rarely (sub)inconspicuous on both faces; petiole somewhat flattened, grooved above, 2–4 by 1.5–2 mm. *Racemes* from the upper 2–4 axils, suberect, the numerous, subsecund flowers laxly arranged; rachis slender, angular,

glabrous or laxly short-pubescent, 4–8 cm, perulae not seen. Pedicels rather slender, mostly glabrous, sometimes laxly puberulous, (3–)4–6(–10) mm, bract not seen; bracteoles 2, above the base, subulate, 1.5 mm, early caducous. *Calyx* glabrous to densely greyish puberulous, tube depressedly cup-shaped, base rounded, 1–1.5 mm, limb suberect initially, later spreading, *c.* 1.5 mm, deeply 5-partite, lobes triangular, subacute or bluntish, sometimes ending in a minute gland, always ciliate, bearing no or occasionally 1 pair of marginal subsessile glands. *Corolla* cylindric-urceolate, rather thin, white to greenish, or white with red flush, or pink, rarely even red, fragrant, glabrous outside, subdensely short-hairy in the lower half inside, (5–)6–7(–8) by 2.5(–3) mm, lobes obtuse, reflexed, *c.* 1 mm. *Filaments* subulate-linear, ± densely hairy, 2–3 mm; anther-cells broad-oblong, 0.8–1 mm, base broadly apiculate, whether or not with a pair of short dorsal spurs; tubules cylindric, ± as wide and long as, rarely a little shorter than the cells, and mostly at an angle with them, with several stalked or subsessile glands or gland-tipped hairs, ± transversely cut apically, pore often somewhat flaring. *Disk* laxly hairy or glabrous. *Style* slender, hairy in the lower ⅓ to ½, finally a little exserted. *Fruit* subglobose, *c.* 4 mm ø, glabrous or glabrescent, crowned by the ± erect subacute calyx lobes, becoming red-purple and juicy at full maturity.

Distr. *Malesia*: Sumatra (Westcoast), Lingga, Banka, Billiton, Anambas Is., Borneo.

Ecol. At sealevel on sandy beach, dunes or rocks by sea, also in (often secondary) forest (also '*kerangas*' forest) on acid sandy, loamy or marshy soil, or strongly leached laterite ('*padang*') and in low moss forest, on sandstone rocks in canyon, generally up to 600(–1500) m. *Fl. fr.* Jan.–Dec.

Vern. *Kapayan*, Dusun, *kayánpang*, *kendolu*, *mandjang marieung*, *mĕmpadang*, *rempadang*, M: Banka, *purai*, Billiton, *kaju tĕmau*, W. Borneo, *brang kanji*, Borneo: W. Kutei.

2. *var.* kunstleri (K. & G.) SLEUM. Blumea 11 (1961) 75. — *V. kunstleri* K. & G. J. As. Soc. Beng. 74, ii (1905) 65; RIDL. J. Str. Br. R. As. Soc. *n.* 79 (1918) 92. — *V. breviflos* RIDL. J. Fed. Mal. St. Mus. 6 (1915) 9. — *V. bancanum* (*non* MIQ. *s. str.*) K. & G. J. As. Soc. Beng. 74, ii (1905) 64, *p.p.*; RIDL. Fl. Mal. Pen. 2 (1923) 209, *p.p.*; BURK. & HENDERS. Gard. Bull. S. S. 3 (1925) 390.

Small terrestrial or epiphytic shrub or tree, up to 6 m. *Leaves* narrow-elliptic to lanceolate, apex long- or short-acuminate, tip bluntish, thin-coriaceous, 3.5–6(–7) by (1.3–)1.5–2.5 cm; petiole 2–4 by 1–1.5 mm. Pedicels slender, 2–4 mm. *Calyx* lobes very short and obtuse, fleshy, or calyx limb often merely wavy, hardly properly lobed, no sessile marginal glands present. *Disk* mostly glabrous, rarely laxly hairy.

Distr. *Malesia*: Sumatra (Atjeh; Eastcoast), Malay Peninsula.

Ecol. In the Malay Peninsula generally epiphytic, or terrestrial in forest borders, in Sumatra reported from recently devastated primary forest and from near solfataras, 900-1500 m, locally common. *Fl. fr.* Jan.–Dec.

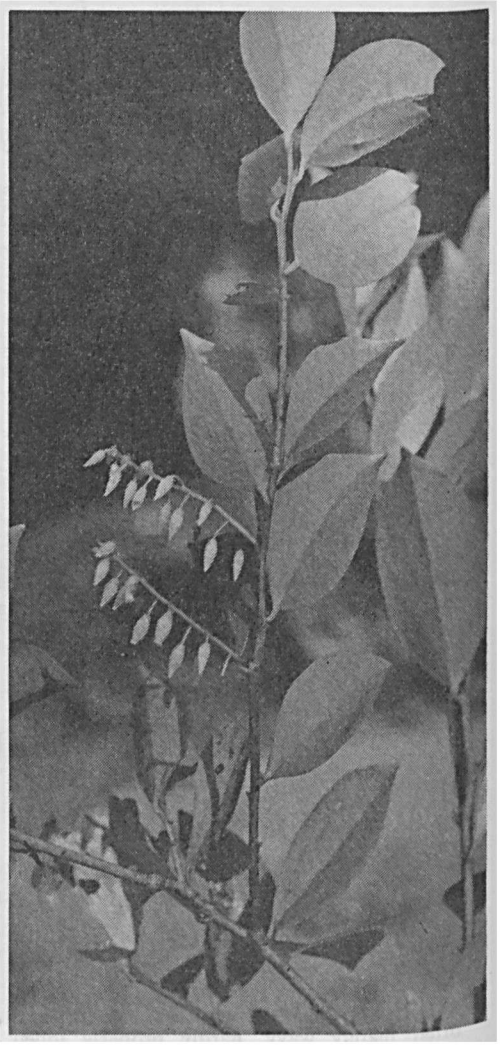

Fig. 112. *Vaccinium bancanum* MIQ. *var. bancanum*. Bako National Park near Kuching, Sarawak, on rocks near shore (SLEUMER 4680) (SLEUMER, 1963).

3. *var.* tenuinervium J. J. S. in K. & V. Bijdr. 13 (1914) 157, 159; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 3; SLEUM. Blumea 11 (1961) 75. — *V. bancanum* (*non* MIQ. *s. str.*) CLARKE, in Fl. Br. Ind. 3 (1882) 454, *p.p. quoad pl. malacc.*; RIDL. J. Str. Br. R. As. Soc. *n.* 39 (1903) 14; K. & G. J. As. Soc. Beng. 74, ii (1905) 64, *p.p.*; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 108; KOORD. Exk. Fl. Java 3 (1912) 19; BURK. & HOLTT. Gard. Bull. S. S. 3 (1923) 58; RIDL. Fl. Mal. Pen. 2 (1923) 209, *p.p.*; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 255; Gard. Bull. S. S. 4 (1928) 280; STEEN. Arch. Hydrobiol. Suppl. 11 (1932) 318;

Bull. Jard. Bot. Btzg III, 13 (1933) 53. — *V. micranthum* STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 190; MERR. En. Born. (1921) 467; HEINE, in Fedde, Rep. 54 (1951) 245 ('*micranthum*'). — *V. ardisioides* RIDL. J. Fed. Mal. St. Mus. 5 (1914) 37, *non* WERNH. 1916. — *V. kunstleri* (*non* K. & G.) RIDL. J. Fed. Mal. St. Mus. 6 (1915) 156. — *V. eburneum* RIDL. J. Fed. Mal. St. Mus. 7 (1916) 45; *ibid.* 10 (1922) 249; HENDERS. Gard. Bull. S. S. 4 (1928) 280. — *V. ardisiiflorum* RIDL. J. Str. Br. R. As. Soc. *n.* 79 (1918) 91 ('*ardisiiflora*'). — *V. wrayi* RIDL. J. Str. Br. R. As. Soc. *n.* 79 (1918) 92.

Differs from *var. bancanum* by generally narrower, elliptic- or oblong-lanceolate, more distinctly acuminate or subcaudate, often thinner *leaves*. *Calyx* mostly ± densely grey-tomentellous, its lobes bearing a string of small sessile or subsessile, yellowish glands all over the margin; these glands later ± caducous and mostly not present on the ripe fruit. *Corolla* white or pinkish, up to 7 by 4 mm. *Disk* laxly hairy, or mostly glabrous.

Distr. *Malesia*: Sumatra, Malay Peninsula, W. Java, Borneo (apparently not represented in Banka).

Ecol. Like *var. bancanum* a terrestrial or epiphytic shrub or treelet in montane forest or ridge forest on acid, sandy or quartzite soil, also in mossy forest, even in subalpine scrub, 600–1500(–2050) m, not on coastal sands or rocks near sealevel, except in the Bako National Park (near Kuching, Sarawak) where *var. tenuinervium* occurs on very acid sandy soil in open heath '*kerangas*' woodland, at 100–120 m. In Sumatra known from dry solfatara fields at *c.* 900 m, and once found at 200 m on Mt Manalese near Aek Buro (Bila, Eastcoast) in scrub forest.

Vern. *Kělab bulut*, Pahang, *kalek*, Sumatra: Westcoast.

Note. In some Javanese specimens the bract is partly persistent for a longer time than in specimens from Sumatra, Malay Peninsula and Borneo, in which it is (very) early caducous. *Var. tenuinervium* is kept here in a broad sense, based with more emphasis on the marginal glands on the calyx lobes, than on the shape and size of the leaves (which show a rather great variation) as it has been the case in the original description which was based on specimens from W. Java.

4. *var.* **kemulense** J. J. S. *ex* SLEUM. Blumea 11 (1961) 76.

Leaves ovate-elliptic, shortly obtusely acuminate, 3–4 by 1.5–2 cm. *Calyx* lobes at least initially with several sessile marginal glands at each side. *Disk* subdensely hairy.

Distr. *Malesia*: Borneo (Mt Kinabalu; Mt Kemul), in forest, 1525–1770 m.

Note. Forms approaching *var. kemulense* are found near solfataras in N. Sumatra and kept under *var. tenuinervium*.

159. **Vaccinium stenanthum** SLEUM. Blumea 12 (1963) 129.

Shrub or small tree, up to 5 m. Branchlets slender, obtusangular, glabrous. *Leaves* scattered, obovate, apex very broadly attenuate and blunt, or mostly rounded, very broadly cuneate towards the base, the latter rounded, basal glands inconspicuous, coriaceous, firm, laxly minutely glandular-setulose beneath, otherwise glabrous, entire, flat, 3.5–6(–6.5) by (1.5–)2–4.5(–5) cm, 5-nerved from the base, with an additional pair of nerves higher from the midrib, all nerves high curved-ascending, hardly or slightly prominently raised above, distinctly so beneath, as is the rather dense coarse reticulation; petiole rugulose, 2–3 by *c.* 1 mm. Sterile axillary buds subdeltoid or thick-subulate, 0.5–1(–1.5) mm, rather inconspicuous. *Racemes* erecto-patent, axillary, flowers laxly arranged, glabrous; rachis slender, 3–4 cm, in *fr.* to 8 cm. Pedicels slender at anthesis, 2–3 mm, in *fr.* 7–13(–15) mm. *Calyx* tube almost turbinate, 2 mm, lobes ovate, blunt, 1 mm, bearing a thickish, apical gland and a row of several minor ones on both sides, ciliolate-fimbriate. *Corolla* narrowly tubular, gradually narrowed in the upper part, rather fleshy, *c.* 8 by 2–2.5 mm, glabrous at both sides, lobes hardly 1 mm. *Filaments* linear below, narrowed upwards, white-villous to almost the top, *c.* 4 mm; anther-cells oblong, echinulate, with 2 dorsal spurs, 1 mm; tubules narrower, 0.5 mm, opening roundish and a little dilated, bearing a few stipitate glands. *Disk* thick, 10-lobed, glabrous below, densely white-hairy on top. *Style* columnar, densely subappressedly hairy to the lower ⅔, glabrous above, *c.* 7 mm. *Berry* globose, 5–6 mm ø.

Distr. *Malesia*: Borneo (Sarawak, Brunei).

Ecol. Both in mossy forest and in extreme '*kerangas*' heath forest on hard sandstone ridge, 260–1065 m. *Fl.* June, *fr.* Oct.

160. **Vaccinium luzoniense** VIDAL, Rev. Pl. Vasc. Filip. (1886) 168; CERON, Cat. Pl. Herb. Manila (1892) 105; MERR. Philip. J. Sc. 3 (1908) Bot. 377; En. Philip. 3 (1923) 250; COPEL. *f.* Philip. J. Sc. 42 (1930) 570, t. 4, f. 3–6; SLEUM. Blumea 11 (1961) 77.

Shrub or small tree, 2–4 m. Branchlets striate, tips reddish, younger parts laxly to subdensely covered with short, patent, bristle-like gland-tipped hairs which are also found on the rachis, and occasionally on the petioles. *Leaves* scattered, elliptic or oblong-elliptic, apex shortly (1–1.5 cm) obtusely acuminate, base broadly cuneate, the pair of basal glands small, though well visible on the slightly widened very base, coriaceous, pale, beneath sparsely glandular-punctulate, otherwise glabrous, entire, flat, or the very margin faintly revolute, 6–9 by 2.5–4(–4.5) cm, midrib flat or very slightly immersed above, prominent beneath, nerves *c.* 3 basal and suprabasal, high curved-ascending pairs, and several upper and shorter, more spreading ones, all distinctly raised on both faces as is the subdense reticulation; petiole flattened, grooved above, 5–7 by 1–1.5 mm. *Racemes* from the upper axils, ± erect, 7–9(–10) cm, lax-flowered, perulae ovate-acuminate, scarious; rachis angular, rather slender. Pedicels stoutish, a little curved, glabrous or sometimes with

sparse subsessile capitate glands, 8–10 mm, with 2 very early caducous subulate bracteoles; bract not seen. *Calyx* tube depressedly cup-shaped, rugulose, mostly with some capitate gland-hairs, 1 mm, limb hardly 1 mm, formed by 5 broad ovoid-deltoid obtuse lobes, each of which ends in a minute apical gland. *Corolla* urceolate-conical, glabrous at both sides, pink or red, 7–8 by 5 mm, very shortly 5-lobed. *Filaments* subulate-linear, laxly patently hairy especially towards the base, 3 mm; anther-cells broad-oblong, 1.2 mm, no spurs; tubules as wide as the cells, *c.* 0.4 mm, obliquely cut apically, the pore gaping widely. *Disk* prominent, glabrous or sometimes bearing some glandular hairs on the inner margin or on the apex of the ovary. *Style* glabrous, almost as long as the corolla. *Fruit* subglobular, blackish at full maturity, *c.* 8 mm ø, the upper third belted by the persistent calyx lobes, obscurely 10-ridged. *Seeds* linear, black, rugose, 1 mm.

Distr. *Malesia*: Philippines (Luzon: Mountain Prov.).

Ecol. In forested stream depressions and on ridges in the mossy forest, also on rocky banks by roadsides, 1500–2100 m. *Fl. fr.* April–July.

Vern. *Suliuag.*

161. Vaccinium tenuipes MERR. Philip. J. Sc. 3 (1908) Bot. 375; En. Philip. 3 (1923) 251; COPEL. *f.* Philip. J. Sc. 42 (1930) 571, t. 4, f. 7–8; SLEUM. Blumea 11 (1961) 77; *ibid.* 12 (1963) 130. — *V. sp.*, MERR. Philip. J. Sc. 2 (1907) Bot. 295.

Scandent, epiphytic or terrestrial shrub, up to 3 m. Branchlets slender, densely clad with fine, patent, soft hairs, mixed with longer and stiff, gland-capitellate ones in the younger, early glabrescent and greyish corticate in the older parts, subdensely leaved. *Leaves* ovate to elliptic-ovate, or lanceolate, apex shortly caudate-acuminate, tip bluntish, base mostly ± rounded, sometimes more broadly attenuate, coriaceous, generally glabrous except some gland-tipped hairs which may be present at the very base and along the margin in the lower part of the lamina, sometimes pubescent all over the whole undersurface, rarely laxly so on both faces initially, moreover sparsely glandular-muriculate or -punctate beneath, basal pair of minute impressed marginal glands at 1–2 mm distance from the petiole, entire, edge slightly to strongly revolute in dry specimens, 3–5 by 1–2.5 cm, midrib and 2 pairs of basal, high curved-ascending, and a few upper and shorter nerves slightly sunken or even faintly raised above, ± prominent beneath, though not rarely ± inconspicuous on both faces, reticulation lax above, more dense beneath, not much perceptible; petiole ± densely pubescent and glandular-setulose, 2–3 by 1 mm. *Racemes* from one or two upper axil(s), (2–)3–5 cm, laxly patently (3–)5–10-flowered; rachis slender, its indumentum as that of the branchlets. Pedicels slender, 1–2 cm, glabrous at least in the upper part, sometimes glandular-pubescent at or near the base, rarely so for the entire length; bracteoles lanceolate, early caducous, *c.* 1.5 mm; bract not seen. *Calyx* mostly glabrous, sometimes pubescent, tube broadly cup-shaped, 1.5–2 mm, lobes ± spreading, triangular-ovate, bluntish, ciliolate, *c.* 1 mm, no apical gland. *Corolla* narrow-conical urceolate, glabrous, varying from white to red-purple, *c.* 10 mm long, below 4–5 mm ø, upper half narrowed to *c.* 2 mm ø, lobes broadly ovate, 1 mm. *Filaments* subulate-linear, ± lanate at the broadened basal part, glabrous apically, 4–5 mm; anther-cells broad-oblong, 1.5 mm, not spurred; tubules as wide as the cells, 0.5 mm, obliquely truncate. *Disk* prominent, glabrous or slightly hairy. *Style* stoutish, glabrous or somewhat hairy below, *c.* 1 cm. *Fruit* subglobose, blackish when ripe, *c.* 4 mm ø. *Seeds* fusiform, dark brown, almost 2 mm.

Distr. *Malesia*: Philippines (Luzon, Mindoro, Panay, Negros).

Ecol. In primary forest, 600–1500 m; on Mt Pulog in mossy forest at 2600 m. *Fl.* Febr.–Sept.

Vern. *Tolog-tolog*, Negros, *likop*, Luzon.

162. Vaccinium filipes SCHLTR, Bot. Jahrb. 55 (1918) 176; SLEUM. *ibid.* 72 (1942) 252; Blumea 11 (1961) 77.

Erect epiphytic shrub, 0.6–1 m. Branchlets slender, patent-puberulous initially, glabrescent, laxly leaved. *Leaves* lanceolate to elliptic-lanceolate, long subcaudate-acuminate, subacute, base broadly attenuate to nearly rounded, 2 basal marginal glands minute, impressed, subcoriaceous, flexible, short-hairy on the petiole and the lower half of the midrib on both faces, glandular-punctate beneath, otherwise glabrous, entire, edge slightly revolute, 4.5–6.5 by 1–3.5 cm, midrib a little sunken above, prominent beneath, nerves 2 basal high curved-ascending, and several upper, much shorter pairs, somewhat prominent on both faces as is the fine rather dense reticulation; petiole short-pubescent, 3–5 by *c.* 1 mm. *Racemes* very lax and slender, few-flowered; rachis up to 4 cm. Pedicels subfiliform, glabrous, nodding, 1.5–2 cm, bract and bracteoles not seen. *Calyx* tube broadly cup-shaped, glabrous, rugulose, 1 mm, limb spreading, 5-lobed to almost the base, lobes broad-deltoid, subacute, 0.8 mm. *Corolla* ovoid, laxly glandular-muriculate outside, glabrous inside, blood red, 5–6 by *c.* 4 mm, lobes ovate, subacute, *c.* 1 mm. *Filaments* subulate, hairy, *c.* 1.8 mm; cells oblong, *c.* 0.8 mm, no spurs; tubules very short, transversely cut apically, pore round. Disk glabrous. *Style* minutely papillose-puberulous, *c.* 5 mm.

Distr. *Malesia*: East New Guinea (Sepik R. region: Schrader Mts, Hunstein and West Ra.).

Ecol. In mountain forest, 1000–2070 m. *Fl.* Aug.

163. Vaccinium molle J. J. S. Nova Guinea 12 (1914) 165, t. 51; *ibid.* 18 (1936) 117; SLEUM. Bot. Jahrb. 72 (1942) 248; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 481; SLEUM. Blumea 11 (1961) 77; *ibid.* 12 (1963) 130.

var. **molle.**

Lax, few-stemmed shrub, 0.5–2(–3) m, sometimes treelet up to 5 m, with few overhanging

branches. Branchlets rather robust, young parts greyish or yellowish velutinous, densely, sometimes subimbricately leaved. *Leaves* ovate to oblong- or elliptic-ovate, apex shortly attenuate or subacuminate, obtuse to nearly rounded, ending in a minute gland, base shallowly to ± deeply cordate, lobes not amplectent, with a marginal gland at both sides near petiole, subsessile, coriaceous, (dark green above, yellowish green below in fresh specimens, flush reddish), initially tomentose on both faces, glabrescent above with age, densely and ± persistently set with soft non-glandular and more laxly with muriculate-glandular hairs beneath, entire, edge ± revolute in dry specimens, 1.5–4 by (0.7–)1–1.5(–2.7) cm, 7-plinerved from and a little from above the base, 2 or 3 pairs of other upper nerves, all curved-ascending and anastomosing, ± impressed above, prominent beneath as is the midrib, reticulation rather obsolete; petiole (1–)2–3 by 1–2 mm. *Racemes* from the upper 1–4 axils, solitary, densely (8–)12–20-flowered, secund, densely ± hirsute and whether or not with scattered subclavate glandular hairs; rachis stoutish, 2–5(–6) cm. Pedicels rather robust, (4–)6–8(–10) mm, bract rather narrowly ovate-acuminate, 2–3(–4) mm, very early caducous. *Calyx* tube campanulate, 1.5–2 mm, limb suberect, 5-partite almost to the base, lobes ovate-triangular, obtuse, 1–1.5 mm, apical gland generally distinct. *Corolla* campanulate, creamy or greenish, densely or subdensely hairy and whether or not laxly glandular-hairy outside, glabrous inside, 5–6 mm long, *c.* 3 mm ø below, 5 mm ø at the lobes in dry, 7–8 by 6 mm in fresh specimens, lobes triangular, obtuse, erect or slightly recurved, *c.* 2 mm. *Stamens* 8 or 10; filaments linear, laxly hairy in the lower half, or sometimes subglabrous, papillose above, 2.2–3 mm; cells oblong, 1.2–1.3(–1.5) mm, no spurs; tubules erect, cylindric, narrower than the cells, 0.8(–1.1) mm, transversely cut distally, pore round, ± flaring. *Disk* laxly to subdensely hairy. *Style* slender, glabrous, 5–6 mm. *Fruit* subglobose, apex truncate, 5–6 mm ø, purple at full maturity.

Distr. *Malesia*: West New Guinea (Vogelkop Peninsula).

Ecol. In forest edge, or on open slope or summit, often found together with *Pteridium aquilinum* regrowths on burnt places and apparently rather fire-resistant, on sandy or clayey soil, 1200–2600 m. *Fl. fr.* Jan.–Dec.

Vern. *Mambau*, Kebar.

var. **mollissimum** (SLEUM.) SLEUM. Blumea 12 (1963) 131. — *V. mollissimum* SLEUM. Bot. Jahrb. 72 (1942) 266; Blumea 11 (1961) 77.

Rather dense shrub or treelet, 1–3 m, with suberect branches. *Leaves* rather dense, ovate or ovate-oblong, apex subacuminately attenuate, tip subacute or blunt, base subtruncate-rounded, sometimes in part subcordate in the same specimen. Bract oblong-lanceolate, membranous, up to 13 by 5 mm, generally caducous (sometimes more foliar and ± persistent during anthesis). *Corolla* narrowly campanulate, 4–5 mm long, 2–2.5 mm ø below, *c.* 3 mm ø at limb. *Style* 4–5 mm. Otherwise hardly different from *var. molle*.

Distr. *Malesia*: New Guinea (Wissel Lakes; Central Distr.: Main Range from Western Highlands to Mt Tafa; Morobe Distr.: Wau-Edie Creek-Mt Dickson area).

Ecol. In primary or secondary forest edge and in open hill sides, especially on eroded or moved ground as landslides, steep road cutting or old gold workings, along creeks, locally common especially in secondary vegetation, 1820–2770 m. *Fl. fr.* Jan.–Dec.

Vern. *Piepa*, Kapauku.

164. Vaccinium summifaucis SLEUM. Bot. Jahrb. 72 (1942) 251; Blumea 11 (1961) 80.

Scandent or epiphytic shrub. Branchlets angular, subpuberulent or glabrous, subdensely leaved. *Leaves* elliptic-oblong, sometimes subovate-elliptic, apex broadly obtusely attenuate to nearly rounded, base broadly attenuate into the petiole, pair of marginal small impressed glands almost at the base, subcoriaceous to coriaceous, rather stiff, glabrous, laxly glandular-punctate beneath, entire, edge subrevolute, 1.8–2.5(–3.5) by 1.1–1.5(–2) cm, midrib a little sunken above, obtusely prominent beneath, nerves 1–2 basal curved-ascending, and 2–3 upper and shorter, more spreading pairs, slightly raised on both faces, reticulation fine and lax, rather inconspicuous above, more visible beneath; petiole 2 by 1–1.5 mm. *Racemes* lax and few-flowered, in the upper 1–3 axils; rachis 1–1.5 cm, pubescent. Pedicels nodding, rather robust, laxly to subdensely set with non-glandular and gland-tipped hairs, which are also more densely found all over the calyx, 9–12 mm, 2 suprabasal minute bracteoles; bract not seen. *Calyx* tube campanulate, 1.5–2 mm, limb ± spreading, deeply 5-lobed, *c.* 2 mm, lobes deltoid-acuminate, subacute, or obtuse by a terminal gland hidden among the hairs. *Corolla* urceolate, *c.* 6.5 by 3 mm, yellowish tomentose outside except the very base, which is almost glabrous, laxly hairy inside, fleshy, pink, lobes short, obtuse. *Filaments* filiform, rather densely hairy below, glabrescent upwards, 2.5 mm; anther-cells oblong, 2 mm, no spurs; tubules cylindric, nearly as wide as the cells, 0.8–1 mm, subobliquely cut at the top. *Disk* glabrous or sparsely hairy on the inner margin. *Style* columnar, glabrous, 5 mm. *Fruit* globular, glabrous or practically so, 6–7 mm ø.

Distr. *Malesia*: East New Guinea (Owen Stanley Ra.).

Ecol. In forest, 2040–2440 m. *Fl.* Dec., Jan.

165. Vaccinium costerifolium SLEUM. Blumea 11 (1961) 77. — *V. varingiaefolium* [*non* (BL.) MIQ.] MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 38, *quoad specim. born.*; MERR. En. Born. (1921) 467.

Trailing or subscandent shrub, sometimes scrambling to a great height, with slender stems. Branchlets terete, 1–4 mm ø, laxly lenticellate, minutely patent-puberulous, often reddish in dry specimens, elongate, laxly leaved. *Leaves* oblong-elliptic or oblong, sometimes elliptic, apex shortly

gradually and obtusely attenuate, base broadly attenuate into the slender petiole, 1 or 2 rather small marginal glands a little above the base on each side, sometimes even with a few other upper ones, thin-coriaceous, glabrous, minutely laxly glandular-muriculate underneath, practically entire, edge but slightly revolute, 5–8 by 2–3.5 cm, upper leaves or those on the lateral branchlets similar in shape but gradually decreasing in size upwards to 1.5 by 0.5 cm and provided with more numerous marginal glands, all leaves sub-5-plinerved by 2 pairs of basal or 0.5–1 cm suprabasal high curved-ascending nerves, and occasionally with one similarly curved nerve which starts from the upper part of the midrib, all impressed above, prominent beneath, reticulation slightly raised on both faces, not rarely rather obscure; petiole rather slender, rugulose, 2–3 mm. *Racemes* from the axils of the younger part of the branchlets, ascending, laxly many-flowered; rachis slender or very slender, angular, minutely patent-puberulous as are the pedicels, eperulate at anthesis, 5–10 cm. Pedicels slender, (3–)4–5(–6) mm, bract lanceolate, 3–6(–8) by *c.* 2 mm, mostly already caducous at anthesis. *Calyx* densely short-pubescent and more laxly glandular-muriculate, tube cupular, 1–1.5 mm, limb suberect, deeply 5-partite, lobes deltoid, 2–2.5 mm, less densely hairy than the calyx tube, no apical gland. *Corolla* urceolate-tubular, a little contracted distally, membranous, pink to deep purple, sweet-scented, (8–)9–10 by *c.* 4 mm, puberulous outside and at base inside, lobes obtuse, suberect, *c.* 1 mm. *Filaments* linear, dilated above the base, densely subpatently hairy below, more laxly so upwards, glabrous distally, *c.* 3 mm; anther-cells oblong, granular, 1.2–1.3 mm, shortly obtusely 2-spurred dorsally; tubules cylindric, narrower than the cells, slightly dilated upwards, 1–1.3 mm, subobliquely cut apically, the back of each tubule extended into 1 or 2 very short and recurved teeth. *Disk* prominent, glabrous or laxly hairy. *Style* columnar, glabrous, 0.9–1 cm. *Fruit* subglobose, *c.* 6 mm ø, laxly pubescent, red, turning black.

Distr. *Malesia*: S. Borneo.

Ecol. In swamp forest or in open '*padang*' forest, on acid sandy soil, partly covered by peat, near sealevel, locally not rare. *Fl.* Jan., *fr.* Sept.

166. Vaccinium adenotrichum SLEUM. Blumea 12 (1963) 131.

Scandent epiphytic shrub. Branchlets obtusangular, glabrous. *Leaves* lax, obovate or oblong-obovate, apex ± rounded, base cuneate to and shortly decurrent on the petiole, basal pair of glands thick, coriaceous, glabrous except scattered glandular hairs or points beneath, entire, somewhat revolute especially towards the base, 6–8.5 by 2.5–5 cm, midrib flattish above, as thick as the petiole and obtusely prominent at the base, gradually decreasing upwards below, nerves 1–2 basal, steeply curved ascending nerves, which meet at the apex of the blade, other upper nerves 6–8 pairs rather straight from the midrib, curved distally and inarching with the basal nerve(s) before the edge, all slightly raised on both faces, reticulation rather dense, generally a little prominent beneath only; petiole flattened, 5–6 by *c.* 2 mm. *Racemes* from several upper axils, abbreviate, 5–8-flowered; rachis subdensely or more laxly glandular-muriculate, 0.5–1 cm; perulae ovate to oblong, membranous, ciliolate, 3–8 by 3–5 mm, early caducous. Pedicels stoutish, rather laxly glandular-muriculate below, more densely so and short-hairy upwards, 8–12 mm. *Calyx* all over densely glandular-muriculate and hairy, tube cup-shaped, base rounded, 1.5 mm, lobes triangular, acutish, ± spreading, 1.5 mm, no apical gland. *Corolla* urceolate, carmine, fleshy, 7–8 by 3–4 mm below, or 2–3 mm at the lobes, at outside glabrous at the very base, otherwise ± densely glandular-muriculate and above the middle also short-hairy, at the inside glabrous in the lower, densely long-hairy in the upper half, lobes ovate-oblong to oblong, ± erect, 1.5–2 mm. *Filaments* subulate, densely set with subsetular spreading long brownish hairs, 1.5 mm; anther-cells oblong, manifestly echinulate, 1.5 mm; tubules slightly narrower than the cells, 0.7 mm, obliquely cut apically. *Disk* prominent, glabrous. *Style* thick-columnar, glabrous, 4 mm.

Distr. *Malesia*: New Guinea (Vogelkop Peninsula: S. slope of Tamrau Ra.), once found.

Ecol. In riverine forest, 840 m. *Fl.* Nov.

167. Vaccinium rigidifolium SLEUM. Blumea 11 (1961) 79.

Shrub. Branchlets robust, densely shortly patent-hairy to subtomentose, densely leaved; axillary buds subglobose. *Leaves* elliptic, more rarely subovate or oblong-elliptic, apex shortly obtusely attenuate, or mostly rounded or nearly so, base ± rounded, though subabruptly contracted into the petiole at the very base, and provided there with 1 (or 2 distant) thick glands on each side, coriaceous, pubescent on both faces especially along the midrib and edge, and moreover laxly glandular-muriculate on both sides when young, gradually glabrescent, mature ones glabrous, still yellowish hairy in the lower part of the midrib, and glandular punctate on the intervenium beneath, or finally epunctate, entire, edge slightly or not revolute, 3–5(–6.5) by 2–3.3 cm, midrib rather narrowly impressed above, thick as the petiole and much prominent below, gradually decreasing and finally evanescent towards the top of the lamina beneath, nerves 4–5 pairs, lowest ones from the base, upper ones equally curved-ascending and anastomosing, all faintly or not impressed above, but slightly raised beneath, reticulation rather dense and visibly prominent beneath only; petiole much flattened, grooved above, densely hairy, 2–5 by 2–3 mm. *Racemes* from the upper, not rarely rather numerous axils, obliquely spreading, densely many-flowered, flowers nodding densely shortly yellowish hairy or -subtomentose; rachis angular, 4–8 cm by 1.5–2 mm, eperulate at anthesis. Pedicels 2–3 (in *fr.* 3–5 mm) by almost 1 mm, subtending bract not seen, bracteoles early

caducous, at or even above the middle of the pedicels, 1–1.5 mm. *Calyx* tube cupular, 1 mm, limb suberect, deeply 5-partite, lobes ovate-deltoid, 1–1.5 mm, glabrescent distally, with a few sessile, thick, blackish marginal glands sometimes joined into one marginal gland. *Corolla* cylindric-urceolate, slightly 5-angular, rather fleshy, pink, 6–7 by 2–3 mm below, shortly yellowish hairy initially outside especially below, exclusively so in the lower part inside, finally ± glabrescent outside, lobes obtuse, reflexed, 1 mm. *Filaments* subulate, dilated below, glabrous at the very base, villous above at the dilated part, more laxly so upwards, *c.* 2 mm; anther-cells oblong, *c.* 1.2 mm, no spurs; tubules much narrower than the cells, cylindric, erect, 1.3–1.5 mm, subobliquely cut apically, back wall of each tubule a little extended, ending in 2 teeth. *Disk* prominent, with erect dense hairs at upper margin. *Style* columnar, laxly to more densely hairy at the base, sparsely so or even glabrous upwards, 4.5–5.5 mm. *Fruit* depressed-globose, glabrescent, 5–6 mm ø, crowned by the laxly hairy disk which is not covered by the calyx lobes.

Distr. *Malesia*: N. Sumatra (Gajo Lands: Mt Lembuh; a similar form with larger leaves and longer petioles from Mts Kemiri and Losir).

Ecol. In ericoid ridge forest or summit scrub, also along stream in mossy forest, (1850–)2700–3500 m. *Fl. fr.* Febr.–March.

168. Vaccinium brachytrichum SLEUM. Blumea 11 (1961) 78. — *V. foxworthii* COPEL. *f.* Philip. J. Sc. 42 (1930) 580, *p.p.*

Shrub. Branchlets slender, angular, very shortly pubescent, subdensely leaved. *Leaves* elliptic, apex shortly obtusely attenuate or subacuminate, base ± broadly attenuate and very shortly decurrent into the petiole, a minute marginal subimpressed gland on each side at *c.* 1 mm from the petiole, thin-coriaceous, firm, glabrous, entire, edge slightly revolute especially towards the base, 2.5–3.5 by (1–)1.2–1.8(–2) cm, midrib a little sunken above, prominent beneath, nerves in 1(–2) basal or slightly suprabasal and 2–3 upper shorter, similarly curved-ascending and anastomosing pairs, mostly not much conspicuous above, slightly raised beneath, reticulation lax, a little prominent beneath only; petiole flattened, (1–)2 mm by 1–1.3 mm. *Racemes* solitary from the uppermost axils, laxly 5–8-flowered, densely short-pubescent or hirtellous in all outer parts; rachis rather slender, 2–3 cm, base included by a few ovate-acuminate perulae (*c.* 2 mm). Pedicels slender, 3–5 mm, caducously bibracteolate at the base, bract not seen. *Calyx* tube campanulate, 1.3 mm, limb erecto-patent, 1 mm, 5-lobed to almost the base, lobes ovate-acuminate, ciliate, here and there with a minute, marginal, sessile gland, but no apical one. *Corolla* urceolate, 5–6 by *c.* 2.5 mm, densely short-pubescent all over outside, and in the lower half inside, lobes obtuse, reflexed, 1 mm. *Filaments* subulate, densely hairy, 2.5 mm; anther-cells (perhaps not fully developed due to insects?) broadly ovate-oblong, 0.7 mm, no spurs; tubules narrower than the cells, *c.* 0.3 mm, curved inward, subobliquely cut apically, no glandular appendages. *Disk* densely hairy. *Style* slenderly columnar, densely hirsutulous to the lower ¾ part, 5 mm. Immature *fruit* globose, short-pubescent, *c.* 4 mm ø, crowned by the suberect calyx lobes and pubescent disk.

Distr. *Malesia*: Philippines (Palawan: on Mt Capoas), 1000 m. Once found. *Fl. fr.* April.

169. Vaccinium cuneifolium (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1062; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 37, *incl. var. acutum* MIQ. *l.c.*; BL. Fl. Jav. Pl. inéd. (1863–83) t. 20; KOORD. Minah. (1898) 514; Exk. Fl. Java 3 (1912) 19; KOORD.-SCHUM. Syst. Verz. 3 (1914) 100; J. J. S. in K. & V. Bijdr. 13 (1914) 136, *in text*; SLEUM. Blumea 11 (1961) 80. — *Thibaudia cuneifolia* BL. Bijdr. (1826) 861; HASSK. Cat. Hort. Bog. (1844) 161. — *Agapetes cuneifolia* (BL.) G. DON, Gen. Syst. 3 (1834) 863. — *V.* ? *bancanum* (*non* MIQ.) KOORD. Minah. (1898) 513.

Shrub or small tree, glabrous in all parts, 1–4 (–7) m. Branchlets angular, subdensely leaved. *Leaves* elliptic to obovate-elliptic, apex broadly obtusely attenuate or subacuminate, not rarely almost rounded, or rarely even slightly retuse, base ± broadly cuneate into the petiole, with 1 or 2(–3) impressed minute marginal glands on each side, mostly at some distance from the petiole, coriaceous, laxly blackish glandular-muriculate or -punctate beneath, entire, edge ± recurved, (3–)4–6 by 2–3(–3.5) cm, midrib rather flat above, prominent beneath, nerves 6–7 pairs, basal pair(s) steeply ascending, upper ones more spreading, faintly raised above, more distinctly so beneath, reticulation lax, sometimes rather inconspicuous on both faces as are not rarely also the nerves; petiole a little flattened, 4–6 by 1–1.5 mm. *Racemes* from the upper axils, ± erect or subpatent, many-flowered; rachis angular, striate, stiff, 4–7 cm, perulae caducous before anthesis. Pedicels rather stoutish, (1–)2–3 mm, bract and bracteoles not seen. *Calyx* tube subsemiglobose, 1 mm, limb spreading, 0.6 mm, 5-lobed almost to the base, lobes ovate-acuminate, subapiculate. *Corolla* subcylindric-oblong, pale green, not open in anthesis, but apparently early caducous as a whole, *c.* 5 by 2.5 mm. *Filaments* linear, hardly 1 mm; anther-cells oblong, 0.8–0.9 mm, no spurs; tubules as wide as the cells, *c.* 0.4 mm, nearly transversely cut apically, muticous. *Disk* annular, not much prominent. *Style* rather slender, *c.* 2 mm. Immature *fruit* globose, with several longitudinal ribs, 2–2.5 mm ø, crowned by disk and calyx lobes.

Distr. *Malesia*: NE. Celebes (Minahasa: Mt Klabat and other nearby craters).

Ecol. In open secondary forest, grassland or edge of craters, on fertile volcanic sandy soil, locally common, 1000–2000 m. *Fl.* Jan.–July, *fr.* Jan.–Febr.

Vern. *Kĕmes ĕmpung*, Klabat, Ts, *wètĕs rintèki*, Tt, *posi-posi rintek*, Tb.

170. Vaccinium ambivalens SLEUM. Blumea 12 (1963) 132.

Shrub, 3–4(–5) m. Branchlets obtusangular, glabrous. *Leaves* laxly arranged, elliptic or more rarely partly in the same specimen elliptic-oblong, apex shorter or longer (1–2 cm) obtusely or mostly subacutely acuminate, base cuneate and slightly decurrent on the petiole, the pair of marginal glands small, impressed, found at or in a short distance from the base, coriaceous, laxly appressedly gland-hairy below, glabrous otherwise, entire, flat, 6–9(–12) by (2–)3–5(–5.5) cm, 9–11-plinerved from and from somewhat above the base, midrib slightly impressed above, prominent beneath, nerves high curved-ascendent, anastomosing before the edge, slightly though distinctly raised on both faces, reticulation dense, very conspicuous, a little prominent on both faces especially beneath; petioles dorsally compressed, grooved above, 5–8(–9) by 1–1.5 mm. *Racemes* from the penultimate axil, solitary, laxly (4–)5–8-flowered, subsecund; rachis rather slender, laxly glandular-muriculate, finally glabrescent, 1.5–3(–4) cm; perulae membranous, ovate or elliptic-ovate, apiculate, glabrous, very early caducous, 0.7–1 by 0.5–0.7 cm. Pedicels robust, ± curved, laxly to very laxly glandular-muriculate, 6–10 mm, bract thick-membranous, lanceolate-oblong, *c.* 1 cm, very early going; bracteoles not observed. *Calyx* tube cup-shaped, base rounded, 2–2.5 mm, densely clothed with short hairs and rufescent muriculate glands, lobes erecto-patent, broad-ovate, subacute, ciliolate, but laxly hairy and muriculate or glabrous distally, 1.5 mm, no apical gland. *Corolla* urceolate-cylindric, fleshy, white to pink, glabrous at both sides, *c.* 7 by 4 mm, lobes reflexed, 1 mm. *Filaments* linear, laxly very shortly and patently hairy initially below, glabrous upwards, or quite glabrous at full anthesis, 2–2.5 mm; anther-cells oblong, papillose, 1.5 mm; tubules almost half as wide as the cells, 0.8 mm, pore oblique. *Disk* glabrous. *Style* slenderly columnar, glabrous or laxly to subdensely set with spreading hairs, 5–6 mm. Submature *fruit* globular, apex truncate, laxly gland-muriculate and short-hairy, *c.* 7 mm ø.

Distr. *Malesia*: West New Guinea (Vogelkop Peninsula: E. part of Tohkiri Ra.; Wandammen Peninsula: Wondiwoi Mts).

Ecol. Terrestrial in mossy *Nothofagus-Myrtaceae* forest at 920–1800 m. *Fl. fr.* March, Oct.

171. Vaccinium vidalii MERR. & ROLFE, Philip. J. Sc. 3 (1908) Bot. 374; MERR. En. Philip. 3 (1923) 252; COPEL. *f.* Philip. J. Sc. 42 (1930) 582, t. 5, f. 10–11; SLEUM. Blumea 11 (1961) 80.

Shrub, 2.5–5(–10) m, sometimes of strangling habit. Branchlets slender, patently hairy at the ultimate obtusangular parts and the petioles, terete and early glabrescent below, greyish corticate, subdensely leaved. *Leaves* oblong-ovate, elliptic-ovate or oblong-lanceolate, mostly widest below the middle, apex rather shortly subcaudate-acuminate, tip bluntish, base broadly attenuate into the petiole, coriaceous, patently hairy at midrib beneath (immature), later glabrous with scattered muriculate glands beneath, not rarely lustrous on both faces, with several spaced minute, impressed glands along margin at least in its lower ⅔, thus becoming faintly crenulate, margin slightly revolute (dry), 2.5–4 by (0.8–)1–1.5 cm, midrib ± strongly impressed above, sharply prominent beneath, nerves 2 basal or slightly suprabasal, high curved-ascending, and 3–4 shorter upper, more spreading pairs, all anastomosing and very little raised above, more distinctly so beneath, reticulation lax and rather indistinct, sometimes quite obsolete; petiole flattened, 2(–3) by 1 mm. *Racemes* from the upper 2 or 3 axils, laxly (3–)4–8-flowered, glabrous; rachis slender, 1–3(–4) cm, eperulate at anthesis. Pedicels slender, 1–1.5 cm, bract and bracteoles not seen. *Calyx* tube semi-globose, base suddenly contracted into a kind of short foot, a little contracted at the limb too, rugulose, *c.* 2 mm, limb low, hardly 0.5 mm, wavy or shortly 5-lobed, lobes obtuse, ciliate, provided with a thick apical gland. *Corolla* urceolate, thin, glabrous at both sides, white in general, sometimes red, (4–)5 by 3(–3.5) mm, lobes deltoid, subacute, reflexed, 0.7–1 mm. *Filaments* subulate-linear, lanate, 1.5 mm; anther-cells broad-oblong, *c.* 1.2 mm, with 2 dorsal spurs set in a nearly right angle (0.5 mm); tubules cylindric, half as wide as the cells, 0.6–0.7 mm, subtransversely cut distally, pore almost round and a little flaring. *Disk* very prominent, densely pubescent. *Style* slenderly columnar, glabrous, 3–4 mm. *Fruit* globose, 4–5 mm ø, crowned by the rather bulky disk which surpasses the calyx lobes. *Seeds* brown, *c.* 1 mm.

Distr. *Malesia*: Philippines (Luzon).

Ecol. On exposed ridges in the mossy forest, (300–)850–2000 m.

Vern. *Kamiling*, *malakamling*, Sbl.

172. Vaccinium amphoterum SLEUM. Blumea 11 (1961) 81.

Shrub or small tree, 1–6(–12) m. Branchlets erect, not rarely 2–4 closely together at the top of the branches, younger parts subterete, striate and puberulent, older ones early glabrescent and covered with cork. *Leaves* rather densely set, elliptic or subovate-elliptic, apex subabruptly acuminate for 0.5–1 cm, subacute, base ± broadly attenuate into petiole, with 1 or 2 marginal, deeply impressed glands a little above the base on each side, furthermore with several remote less distinct marginal glands, coriaceous, laxly minutely glandular-muriculate beneath, otherwise glabrous, 3–4.5 by 2–2.5(–2.8) cm, very margin a little revolute, midrib impressed above, at base beneath as thick as the petiole, gradually decreasing upwards, nerves 2 basal or slightly suprabasal and ascendent, and 2–3 upper shorter pairs, all curved and anastomosing, minutely sunken above in almost fully grown leaves, prominent beneath, reticulation rather dense, slightly raised beneath only; petiole flattened and grooved above, initially puberulent, 4–7 by *c.* 1 mm. *Racemes* from the upper 2–3 axils, suberect, laxly 6–12-flowered, flowers secund; rachis angular, rather slender, minutely patently puberulous and sparsely glandular-muriculate, 3–5(–6) cm, eperulate at

anthesis. Pedicels rather stoutish, not hairy, very laxly glandular-muriculate below, more densely distally, 7–11 mm, bract oblong, acute, foliaceous, membranous, early caducous or ± persistent, 8–12 by 2–4 mm; bracteoles not seen. *Calyx* cup-shaped, base rounded, ± densely clothed with minute non-glandular hairs and muriculate glands, tube 1–1.5 mm, limb 0.5 mm, margin wavy or very shortly obtusely 5-lobed, lobes often merely indicated by the thick, may be penicillate apical glands. *Corolla* tubular-urceolate, a little fleshy, pinkish, glabrous at both sides, 7–8 by 3–4 mm, lobes deltoid, obtuse, hardly 1 mm, finally reflexed. *Filaments* subulate-linear, densely hairy below, glabrous distally, *c.* 3 mm; anther-cells oblong, 1–1.2 mm, no spurs; tubules erect, cylindric, slightly narrower than the cells, *c.* 0.8 mm, obliquely cut distally, the back of each tubule extending into a short tooth. *Disk* depressed, laxly or densely erect-hairy at the inner margin. *Style* columnar, glabrous, *c.* 7 mm, not exserted. *Fruit* depressed-globose, pubescent and glandular-muriculate, 5–6 mm ø, calyx lobes mostly inflexed.

Distr. *Malesia*: SE. New Guinea (Milne Bay Distr.: slopes of Mt Dayman in Maneau Ra.).

Ecol. In dry edges or ridges of stunted mossy forest, and plentiful there as substage tree or in canopy layer, or frequent shrub in ferny regrowth of the burned mossy forest, 2230–2750 m. *Fl. fr.* May–June.

173. Vaccinium banksii MERR. Publ. Gov. Lab. Philip. *n.* 35 (1906) 54; Philip. J. Sc. 3 (1908) Bot. 372; En. Philip. 3 (1923) 248; COPEL. *f.* Philip. J. Sc. 42 (1930) 590; SLEUM. Blumea 11 (1961) 81.

Shrub, (0.5–)1–7 m, or treelet, trunk up to 20 cm ø breast high. Branchlets erect, angular, youngest parts puberulent and sparsely glandular-muriculate, older ones early glabrescent and corticate, subdensely leaved. *Leaves* elliptic to oblanceolate-elliptic, apex shortly and broadly attenuate or subacuminate, generally obtuse, rarely subacute, base cuneate into the petiole, bearing a conspicuous marginal gland on each side at some distance from the petiole, and several other, often less distinct or rather obscure ones at intervals of *c.* 5 mm up to the apex, coriaceous laxly glandular-muriculate or -punctate beneath, otherwise glabrous, the very edge a little revolute, (2.5–)3–4(–5) by (0.8–)1–1.6 cm, midrib slightly or not sunken above, obtusely prominent beneath, nerves 2 basal, steeply ascending, and 3–4 upper, shorter and more spreading pairs, all subinconspicuous above, slightly raised beneath as is the rather dense reticulation; petiole 2–3 by 1 mm. *Racemes* from the upper axils, laxly (4–)5–12-flowered, suberect, rather densely patently short-hairy and more laxly glandular-muriculate in all outer parts, the corolla excepted; rachis rather stoutish, eperulate at anthesis, (1.5–)2–3(–4) cm. Pedicels rather robust, 3–5(–6) mm, bract and bracteoles not known. *Calyx* tube broadly cup-shaped to almost patellar, hardly 1 mm, base subtruncate, limb erecto-patent, deeply 5-lobed, lobes deltoid, blunt or subacute, 1–1.3 mm, dorsally less muriculate than the calyx tube, with a thick apical gland. *Corolla* urceolate, gradually narrowed upwards, rather fleshy, red, glabrous at both sides, 7 by 2.5–3 mm, lobes obtuse, reflexed, *c.* 1.5 mm. *Filaments* subulate-linear, densely hairy, hardly 1.5 mm; anther-cells broad-oblong, no spurs, 0.8 mm; tubules as wide as the cells, 0.5 mm, obliquely cut apically, the back wall of each tubule extended into a broad acute tooth. *Disk* laxly to subdensely hairy. *Style* thick-columnar, glabrous, *c.* 6 mm. *Fruit* depressed-globose, *c.* 5 mm ø, pubescent, crowned by the rather bulky and hairy disk.

Distr. *Malesia*: Philippines (W. Negros: Canlaon volcano).

Ecol. On ridges, in the mossy forest, 1300–2000 m.

Vern. *Dusong.*

174. Vaccinium crenatifolium SLEUM. Blumea 12 (1963) 133.

Laxly branched shrub, (1.5–)2–4 m, practically glabrous. Branchlets reddish, angular, rather slender, laxly leaved; axillary flower buds globose, perulae ovate. *Leaves* narrowly elliptic or oblong, apex shortly bluntly acuminate, base cuneate to and a little decurrent on the petiole, with regular, 2–3 mm spaced impressed blackish crenations, laxly glandular-muriculate or -punctulate below, 3–5(–5.5) by 1.5–2(–2.7) cm, midrib ± manifestly impressed above, raised beneath, nerves 2–3 basal and slightly suprabasal and 1 or 2 pairs of upper nerves, all steeply curved-ascendent and a little prominent on both faces, or not rarely rather obscure above, reticulation lax, ± distinctly raised beneath, or sometimes inconspicuous; petiole reddish, rugulose, grooved above, 4–5(–6) by 1–1.5 mm. *Racemes* from the upper 1–3 axils, obliquely erect, subsecund, flowers nodding, rather numerous; rachis angular, rather slender, (1.5–)2–3 cm, no perulae at flowering time. Pedicels ± robust and curved, 3–5 mm, bracts or bracteoles not seen. *Calyx* green, tube cup-shaped, base subtruncate, 1–1.3 mm, lobes ovate-triangular, ciliolate, the apical gland green, glabrous, rather thick. *Corolla* urceolate-cylindric, dirty reddish, greenish or greenish creamy, often suffused with red, sometimes pink, *c.* 5 mm long, 2 mm ø (dry), very shortly glandular-muriculate outside in bud, quite glabrous at both sides at anthesis, lobes reflexed, paler or white, hardly 1 mm. *Filaments* glabrous at the very base, slightly dilated above, villous almost to the top, 1.5 mm; anther-cells oblong, angular, echinulate, 0.7 mm; tubules slightly narrower than cells, 0.5 mm, obliquely cut apically. *Disk* yellowish, glabrous. *Style* rather slender, glabrous, 4–5 mm. Mature *fruit* globose, *c.* 4 mm ø, finally dark blue-purple.

Distr. *Malesia*: NW. New Guinea (Vogelkop Peninsula: crest of the Nettoti Ra.).

Ecol. In edge of mossy forest, or in more dry (also secondary) thickets along path across mossy crest forest, 1750–1960 m. *Fl. fr.* Nov.–Dec.

Vern. *Itiu*, Kebar.

175. Vaccinium apophysatum SLEUM. Blumea 11 (1961) 82. — *V.* ? *vidalii* (*non* MERR. & ROLFE) LAM & HOLTH. Blumea 5 (1942) 224.

Terrestrial much-branched shrub, up to 3 m. Branches terete, robust, with sparse lenticels. Branchlets rather slender, tips puberulous, glabrescent, subdensely leaved. *Leaves* elliptic to oblong, sometimes subobovate-elliptic, apex obtusely attenuate to rounded, base broadly attenuate or almost rounded, subcoriaceous, glabrous, crenulate by 5–8 impressed glands on each side, 1.5–2.5(–3.5) by (0.8–)1–1.5(–2) cm, midrib and nerves slightly raised on both faces, nerves 4–5 pairs, anastomosing, reticulation subinconspicuous; petiole rugulose, 1–2 mm. *Inflorescence* (in young *fr.*) quite glabrous; racemes laxly 3–5-flowered; rachis angular, slender, 1–2 cm. Pedicels rather slender, 6–8(–15) mm, bract and bracteoles not seen. *Calyx* tube campanulate, base suddenly and very shortly, though distinctly contracted into a kind of foot, 5-angular (dry), ± contracted below the limb, 1–1.5 by *c.* 2 mm, limb erecto-patent, deeply 5-partite, hardly 1 mm, lobes broad-ovate, apex rounded, ciliate, apiculate by a distinct gland. *Corolla* cylindric-urceolate, thin, white, pink or red, glabrous at both sides, 5 by *c.* 2.5 mm, lobes obtuse, reflexed, hardly 1 mm. *Stamens* 8, *c.* 2.8 mm; filaments subulate, subdensely long-hairy, 1.8 mm; cells broad-oblong, *c.* 0.8 mm, no spurs; tubules a little narrower than the cells, obliquely truncate apically, *c.* 0.8 mm. *Style* glabrous, 4 mm. *Disk* glabrous. Submature *fruit c.* 5 mm ø.

Distr. *Malesia*: N. Moluccas (Talaud Is.: E. slope of Mt Piapi on Karakelang).

Ecol. On open sunny slope, *c.* 400 m, locally common. *Fl.* May.

176. Vaccinium woodianum COPEL. *f.* Philip. J. Sc. 42 (1930) 591; SLEUM. Blumea 11 (1961) 82. — *V. banksii* (*non* MERR. 1906) MERR. Philip. J. Sc. 2 (1907) Bot. 255, 293.

Terrestrial shrub, *c.* 1 m. Branchlets rather slender, stiff, angular, glabrous. *Leaves* dense, elliptic to obovate-elliptic, sometimes obovate, apex broadly obtusely attenuate, base ± cuneate and somewhat decurrent, coriaceous, sparsely glandular-punctate beneath, otherwise glabrous, crenulate by impressed glands, very edge slightly revolute, 2–3(–3.5) by 1–1.5 cm, midrib a little sunken above, strongly obtusely prominent beneath, nerves 2 basal or suprabasal and 2–3 upper shorter pairs, all curved-ascending and anastomosing, faintly raised on both faces, reticulation hardly prominent or visible beneath; petiole flattened dorsally, 2–3 by *c.* 1 mm. *Racemes* from the uppermost 1 or 2 axils, laxly 3–5-flowered, glabrous in all outer parts; rachis slender, 1–2 cm, eperulate. Pedicels slender, *c.* 7 mm. *Calyx* tube cup-shaped, rugulose, rather shining, 1 mm, limb suberect, deeply 5-lobed, lobes ovate, obtuse, ciliolate, 1 mm, with a distinct apical gland. *Corolla* urceolate, red, glabrous at both sides, 5 by *c.* 2.5 mm, lobes ovate, obtuse, reflexed, *c.* 1 mm. *Filaments* linear, pubescent; anther-cells lanceolate, no spurs, *c.* 1.5 mm including the tubules, the latter short, obliquely cut apically. *Disk* rather bulky, ± densely set with short erect hairs. *Style* glabrous, *c.* 4 mm.

Distr. *Malesia*: Philippines (Mindoro: Mt Halcon), 2700 m. Once found.

Vern. *Kátmo.*

Note. In the original collection the flowers are ± galled.

177. Vaccinium cumingianum VIDAL, Rev. Pl. Vasc. Filip. (1886) 167; MERR. Philip. J. Sc. 1 (1906) Suppl. 112; *ibid.* 3 (1908) Bot. 375; En. Philip. 3 (1923) 248; COPEL. *f.* Philip. J. Sc. 42 (1930) 584, t. 6, f. 1–3, *incl. var. tayabasense* COPEL. *f. l.c.* 585; SLEUM. Blumea 11 (1961) 82. — *V. microphyllum* (*non* BL.) F.-VILL. Nov. App. (1880) 121, *p.p.* — *V. sp.* (*aff. V. coriaceo*) VIDAL, Sinopsis Atl. (1883) 30, t. 60, f. C. — *V. sp.*, VIDAL, Phan. Cuming. Philip. (1885) 21, 123.

KEY TO THE VARIETIES

1. Calyx lobes ± obscure, only marked by an apical gland.
2. Leaves with 1–2(–3 or –4) remote marginal glands on either side of the lower half of the lamina . . . . . **1. *var.* cumingianum**
2. Leaves glandular-crenulate all along the margin . . . . . **2. *var.* igorotorum**
1. Calyx lobes well developed.
3. Leaves narrow-elliptic or lanceolate, generally 2.5–4 cm long. **3. *var.* marivelesense**
3. Leaves elliptic-oblong or narrowly elliptic-obovate, generally 1.5–2 cm long **4. *var.* pyriforme**

1. *var.* cumingianum.

Shrub or small tree, 1–7(–10, –15) m, generally terrestrial. Branchlets slender, tips puberulent, subangular, striate, older parts glabrescent and early greyish corticate, subdensely to densely leaved. *Leaves* narrow-elliptic or ± lanceolate, apex shortly to more longish acuminate (very tip callous and bluntish), base ± cuneate, provided with 1 or mostly 2(–3–4) spaced small marginal glands in the basal half on each side, subcoriaceous, dull, glabrous, laxly glandular-punctate beneath, entire, edge mostly a little recurved, (1.5–)2.5–3.5(–4) by (0.5–)0.7–1.5 cm, midrib narrow and somewhat impressed above, prominent beneath, nerves 1–2 basal, and several upper shorter pairs, all high curved-ascending and anastomosing, faintly or not visible above, slightly raised beneath, reticulation subdense and mostly but slightly conspicuous beneath; petiole reddish, *c.* 2 by 0.5 mm. *Racemes* from the upper 1–2 axils, suberect, laxly (3–)5-flowered, glabrous; rachis slender, (0.5–)1–2.5(–4) cm, eperulate at anthesis. Pedicels rather stoutish, glabrous or with a few stalked glands below the calyx, (2–)4–6(–12) mm; bract and bracteoles not seen. *Calyx* tube cup-shaped, base rounded, glabrous, 1(–1.5) mm, limb low (0.5 mm) and fleshy, wavy, lobes obscure, marked by an apical gland. *Corolla* tubular-urceolate, thin,

glabrous outside, laxly to subdensely long-hairy in the lower part inside, white, pink or red, 5(–6) by *c.* 2.5 mm, lobes obtuse, reflexed, hardly 1 mm. *Filaments* subulate-linear, densely hairy, 2–2.5 mm; anther-cells oblong, 1.3–1.5 mm, generally no spurs; tubules cylindric, nearly half as wide as the cells, erect, divergent, 0.8–1 mm, subobliquely cut apically, pore almost orbicular, the back wall sometimes extended into a very short tooth. *Disk* prominent, sparsely to subdensely pubescent. *Style* columnar, glabrous, *c.* 5.5 mm, finally a little exserted. *Fruit* depressed-globose, 5–6 mm ø, dull and nearly blackish when ripe.

Distr. *Malesia*: Philippines (Luzon).

Ecol. In mountain forest, especially mossy forest, locally common on exposed ridges, (600–)1100–2000 m. *Fl.* Jan.–Dec.

Vern *Daneodu, gutung, itangan, karang*, Ig., *daniri*, Tag., *darusarip*, Neg.

2. *var.* **igorotorum** COPEL. *f.* Philip. J. Sc. 42 (1930) 586; SLEUM. Blumea 11 (1961) 83.

Leaves narrow-elliptic, the entire margin distantly glandular-crenulate, generally 2.5–3.5 cm long. *Calyx* lobes ± obsolete.

Distr. *Malesia*: Philippines (Luzon: Mountain Prov.).

3. *var.* **marivelesense** COPEL. *f.* Philip. J. Sc. 42 (1930) 586; SLEUM. Blumea 11 (1961) 83. — *V. igorotorum* COPEL. *f. ex* ELM. Leafl. Philip. Bot. 9 (1933) 3142, *nom. nud.*

Leaves in shape as in *var. cumingianum*, but generally 2.5–4 cm long, the marginal glands restricted to the lower half of the lamina. *Calyx* lobes distinct, broadly ovate-rounded, ciliate, *c.* 1 mm.

Distr. *Malesia*: Philippines (Luzon: Bataan, Zambales and Pampanga Prov.).

4. *var.* **pyriforme** (MERR.) COPEL. *f.* Philip. J. Sc. 42 (1930) 586; SLEUM. Blumea 11 (1961) 83. — *V. pyriforme* MERR. Philip. J. Sc. 2 (1907) Bot. 295; *ibid.* 3 (1908) Bot. 373; En. Philip. 3 (1923) 251.

Leaves elliptic-oblong or narrowly elliptic-obovate, glandular-crenulate all along the margin, generally 1.5–2 cm long. *Calyx* lobes well developed.

Distr. *Malesia*: Philippines (Mindoro: Mt Halcon; Panay: Mt Bulilao; Luzon: Albay Prov.: Mt Mayon; Camarines Norte and/or Camarines Sur Prov.).

178. **Vaccinium gracile** J. J. S. Med. Rijksherb. *n.* 25 (1915) 12; Nova Guinea 12 (1917) 531; *ibid.* (1918) t. 220; SLEUM. Bot. Jahrb. 72 (1942) 254; Blumea 11 (1961) 83.

Epiphytic shrub. Branchlets elongate, slender, sparsely set with muriculate glandular hairs and finely patent-puberulous in the youngest parts, early glabrescent; axillary buds ovoid, acute, minute. *Leaves* laxly arranged, ovate, for 3–4 cm narrowly caudate-acuminate, subacute, base broadly attenuate or rounded in general, though shortly contracted into the petiole at the very base, with 2 or 3(–4) spaced pairs of marginal glands in the basal half of the blade, subcoriaceous, flexible, shining, with lax longish, glandular, muriculate, appressed hairs especially at the midrib and nerves beneath, otherwise glabrous, entire, edge slightly revolute, 6.5–10 by 1.8–3.7 cm, midrib narrowly sunken above, prominent beneath, nerves 2–3 basal or slightly suprabasal, high curved-ascending and several upper shorter, more spreading pairs, all anastomosing and slightly raised on both faces as is the dense reticulation; petiole 3–6 by 1 mm, grooved above, initially puberulent. *Racemes* in the upper 3 or 4 axils, very laxly 8–12-flowered; rachis slender, quite glabrous as are the pedicels. 2.5–4.7 cm, eperulate; flowers nodding, on slender pedicels (1.2–1.7 cm) which bear some muriculate subclavate glands distally. *Calyx* glabrous, tube cylindric, base obtuse or truncate, 2.5–3 by 2 mm, limb suberect, low, lobes broadly triangular, exceptionally bearing an apical gland, ciliate, 0.5 mm. *Corolla* elongate-conical or suburceolate, contracted in the upper $^2/_5$, rather fleshy, fiery red with pale lobes, glabrous outside, pubescent in the lower ⅓ inside, (1.1–)1.2–1.4 by 0.3 cm below, lobes ovate-triangular, recurved, *c.* 0.8 mm. *Filaments* linear, dilated and densely hairy below, less pubescent or glabrescent upwards, 3–3.5 mm; anther-cells oblong, *c.* 1 mm, no spurs; tubules cylindric, as wide as the cells or a little widened upwards, almost transversely cut distally, 0.5 mm. *Disk* laxly pubescent at the inner margin. *Style* columnar, densely subappressed-pubescent below, less so to the lower ⅔ part.

Distr. *Malesia*: West New Guinea (Hellwig Mts), on peaty soil at 1700 m. Once found. *Fl.* Dec.

179. **Vaccinium tubiflorum** J. J. S. Nova Guinea 12 (1914) 166, t. 52 A; SLEUM. Bot. Jahrb. 72 (1942) 250; Blumea 11 (1961) 83.

Shrub or treelet, *c.* 3.5 m. Branchlets obtusangular, glabrous. *Leaves* lax, elliptic, apex broadly attenuate, subacute or rather bluntish, base cuneate and a little decurrent into the broadened petiole, the gland on each side strictly basal, coriaceous, glabrous, sparsely glandular punctate beneath, entire, edge revolute, (3–)4–7 by (1.3–)2–3 cm, midrib obtusely sunken above, prominent beneath, as wide as the petiole below, gradually decreasing upwards, nerves 2 basal or slightly suprabasal, high ascending and 2–3 upper shorter, more spreading pairs, all anastomosing and slightly raised on both faces, reticulation rather dense, rather conspicuously prominent on both sides; petiole 4–6 by 1–1.5 mm. *Racemes* in the upper (1–)2(–3) axils, laxly 2–4-flowered; rachis rather slender, flexuous, glabrous, 0.7–1 cm, eperulate. Pedicels ± stoutish, very sparsely muriculate, 6–9 mm; bract and bracteoles not seen. *Calyx* tube cup-shaped, base ± truncate, rather densely gland-muriculate and sparsely minutely hairy especially at the base, 1.5–2 mm, limb suberect, deeply 5-partite, lobes ovate, glabrous on both sides, ciliate, 1 mm, the apical gland ±

conspicuous. *Corolla* tubular, slightly zygomorphous, rather fleshy, pink, glabrous at both sides, *c.* 2 by 0.5–0.6 cm, lobes ovate-triangular, obtuse, finally recurved, 3–4 mm. *Filaments* subulate-linear, subdensely patently hairy or almost villous, 2.5–3 mm; anther-cells oblong, 1.8–2 mm, no spurs; tubules very short, as wide as the cells, obliquely cut distally, muticous, hardly 1 mm. *Disk* bulky, glabrous. *Style* rather slender, sparsely patent-pubescent especially in the lower half, as long as the corolla or finally a little exserted.

Distr. *Malesia*: NW. New Guinea (Arfak Mts, Anggi Lakes), on moss-covered granite, at 2500 m. One collection. *Fl.* April.

180. Vaccinium debilescens SLEUM. Bot. Jahrb. 72 (1942) 257; Blumea 11 (1961) 83.

Shrub or very slender tree, 1–3 m, not rarely epiphytic, glabrous in all outer parts. Branchlets slender, obtusangular, early covered with a thin greyish cork, subdensely leaved. *Leaves* often reflexed, narrowly subovate-lanceolate, apex ± long attenuate or mostly subcaudate-acuminate, very tip bluntish, base rather broadly attenuate to cuneate, with a pair of small ± basal marginal glands, and sometimes another remote upper one on each side, subcoriaceous, very laxly glandular-punctate beneath, entire, edge slightly revolute especially towards the base of the lamina, 2.5–3.5 by 0.7–1.2 cm, widest below the middle, midrib narrowly sunken or flat above, prominent beneath, nerves 1(–2) basal or slightly suprabasal, high curved-ascendent, and several much shorter and more spreading, often vein-like upper pairs, all anastomosing and faintly sunken above in fully mature leaves, a little raised beneath, reticulation ± dense, visibly prominent beneath only; petiole 2(–3) by *c.* 0.5 mm. *Racemes* in the upper 1–2 axils, recurved, very laxly (3–)4–5(–6)-flowered, flowers nodding; rachis rather robust, (0.5–)1(–2) cm, eperulate. Pedicels stoutish, curved, (1–)1.2–1.6 cm, swollen at both ends; bract and bracteoles not seen. *Calyx* tube obconical, base truncate, 3 by 3 mm with 5(–7) obtuse wings which extend into the lobes of the low calyx limb, lobes erect, thick, obtuse by a rather conspicuous apical gland, 1 mm. *Corolla* tubular-urceolate, fleshy, glabrous at both sides, green, pink or red, *c.* 7 by 3 mm below, lobes ovate, rounded-obtuse, hardly 1 mm, finally a little spreading or even reflexed. *Filaments* subulate, villous except the very base, 1.5–1.8 mm; anther-cells oblong, 0.8 mm, no spurs; tubules cylindric at a right angle with and at base, much narrower than the cells, a little widened upwards, 1 mm, subobliquely cut distally, the back wall of each tubule often extending into several minute, irregular teeth-like appendices. *Disk* glabrous. *Style* columnar, somewhat thickened in the upper part, glabrous, as long as the corolla. *Fruit* subglobose, ± truncate distally, the ribs still visible, crowned by the bulky disk, *c.* 5 mm ø.

Distr. *Malesia*: W. New Guinea (Oranje Mts: Lake Habbema).

Ecol. Common in undergrowth of more open forest or in very mossy forest of ridge crests, 2900–3225 m. *Fl. fr.* Aug.

181. Vaccinium minusculum SLEUM. Bot. Jahrb. 72 (1942) 264; Blumea 11 (1961) 83.

Shrubby small tree, 3 m. Branchlets slender, youngest parts angular and puberulous. *Leaves* rather dense, ovate-lanceolate, apex gradually acuminate, tip blunt, base broadly attenuate, sometimes nearly rounded, with 2 dark minute, spaced marginal impressed glands on each side in the lower third of the blade, occasionally a third almost inconspicuous distant one, subcoriaceous, glossy especially above, glabrous, entire, very edge ± revolute, 1.2–1.5 by (0.4–)0.5–0.7(–0.8) cm, midrib generally a little sunken above, prominent beneath, nerves 1(–2) basal and slightly suprabasal, high curved-ascending, and several upper shorter, spreading, vein-like pairs, all anastomosing and slightly prominent on both sides as is the rather dense fine reticulation; petiole slender, 1 mm. *Racemes* from the upper 2(–3) axils, laxly 3–4(–5)-flowered, glabrous in all outer parts; rachis slender, 5–7(–10) mm, perulae several, linear-oblong, *c.* 1.5 mm, mostly gone in flowering time. Pedicels slender, curved, 6–10 mm, with 2 slightly suprabasal subulate bracteoles, bract absent at anthesis. *Calyx* tube broadly cup-shaped, almost patellar, rugulose, shining, 1–1.2 mm, limb spreading, 0.5–0.8 mm, deeply 5-lobed, lobes broadly deltoid, ciliolate, provided with a rather conspicuous dark apical gland. *Corolla* subglobose-urceolate, contracted distally, membranous, pinkish white, glabrous at both sides, *c.* 3 mm, lobes very short, recurved. *Filaments* subulate, glabrous at the very base, hairy above up to the middle, glabrous in upper half, 1.5 mm; anther-cells oblong, granular, 1 mm, the 2 dorsal spurs 0.8 mm, at an almost right angle; tubules nearly as wide as the cells, 0.7 mm, subtruncate apically. *Disk* glabrous, shining. *Style* columnar, glabrous, *c.* 3 mm.

Distr. *Malesia*: East New Guinea (Central Distr.: Mt Tafa). One collection.

Ecol. In mossy forest, 2300 m, common. *Fl.* May.

182. Vaccinium viscifolium K. & G. J. As. Soc. Beng. 74, ii (1905) 63, *incl. var. minus* K. & G. *l.c.* 64; RIDL. J. Fed. Mal. St. Mus. 4 (1909) 41; *ibid.* 6 (1915) 49; Fl. Mal. Pen. 2 (1923) 207; DOP, in Fl. Gén. I.–C. 3 (1930) 713; SLEUM. Bot. Jahrb. 71 (1941) 452; Blumea 11 (1961) 84. — *V. perakense* RIDL. J. Str. Br. R. As. Soc. *n.* 79 (1918) 92, *in obs.*; Fl. Mal. Pen. 2 (1923) 207; BURK. & HENDERS. Gard. Bull. S. S. 3 (1925) 390; HENDERS. J. Fed. Mal. St. Mus. 13 (1927) 4; SYMINGTON, J. Mal. Br. R. As. Soc. 14 (1936) 355; FLETCHER, Fl. Siam. En. 2 (1938) 313; SLEUM. Bot. Jahrb. 71 (1941) 452. — *V. teysmannii* (*non* MIQ.) RIDL. J. Str. Br. R. As. Soc. *n.* 39 (1903) 15; K. & G. J. As. Soc. Beng. 74, ii (1905) 64; RIDL. J. Linn. Soc. Bot. 38 (1908) 313, *repr.* J. Fed. Mal. St. Mus. 2 (1908) 120; *ibid.* 6 (1915) 156. — *V. decorum* RIDL. *ibid.* 5 (1914) 36; Fl. Mal. Pen. 2 (1923) 207. — *V. subobovatum* FLETCHER, Kew

Bull. (1936) 39, *as to type;* Fl. Siam. En. 2 (1938) 314; SLEUM. Bot. Jahrb. 71 (1941) 453.

var. **viscifolium.**

Shrub or medium-sized tree, up to 6 m, sometimes epiphytic. Branchlets rather robust, angled and striate lengthwise, glabrous or puberulous, laxly leaved; axillary buds subglobose. *Leaves* obovate in general, sometimes more elliptic- or oblong-obovate, rarely broadly oblanceolate, spathulate or almost obovate-rounded, apex obtuse or mostly rounded, rarely attenuate, base ± cuneate and merging into the petiole, with a thick marginal gland on each side at the base of the blade or at apex of petiole, very coriaceous, firm, glabrous, laxly thick-glandular-punctate beneath, 4–7(–9–10) by (2–)2.5–4(–5–6.5) cm, entire, edge slightly or hardly revolute, midrib rather flat or a little sunken above, broadened below, and ± flattish or slightly obtusely prominent beneath, nerves 1–2 basal and 2–3(–4–6) shorter upper and more spreading pairs, all curved-ascending and anastomosing, a little prominent on both faces, though not rarely rather inconspicuous especially beneath, reticulation lax, faintly perceptible on both sides, or often obsolete beneath; petiole flattened, 4–8 by 1.5–2(–3) mm, initially puberulous. *Racemes* in the upper 2–5, sometimes already defoliate axils, suberect, subdensely many-flowered; flowers pendulous; rachis rather slender, angular, striate, (2–)3–6(–8–11) cm, eperulate at anthesis. Pedicels rather slender, (3–)4–6 (in *fr.* 6–8–10) mm, whether or not laxly patent-hairy and glandular-muriculate as is the *calyx* tube; the latter campanulate to subsemiglobose, 1–1.5 mm, limb erect, or finally reflexed, deeply 5-partite, lobes *c.* 1 mm, deltoid, subacute, ciliate, sometimes provided with a minute subglobular, but mostly no apical gland. *Corolla* cylindric-urceolate, rather thin, deep pink to white, glabrous at both sides, 6–7 by *c.* 2.5 mm, lobes suberect, narrow, obtuse, 1 mm. *Stamens* 8 or 10; filaments subulate, densely hairy, (3–)4(–5) mm; cells narrow-oblong, *c.* 1 mm, no spurs; tubules slenderly cylindric, narrower than the cells, 2–3 mm, as the style finally a little exserted, obliquely cut apically. *Disk* glabrous. *Style* slender, glabrous, 6–7 mm. Submature *fruit* globular, glabrescent, *c.* 5 mm ø.

Distr. Indochina (S. Annam), S. Siam, and in *Malesia*: Malay Peninsula (including also P. Tioman).

Ecol. Hill and mountain forest, and especially in *Leptospermum* scrub on summits, locally not rare, (300–)900–2100 m. *Fl.* Jan.–Dec.

var. **bicalcaratum** SLEUM. Blumea 11 (1961) 84.

Leaves shortly (*c.* 1 cm) and obtusely attenuate at the apex. Anthers with 2 distinct dorsal spurs (1 mm), otherwise hardly different from *var. viscifolium.*

Distr *Malesia*: Malay Peninsula (Cameron Highlands near summit of Mt Jasar), in mossy forest. One collection.

183. Vaccinium loranthifolium RIDL. J. Str. Br. R. As. Soc. *n.* 79 (1918) 91; Fl. Mal. Pen. 2 (1923) 208; SLEUM. Blumea 11 (1961) 84.

Small shrub or stunted tree, with thick blackish branches. Branchlets stoutish, angular, densely short-pubescent, striate, early greyish-blackish corticate, laxly leaved; axillary buds subglobose as in *V. viscifolium. Leaves* obovate, apex rounded, base broadly attenuate into the flattened petiole, with a pair of distinct basal glands, stiff-coriaceous, subdensely set with glandular or almost resinous dots (as in *V. viscifolium*) beneath, initially with some hairs on petiole and very base of lamina, entire, edge often ± revolute in dry specimens, 4–6.5 by 2.5–3.5 cm, sub-9-plinerved, midrib slightly raised or flattish above, broadened and rather flat below, ± evanescent upwards beneath, nerves 4 pairs from and from up to 1 cm above the base, steeply curved-ascending, with 1 or 2 upper, similar, shorter ones, all anastomosing, veins laxly reticulate, visibly raised above or mostly ± obscure; petiole flattened, red, (5–)6–8 by 1.5–2 mm. *Racemes* in the upper 2(–3) axils, erect, rigid, densely (10–)15–20-flowered, flowers nodding; rachis stout, red, angular, densely shortly and patently hairy, 3–5(–6) cm, peduncle 1–1.5 cm; perulae ∞, outer ones ovate, inner ones elliptic or obovate, glabrous and rugose dorsally, ciliate, up to 8 by 5 mm, early caducous. Pedicels robust, 1.5–2(–3) mm (in *fr.* –4 mm), reflexed, glabrous, bract oblong, thin, up to 7 by 2.5 mm, early caducous; bracteoles basal, subulate, ciliate, 2 mm, early caducous. *Calyx* tube cup-shaped to broadly obconical, base ± truncate, rugose, glabrous, 1.5–2 mm, limb a little spreading, thin-coriaceous, pale, deeply 5-partite, lobes broad-ovate to semi-orbicular, 1–1.5 mm, ciliate, apical gland thick, broadly subglobular or mostly ± broadened on each side to form a callose ribbon. *Corolla* ovoid-urceolate, fleshy, apparently red, glabrous outside, laxly to subdensely hairy at least in the lower part inside, 6–7 by 3(–4) mm, lobes ovate, finally reflexed, *c.* 1 mm. *Stamens* 8 (or 10); filaments linear-subulate, all over densely hairy up to the connective, 1.5–2 mm; cells narrow-oblong, base truncate, 1.3–1.5 mm, with 2 short, sometimes rudimental dorsal spurs; tubules narrow-cylindric, erect, half as wide as the cells, 1.2–1.5 mm, obliquely cut distally, pore ± orbicular, back wall often extended into 2 very short teeth. *Disk* bulky, glabrous. *Style* columnar, glabrous, 5–6 mm. *Fruit* pulpy, subglobose, *c.* 5 mm ø, crowned by the erect calyx lobes.

Distr. *Malesia*: Malay Peninsula (Main Range from Mt Kerbau to Mt Batu Brinchang, Mt Siku and Mt Irau).

Ecol. In mossy forest and summit vegetation on open ridges, 1830–2175 m. *Fl.* April–Aug.

184. Vaccinium scandens SCHLTR, Bot. Jahrb. 55 (1918) 179; SLEUM. *l.c.* 72 (1942) 257; Blumea 11 (1961) 84.

High scandent glabrous shrub or liana. Branchlets slender, flexuous, terete, older parts with elliptic lenticels. *Leaves* rather lax, oblong-lanceolate, apex long and ± gradually caudate-acuminate, ± falcate, subacute, base cuneate,

with 1 pair of minute, basal or slightly suprabasal, well visible glands, subcoriaceous, flexible, very laxly glandular-punctate beneath, entire, 7–15 by (1–)1.2–3 cm, 5(–7)-plinerved, midrib narrowly sunken in the lower part above, somewhat prominent beneath, nerves 2(–3) basal and up to 1 cm suprabasal pairs, steeply ascending and subparallel to the edge, anastomosing and slightly raised on both faces, as is the rather dense reticulation; petiole 0.5–1(–1.2) cm by *c.* 1 mm. *Racemes* in the upper 2–3 axils, laxly 6–10-flowered, subsecund, often ± recurved; rachis rather slender, (3–)5–8(–10) cm, eperulate. Pedicels stoutish, 6–8 mm, bract and bracteoles not known. *Calyx* tube tubular-cup-shaped, base subtruncate, 3 mm, limb erect, deeply 5-lobed, 1 mm, lobes ovate, their margin much thinner or translucent, irregularly erose, at apex with a conspicuous rather thick dark gland. *Corolla* (immature) ovoid, fleshy, whitish or reddish green, glabrous at both sides, at least 6 mm long. *Stamens* 10, alternately slightly unequal, at least 4 mm long; filaments subulate, densely hairy, a little longer than the narrow-oblong cells, no spurs; tubules slenderly cylindric, as long as the cells, apex obliquely cut, pore somewhat widened distally or flaring, the back wall of each tubule extended into 2 short, erect teeth. *Disk* glabrous. *Style* glabrous, as long as the corolla.

Distr. *Malesia*: NE. New Guinea (Sepik Distr.: April R. region, Hunstein Mts), in dense mountain forest, 850–1000 m. *Fl.* Oct., Dec.

185. Vaccinium littoreum MIQ. Fl. Ind. Bat. Suppl. 1 (1860) 251, 587; J. J. S. in K. & V. Bijdr. 13 (1914) 160; STEEN. Arch. Hydrobiol. Suppl. 11 (1932) 318, f. 16, 20 & 23; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 4; SLEUM. Blumea 11 (1961) 85. — *V. hasseltii* MIQ. Ann. Mus. Bot. Lugd.-Bat. 2 (1863) 40; K. & G. J. As. Soc. Beng. 74, ii (1905) 66, *excl. syn.*; KOORD. Exk. Fl. Java 3 (1912) 18; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 109; HALL. *f.* Med. Rijksherb. *n.* 12 (1912) 29; MERR. Philip. J. Sc. 14 (1919) 248; RIDL. Fl. Mal. Pen. 2 (1923) 209, f. 91, *incl. var. sabuletorum* RIDL. *l.c.* 210; BURK. & HENDERS. Gard. Bull. S. S. 3 (1925) 390; RIDL. Kew Bull. (1926) 71; HENDERS. Gard. Bull. S. S. 4 (1928) 280; JOCHEMS, Trop. Natuur 18 (1929) 29, f. 8; BURK. Dict. (1935) 2217; HENDERS. J. Mal. Br. R. As. Soc. 17 (1939) 53. — *V. sabuletorum* RIDL. Trans. Linn. Soc. II, Bot. 3 (1893) 315 ('*sabuletrum*'). — *V. bancanum* (*non* MIQ.) RIDL. J. Str. Br. R. As. Soc. *n.* 33 (1900) 103.

Large terrestrial or epiphytic erect glabrous shrub, or small tree, 1–4(–10) m; bark blackish. Branchlets dark and angled when dry, rather slender, laxly to subdensely leaved, early corticate. *Leaves* elliptic to elliptic-oblong, sometimes ± ovate or subobovate, apex long or more shortly and often rather abruptly (subcaudate-)acuminate, tip bluntish, base broadly attenuate to cuneately decurrent, with a swollen gland on each side at about the middle of the 'petiolar' part, coriaceous or subcoriaceous, reddish when young, shining, not glandular-punctate beneath, entire, very edge ± revolute, 3.5–6(–7) by 1.4–2.5(–3.5) cm, midrib slightly or hardly prominent above, more robust *i.e.* more distinctly raised beneath, nerves 3–5 basal and somewhat suprabasal, slightly curved and steeply ascending or even erect, and several upper shorter and more spreading, ± vein-like pairs, all anastomosing and generally slightly prominent on both faces or at least beneath, as is the rather dense reticulation; 'petiole' a little compressed and grooved dorsally, 3–6(–8) by *c.* 1 mm. *Racemes* in numerous axils, obliquely ascending, or mostly ± recurved, the numerous flowers secund, subdense to rather lax; rachis slender, (3–)4–7 cm, peduncle short, eperulate in flowering time. Pedicels slender, 2.5–4 mm, bracts and bracteoles not seen. *Calyx* tube shortly cupular or even patellar, 0.5 mm, limb spreading or finally reflexed, deeply 5-partite, lobes broadly triangular, hardly ciliate, *c.* 1 mm, apical gland distinct. *Corolla* subtubular-urceolate, waxy red, pink or white, glabrous at both sides, 7–8 by *c.* 2.5 mm, lobes triangular, obtuse, reflexed, *c.* 1 mm, sometimes with a tuft of hairs inside. *Stamens* 8 or 10; filaments linear-subulate, rather long hairy, especially at the dilated base, 2.5 mm; cells almost vertical, oblong, 1 mm, very shortly or not 2-spurred dorsally; tubules at ± right angles to the cells and much narrower, cylindric, *c.* 3 mm, much obliquely cut apically, back wall of each tubule generally extending into a pair of fine erect beaks or teeth. *Disk* glabrous. *Style* slenderly columnar, glabrous, *c.* 7–8 mm. *Fruit* subglobose, black when fully mature, 6–7 mm ø, crowned by the minute calyx lobes and the bulky disk.

Distr. *Malesia*: Sumatra (including also Siberut I.), Malay Peninsula, W. and E. Java; reported from Banka, but not recollected there.

Ecol. In forest near the seashore, ascending from the coast to 2400 m, in mossy forest epiphytic, on sandy or peaty soil, but also known from rather dry limestone rocks or slopes and near solfataras or chalk tuff terraces, locally common. *Fl.* Jan.–Dec.

Uses. Berries said to be edible. The hard timber is used for handles.

Vern. *Gundang-gundang*, Karo, *kaju kalé kuli manih*, Minangkabau, *sae sae batu*, *sae sae na babi*, Tapanuli, *poko padang*, Singapore, *andor na igar*, *semeleoleo*, *simar lojo-lojo*, Toba, *bringin*, Mad.

186. Vaccinium artum J. J. S. Nova Guinea 18 (1936) 118, t. 31, f. 2; SLEUM. Bot. Jahrb. 72 (1942) 252; Blumea 11 (1961) 86.

Much branched epiphytic shrub. Branchlets very slender, terete, youngest parts subappressedly yellowish hirsutulous, as are the petioles, or rough by the persistent hair-bases, subdensely leaved. *Leaves* ovate to narrow ovate-elliptic, apex caudate-acuminate, tip acutish or bluntish, base broadly attenuate to almost rounded, with 1 or 2 slightly suprabasal marginal glands on each side, thin-coriaceous, rather firm, often convex or strongly revolute (sometimes up to the midrib) when young, glabrous at full age, entire, 1.5–2.5 by

0.5–0.9 cm, subtriplinerved, midrib narrowly grooved above, a little raised beneath, nerves and veins generally obscure, sometimes faintly visible beneath; petiole 1–2 mm. *Racemes* in the upper 1–3 axils, laxly 4–8-flowered; rachis very slender, hirsutulous, 1–1.5 cm; perulae oblong, glabrous, 2–3 mm, early caducous. Pedicels patent, filiform, a little thickened distally, at base laxly hairy, 1.4–1.6 cm, bract and bracteoles not seen. *Calyx* tube narrowly cup-shaped or subobconical, base truncate, glabrous, 1.5 mm, limb suberect, 0.5 mm, 5-lobed to the base, lobes ovate-deltoid, ± keeled dorsally, margin paler and membranous, ciliate, keel ending in a small though distinct apical gland. *Corolla* tubular-urceolate, narrowed upwards, fleshy, glabrous at both sides, red, *c.* 6 by 2 mm, lobes ovate, reflexed, 0.5 mm. *Filaments* sigmoid, linear, laxly long-hairy below, 2 mm; anther-cells oblong, 1 mm, no spurs; tubules short-cylindric, ± as wide as the cells, curved, *c.* 0.4 mm, obliquely cut distally, back wall of each tubule ending in 1–2 short, ± reflexed teeth. *Disk* glabrous. *Style* columnar, glabrous, 5.5 mm.

Distr. *Malesia*: W. New Guinea (Nassau Mts and Wissel Lakes region).

Ecol. In mossy forest, at 2500 m. *Fl.* Sept.-Oct.

187. Vaccinium habbemae KOORD. Nova Guinea 8 (1912) 882, f. 1; J. J. S. *ibid.* 12 (1917) 530; SLEUM. Bot. Jahrb. 72 (1942) 258; Blumea 11 (1961) 86.

KEY TO THE VARIETIES

1. Calyx lobes with a small apical gland only.
2. Leaves (2.5–)3–4.5 by 1–1.5 cm. **1. *var.* habbemae**
2. Leaves 1.2–2 by 0.6–1.1 cm. **2. *var.* parvifolium**
1. Calyx lobes both with a thick apical gland and some irregular, small, marginal ones. **3. *var.* pluriglandulosum**

1. *var.* habbemae.

Shrub, 1–1.5 m. Branchlets shortly yellowish hirsutulous or subvillous in the young parts as are the petioles and the base of the lamina initially, slender, densely leaved, older parts terete, early glabrescent, defoliate and covered with blackish cork. *Leaves* ovate-lanceolate, apex subcaudate-acuminate, tip bluntish, base broadly attenuate, with 2(–3) distant, small, marginal, impressed glands in the lower third of the blade on each side, coriaceous, glabrous at full age, entire, edge ± recurved, (2.5–)3–4.5 by 1–1.5 cm, midrib narrowly sunken above, markedly prominent beneath, nerves 2 basal or slightly suprabasal, high curved-ascendent, and several upper, shorter and more spreading pairs, basal ones but faintly sunken above, all nerves slightly prominent beneath, reticulation dense, minutely raised beneath only; petiole 2–3(–4) by *c.* 1 mm. *Racemes* from the upper 1–2(–3) axils, laxly and ± patently 4–6-flowered; rachis slender, glabrous, 1–3(–4) cm, perulae *c.* 2 mm, early caducous. Pedicels very slender, glabrous, (1–)1.2–1.5 cm, bract and bracteoles not seen. *Calyx* glabrous, tube elongate-cupular, base shortly subabruptly attenuate, always ± truncate, 3–4 by 3 mm, limb erect, 5-lobed to the base, lobes ovate-deltoid, 1.5 mm, margin thinner and translucent, sometimes laxly ciliate distally, dorsal keel ending in a distinct, rather small, apical gland. *Corolla* tubular-urceolate, slightly narrowed upwards, fleshy, red, glabrous at both sides, *c.* 10 by 3 mm, lobes obtuse, recurved, hardly 1 mm. *Filaments* subulate, laxly patently long-hairy in the lower half, glabrous above, 3(–4) mm; anther-cells oblong, 1.2–1.5 mm, no spurs; tubules as wide as the cells, 0.8–1 mm, obliquely cut apically, back wall of each tubule ending in 2(–1) short teeth. *Disk* glabrous. *Style* slenderly columnar, glabrous, almost equalling the corolla.

Distr. *Malesia*: W. New Guinea (Hellwig Mts).

Ecol. In forest or summit vegetation, 2000–2600 m. *Fl.* Nov., Jan.

2. *var.* parvifolium J. J. S. Nova Guinea 12 (1914) 162; SLEUM. Bot. Jahrb. 72 (1942) 258; Blumea 11 (1961) 86.

Leaves ovate to oblong-ovate or lanceolate, 1.2–2 by 0.6–1.1 cm, ± gradually (and more shortly than in *var. habbemae*) acuminate, obtuse, margin faintly crenulate, reticulation less distinct or even obsolete. *Inflorescence* up to 13-flowered.

Distr. *Malesia*: W. New Guinea (Oranje Mts, Mt Goliath), 3200–3450 m.

3. *var.* pluriglandulosum J. J. S. Nova Guinea 12 (1917) 530; SLEUM. Bot. Jahrb. 72 (1942) 258; Blumea 11 (1961) 86.

Differs from *var. habbemae* by some irregular small marginal glands besides the thick apical gland on the calyx lobes. *Flowers* purple red.

Distr. *Malesia*: W. New Guinea (Oranje Mts: Mt Wichmann; Kajan Mts), 3000–3200 m.

188. Vaccinium perrigidum ELM. Leafl. Philip. Bot. 3 (1911) 1094; MERR. En. Philip. 3 (1923) 251; COPEL. *f.* Philip. J. Sc. 42 (1930) 561, t. 3, f. 1–4; SLEUM. Blumea 11 (1961) 86.

Epiphytic shrub, glabrous in all outer parts; stems usually few, larger ones up to 5 m long. Branchlets robust, somewhat flattened, striate. *Leaves* lax, elliptic to lanceolate-elliptic, apex rather shortly and subabruptly subcaudate-acuminate, tip blunt, base broadly attenuate into the petiole to almost rounded, with a thick marginal gland at 2–3 mm distance from the petiole on each side, rigidly coriaceous, sublucid on both faces, deep green above, paler beneath, initially laxly glandular-punctate beneath, entire, edge subrevolute in dry specimens, 7–10 by 3–4.5(–6) cm, sub-5–7-plinerved, midrib ± flat above, obtusely prominent beneath, nerves 1–2 basal or up to 1 cm suprabasal steeply curved-ascending and 1–3 upper shorter pairs, all anastomosing and equally slightly prominent on both faces, reticulation rather lax above, more dense beneath, mostly slightly raised on both sides; petiole flattened, rugose, reddish brown in fresh specimens, narrowly or obscurely grooved above, 1–1.5 cm

by 1.5–2 mm. *Racemes* in the upper 1–2 axils, suberect, laxly 8–12-flowered; rachis stout, flattened, smooth, 5–8 cm, eperulate. Pedicels robust, curved, *c.* 1 cm, bract and bracteoles not seen. *Calyx* turbinate, tube 1–1.5 mm, limb spreading, almost 1 mm, wavy or obscurely lobed to near the base, lobes broadly rounded, ciliate, marked by a thick apical gland. *Corolla* urceolate, waxy white, glabrous at both sides, 9–10(–12) by 4 mm, lobes ovate, reflexed, purplish, *c.* 1 mm. *Filaments* linear, all over subdensely hairy, 5 mm; anther-cells narrow-oblong, 2 mm, no spurs; tubules as wide as the cells, 1 mm, obliquely cut apically. *Disk* rather bulky, glabrous. *Style* columnar, glabrous, as long as the corolla. *Fruit* subglobose, truncate, *c.* 9 mm ø (fresh). *Seeds c.* 2 mm.

Distr. *Malesia*: Philippines (Mindanao).

Ecol. On rocky bluffs or ridges in the mossy forest, 1525–1675 m.

Vern. *Balau*, Mbo., *basisir*, Bag.

189. Vaccinium retivenium SLEUM. Bot. Jahrb. 71 (1940) 164 (*'retevenium'*); Blumea 11 (1961) 86; *ibid.* 12 (1963) 133.

Shrub or small tree, (1.5–)3–8 m, bark fine grid-cracking, patchy grey-brown and grey; trunk 4–10 cm ø. Branchlets obtusangular in the youngest, terete in the older parts, quite glabrous as is the plant in all its outer parts, dark brown or mostly blackish when dry as are leaves and flowers then. *Leaves* laxly arranged, ovate-elliptic or sometimes more lanceolate, apex for 1.5–3 cm (sub)caudate-acuminate, acute, base broadly attenuate or almost rounded, very base very shortly and abruptly contracted, with 2 or 3 (sometimes 4) marginal spaced glands on each side, in the lower half of the blade, ± coriaceous, shining, flat, entire, 8–11(–14) by 3–4.5(–6, –7) cm, 7(–9)-plinerved from and from a little above the base, midrib and nerves equally prominent on both faces, rarely beneath only, veins and veinlets rather densely reticulate, ± distinctly raised beneath; petiole ± flattened and grooved above, rugulose, 1–2 cm by *c.* 1.5 mm. *Racemes* in the upper 1–2(–3) axils, obliquely ascending, very laxly and patently 6–8(–10)-flowered; rachis rather slender, (3–)5–7(–11) cm, eperulate. Pedicels relatively slender, gradually swollen distally, often slightly curved, 1.3–1.6(–2) cm by *c.* 1 mm (at apex) (3 cm and thick in *fr.*), bract and bracteoles not seen. *Calyx* tube narrowly cup-shaped or almost cylindrical, rugulose, shining, base rounded, 4–5 by 4 mm, limb coriaceous, erect, 5-lobed to the base, lobes broad-deltoid, 1 mm, obtuse by a thick apical gland. *Corolla* broad-urceolate to subcampanulate, thick-fleshy, white, *c.* 6 by 5 mm, glabrous at both sides, lobes suberect, *c.* 2 mm. *Filaments* subulate-linear, densely hairy, *c.* 1.8 mm; anther-cells oblong, 1.5 mm, very shortly or not 2-spurred dorsally; tubules nearly as wide as the cells, 0.5 mm, a little incurved, apex obliquely cut. *Disk* low, glabrous. *Style* columnar, glabrous, *c.* 5 mm. *Fruit* subovoid-globose, apex truncate, calyx lobes inflexed, 6–8 by 6–7 mm, greenish pinkish.

Distr. *Malesia*: Borneo (Sarawak: Ulu Baram and Mt Kalulong; North Borneo: Mt Kinabalu, and Mt Alab in the Crocker Ra.).

Ecol. In mountain forest and moss forest, (1065–)1500–2440 m. *Fl.* Febr.–June, *fr.* June–Oct.

Vern. *Kliang batu*, Iban.

190. Vaccinium angulatum J. J. S. Nova Guinea 12 (1914) 167, t. 52 B; *ibid.* 12 (1917) 536; SLEUM. Bot. Jahrb. 72 (1942) 249; Blumea 11 (1961) 86.

Shrub 2–4 m. Branchlets subangular, youngest parts glabrous or very laxly glandular-muriculate, not properly hairy. *Leaves* laxly to subdensely arranged, elliptic to elliptic-obovate, apex shortly attenuate or subacuminate, tip mostly obtuse, sometimes ± rounded, base cuneate into the flattened petiole, with a pair of small, basal, marginal glands, coriaceous, glabrous, minutely punctate beneath, entire, very edge a little revolute, (3.8–)4.5–7(–8) by (2–)2.5–3.5(–5) cm, midrib narrowly impressed above, as thick as the petiole and obtusely prominent in the lower part beneath, nerves 1–2 basal and slightly suprabasal, and 2–3 upper shorter, more spreading pairs, all rather straight-ascending, anastomosing, faintly raised or almost obsolete above, somewhat prominent beneath, reticulation dense and fine, visibly prominent especially beneath; petiole grooved above, 4–6(–8) by 1–1.5 mm. *Racemes* in the uppermost 1 or 2 axils, laxly 5–8-flowered; rachis rather slender, sparsely muriculate or clavate-glandular as are the pedicels, 2–3 cm, perulae oblong, membranous, up to 8 by 3 mm, early caducous. Pedicels ± nodding, rather robust, (0.8–)1–1.5 cm, bract and bracteoles not seen. *Calyx* tube subdensely glandular-muriculate, obconical, 1.5–2 mm, limb spreading to ± reflexed, deeply 5-lobed, lobes triangular, acute, glabrous dorsally, 1.5 mm, margin thin and often irregularly erose or almost dented, whether or not ciliate, apical gland subglobular, not rarely early caducous. *Corolla* tubular, slightly 5-angular, the very base ± abruptly widened or ± saccate, fleshy, rose red with paler or even white lobes, glabrous at both sides, much accrescent during the anthesis at full maturity, (1.6–)2–2.2 cm by 4–5 mm ø, lobes ovate-triangular, 2–3 mm. *Filaments* linear, dilated below, villous, *c.* 2 mm; anther-cells oblong, almost 2 mm, no spurs; tubules as wide as the cells, hardly 1 mm, obliquely cut apically. *Disk* glabrous. *Style* slender, glabrous, 1.8 cm. *Fruit* depressed-globose, crowned by the calyx lobes which are passed by the bulky disk, *c.* 4 mm ø.

Distr. *Malesia*: West New Guinea (Hellwig Mts, the Northwest R. area, and the base of Mt Carstensz).

Ecol. In forest, (1090–)1675–2600 m. *Fl.* Dec., Jan.

191. Vaccinium angiense KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 480, f. 5; SLEUM. Blumea 11 (1961) 86; *ibid.* 12 (1963) 133.

Shrub or treelet, 2–3(–5) m. Branchlets short, angular, glabrous, tips reddish, older parts early covered with greyish blackish cork. *Leaves* lax, elliptic, apex very broadly attenuate and often

obtuse or sometimes in part even rounded, base broadly attenuate, with a minute or sometimes subinconspicuous marginal gland on each side at some distance from the petiole, ± coriaceous, rather stiff, laxly glandular-punctate beneath, otherwise quite glabrous, entire, edge a little revolute towards the base of the lamina, 2.5–3.5 by 1.2–1.8 cm, midrib narrow and a little sunken above, as thick as the petiole and obtusely prominent in the lower part, nerves 2 basal or slightly suprabasal and 1–2 upper pairs, all high curved-ascending and anastomosing, rather obsolete above, faintly raised beneath, reticulation inconspicuous; petiole 2–4 by 1 mm. *Racemes* both axillary and ramiflorous, laxly 8–10(–12)-flowered; rachis angular, quite glabrous, 3–4(–5) cm, eperulate at anthesis. Pedicels rather slender, glabrous, 5–6 mm (in *fr.* 7–9 mm). *Calyx* cup-shaped, glabrous, tube 1 mm, limb low, deeply 5-lobed, lobes broad-deltoid, obtuse, 0.5 mm, mostly without a small apical gland. *Corolla* urceolate, pink to pinkish cream, glabrous, 5–6 mm in all, lobes almost whitish, ovate, obtuse, 1 mm. *Filaments* linear, dilated at base, densely hairy below the middle, *c.* 1.5 mm; anther-cells oblong, *c.* 1.5 mm, no spurs; tubules cylindric, erect, slightly narrower than the cells, *c.* 0.8 mm, nearly transversely cut apically, pore a little flaring. *Disk* glabrous. *Style* slender, glabrous, 5 mm. Submature *fruit* globular, 4–5 mm ø, calyx lobes inflexed.

Distr. *Malesia*: NW. New Guinea (Arfak Mts).

Ecol. In *Nothofagus* forest undergrowth or forest edge, rarely on burnt open summit, 1950–2300 m. *Fl. fr.* Jan.–Dec.

Vern. *Menokwan*, Manikiong.

192. Vaccinium cruentum SLEUM. Blumea 11 (1961) 87; *ibid.* 12 (1963) 134.

Much branched erect, sometimes tree-like shrub, up to 5 m. Branchlets slender, tips subdensely pubescent, older parts deeply longitudinally striate and glabrescent, reddish in dry specimens, finally greyish corticate, laxly to subdensely leaved. *Leaves* oblong-elliptic, sometimes subovate-oblong, with the apex for 0.3–0.8 cm obtusely acuminate, and the base broadly or more narrowly attenuate, or sometimes ovate to ovate-elliptic and the base truncate or rounded, with a conspicuous ± prominent marginal basal gland close to the petiole, coriaceous, bright red and densely to more laxly pubescent all over both faces when young, glabrescent but persistently and ± densely hairy at the midrib, more laxly and ± caducously hairy and glandular-muriculate beneath, entire, slightly or not revolute, (1.8–)2–3 by (0.8–)1–1.5(–1.8) cm, midrib impressed above, obtusely prominent beneath, nerves 1–2 basal and 3–4 upper, more spreading pairs, all anastomosing, slightly raised beneath only as is the rather dense reticulation; petiole pubescent, 2–3 by *c.* 1 mm. *Racemes* from the upper axils, subdensely 6–15-flowered, shortly subdensely whitish pubescent, the corolla excepted; rachis rather slender, (1–)2–3 cm. Pedicels stoutish, (4–)5–8 mm, bract oblong or lanceolate, acute, membranous, up to 8 by 4 mm, early caducous; bracteoles not seen. *Calyx* cup-shaped, tube *c.* 2 by 3 mm, limb *c.* 1 mm, 5-lobed almost to the base, lobes deltoid, obtuse by a large apical gland. *Corolla* subcylindric-urceolate, blood red or dark crimson or almost magenta (deep pink in more shady places), fleshy, glabrous at both sides, (7–)8(–9) mm by 3–4 mm ø below, *c.* 2.5 mm ø at apex, lobes obtuse, reflexed, 1 mm. *Filaments* subulate from a dilated base, ± densely long-hairy in the lower third, glabrous above, 2.5(–3.5) mm, alternately subunequal; anther-cells oblong, granular, base obtuse, *c.* 1 mm, no spurs; tubules cylindric, erect, slightly narrower than the cells, 0.5 mm, subobliquely cut apically, back wall of each tubule into a distinct erect or reflexed tooth. *Disk* glabrous or set with a few, sometimes more numerous hairs. *Style* rather slender, glabrous, 7–8 mm. *Fruit* globose, pubescent, blackish at full maturity, (5–)6–8 mm ø.

Distr. *Malesia*: East New Guinea (Eastern and Southern Highlands: Mt Wilhelm and Mt Otto; Mt Giluwe).

Ecol. In mossy forest, on edge of low mossy forest with grassland, or in alpine shrubbery, 2800–3745 m, locally not rare. *Fl. fr.* July–Sept.

Vern. *Dinohgubol*, Chimbu: Masul, *dingding*, Wahgi: Minj, *longeba*, Mairi: Mondo, *t'lampso*, Mendi.

193. Vaccinium alvarezii MERR. Philip. J. Sc. 4 (1909) Bot. 304; En. Philip. 3 (1923) 247; COPEL. *f.* Philip. J. Sc. 42 (1930) 562, t. 3, f. 5–6; SLEUM. Blumea 11 (1961) 87. — *V. turbinatum* MERR. Philip. J. Sc. 10 (1915) Bot. 54; En. Philip. 3 (1923) 252.

var. **alvarezii.**

Shrub or treelet, *c.* 3 m, usually epiphytic. Branchlets stoutish, tips angular, quite glabrous, reddish when dry. *Leaves* lax, oblong-obovate or narrowly obovate-elliptic, sometimes elliptic, apex shortly gradually or subabruptly, obtusely attenuate or subacuminate, not rarely ± obtuse, base cuneate or ± decurrent, with a basal or ± suprabasal, thick, marginal gland and sometimes 1–2 minute upper ones on each side, coriaceous, ± stiff and shining, entire, edge somewhat revolute (dry), glabrous except sparse glandular hairs or points beneath, 5–8(–10) by (2–)2.5–4(–5.5) cm, midrib narrowly sunken at base, apically flattish or even ± raised, nearly as wide as the petiole and obtusely prominent at base beneath, nerves 2(–3) basal or slightly suprabasal, high ascending, and a few upper, shorter and more spreading pairs, all anastomosing and ± faintly raised above, markedly prominent beneath, reticulation rather dense, finely prominent beneath only; petiole transversely rugose, (4–)5–7 by 1.5–2(–2.5) mm. *Racemes* from the upper axils, solitary or rarely in pairs, ascending, 10–15(–20, –25)-flowered; rachis rather robust, angular, mostly quite glabrous, rarely papillose-puberulous, 3–5 (–9) cm. Pedicels stoutish, glabrous or rarely papillose-puberulous, 0.7–1.5 cm (in *fr.* 2 cm); bract and bracteoles not seen. *Calyx* glabrous, tube campanulate, 1 mm, limb spreading, deeply 5-

lobed, lobes broadly ovate or obtusely triangular, 1.5–2 mm, ciliolate, all or partly ± distinctly gland-apiculate. *Corolla* subventricose-cylindric or barrel-shaped, white, pink or red, glabrous at both sides, 10–11 by *c.* 5 mm, lobes erect, ovate, obtuse, 1.5–2 mm. *Filaments* linear, white-villous, 4–5 mm; anther-cells oblong, verruculose, 2.5 mm, no spurs; tubules cylindric, divergent, a little narrower than the cells, *c.* 0.6 mm, subobliquely cut apically. *Disk* prominent, glabrous. *Style* glabrous, as long as the corolla. *Fruit* depressed-globose, truncate at the apex, crowned by the bulky disk which protrudes beyond the persistent calyx lobes, 5–6 mm ø. *Seeds* fusiform, black, *c.* 1.5 mm.

Distr. *Malesia*: Philippines (Luzon).

Ecol. In primary forest, (100–)300–2000 m.

Vern. *Dungál.*

var. **moisense** COPEL. *f.* Philip. J. Sc. 42 (1930) 564; SLEUM. Blumea 11 (1961) 88.

Calyx tube, disk and internal surface of the corolla short-pubescent.

Distr. *Malesia*: Philippines (Luzon: Isabela Prov. on Mt Moises), at 900 m. One collection.

194. Vaccinium cavendishioides SLEUM. Blumea 11 (1961) 88; *ibid.* 12 (1963) 134.

Shrub, 2 m, sometimes scandent or treelet up to 5(–10) m. Branchlets reddish, slender, obtusangular, glabrous, early corticate, laxly to subdensely leaved. *Leaves* elliptic or lanceolate- to oblong-elliptic, apex shortly or very shortly obtusely acuminate or attenuate, occasionally shortly subcaudate-acuminate, base broadly or more narrowly attenuate, the marginal gland on each side minute, impressed, strictly basal, subcoriaceous or thin-coriaceous, glabrous, entire, edge very narrowly cartilaginous and pale, flat, 3–5.5 (–7.5) by (1.3–)1.5–2.5(–3.5) cm, midrib slightly impressed above, obtusely prominent beneath, nerves *c.* 3 basal and a little suprabasal, and several upper equally curved-ascending pairs, all anastomosing and not much prominent on both faces, reticulation slightly raised beneath only; petiole compressed dorsally, 3–4(–5) by *c.* 1 mm. *Racemes* in the upper 4–6 axils, ascending or more spreading, minutely papillose-puberulous, glabrescent except the rachis, 12–18-flowered; rachis angular, rather slender, 2.5–5 cm, eperulate at anthesis. Pedicels slender, 3–5(–6) mm, bract membranous, ovate to ovate-oblong, ciliolate, 3–6 by 2–3 mm, caducous before anthesis, bracteoles subulate-linear, ciliolate, hardly 1 mm, very early caducous. *Calyx* tube cup-shaped, base subtruncate, 1–1.2 mm, limb subpatent, 5-partite almost to the base, lobes subovate-deltoid, 0.5–0.7 mm, bluntish, ciliolate, sometimes with an apical gland. *Corolla* urceolate, slightly constricted distally, thin, dull reddish or pink with creamy lobes, or pure white, or yellowish greenish, glabrous at both sides, (4–)5 by *c.* 2 mm (6 by 2.5–3 mm fresh), lobes obtuse, reflexed, 0.7 mm. *Filaments* subulate-linear, densely hairy below, 2 mm; anther-cells broad-oblong, 0.7–0.8 mm, no spurs; tubules cylindric, almost as wide as the cells, 0.4–0.5 mm, obliquely cut apically, back wall of each tubule extending into 1 or 2 short erect teeth. *Disk* prominent, glabrous. *Style* glabrous, rather slender, *c.* 5 mm, finally exserted. *Fruit* globular, *c.* 4 mm ø, purplish-blackish.

Distr. *Malesia*: NW. New Guinea (Vogelkop Peninsula).

Ecol. In primary or secondary forest, or along edge of *Castanopsis-Araucaria* forest, in '*ladang*' shrubbery or fern scrub, not rarely steep slopes, on limestone rocks, on clayey or sandy ground, 275–1350 m, very common locally. *Fl. fr.* Jan.–Dec.

Vern. *Gobijr*, Maibrat, *bomantinbur*, *mambao*, Kebar, *obaire*, Framo, *kedjari*, Teminabuan, *audawatene*, Arguni.

195. Vaccinium dictyoneuron SLEUM. Blumea 12 (1963) 136.

KEY TO THE VARIETIES

1. Calyx tube glabrous.
   2. Leaves (4–)4.5–7.5 by 2.5–4(–5) cm. **1. *var.* dictyoneuron**
   2. Leaves 2.5–3.5(–4) by 1–2(–3) cm. **2. *var.* oreophilum**
1. Calyx tube ± densely glandular-muriculate and hairy . . . . . **3. *var.* koëbrense**

1. *var.* dictyoneuron.

Erect glabrous shrub, 2–4 m, tips of branchlets reddish and shining; axillary buds ovoid, acutish, 2 mm. *Leaves* subdensely arranged, elliptic, apex shortly, not rarely rather abruptly obtusely acuminate, base broadly attenuate to and a little decurrent on the petiole, coriaceous, firm, entire, pair of basal marginal glands small, (4–)4.5–7.5 by 2.5–4(–5) cm, (7–)9–11-plinerved from and a little from above the base and 1–2 pairs of upper nerves, all slightly impressed above and raised beneath, veins and veinlets rather densely reticulate and prominent on both faces or at least beneath; petiole slightly depressed, grooved above, blackish (dry), 5–8 by 1.5–2 mm. *Racemes* in several upper axils, obliquely suberect, perulae ovate to oblong, 6–10 by *c.* 4 mm, early going; rachis 3–4.5 cm, stoutish. Pedicels robust, 8–10 mm (in *fr.* 10–15 mm), bract lanceolate, very early caducous. *Calyx* tube obconical, base ± truncate, finally constricted below the limb, 2 mm, lobes ovate-deltoid, ciliolate, 1–1.5 mm, no apical gland. *Corolla* urceolate-cylindric, fleshy, pink to light carmine, glabrous also inside, 8(–9) by *c.* 3 mm, lobes 1.5 mm, reflexed. *Filaments* linear, base slightly dilated and glabrous, otherwise densely short-hairy almost to the top, 3.5–4 mm; anther-cells oblong, slightly echinulate, 1.9–2.2 mm; tubules a little narrower than the cells, 0.7–0.9 mm, obliquely cut at apex. *Disk* prominent, glabrous. *Style* slenderly columnar, (7–)8–9 mm. *Fruit* subglobose, truncate, purplish at maturity, 6–7 mm ø, calyx lobes curved inwards.

Distr. *Malesia*: NW. New Guinea (Arfak Mts around the Anggi Lakes).

Ecol. In forest edge or undergrowth, often sterile, 1900–2000 m. *Fl. fr.* Oct.–Jan.

2. *var.* **oreophilum** SLEUM. Blumea 12 (1963) 136.
Differs from the type variety by smaller leaves, 2.5–3.5(–4) by 1–2(–3) cm, petioles *c.* 5 mm, slightly shorter and less densely flowered racemes. *Calyx* lobes not rarely provided with an apical gland. Compact, much branched shrub, (1–)2–3 m.
Distr. *Malesia*: NW. New Guinea (Arfak Mts around the Anggi Gigi Lakes).
Ecol. In low *Nothofagus* forest or forest edge, or in devastated subsummit relict forest, 2200–2400 m, locally plentiful. *Fl. fr.* Jan.

3. *var.* **koëbrense** SLEUM. Blumea 12 (1963) 137.
Differs from *var. oreophilum* by glabrescent and ± densely glandular-muriculate calyx tube. Shrub, 0.4–3 m.
Distr. *Malesia*: NW. New Guinea (Arfak Mts: Mt Koëbré Ridge between Anggi Lakes and from Mt Mundi).
Ecol. In forest edge or in open, regularly burnt summit scrub, 1900–2300 m. *Fl. fr.* Jan.–Febr.
Vern. *Menokwan*, Manikiong.

196. **Vaccinium irigaense** MERR. Philip. J. Sc. 10 (1915) Bot. 52; En. Philip. 3 (1923) 249; COPEL. *f.* Philip. J. Sc. 42 (1930) 576, t. 5, f. 3–5; SLEUM. Blumea 11 (1961) 88.
Glabrous shrub, 4–8 m. Branchlets angular, striate, brownish, shining, rather stoutish, laxly to subdensely leaved. *Leaves* oblanceolate, or elliptic-oblanceolate, for *c.* 1 cm abruptly subcaudate-acuminate, tip bluntish, base cuneately tapering into petiole, marginal basal glands 1(–2) minute, at a short distance from the petiole on each side, thin-coriaceous, very sparsely glandular-dotted underneath, shining, entire, very edge ± recurved, 4.5–6 by 1.5–2.5(–3) cm, sub-5(–7)-plinerved, a few upper, much shorter and more spreading nerves or veins, all anastomosing and slightly raised on both faces as is the ± dense reticulation; petiole flattened, shallowly grooved above, 5–7 by 1–1.5 mm. *Racemes* in the upper 3–4 axils, ± many-flowered, suberect, spreading or occasionally recurved; rachis stoutish, angular, 5–6 cm, eperulate. Pedicels rather robust, 5–7 mm, bract and bracteoles not seen. *Calyx* tube campanulate-obconical, base subtruncate, rugulose, 1–1.5 mm, limb suberect, 1 mm, 5-partite nearly to the base, lobes broad-ovate to subdeltoid, blunt or subacute, ciliate, occasionally some lobe with a small apical gland. *Corolla* 7(–8) mm, cylindrical below and *c.* 3 mm ø, subabruptly contracted to *c.* 1.5 mm ø in the upper third, glabrous at both sides, red, lobes slightly spreading, oblong, obtuse, whitish, 1 mm. *Filaments* linear and densely hairy below, almost filiform and glabrous upwards, 3.5–4 mm, alternately a little unequal; anther-cells oblong, 1 mm, no spurs; tubules as wide as the cells, very short, curved, 0.5 mm, obliquely cut or subtransversely truncate apically. *Disk* bulky. *Style* rather slender, 7(–8) mm, finally somewhat exserted. Immature *fruit* globose, *c.* 6 mm ø, crowned by the conspicuous disk and the erect calyx lobes.
Distr. *Malesia*: Philippines (Luzon: Camarines Sur & Sorsogon Prov.; Catanduanes; Biliran I.).
Ecol. On ridges in mossy forest, 530–1000 m.
Vern. *Dalupáan*, Bik.

197. **Vaccinium fraternum** SLEUM. Blumea 11 (1961) 89.
Much-branched, glabrous treelet, 4–6 m. Branchlets slender, reddish, shining, subdensely leaved. *Leaves* narrow-elliptic or oblong-, more rarely subovate-elliptic, apex (sub)caudate-acuminate for 1–1.5 cm, tip bluntish, base ± broadly attenuate or cuneate into the petiole, marginal gland on each side small, basal or ± suprabasal, coriaceous, very laxly or hardly visibly glandular-punctulate beneath, entire, 3.5–6 by (1.5–)1.8–2.5(–3.2) cm, midrib very narrowly impressed above, broad and obtusely prominent below, nerves 1–2 basal or slightly suprabasal and 2–3(–4) upper pairs, all curved-ascending and anastomosing, subinconspicuous above, minutely raised beneath, reticulation rather dense, visibly raised beneath only; petiole (fresh red) rather slender, dorsally compressed and grooved, 3–5 by *c.* 1 mm. *Racemes* in the upper 1–2(–3) axils, erect or a little recurved, subdensely 10–15-flowered, flowers subsecund; rachis rather slender, (3–)4–6 cm, perulate. Pedicels stoutish, (4–)5–6(–7) mm, bract narrow-oblong, acuminate, 6–10 by 2–4 mm, partly persistent during anthesis, bracteoles not seen. *Calyx* tube sub-campanulate-obconical, base attenuate and ± truncate, rugulose, 1.5 mm, limb spreading, rather low, *c.* 0.5 mm, deeply 5-lobed, lobes very broadly ovate or depressed-semiorbicular, ciliate, apical gland rather thick. *Corolla* subcylindric-urceolate, thin, greenish white, glabrous at both sides, *c.* 7 by *c.* 2.5 mm, lobes ovate, finally reflexed, *c.* 1 mm. *Filaments* subulate-linear, densely long hairy in the lower ⅔, glabrous above, *c.* 2.5 mm; anther-cells oblong, 1–1.2 mm, no spurs; tubules as wide as the cells below, narrowed upwards, very obliquely cut at apex, 0.5–0.6 mm, back wall of each tubule protracted into an erect distinct tooth. *Disk* thick, glabrous, surpassing the calyx lobes. *Style* slenderly columnar, glabrous, *c.* 6 mm.
Distr. *Malesia*: East New Guinea (Milne Bay Distr.: E. slopes of Goodenough I.).
Ecol. In open low forest of crests, 1700 m, frequent. *Fl.* Oct.

198. **Vaccinium claoxylon** J. J. S. Ic. Bog. 4 (1910) 71, t. 321; MERR. En. Born. (1921) 466; SLEUM. Blumea 11 (1961) 89; *ibid.* 12 (1963) 134; *ibid.* 12 (1964) 343. — *V. sp.* near *V. teysmannii*, STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 190.
Shrub or small tree, rarely up to 10 m, generally terrestrial, occasionally epiphytic. Branchlets robust, tips angular, glabrous. *Leaves* lax, broadly elliptic or subovate- or obovate-elliptic, apex shortly attenuate, obtuse, rarely almost rounded, base rarely rounded, generally gradually spathulate-attenuate into a short petiole 2–6 mm (E. Borneo) or subsessile (Mt Kinabalu), with a thick basal gland on each side, stiff-coriaceous, glabrous, laxly dark glandular-punctate beneath (remains of glandular muriculate hairs which are found on young leaves), entire, flat, (6–)8–13(–14) by (3–)4–

7.5(–8.5) cm, midrib robust, convex-prominent and as wide as the petiole below (fresh red), nerves (5–)6–7(–8) pairs, the lowest ones from and a little from above the base, the upper ones pinnately arranged and subparallel to each other, all curved-ascending and anastomosing, slightly raised above, more distinctly so beneath, reticulation dense and prominent on both sides. *Racemes* from the upper, defoliate axils, erecto-patent, secund, densely many-flowered to near the base, glabrous; rachis angular, stiff, 6–13 cm, perulae early caducous. Pedicels robust, (1–)1.5–2(–2.5) mm, bract and bracteoles not seen. *Calyx* tube cup-shaped, base truncate, 1–1.5 mm, limb erect, 5-partite to the base, lobes ovate-triangular, blunt, 1.2–1.5 mm, with numerous, small, thick, sessile glands and some very fine ciliate hairs along the margin. *Corolla* subtubular-urceolate, glabrous at both sides, rather fleshy, whitish to pink, sweet scented, 6–7(–8) by *c.* 2.5 mm, lobes ovate, finally reflexed, 1 mm. *Stamens* 10, almost as long as the corolla (exserted when corolla lobes are reflexed), alternately slightly unequal; filaments linear, dilated above the base, laxly to subdensely long-hairy in the lower ⅔, glabrous above; anther-cells oblong, free from the base, slightly granular, no spurs, *c.* 1.3 mm including the very short tubules, the latter almost as wide as the cells, obliquely cut at apex. *Disk* prominent, glabrous. *Style* columnar or slightly obconical at the base, as long as the corolla, densely set with long, appressed hairs in the lower ⅔, glabrous above. *Fruit* subglobular, wrinkled, *c.* 4 mm ø, obscurely lengthwise 10-ribbed, crowned by the inflexed calyx lobes.

Distr. *Malesia*: Borneo.

Ecol. In submontane (also mossy) forest or scrub, wooded ridges, 700–1550 m, on Mt Kinabalu up to 2985 m, locally not rare. *Fl. fr.* Jan.–Sept.

199. Vaccinium halconense MERR. Philip. J. Sc. 2 (1907) Bot. 294; *ibid.* 3 (1908) Bot. 377; En. Philip. 3 (1923) 249; COPEL. *f.* Philip. J. Sc. 42 (1930) 578, t. 5, f. 6–7; SLEUM. Blumea 11 (1961) 89.

Tree-like shrub, usually terrestrial, sometimes epiphytic or scandent, 3–15 m. Branchlets reddish brown, rigid, angular, glabrous. *Leaves* rather laxly arranged, oblong-elliptic, occasionally subobovate-elliptic or -oblong, apex mostly shortly attenuate or subacuminate, obtuse, sometimes almost rounded, base ± cuneate into the broadened petiole, with a basal or slightly suprabasal marginal gland on each side, coriaceous, rather stiff, glabrous, laxly glandular-punctate beneath, entire, edge a little recurved, 6–9(–11) by 2–3.5(–4) cm, midrib narrowly sunken above, as wide as the petiole and obtusely prominent in the lower part, nerves 2(–3) basal or slightly suprabasal and 2–3 upper and shorter, similarly steeply curved-ascending and anastomosing pairs, mostly faintly immersed above and hardly prominent or even subinconspicuous beneath, reticulation lax to subdense, a little raised on both faces, sometimes rather obscure; petiole flattened, 3–5(–6) by 2–3 (–4) mm. *Racemes* in the upper axils, suberect, rather laxly to subdensely 10–15-flowered, subdensely short-yellowish pubescent the corolla excepted; flowers pendulous; rachis angular, 3–6 (–7) cm, eperulate. Pedicels rather slender, 6–10 (in *fr.* –12) mm, bract subulate, 3 mm, early caducous, bracteoles not seen. *Calyx* tube campanulate to semiglobose, 1–1.5 mm, limb suberect, 1.5–2 mm, deeply 5-partite, lobes ovate-acuminate, bluntish, sometimes less densely hairy than the tube, ciliate, no distinct apical gland visible, but with several small marginal yellow glands, these caducous in later stages. *Corolla* broadly tubular-urceolate, (5–)6–7 by 2.5–3 mm, thin, white, glabrous outside, laxly hairy inside, lobes suberect, obtuse, 1 mm. *Filaments* linear, densely hairy, 2 mm; anther-cells oblong, 1.3 mm, with 2 minute dorsal spurs; tubules cylindric, half as wide as the cells, transversely cut at apex, 0.5 mm, no glandular appendages. *Disk* bulky, pubescent. *Style* columnar, as long as the corolla, densely pubescent. *Fruit* globose, glabrescent, *c.* 8 mm ø (fresh), crowned by the persistently hairy calyx lobes. *Seeds* polyedric-elongate, 1.5 mm.

Distr. *Malesia*: Philippines (Luzon, Mindoro, Negros, Mindanao).

Ecol. In mossy forest, on exposed ridges, 1200–2135 m. *Fl. fr.* Jan.–Dec.

Vern. *Ayusin*, Sbl., *tagilumboy*, Magamai, *yagomum-nag dako*, Negros.

200. Vaccinium roseiflorum J. J. S. in Gibbs, Arfak (1917) 173; SLEUM. Bot. Jahrb. 72 (1942) 257; Blumea 11 (1961) 90.

Small tree. Branchlets slender, minutely puberulous. *Leaves* lax, elliptic, apex shortly, ± abruptly and obtusely acuminate, base subacutely attenuate, with 1 or 2 small marginal glands on each side 2–3 mm above the base, coriaceous, glabrous, rather dull, entire, edge a little revolute, 2.4–4 by 1.3–2.2 cm, midrib narrowly impressed above, slightly raised beneath, nerves 1 or 2 basal or ± suprabasal, curved-ascending and anastomosing pairs, faintly sunken above and hardly prominent beneath, and a few upper, less perceptible pairs, reticulation 0; petiole slender, semiterete, 2–3 mm. *Racemes* in the upper 1–2 axils, ascending, secund, laxly 7–9-flowered; rachis slender, 3–4 cm, densely puberulous and more laxly muriculate-glandular as are pedicels and calyx, eperulate. Pedicels rather slender, 5–7 mm, bract and bracteoles not seen. *Calyx* tube cupular, 1.5 mm, limb deeply 5-partite, lobes ovate-triangular, subacute *c.* 1.2 mm, with a row of small, sessile, marginal, sometimes early caducous glands, and ciliolate towards the apex, mostly also with an apical gland. *Corolla* suburceolate-cylindric, rather fleshy, pink glabrous at both sides, 6–7 by 2.5–3 mm, lobes semiorbicular, *c.* 1.2 mm. *Filaments* linear, narrowed upwards, villous in the lower ¾, *c.* 2 mm; anther-cells oblong, curved, echinulate below, 1 mm, no spurs; tubules suberect, 0.4 mm, obliquely cut at apex, back wall of each tubule extended into 1–2 very short, ± recurved teeth. *Disk* glabrous. *Style* slender, glabrous, *c.* 5 mm.

Distr. *Malesia*: NW. New Guinea (Arfak Mts near the Anggi Lakes), one collection.

Ecol. On edge of forest-patch, at *c.* 2135 m. *Fl.* Dec.

201. Vaccinium leptocladum SLEUM. Blumea 11 (1961) 90.

Very slender, epiphytic shrublet, youngest branchlets hardly 1 mm ø, angular and patently puberulous, older ones glabrescent, *c.* 2 mm ø, laxly to subdensely leaved. *Leaves* narrowly oblong or mostly obovate-oblong, apex obtuse or rounded, base cuneate, subcoriaceous, glabrous, no basal marginal glands, entire, minutely revolute at the very edge, (7–)8–10 by 2.5–3 mm, nerves 2–3, basal or slightly suprabasal, high ascending pairs, a little raised on both faces as is the midrib, reticulation subdense, not much prominent on both sides; petiole slender, *c.* 1 mm. *Racemes* from 1 or 2 upper axils, either reduced to 2 flowers on a slender peduncle, 3–5 mm long (pedicels slender, glabrous, 4–6 mm), or even to a solitary flower on a 2–3 mm long peduncle (pedicel 5–7 mm), bract and bracteoles not seen. *Calyx* all over subdensely pubescent, tube broad-campanulate, 0.5 mm, limb suberect, deeply 5-lobed, lobes deltoid, *c.* 1 mm, bluntish, edge ciliate and set with several thickish subsessile glands. *Corolla* ovoid-urceolate, inflated below, abruptly contracted distally, 3.5–4 mm, by *c.* 2.5 mm, glabrous outside, puberulous in the lower ¼ inside, red, lobes hardly 1 mm. *Filaments* linear-subulate, villous, 1.5 mm; anther-cells broad-oblong, no spurs, *c.* 0.8 mm including the equally wide and very short, obliquely truncate tubules. *Disk* laxly hairy. *Style* filiform, hairy in the lower half, *c.* 4 mm.

Distr. *Malesia*: SE. Borneo (Mt Kutei), in forest at 1600 m. One collection. *Fl.* Oct.

202. Vaccinium phillyreoides SLEUM. Bot. Jahrb. 71 (1940) 163; Blumea 11 (1961) 90; *ibid.* 12 (1963) 135. — *V. sp.* near *V. varingiaefolium*, STAPF, Trans. Linn. Soc. II, Bot. 4 (1894) 189.

Scandent, large, terrestrial or epiphytic shrub in the crown of large trees. Branchlets slender, divaricate, ultimate parts obtusangular, lower ones subterete, minutely puberulous, subdensely to more laxly leaved. *Leaves* lanceolate or ovate-lanceolate, apex gradually or subcaudately acuminate, often a little curved, tip bluntish, base cuneately narrowed, with one small marginal gland 2–3 mm above the petiole, subcoriaceous, rather laxly minutely glandular-muriculate beneath, otherwise glabrous, entire, narrowly marginate, hardly or not revolute at the edge, 2.2–3(–3.5) by 0.5–0.8(–1) cm, midrib generally slightly sunken above, prominent beneath, nerves 2 basal or up to 3 mm suprabasal, high curved-ascending, and 1–2 upper and shorter, mostly spreading pairs, all anastomosing and either a little raised on both faces, or sometimes subobscure above, reticulation dense and minutely raised in immature, almost obscure in fully mature leaves; petiole 1–2 mm. *Racemes* a few from the upper axils, ascending, laxly 6–8(–10)-flowered; rachis angular, puberulous as are the pedicels, (1.5–)2.5–4 cm, eperulate. Pedicels slender, reddish, 5–7 mm, bract and bracteoles not seen. *Calyx* tube cup-shaped or semi-globose, puberulous, 1–1.5 mm, limb subpatent, deeply 5-partite, lobes ovate-acuminate, 1–1.5 mm, subglabrous dorsally, with a marginal row of small, sessile, brownish glands. *Corolla* tubular, rather fleshy, red to carmine, glabrous at both sides, 8–9 by 2.5 mm, slightly contracted at apex and 5-lobed for *c.* 1 mm. *Filaments* linear to filiform, with lax longish white hairs, alternately 6 and 7 mm; anther-cells oblong, 1 mm, no spurs; tubules ± as wide as the cells, 0.2–0.3 mm, obliquely cut distally. *Disk* densely white-hairy. *Style* columnar, *c.* 8 mm, densely hairy in the lower part, glabrescent towards the top. *Fruit* globose, *c.* 5 mm ø, short-pubescent, with a densely pubescent disk included by the incurved calyx lobes.

Distr. *Malesia*: Borneo.

Ecol. In montane rain-forest or jungle ridge, 700–1830 m. *Fl. fr.* Oct.–March.

203. Vaccinium amplexicaule J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 52; Nova Guinea 12 (1914) 159, t. 45 C; SLEUM. Bot. Jahrb. 72 (1942) 263; Blumea 11 (1961) 90.

Shrub, *c.* 0.5 m. Branchlets puberulous, densely leaved. *Leaves* ovate, shortly obtusely acuminate, base deeply cordate-auriculate and ± conduplicate, lobes rounded and amplexicaulous, with a marginal gland on each side at a short distance from the petiole, coriaceous, puberulous at the base above, glabrous elsewhere, glandular-punctate beneath, entire, 2.8–3.5(–4.3) by 2–2.8 cm, 7–9-plinerved, and 2–3 pairs of nerves higher up, all ± impressed above, hardly or not prominent beneath, reticulation obsolete; petiole puberulous, 2–3 by 2 mm. *Racemes* from the upper axils, 10–13-flowered; rachis angular, puberulous, 2–2.7 cm. Pedicels spreading, terete, puberulous, *c.* 1 cm by 1.5 mm; bract and bracteoles not seen. *Calyx* glabrous, campanulate, *c.* 4 by 6 mm, tube 1.5 mm, limb spreading, lobes broadly subovate-triangular, acute, ciliate, 2.5 by 4 mm. *Corolla* shortly campanulate-urceolate, obtusely 5-angled, fleshy, glabrous at both sides, white, 6–7 by 8 mm, lobes broadly triangular, obtuse, revolute, 2(–2.5) mm, reflexed. *Filaments* linear, base dilated, curved and long-hairy above the base, straight and less hairy distally, *c.* 2.7 mm; anther-cells oblong, base protracted into an obtuse apiculus, *c.* 2 mm, with 2 dorsal spurs (0.7 mm); tubules narrow-cylindric, *c.* 1.5 mm, the pore almost round. *Disk* puberulous. *Style* terete, faintly hirtellous below, glabrous upwards, *c.* 4.5 mm.

Distr. *Malesia*: West New Guinea (Oranje Mts: Mt Goliath), 3200 m, on humus and moss-covered rocks in sunny places, rare. Once found. *Fl.* March.

Note. Described as having no stipitate glands on anther-cells and tubules which, however, possibly are present, to conclude from the many characters which connect *V. amplexicaule* with *V. otophyllum*, *V. daphniphyllum*, *V. convallariiflorum* and *V. appendiculatum*.

204. Vaccinium hooglandii SLEUM. Blumea 11 (1961) 91.

Glabrous shrub or treelet, not rarely epiphytic. Branchlets angular, early greyish corticate, striate, densely leaved below, subimbricately so towards the tips. *Leaves* ovate, apex shortly obtusely acuminate or attenuate, base deeply cordate and auriculate, lobes rounded and ± amplexicaulous, red with glaucous bloom when young, green at full age, coriaceous, entire, lower ones 5–8(–9) by 3–5(–6) cm, upper ones gradually decreasing in size, to 2.5 by 1.5–2 cm, margin hardly revolute, midrib flat or faintly sunken above, prominent beneath, nerves 7–8 pairs, 3–4 of which from the base, anastomosing and subimpressed above, slightly raised beneath, reticulation dense, somewhat prominent beneath only; petiole (1–)2–3 by 1.5–2 mm. *Racemes* from the uppermost axils, short, occasionally almost reduced to fascicles, mostly densely, rarely more laxly 5–10(–12)-flowered; rachis *c.* 1 cm. Pedicels rather robust, curved, 0.8–1.3 cm, bract lanceolate, ciliate distally, *c.* 6 by 2 mm, rather early caducous; bracteoles not seen. *Calyx* broadly campanulate, tube 1.5–2 mm, limb spreading, thick-fleshy, 5-partite to the base, lobes broadly deltoid, the apex obtuse and occasionally ciliate, 1.5–2 by 2.5 mm, no apical gland. *Corolla* subglobose-urceolate, slightly contracted below the lobes, fleshy, pink, *c.* 5 by 4 mm, glabrous outside, hairy in the upper part inside, lobes obtuse, subreflexed, 1 mm. *Filaments* linear, villous in front, glabrous at the back, *c.* 1 mm; anther-cells oblong, no spurs, *c.* 1.5 mm including the very short, equally wide and obliquely cut tubules, showing a knob or small gland between them. *Disk* annular, glabrous, 3.5 mm. *Fruit* globose, apex truncate and crowned by the bulky disk, *c.* 6 mm ø, finally blackish.

Distr. *Malesia*: East New Guinea (Western Highlands around Mt Hagen).

Ecol. Terrestrial in forest edge of the lower montane rain-forest, or epiphytic in crown of tal *Nothofagus* forest, 1980–2195 m. *Fl.* April–Aug

205. Vaccinium schoddei SLEUM. Blumea 12 (1963) 135.

Lax treelet or (sometimes scandent) glabrous shrub; stems apparently few, slender, terete, branched distally. *Leaves* rather densely arranged, in part subimbricate, ovate, shortly attenuate or subacuminate towards the mostly blunt apex, base auriculate, lobes amplexicaulous, *c.* 1 cm ø, the pair of basal glands close to the petiole and rather inconspicuous, coriaceous, (3–)4–8 by (2–)2.5–4(–5) cm, entire, hardly revolute, 7–9-plinerved, and 3–4 upper irregular pairs of nerves, all in-arching along the edge, slightly impressed above as is the midrib, prominent below, veins and veinlets densely reticulate, raised on both faces, or certainly beneath; petiole (and midrib) reddish, 2–4(–5) by 1.5–2 mm. *Racemes* from the upper 1–3 axils, subsecund, few- to many-flowered, reddish all over; rachis angular, (1–)2–4(–5) cm; perulae, bracts and bracteoles not seen. Pedicels curved, robust, 0.8(–1.5) cm. *Calyx* tube obconical, base truncate, shining, purplish and pruinose as is the corolla in dry specimens, 2–2.5 by 3.5 mm, lobes erecto-patent, deltoid, ciliolate, 2–2.5 mm, no apical gland. *Corolla* urceolate-cylindric, fleshy, green suffused with red, or crimson when fresh, 11–12 by 4–5 mm, laxly hairy at the stamens inside, glabrous otherwise, lobes 1 mm. *Filaments* glabrous and dilated at the very base, gradually attenuate and villous upwards, *c.* 3.5 mm; anther-cells oblong, almost smooth, 1.2 mm; tubules nearly as wide as the cells, 0.8 mm, obliquely cut apically. *Disk* glabrous. *Style* slenderly columnar, glabrous, 1 cm. Submature *fruit* globose, 5–6 mm ø, calycine lobes erect.

Distr. *Malesia*: East New Guinea (Southern and Western Highlands).

Ecol. In upper montane *Nothofagus* forest, alpine shrubberies or summit grassland, 2700–3520 m. *Fl. fr.* July–Aug.

Vern. *Kund*, Enga, *orsar*, *wanegamp*, Mendi, *argilmai*, Hagen.

206. Vaccinium stellae-montis SLEUM. Blumea 11 (1961) 91.

Shrub, 0.3–3 m. Branchlets terete, laxly short-hairy, 2–3 mm ø. *Leaves* dense, elliptic to oblong-elliptic, apex rounded and retuse for 0.5–1 mm, base broadly attenuate to almost rounded, with a small marginal gland at the very base, coriaceous, glabrous except the midrib which is laxly hairy in its lower part above, lustrous above, entire, very laxly glandular-punctate beneath, 1.5–2.3 by (0.8–)1–1.5 cm, midrib slightly or hardly impressed above, a little prominent beneath, nerves 2–3 pairs, high ascendent, the upper pair sometimes ± obscure, all faintly or not sunken above, slightly raised beneath, reticulation not much conspicuous; petioles subterete, hairy, 3–4(–5) by 0.5–1 mm. *Racemes* from the upper 2–3 axils, (2–)3(–4)-flowered, glabrous; rachis slender, (0.5–)1–1.5 cm, base included by a few reduced perulae; flowers nodding. Pedicels as thick as the rachis, 0.8–1.1 cm, bract and bracteoles subulate, 1–1.5 mm, very early caducous. *Calyx* tube turbinate, rugulose, red, 1.5–2 mm, limb spreading, *c.* 1 mm, 5-lobed nearly to the base, lobes broadly deltoid, very blunt, ciliolate. *Corolla* almost subglobular-urceolate, deep pink at the tube, white at the inside of the lobes, rather fleshy, inside hairy all over, 0.8–1.2 cm long, 6–8 mm ø, contracted to 3–4 mm ø distally, lobes suberect, obtuse, 1.5 mm. *Filaments* narrow-linear, slightly dilated at the base, subdensely hairy below, more laxly so upwards, glabrous distally, *c.* 4.5 mm; anther-cells oblong, echinulate, curved, 1.5 mm; tubules as wide as the cells, hardly 0.5 mm, apex obliquely cut, almost muticous. *Disk* glabrous. *Style* columnar, glabrous, 6 mm.

Distr. *Malesia*: Central New Guinea (Star Mts: Mt Antares, Mt Sirius), in alpine shrub vegetation, 3050–3300 m. *Fl.* July.

207. Vaccinium lageniforme J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 53; Nova Guinea 12 (1914) 158,

t. 45 B; SLEUM. Bot. Jahrb. 72 (1942) 249; Blumea 11 (1961) 92.

Shrub, 1 m. Branchlets terete, glabrous. *Leaves* lax, obovate, apex rounded, base spathulate-contracted, with a marginal basal gland on each side near to the petiole, coriaceous, glabrous, entire, edge much revolute, 6.5–7.5 by 3–3.5 cm, midrib slightly sunken above, prominent beneath, nerves 2 basal or a little suprabasal, and a few upper, equally curved-ascending pairs, faintly impressed above, ± obsolete beneath, as is the reticulation; petiole compressed dorsally, 6–7 by *c.* 2 mm. *Racemes* from the upper axils, laxly 3–5-flowered, flowers ± spreading, glabrous; rachis 0.7–1 cm, eperulate. Pedicels robust, *c.* 1 cm, with 2 minute, tooth-like suprabasal bracteoles; bract not seen. *Calyx* tube broadly cup-shaped, *c.* 2 mm, limb spreading, 2 mm, deeply 5-partite, lobes semiorbicular, ciliolate, 1–1.5 mm. *Corolla* subglobular-urceolate, thick-fleshy, carmine, inside below laxly hairy, *c.* 8 by 8 mm, lobes slightly reflexed, triangular, obtuse, 2 mm. *Filaments* linear, laxly patently (hispid-)hairy, 2.5 mm; anthers bifid slightly over halfway; cells oblong, 1.5 mm, no spurs; tubules erect, nearly as wide as the cells, 1.5 mm, obliquely cut at the narrowed end. *Disk* glabrous. *Style* thick-lageniform, or more bottle-like, glabrous, 3.5 mm, *c.* 2 mm ø at base.

Distr. *Malesia*: New Guinea (Oranje Mts: base of Mt Goliath), on swampy, humous sunny places, not common. One collection. *Fl.* April.

208. Vaccinium crassistylum SLEUM. Blumea 11 (1961) 92; *ibid.* 12 (1964) 344.

Small scrambling shrub or treelet. Branchlets slender, drooping, quite glabrous. *Leaves* lax, ovate to lanceolate-ovate, apex (sub)caudate-acuminate for 1–2 cm, subacute, base broadly attenuate to rounded, with a rather thick supra-basal marginal gland and a few less distinct spaced upper ones, coriaceous, almost white when young or tinged with pink, glabrous, ± glossy, edge very narrowly cartilaginous, 3–8 by 1.5–3 cm, midrib ± immersed above, prominent beneath, nerves 2 basal, 1–2 upper, equally high curved-ascendent and anastomosing, and a few uppermost, much shorter and vein-like pairs, all faintly sunken or subobscure above, slightly raised beneath, reticulation rather dense, generally visibly raised beneath only; petiole 3–4 by *c.* 1 mm. *Racemes* from the upper 2–5 axils, laxly 3–5(–7)-flowered, glabrous, shortly peduncled; rachis very slender, 1–1.5(–2) cm, eperulate. Pedicels filiform, 1.5(–1.8) cm (*c.* 2 cm in fruit), sometimes subtended by an acicular bract. *Calyx* broadly cupular, tube *c.* 1.5 mm, limb erect, 0.6–1 mm, 5-lobed, -dented or -wavy to almost the base. *Corolla* subglobose, shortly 5-lobed, rather fleshy or waxy, white or greenish, glabrous at both sides, *c.* 4 by 4–5 mm. *Filaments* broadly subulate, densely hairy, 1.5 mm; anther-cells ovate-oblong, 1 mm, no (or rather indistinct) spurs; tubules slightly narrower than the cells, cylindric, 0.6 mm, pore oblique. *Disk* glabrous. *Style* thick-columnar, glabrous, 3 mm. *Fruit* depressed-globose (submature), said to be deep red, crowned by the bulky disk surpassing the calyx lobes, *c.* 4 mm ø.

Distr. *Malesia*: East New Guinea (Eastern and Western Highlands).

Ecol. In the lower montane *Nothofagus* forest, climbing over *Rhododendron*, or along edge of *Castanopsis* forest, 1600–2590 m. *Fl. fr.* Aug.–Nov.

Vern. *Kap-kap*, Minj.

209. Vaccinium brevipedunculatum J. J. S. Nova Guinea 18 (1936) 119, t. 32; SLEUM. Bot. Jahrb. 72 (1942) 252; Blumea 11 (1961) 92.

Much branched, epiphytic shrub, up to 2 m. Branchlets slender, drooping, subdensely leaved, younger parts densely covered with short, almost hispid and ± spreading hairs as are the petioles, peduncles and the lower part of the midrib on both faces or above only; axillary buds minute, subulate. *Leaves* ovate-elliptic to -lanceolate, apex subcaudate-acuminate, subacute, base broadly attenuate to nearly rounded, obtuse, with a minute marginal gland on each side at 2–3 mm distance from the petiole, coriaceous, glabrous (except the midrib), laxly glandular-punctate beneath, entire, edge ± revolute (dry), 1.6–3 by 0.7–1.4 cm, midrib narrowly immersed above, slightly raised beneath, pair of basal ascending nerves faintly raised on both sides, as are the few upper nerves and the reticulation; petiole 1–2 mm. *Racemes* from some of the upper axils, abbreviate, umbel-like, (1–)2–3-flowered; peduncle *c.* 2 mm, bearing some small ovate-acuminate perulae. Pedicels spreading, ± filiform, mostly with a few patent hairs in the lower part, rarely hairy all over, apex swollen and with a few muriculate glands, 1.1–1.7(–2.2) cm; bract and bracteoles not seen. *Calyx* coriaceous, glabrous, tube cup-shaped, at base abruptly contracted, 1.5 mm, limb erect, 0.5 mm, 5-lobed to the base, lobes broadly ovate-triangular, bluntish, ciliolate. *Corolla* broadly conical-urceolate, fleshy, glabrous at both sides, white, light red, or pink with white lobes, 4(–5) by *c.* 2.5 mm, lobes recurved, 0.5 mm. *Filaments* subulate-linear, laxly patently hairy, *c.* 1.5 mm; anther-cells oblong, *c.* 1 mm, no spurs; tubules erect, nearly as wide as the cells, 0.5 mm, obliquely cut at apex. *Disk* prominent, glabrous. *Style* robust, glabrous, 3.5 mm. *Fruit* said to be purplish black.

Distr. *Malesia*: West New Guinea (Mt Doorman; Bernhard camp, Idenburg R.).

Ecol. High epiphyte in mossy forest, 900–2000 m. *Fl.* March, Nov.

210. Vaccinium longepedicellatum SLEUM. Blumea 11 (1961) 93. — *V. ardisioides* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 90, *non* RIDL. 1914; SLEUM. Bot. Jahrb. 72 (1942) 252.

Shrub. Branchlets slender, terete, laxly leaved, young parts covered with a thin indument of appressed, short, whitish hairs, as are the petioles. *Leaves* lanceolate, apex gradually and long attenuate-acuminate, straight or a little curved, subacute, base rather broadly attenuate, with a

minute basal gland on each side at 2–3 mm from the petiole, coriaceous, glabrous, laxly glandular-punctate beneath, entire, flat, 3–3.8 by 0.8–1 cm, midrib impressed above, strongly raised beneath, nerves 1–2 basal, high curved-ascending, and *c.* 4 upper and shorter pairs, all anastomosing, faintly impressed or mostly inconspicuous above, slightly raised beneath, reticulation rather dense and distinct beneath only; petiole 2–3 by *c.* 1 mm. *Racemes* from the upper axils, lax, 10–15-flowered, suberect, glabrous; rachis slender, 4–6 cm, perulae small. Pedicels slender, ± thickened upwards, 1.2–1.5 cm, each from a thickened cushion-like part of the rachis. *Calyx* tube campanulate, for 1 mm stalk-like contracted at base, *c.* 3 mm, shining, limb suberect or ± spreading, lobed to near the base, lobes ovate, bluntish, ciliolate, 1–1.5 mm, slightly keeled dorsally, the end of the keel ± gland-like protruding. *Corolla* depressedly subglobose-urceolate, apex contracted into a short apiculus (1 mm), lower part subglobose, fleshy, glabrous on both sides (red?), 5(–6) by 3 mm, lobes 1 mm. *Filaments* subulate, densely hairy in lower half, filiform and glabrous above, *c.* 2.2 mm; anther-cells obovate, not spurred, 1 mm including the tubules, these very short, as wide as or slightly wider than the cells, obliquely cut at apex. *Disk* glabrous. *Style* glabrous, 4 mm.

Distr. *Malesia*: West New Guinea (Mt Carstensz), once collected at 2530–3350 m.

211. Vaccinium retusifolium J. J. S. in Fedde, Rep. 30 (1932) 176; SLEUM. Blumea 11 (1961) 93.

Shrub or tree, up to 6 m; bark scaling, redbrown. Branchlets rather robust, angular, puberulent, subdensely leaved. *Leaves* oblong-obovate or narrow-elliptic, apex obtuse and retuse for *c.* 1 mm, base ± cuneate and decurrent into the broadened petiole, on each side with 1 or 2 marginal glands at some distance from the petiole, coriaceous, glabrous except the very base, with lax muriculate glands beneath, entire, edge narrowly revolute, 1.4–2.7(–3.6) by 0.6–1.6 cm, midrib faintly and narrowly immersed above, obtusely prominent beneath, nerves 3–4 steeply ascending pairs, the lowest from the very base, the upper from the lower half of the midrib, all obscure or minutely raised above, slightly prominent beneath and anastomosing, reticulation dense and finely raised beneath only; petiole initially puberulent, 1–2(–3) by *c.* 1 mm. *Racemes* from the upper 1–3 axils, laxly greyish patent-puberulous the corolla excepted, sometimes tardily glabrescent, but never becoming strictly glabrous, laxly 8–11-flowered; rachis rather slender, 1.5–2.5 cm, with some small ovate-triangular perulae. Pedicels ± secund, 4–6 mm; bract and bracteoles not seen. *Calyx* tube campanulate, 2 mm, limb ± spreading, 5-lobed to near the base, lobes triangular, subacute, ciliate, *c.* 1.5 mm. *Corolla* broadly tubular-urceolate, rather fleshy, glabrous outside, laxly hairy especially in the lower part inside, dark pink to bright red, 10–11(–12) by *c.* 4 mm, lobes broadly triangular, obtuse, *c.* 1.5 mm. *Filaments* linear, dilated above the base, densely patently hairy, *c.* 5 mm; anther-cells oblong, 1.5 mm, no spurs; tubules very short or almost 0, as wide as the cells, ± transversely cut apically. *Disk* pubescent. *Style* robust, mostly subdensely, sometimes sparsely patently pubescent, 1 cm. *Fruit* subglobose, *c.* 5 mm ø, crowned by the puberulent disk, blue-black, rather sweet.

Distr. *Malesia*: Moluccas (Buru and Central Ceram).

Ecol. In primary forest, on limestone, 1475–3000 m, locally very common. *Fl.* Febr.–March, July–Aug.

212. Vaccinium xerampelinum SLEUM. Blumea 12 (1963) 134. — **Fig. 113.**

Treelet or shrub, 3–4 m. Branchlets obtusangular, laxly leaved, patently puberulent at tips, otherwise glabrous; buds subglobose, 1–1.5 mm. *Leaves* elliptic-oblong, apex broadly attenuate and blunt, base cuneate and ± decurrent, pair of basal marginal glands slightly prominent, coriaceous, dark glandular-punctate beneath, entire, not or but slightly revolute, 3–5.5 by 1.5–2.5 cm, basal and somewhat suprabasal plinerves in 2–3 (–4) pairs, steeply ascending, other shorter nerves or veins from the midrib several, irregular, short, all not much or hardly distinct above, more visibly raised beneath, reticulation rather dense, slightly prominent beneath only; petiole flattened, 3–5 by 1.5–2 mm. *Racemes* from the upper 1–3 axils, erect, rather many-flowered, subsecund; rachis angular, shining, 3–8 cm, perulae not known. Pedicels mostly somewhat curved, stoutish, (5–)6–8 (–10) mm; no subtending bracts or bracteoles. *Calyx* tube almost cup-shaped, base ± truncate, 1.5–2 mm, lobes subpatent, ovate, obtuse, ciliolate, 1.5 mm, no apical gland. *Corolla* cylindric-urceolate, waxy-fleshy, purple, pruinose, 12 by 6–8 mm (fresh), 7–8 by *c.* 3 mm (dry), lobes ovate, reflexed, paler than the tube, *c.* 1 mm. *Filaments* purplish, villous and dilated just above the base, narrow-linear and gradually glabrous upwards, 2.5 mm; anther-cells broad-oblong, angular, echinulate, 1.2 mm; tubules equally wide, 0.6 mm, obliquely cut distally, back-wall extended into 1–2 acute teeth; pollen blackish purple. *Disk* prominent, glabrous. *Style* slenderly columnar, glabrous or laxly hairy in the lower third, more densely and partly longer hairy for the rest, 6–7 mm, slightly exserted.

Distr. *Malesia*: NW. New Guinea (crest of the Nettoti Ra., Vogelkop Peninsula).

Ecol. In mossy *Xanthomyrtus-Podocarpus-Nothofagus* crest forest, at 2100 m. *Fl.* Dec.

213. Vaccinium brassii SLEUM. Bot. Jahrb. 72 (1942) 251; Blumea 11 (1961) 93.

var. **brassii.**

Tree, 8–12 m, with erect branches. Branchlets angular, the youngest parts sharply so and puberulent, older ones glabrous and more obtuse, very early covered with greyish cork. *Leaves* lax to subdense, oblong to elliptic-oblong, apex rather shortly acuminate and acutish, base ± broadly cuneate or attenuate, rarely subrotundate,

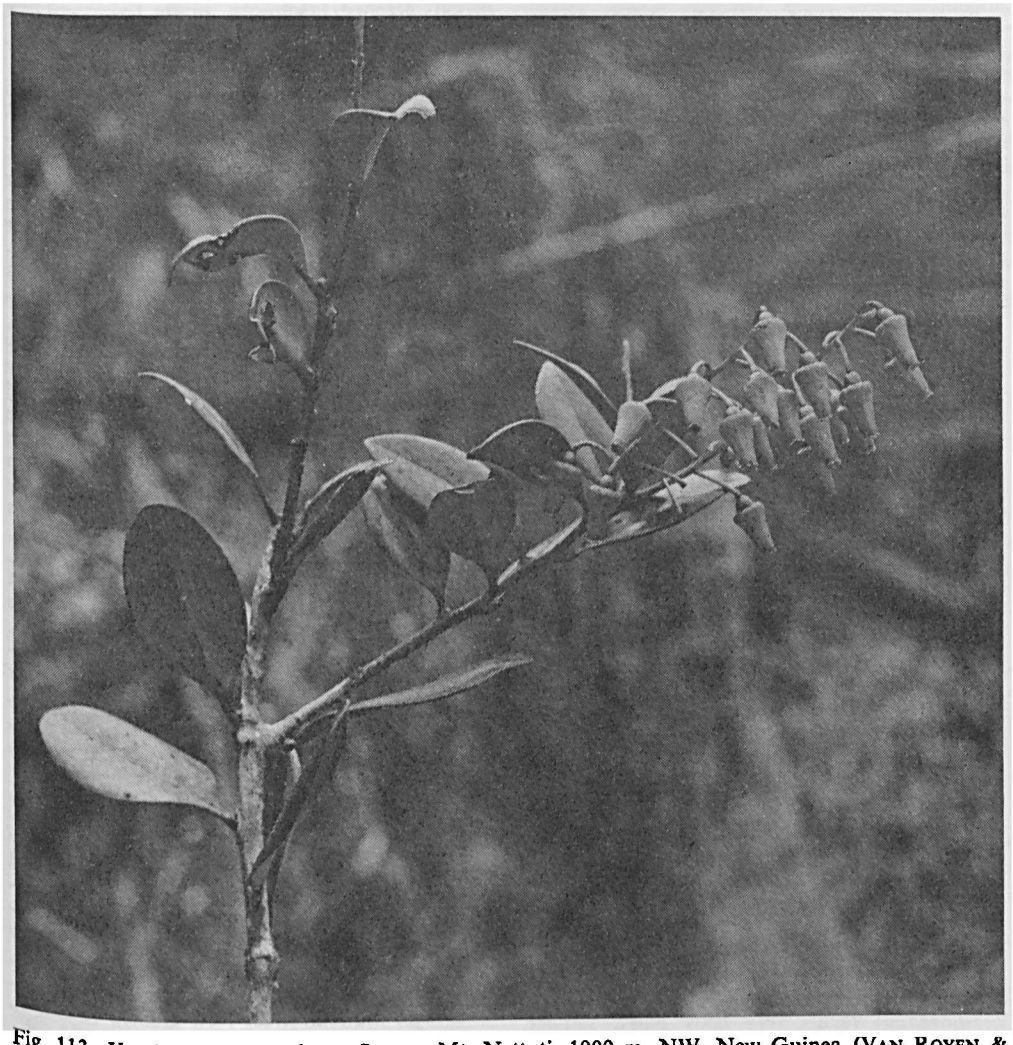

Fig. 113. *Vaccinium xerampelinum* SLEUM. Mt. Nettoti, 1900 m, NW. New Guinea (VAN ROYEN & SLEUMER 7985, type) (SLEUMER, 1961).

on each side with 2 marginal glands, the lower near the petiole, the upper at 1–2 mm above the basal, subcoriaceous, rather stiff, dull bluish green above and pale green underneath (fresh), laxly appressedly glandular-muriculate beneath, otherwise glabrous, entire, edge narrowly cartilaginous, slightly or not revolute, 2–3(–3.5) by 1–1.5(–2) cm, midrib ± immersed above, ± prominent beneath, nerves 2 basal or slightly suprabasal, rather straight, and 2 upper shorter, more curved pairs, all ± steeply ascending and anastomosing, faintly impressed or subinconspicuous above, distinctly raised beneath, reticulation rather dense and fine, ± visibly raised beneath only; petiole and nerves reddish (fresh), dark when dry, flattened, (2–)3–4 by 1–1.5 mm. *Racemes* from the upper 2–3 axils, suberect or somewhat drooping, finely and laxly white-puberulous at rachis and pedicels, densely so on calyx, 8–12-flowered; rachis stoutish, angular, (2–)3–5 cm, eperulate at anthesis. Pedicels robust, 8–10(–12) mm, to 20 mm in fruit, thickened distally; bract and bracteoles not seen. *Calyx* purple-grey, tube campanulate, 2–2.5(–3) mm, limb ± spreading, 1.5–2 mm, deeply (5–)6–8-lobed, lobes subovate-deltoid, obtuse, pubescent also at the tips inside. *Corolla* broadly cylindric or slightly urceolate at full anthesis, sometimes subcampanulate, fleshy, pink to dull red, 7–8 by 5–6 mm, glabrous outside (occasionally sparsely puberulent at the lobes), laxly hairy inside, lobes 6–8, deltoid, obtuse, reflexed, 1.5–1.7 mm. *Stamens* mostly 12, alternately 5 and 5.5 mm; filaments linear-subulate, densely hairy especially below, 3.5–4 mm; anther-cells oblong, ± curved, 1.8–2 mm, no spurs; tubules cylindric, ± as wide as the

cells, ± divergent, 0.5 mm, obliquely cut at apex, the elliptic pore flaring and often with 1–2 minute teeth by an extension of the back wall of each tubule. *Disk* densely hairy. *Style* columnar, laxly hairy nearly to the top, ± as long as the corolla. *Fruit* subglobose, (5–)6–7 mm ø, fleshy and dull glaucous purple when ripe, shortly greyish hairy, crowned by the inflexed calyx lobes and the disk.

Distr. *Malesia*: East New Guinea (Wharton Ra.; Mt Albert-Edward).

Ecol. In more open montane forest, 2840–4000 m, locally common. *Fl.* June–Sept.

var. **madarum** SLEUM. Bot. Jahrb. 72 (1942) 252; Blumea 11 (1961) 93.

Racemes elongate, flowers more laxly arranged. Pedicels and tubules slightly longer than in *var. brassii*. *Calyx* glaucous-pruinose, not hairy. *Disk* densely hairy. *Style* glabrous.

Distr. *Malesia*: East New Guinea (Wharton Ra.: at the Murray Pass), together with *var. brassii*, at 2840 m.

214. Vaccinium leptomorphum SLEUM. Blumea 11 (1961) 93.

Epiphytic, weak shrub, branches *c.* 1 m. Branchlets slender, subterete, patently short-pubescent in the young, glabrescent in the older parts. *Leaves* lax or more dense, ovate, apex subcaudate-acuminate for 0.5–1 cm, blunt, base broadly attenuate to ± rounded, marginal gland on each side small, at 1–2 mm from petiole, subcoriaceous, very laxly glandular-punctate beneath, otherwise glabrous, 2.5–3.5 by (0.7–)0.9–1.4 cm, entire, edge distinctly revolute especially in lower half, midrib impressed above, not much prominent beneath, nerves 1–2 basal or ± suprabasal, high curved-ascending and a few upper shorter, ± pinnate and vein-like pairs, all subinconspicuous above, slightly raised beneath as is the rather dense reticulation; petiole puberulous, (2–)3–4 by 0.5 mm. *Racemes* from the upper 1–2 axils, laxly 2–3-flowered; rachis very laxly hairy, slender, 0.5–1 cm, eperulate. Pedicels slender, 1.2–1.5 cm, 1.5 cm in fruit, laxly hairy distally. *Calyx* laxly hairy at the tube below, less so at the limb, tube campanulate, 1.5 mm, limb subpatent, 5-lobed almost to the base, 1.5 mm, lobes deltoid, bluntish, ciliate. *Corolla* tubular-urceolate, attenuate towards the limb, pinkish white, thin, glabrous outside, laxly hairy in the lower third inside, 9–10 by *c.* 3 mm, lobes ovate, reflexed, *c.* 1 mm. *Stamens* 8; filaments subulate-linear, subdensely patently hairy, 2.5 mm; anther-cells ovate-oblong, 0.8 mm, no spurs; tubules *c.* 0.3 mm, as wide as the cells, occasionally with a minute sessile gland, obliquely cut at apex, back wall of each tubule extending into a very short reflexed tooth. *Disk* laxly pubescent. *Style* columnar, 7.5 mm, laxly patently hairy in the lower ¾, papillose above. Submature *fruit* globose, laxly pubescent, *c.* 3 mm ø.

Distr. *Malesia*: NE. New Guinea (E. slopes of Goodenough I.), in mossy forest at 1600 m. *Fl.* Oct.

215. Vaccinium capillatum SLEUM. Blumea 11 (1961) 94; *ibid.* 12 (1963) 135. — *V. minuticalcaratum* J. J. S. *f. capillatum* SLEUM. Bot. Jahrb. 72 (1942) 254.

Tree or treelet, 2–8(–16) m; bark 2 cm, scaly, brown; wood red brown. Branchlets rather slender, angular, quite glabrous. *Leaves* lax to subdense, elliptic or oblong-elliptic, apex subcaudate-acuminate for 1–2 cm, subacute, base attenuate or subcuneate, marginal gland on each side next to petiole (occasionally another gland at a short distance), coriaceous, glabrous, laxly glandular-punctate beneath, entire, (4–)5–10 by (2–)2.2–3 cm, flat or a little recurved at the very edge, midrib narrowly impressed above, prominent beneath, nerves 2–3 basal or slightly suprabasal and 1–2 upper, shorter, similarly curved-ascendent, and a few uppermost very short and ± spreading pairs, all anastomosing and somewhat raised above, more distinctly so beneath, as is the dense reticulation; petiole (4–)5–7 by *c.* 1 mm. *Racemes* solitary from the upper 1–2 axils, suberect, rather densely (5–)8–15-flowered; rachis rather robust, glabrous as are the pedicels, (2–)2.5–5 cm. Pedicels stoutish, 9–12 mm; subtending bracts lanceolate, thin, 1.5–2 by *c.* 0.4 cm, not rarely already gone at anthesis. *Calyx* subdensely short-pubescent, tube campanulate, 1.2 mm, limb subpatent, 1.5 mm, 5-lobed to nearly the base, lobes deltoid, subacute, ciliate. *Corolla* tubular-urceolate, rather thin, glabrous or very laxly short-hairy outside, laxly hairy in the lower half inside, white or pink, *c.* 9 by 3–4 mm, lobes narrowly ovate, obtuse, reflexed, 1 mm. *Filaments* linear-subulate, subdensely hairy, 2.8–3 mm; anther-cells oblong, 1.5 mm, with 2 very short spurs; tubules slightly narrower than the cells, 0.8 mm, subobliquely cut at apex, back wall of each tubule protracted into an erect, short tooth. *Disk* markedly 10-lobed, rather densely pubescent at the inner margin. *Style* rather slender, *c.* 8 mm, subpatently hairy in the lower ¾. Submature *fruit* subglobose, truncate at both ends, pubescent on top, *c.* 4 mm.

Distr. *Malesia*: West New Guinea (Balim R. valley and Lake Habbema area).

Ecol. In old secondary forest, on poor sandy soil, locally abundant, 1800–3225 m. *Fl. fr.* June–Dec.

Vern. *Wattaraa*, Dani.

216. Vaccinium reticulato-venosum SLEUM. Blumea 11 (1961) 94; *ibid.* 12 (1963) 135.

Shrub or slender tree, occasionally scandent on tree trunks up to 12 m. Branchlets slender, terete below, tips angular, papillose-puberulous, laxly leaved; axillary buds ovoid-subulate, minute. *Leaves* ovate to elliptic, more rarely sublanceolate-ovate, apex ± abruptly caudate-acuminate for 1.5–2 cm, subacute, base broadly attenuate to rounded, with 2(–3) marginal minute glands on each side, remote from the petiole in the lower ¼, subcoriaceous, flexible, glabrous or very laxly papillose-puberulous at the midrib beneath, furthermore very laxly glandular-punctate all over the intervenium beneath, entire, ± revolute at the very edge, 4–7(–8, –10) by 2–3(–3.5) cm, midrib

± impressed above, prominent beneath, nerves 2–3 basal and slightly suprabasal, high-curved ascendent and 1–2 upper, shortly, equally curved pairs, the uppermost few nerves rather straight and vein-like, all distinctly anastomosing and ± raised on both faces, as is the dense reticulation; petiole transversely rugose, puberulous initially, rather slender, 2–3(–4) mm. *Racemes* from a few upper axils, laxly 5–8-flowered; rachis slender, (2–)2.5–4 cm, perulae few, ovate-acuminate, *c.* 2 mm, patent-puberulous as are the pedicels, the latter slender, 1–1.5 cm, with a few glandular-muriculate hairs below the calyx. Bract oblong, *c.* 3 mm, usually gone before anthesis, bracteoles oblong-acuminate, *c.* 2 by 1 mm, at or above the middle of the pedicel, not rarely persistent for some time. *Calyx* tube campanulate, sparsely muriculate, 1.3–1.5 mm, limb subpatent, 1.5–2 mm, 5-lobed to almost the base, lobes ovate-deltoid, a little keeled dorsally and slightly thickened distally (no proper apical gland), glabrous, ciliate. *Corolla* tubular-urceolate, gradually attenuate upwards, thin, glabrous outside, laxly hairy in the lower third inside, 10(–11) by 3 mm (below), brilliant red, lobes ovate, reflexed, 1 mm. *Filaments* subulate, densely hairy below, glabrescent upwards, 2.5 mm; anther-cells oblong, *c.* 1 mm, no spurs; tubules as wide as the cells, hardly 0.3 mm, apex transversely cut. *Disk* subdensely pubescent. *Style* subappressedly white-hairy all over, *c.* 9 mm. *Fruit* blackish purple, *c.* 4 mm ø.

Distr. *Malesia*: East New Guinea (Hindenburg Ra. E. and S. Highlands; Wau-Salamaua area; Owen Stanley Ra.: Musa Mts; N. slopes of Mt Dayman).

Ecol. In *Castanopsis* or *Nothofagus* forest, 1400–3090 m. *Fl. fr.* Jan.–Oct.

217. Vaccinium pilosilobum J. J. S. Bot. Jahrb. 68 (1937) 213; SLEUM. Blumea 11 (1961) 97.

Scandent shrub. Branchlets slender, obtusangular, glabrous or nearly so. *Leaves* lax, ovate to oblong-ovate, apex for 2–3 cm caudate-acuminate, tip bluntish, base shallowly cordate, rounded to subtruncate, with 1(–2) marginal, conspicuously impressed glands at 1–2 mm from petiole, coriaceous to subcoriaceous, laxly glandular-punctate beneath, glabrous, entire, edge ± revolute, (5–)6–10 by (2.5–)3–5 cm, nerves 3–4 pairs from and ± from above the base, curved and high ascendent, and a few upper, shorter ones, all anastomosing and prominent above, less distinctly so beneath, reticulation dense, finely raised on both surfaces; petiole transversely rugose, (5–)6–11 by 1–1.5 mm. *Racemes* from the upper axils, 5–10-flowered; rachis subglabrous or with sparse minute, clavate hairs, (0.4–)1–3 cm. Pedicels slender, glabrous or laxly muriculate, 0.8–1.2 cm, in fruit stoutish, 1–1.3 cm. Bract foliaceous, ovate-oblong, acuminate, red, ciliate, up to 2.7 by 1.4 cm, caducous before full anthesis; bracteoles suprabasal, subulate, ciliate, 1–2 by *c.* 1 mm. *Calyx* tube campanulate, base nearly rounded, laxly or at the base more densely finely hairy and muriculate, *c.* 2 by 2.5 mm, limb spreading or finally reflexed, deeply 5-partite, lobes ovate-acuminate, long-ciliate, 1(–1.5) mm. *Corolla* tubular, membranous, with 5 wings decurrent from the lobes, pink at the tube, whitish at the lobes, *c.* 2.5(–3) cm long, 4–5(–7) mm ø, lobes ± densely short-hairy, deltoid, subacute, 2–3 mm. *Filaments* linear-subulate, densely patent-hairy to subvillous except at base, alternately 8 and 9 mm; anther-cells elongate-oblong, echinulate, base ± obtuse, 2–2.3 mm, no spurs; tubules much narrower than the cells, erect, cylindric, 0.5–0.8 mm, truncate at apex, pore round, slightly flaring. *Disk* densely erect-hairy, prominent. *Style* filiform, glabrous, 2.5–3 cm, slightly exserted. *Fruit* globose, *c.* 5 mm ø.

Distr. *Malesia*: Central Celebes.

Ecol. Montane forest, (1550–)2500–3000 m. *Fl. fr.* June.

218. Vaccinium sclerophyllum SLEUM. Blumea 11 (1961) 96.

Small, densely branched shrub. Branchlets slender, angular, patently puberulous. *Leaves* dense, narrowly oblong-obovate to obovate, apex obtuse or mostly a little retuse, base cuneate, with 1–2 minute, impressed marginal glands on both sides, remote from petiole, coriaceous, rigid, entire, edge much revolute, 1.2–2.5 cm long, 0.5–0.8(–1.1) cm wide in the partly revolute state of dry specimens, sparsely glandular-muriculate beneath, otherwise glabrous, midrib slightly impressed above, obtusely prominent beneath, nerves 1 basal and 2–3 suprabasal pairs, curved-ascending, faintly raised above, more distinctly or sometimes subinconspicuous beneath, veins laxly reticulate, visible on both faces or beneath only; petiole subterete, *c.* 2 by 0.7 mm, on a thick leaf-cushion. *Racemes* from the upper 1(–2) axils, glabrous, (3–)4–6-flowered; rachis ± slender, *c.* 1 cm, eperulate. Pedicels slender, nodding, *c.* 6 mm. *Calyx* tube cup-shaped, base rounded, 1.5–2 mm, limb erecto-patent, deeply 5-lobed, lobes deltoid, 1–1.5 mm, bluntish. *Corolla* tubular, rather fleshy, *c.* 2 cm by 3(–4) mm, faintly 5-angular, blood red, glabrous at both sides, lobes deltoid, obtuse, *c.* 2 mm. *Filaments* filiform, densely hairy, alternately 4 and 5 mm; anther-cells subquadrate, 1 mm, no spurs; tubules very short, as wide as the cells, 0.3 mm, subobliquely truncate apically. *Disk* subdensely and shortly white-hairy. *Style* filiform, glabrous, *c.* 2 cm.

Distr. *Malesia*: E. Central Celebes (Subdiv. Poso: Mt Lumut), at *c.* 2200 m. One collection. *Fl.* Sept.

219. Vaccinium bartlettii MERR. Pap. Mich. Ac. Sc. 19 (1933) 183; SLEUM. Blumea 11 (1961) 96. — *V. lucidum* (BL.) MIQ. *var. pumilum* J. J. S. Med. Rijksherb. *n.* 9 (1916) 30.

Shrub, up to 3 m, sometimes epiphytic. Branchlets slender, patent-puberulous on the younger, glabrescent, finely and densely verruculose in the older parts; bark grey, longitudinally fissured. *Leaves* dense, elliptic or subovate-elliptic, not rarely obovate or subrhombic, apex obtuse to rounded, base ± broadly cuneate or sometimes almost round-

ed, no basal marginal glands visible, subcoriaceous, glabrous, but laxly glandular-punctate beneath, shining especially above, entire, edge slightly recurved, 0.7–1.2 by 0.4–0.6(–0.7) cm, midrib slightly immersed above, raised beneath, nerves 2–3 basal and suprabasal pairs, ascending to the apex and anastomosing, finely raised on both faces as is the rather dense reticulation; petiole slender, puberulous, (1–)2 mm. *Racemes* axillary, abbreviate, (2–)3–5(–8)-flowered; rachis (including peduncle, 0.5–1 cm) very slender, glabrous or puberulous, 1.5–2 cm, with a few ovate-acuminate perulae (1–2 mm). Pedicels very slender, glabrous, ± curved, 5–7(–9) mm. Bracts subulate (2 mm), early caducous; bracteoles rudimentary. *Calyx* glabrous, tube turbinate-campanulate, base truncate, *c.* 2 mm, limb patent or reflexed, its lobes deltoid, ciliate normally and laxly caducously glandular-muriculate along the edge. *Corolla* elongate, tubular-urceolate, much narrowed in the upper third or half, intensely red or dark red brown, somewhat fleshy, glabrous outside, ± densely hairy in the lower third inside, 8–9 by 2.5–3 mm (below), lobes finally reflexed, obtuse, 1 mm. *Filaments* linear-subulate, alternately 4–4.5 and 2.5–3 mm, long-hairy to the lower ¾ or more; anther-cells broadly obovate-oblong, no spurs, 1–1.3 mm, tubules as wide as the cells, very short or practically 0, apex truncate. *Disk* sparsely erecto-pubescent. *Style* almost filiform, glabrous below, papillose-puberulous in the upper half, not properly hairy, *c.* 8 mm. *Fruit* subglobose, *c.* 4 mm ø, finally blackish.

Distr. *Malesia*: N. half of Sumatra (Atjeh, Eastcoast and Westcoast Res.).

Ecol. In ridge forest, open facies of the mossy forest, or in open mountain heath or scrub, in scattered groups, (1350–)1800–3000 m, locally common. *Fl.* Jan.-Dec.

220. Vaccinium acrobracteatum K. SCH. in K. Sch. & Laut. Nachtr. (1905) 339; SCHLTR, Bot. Jahrb. 55 (1918) 175; SLEUM. Blumea 11 (1961) 97; *ibid.* 12 (1963) 135. — *V. torricellense* SCHLTR, Bot. Jahrb. 55 (1918) 175; SLEUM. *ibid.* 72 (1942) 249. — *V. tiariforme* J. J. S. Nova Guinea 18 (1936) 115. — *V. lageniforme* (*non* J. J. S.) KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 481. — *V. papuanum* J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 51; Nova Guinea 12 (1914) 162, t. 48; *ibid.* 18 (1936) 118; SLEUM. Bot. Jahrb. 72 (1942) 253; Blumea 11 (1961) 50. — *V. adenanthum* SLEUM. Bot. Jahrb. 72 (1942) 268. — **Fig. 114.**

Terrestrial or mostly epiphytic, erect or pendulous shrub or small tree, much branched, (0.5–)1.5–2(–5) m. Branchlets robust, obtusangular, tips purple red, glabrous, early corticate; sterile buds subglobular. *Leaves* obovate to obovate-subspathulate, oblong- or elliptic-, rarely suborbicular-obovate, apex broadly attenuate and obtuse to rounded, or ± retuse, base ± cuneate into and a little decurrent on the stout petiole, red when young, a pair of minute dark marginal glands near the petiole, coriaceous to subcoriaceous, shining above, laxly glandular-muriculate beneath,

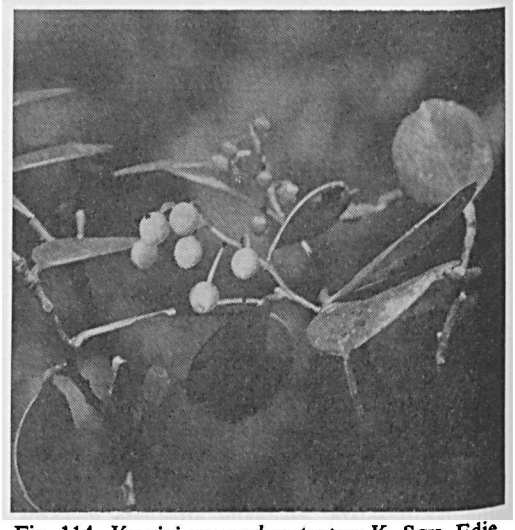

Fig. 114. *Vaccinium acrobracteatum* K. SCH. Edie Creek, 1900 m, E. New Guinea (NGF 13939 WOMERSLEY & SLEUMER) (SLEUMER, 1961).

glabrous, entire, edge ± recurved especially towards the base of the lamina, (2.4–)4–9 by (1–)2–5.5 cm, midrib narrowly immersed in the lower part above, much narrower than the petiole and slightly prominent or evanescent beneath, nerves 1–2(–3) basal and 1–2(–3) upper pairs, all rather steeply ascending and straight below, ± curved distally, ± inconspicuous above, ± raised beneath, reticulation lax and conspicuously raised but in fully mature leaves, otherwise rather obsolete; petiole red, ± flattened, transversely rugose, (2–)3–5(–7) by 1.5–2(–3) mm. *Racemes* axillary, suberect, laxly subsecundly (3–)5–8(–10)-flowered, all over laxly, in the calyx tube mostly densely set with short muriculate glandular hairs, glabrescent, rarely glabrous; rachis stoutish, angular, (1–)4–5(–7) cm; perulae few, ovate to suborbicular, 3–4 by 3 mm, subcoriaceous, early caducous. Pedicels rather robust, (0.3–)0.5–1.5(–1.8) cm. Bract ovate-oblong, firmly membranous, glabrous, ciliate, 0.6–1(–2) by 0.2–0.5 cm, ± early caducous, or a few upper ones persisting till fruiting time, green, suffused with red; bracteoles subulate, early caducous. *Calyx* tube broadly cup-shaped, base subtruncate, 1.5–2 mm, generally laxly to subdensely glandular-muriculate, rarely glabrous, limb ± expanded, 1.5 mm, lobed halfway, lobes broad-ovate or semiorbicular, obtuse, ciliolate, without apical gland. *Corolla* broadly urceolate, fleshy, reddish, pink or nearly white, darker at the lobes, sparsely to subdensely set with stalked or muriculate glands outside, glabrescent at anthesis, glabrous or very laxly hairy below inside, 6–8(–10) by 3–4(–5) mm, lobes suborbicular, 1–1.5 mm, finally reflexed, densely papillose inside. *Filaments* linear, laxly patently hispid-hairy below, 2.5–3 mm; anther-cells oblong, 1.5–2 mm, no spurs; tubules short-cylindric, gradually narrowed upwards, apex obliquely cut,

0.5–1 mm, back wall of each tubule ± extended into a bifid tooth. *Disk* glabrous. *Style* columnar or somewhat thickened in the middle, glabrous, 5–8 mm. *Fruit* depressed-globose, crowned by the bulky disk, 6–7 mm ø, glabrescent, reddish to dull purplish.

Distr. *Malesia*: throughout New Guinea.

Ecol. Epiphytic or terrestrial in the lower and montane (*Agathis* and *Nothofagus*) forest and in mossy bush, 500–2000(–2400) m, rare in lowland riverine forest at 200–500 m. Forming scrubs on poor sandy soil or locally dominant as a tree in secondary forest in the Bele and Balim R. valley at 1600–2200 m. *Fl. fr.* Jan.–Dec.

Vern. *Djeggeba*, Chimbu: Masul, *ronbug*, Wahgi: Minj, *kerandegug*, Hagen: Togoba, *barau*, Mairi: Watabung, *erikai*, Wapi: Wigote.

221. Vaccinium nitens SLEUM. Blumea 11 (1961) 97.

Small tree, 6–7 m, trunk 15 cm ø. Branchlets ± robust, with sparse club-shaped glands on youngest, glabrous on older parts; sterile flower buds subglobose. *Leaves* obovate-elliptic, apex broadly attenuate, obtusely subacuminately contracted for 3–5 mm or almost rounded, base cuneate and somewhat decurrent, a pair of rather small marginal glands distant from petiole, thin-coriaceous, glossy, laxly glandular-muriculate beneath, entire, very edge ± revolute, (4–)5–7 by 2.5–4 cm, midrib ± impressed in the lower part above, as thick as the petiole, convex and prominent at base beneath, nerves 2–3 basal or ± suprabasal and (2–)3–4 upper subparallel pairs, all ascendent and rather straight below, curved upwards, ± raised on both faces, reticulation subdense, ± prominent above, more distinctly so beneath; petiole flattened, grooved above, transversely rugose, 2–5 by 1–2 mm. *Racemes* from the upper and lower defoliate axils, spreading, laxly many-flowered, subsecund; rachis thickish, angular, laxly or mostly subdensely clad with glandular hairs or very slender club-shaped brownish glands, as are the pedicels and the calyx tube, not hairy, 5–8 cm, eperulate. Pedicels rather slender, 5–6(–7) mm. Bracts not known; bracteoles subulate, basal, early caducous. *Calyx* tube broadly campanulate, 1 mm, limb ± spreading, deeply 5-lobed, lobes deltoid, glabrous dorsally, ciliolate at the apex. *Corolla* tubular-urceolate, thin, white, sweet-scented, glabrous at both sides, (6–)7 by *c.* 2.5 mm, lobes obtuse, reflexed, hardly 1 mm. *Filaments* subulate, laxly hairy but for the wider base, alternately 2.5 and 2 mm; anther-cells broad-oblong, 0.5–0.6 mm, no spurs; tubules cylindric, slender, ± divergent, 1 mm, apex obliquely cut. *Disk* glabrous. *Style* columnar, glabrous, 6 mm.

Distr. *Malesia*: Philippines (Mindoro: Mt Yagaw).

Ecol. On steep rocky slope in virgin forest, 2500 m. *Fl.* July.

Vern. *Bak haw sa eli.*

222. Vaccinium apiculatum SLEUM. Blumea 11 (1961) 95; *ibid.* 12 (1963) 135.

Shrub or tree-like shrub, up to 8 m. Branchlets suberect, rather robust, angular, glabrous, early corticate. *Leaves* dense, elliptic or oblong-elliptic, apex shortly acuminate and tipped by a minute apical gland, base attenuate or cuneate, marginal gland on each side conspicuously impressed at 0–2 mm from petiole, more rarely with another marginal gland, coriaceous, glabrous, crenulate in upper third by small glands, (2–)2.2–3 by 1–1.5 cm, midrib ± impressed below, ± flat upwards above, prominent beneath, nerves 1–2 basal and 1–2 suprabasal or from the upper part of the midrib subcurved-ascendent and anastomosing pairs, hardly prominent above, more distinctly so beneath, veins laxly reticulate, mostly slightly raised beneath only; flush reddish; petiole ± flattened, 1–2(–3) by *c.* 1 mm. *Racemes* from upper 1–2(–3) axils, erect, densely 8–12-flowered, flowers pruinose when dry; rachis robust, angular, glabrous, 1.5–2.5 cm, eperulate at anthesis. Pedicels stoutish, curved, glabrous, 2–4 mm. Bracts oblong, acuminate, up to 7 by 3 mm, early caducous; bracteoles basal, subulate, very early caducous. *Calyx* coriaceous, tube campanulate, glabrous, 1.5 mm, limb erect, 5-parted almost to the base, lobes ovate-triangular, (1–)1.5–2 mm, ciliate. *Corolla* urceolate, slightly 5-angular, rather fleshy, glabrous at both sides, pink, 7–8 by 3 mm (below), lobes paler obtuse, reflexed, *c.* 1 mm. *Filaments* subulate, densely hairy below, more laxly upwards, 2–2.5 mm; anther-cells oblong, 1.2–1.5 mm, on spurs; tubules cylindric, narrower than the cells, somewhat divergent and curved, *c.* 1 mm, apex obliquely cut. *Disk* glabrous. *Style* columnar, glabrous, (5–)6–7 mm. Submature *fruit* subglobose, *c.* 4 mm ø.

Distr. *Malesia*: E. New Guinea (Southern and Western Highlands: Mt Hagen, Mt Sugarloaf, Mt Giluwe).

Ecol. In montane cloud forest at the upper forest limit, or in alpine grassland or shrubbery, 3140–3650 m. *Fl.* July, Aug.

Vern. *Monge mandimand*, Enga, *tingukil*, Mendi.

223. Vaccinium tomicipes J. J. S. Bot. Jahrb. 68 (1937) 212; SLEUM. Blumea 11 (1961) 95.

Epiphytic shrub, 0.5 m. Branchlets slender, tips angular, patent-puberulous and laxly clavate-glandular, older parts glabrescent and with dark cork. *Leaves* ovate, apex gradually acuminate, obtuse, base rounded to subcordate, basal marginal gland on each side distant from petiole, subcoriaceous, ciliolate and very laxly glandular-muriculate at both faces initially, glabrescent, edge entire, recurved, 0.8–1.3 by 0.4–0.7 cm, 3–5-plinerved, midrib and basal nerves slightly, other upper nerves or veins but faintly raised above, ± inconspicuous beneath, no reticulation; petiole puberulous, 1–1.5 mm. *Flowers* solitary, axillary, each on a very slender sparsely muriculate or glabrous peduncle, 6–8(–10) mm, swollen at the articulation with the equally very slender pedicel (10–15 mm), with a few scarious ovate-oblong glabrous perulae (1–2 mm) at and a little above the base. *Calyx* obconical, tube 5-angled, laxly muriculate, 2 mm, limb expanded, lobes obtusely broad-

triangular, 0.8 mm. *Corolla* suburceolate-cylindric, but slightly contracted distally, sparsely or very sparsely glandular-muriculate outside, with a hairy ring or 5 longitudinal tufts of hairs above the base inside, thin-fleshy, white or pinkish, *c.* 6 by 2–2.5 mm, lobes reflexed, 0.8 mm. *Filaments* linear, villous in the lower $^3/_5$, *c.* 2 mm; anther-cells broad-oblong, echinulate, 0.8 mm, no spurs; tubules narrow-cylindric, *c.* 1 mm, pore strictly apical, slightly widened and denticulate at the margin. *Disk* glabrous. *Style* glabrous, *c.* 5 mm.

Distr. *Malesia*: SW. Central Celebes (Latimodjong Ra.: Mts Pokapindjang and Batu Toding), three collections.

Ecol. In rain-forest, 2400–2600 m. *Fl.* May–June.

224. Vaccinium ligustrifolium J. J. S. in Gibbs, Arfak (1917) 174; SLEUM. Bot. Jahrb. 72 (1942) 252; Blumea 11 (1961) 96.

Shrub or small tree. Branchlets angular, slender, minutely puberulous in the youngest parts, glabrescent below. *Leaves* ovate-elliptic or elliptic, apex gradually attenuate and obtuse, base attenuate, a small marginal gland on each side at *c.* 1.5 mm from petiole, coriaceous, glabrous, entire, edge narrowly cartilaginous, hardly revolute, 1.8–3.3 by 0.8–1.6 cm, midrib shallowly immersed above, ± raised beneath, nerves and reticulation inconspicuous; petiole puberulous, glabrescent, 1.5–3.5 by *c.* 1 mm. *Racemes* axillary, *c.* 4-flowered; rachis glabrous, rather stoutish, *c.* 7 mm. Perulae, bracts and bracteoles not seen. Pedicels rather robust, glabrous, *c.* 5 mm. *Calyx* patently pubescent, tube campanulate, 1.5 mm, limb subpatent, lobes triangular, acute, ciliate, hardly 1 mm. *Corolla* narrowly urceolate, glabrous outside, laxly hairy inside, rather fleshy, pink, *c.* 7.5 by 3 mm (below), lobes ovate-triangular, obtuse, reflexed, 1.2–1.5 mm. *Filaments* linear, dilated and almost villous above the base, laxly hairy upwards, glabrous distally, 3 mm; anther-cells oblong, 1 mm, no spurs; tubules as wide as the cells, *c.* 0.3 mm, apex obliquely cut. *Disk* erecto-pubescent at the inner margin. *Style* columnar, glabrous, 6 mm.

Distr. *Malesia*: West New Guinea (Vogelkop Peninsula: Arfak Mts, Anggi Lakes), in edge of forest at 2135 m. One collection. *Fl.* Dec.

225. Vaccinium jagori WARB. in Perk. Fragm. Fl. Philip. (1905) 174; MERR. Philip. J. Sc. 1 (1906) Suppl. 112; *ibid.* 3 (1908) Bot. 337; En. Philip. 3 (1923) 250; COPEL. *f.* Philip. J. Sc. 42 (1930) 592, t. 6, f. 4–5; SLEUM. Blumea 11 (1961) 98. — *V. angustilimbum* MERR. Philip J. Sc. 12 (1917) Bot. 294; En. Philip. 3 (1923) 248.

Shrub or small glabrous tree, up to 7 m. Branchlets stoutish, angular, early covered with striate greyish cork. *Leaves* narrowly elliptic to broadly obovate-oblong or -elliptic, apex shortly and obtusely attenuate, acuminate or apiculate or ± rounded, base cuneately narrowed and ± decurrent, basal or ± suprabasal marginal gland on each side distinct, other less distinct spaced glands over the entire margin, coriaceous, glabrous, glandular-punctate beneath, often dark when dry, shining, 5–8 by (1–)1.5–3(–4) cm, very edge ± recurved, midrib flattish or slightly raised above, obtusely prominent beneath, nerves 2–3 basal and several subparallel, equally steeply ascending upper pairs, all anastomosing and slightly to ± indistinctly prominent above, more markedly raised beneath, reticulation rather dense, not much conspicuous; petiole flattened, 2–3(–4) by *c.* 2 mm, transversely rugose. *Racemes* from the upper 1–3 axils, 8–12(–20)-flowered; rachis stoutish, angular, 3–5 cm, eperulate at anthesis. Pedicels rather robust, often nodding, 4–5 mm, in *fr.* 8 mm. Bract or bracteoles not seen. *Calyx* tube short-campanulate, base truncate, 1 mm, limb ± spreading, deeply 5-lobed, lobes ovate-triangular, obtuse, ciliolate, tip ± thickened, but without proper gland, 1–1.3 mm. *Corolla* cylindric-urceolate, fleshy, glabrous at both sides, (8–)10 by 4 mm, usually red, but varying to white, lobes ovate, ± recurved, *c.* 1 mm. *Filaments* linear, densely hairy, *c.* 3 mm; anther-cells broadly oblong, 1 mm, no spurs; tubules as wide as the cells, 0.5 mm, apex obliquely cut, no appendages. *Disk* glabrous. *Style* columnar, glabrous, (8–)10 mm. *Fruit* globular, black when ripe, 5–6 mm ø, the calyx lobes not exceeding the disk, which is about 3 mm ø. *Seeds* numerous, slender, black, *c.* 1.5 mm.

Distr. *Malesia:* Philippines (Luzon).

Ecol. On exposed ridges in primary forest or in the moss forest, (300–)1000–2000 m.

Vern. *Gutmó, multamut*, Ting., *darikidik*, Neg.

226. Vaccinium sylvaticum ELM. Leafl. Philip. Bot. 3 (1911) 1095; MERR. En. Philip. 3 (1923) 251; COPEL. *f.* Philip. J. Sc. 42 (1930) 588; SLEUM. Blumea 11 (1961) 98. — *V. mearnsii* ELM. Leafl. Philip. Bot. 3 (1911) 1098; MERR. En. Philip. 3 (1923) 250.

Shrub or stunted tree, terrestrial or epiphytic, 2–10 m; stems several, ascending; branches ascending and spreading, covered with smooth, greyish, mottled bark. Branchlets rather stoutish, angular, practically glabrous. *Leaves* lax, oblanceolate to oblong, or ± elliptic, apex ± shortly subcaudate-acuminate, tip bluntish, base ± cuneate, with a basal or ± suprabasal, marginal, impressed gland and a number of upper spaced ones, the upper ones resembling faint crenulations, coriaceous, glabrous, shining, very edge ± revolute, (5–)6–10 by (2–)2.5–4 cm, sub-5-plinerved, midrib narrowly immersed above, obtusely prominent beneath, nerves 1–2 basal or ± suprabasal, high curved-ascending and a few upper, shorter, more spreading and vein-like pairs, all anastomosing and ± raised on both faces as is the dense reticulation; petiole flattened, 6–10 by 1.5–2 mm. *Racemes* from the upper 3–4 axils, ± ascendent, finely patent-puberulous, subdensely 8–15-flowered; rachis stoutish, 3–8 cm, eperulate towards anthesis. Pedicels ± robust, 4–5(–7) mm. Bracts and bracteoles not known. *Calyx* tube cup-shaped, 1 mm, limb ± spreading, deeply 5-lobed, lobes

deltoid, subobtuse, ciliate, 1 mm. *Corolla* suburceolate, gradually tapering from the inflated base to the minutely 5-lobed apex, thin-fleshy, glabrous at both sides, red, or red with white lobes, 7–8 by 3.5 mm (below). *Filaments* linear, sparsely to subdensely hairy, 2.5–3 mm; anther-cells oblong, *c.* 1.2 mm, no spurs; tubules cylindric, nearly as wide as the cells, *c.* 0.4 mm, apex subobliquely truncate. *Disk* prominent, densely hairy. *Style* glabrous, *c.* 8 mm. Immature *fruit* subglobose, *c.* 7 mm ø. *Seeds* oblong, compressed, reddish brown, 1.5 mm.

Distr. *Malesia:* Philippines (Mindanao).

Ecol. On forested ridges, 1000–1250 m. *Fl. fr.* Aug.-Sept.

Vern. *Mangoblbas, taúpol,* Bag.

227. Vaccinium gjellerupii J. J. S. Nova Guinea 12 (1914) 163, t. 49; SLEUM. Bot. Jahrb. 72 (1942) 253; KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 480; SLEUM. Blumea 11 (1961) 98; *ibid.* 12 (1963) 136.

Erect glabrous shrub or treelet, (0.5–)1–3(–6) m. Branchlets angular, rather slender; buds subglobose. *Leaves* lax to subdense, elliptic or lanceolate-elliptic, apex shortly and gradually attenuate or subacuminate, subacute or mostly blunt, base attenuate to subcuneate and ± decurrent, 1(–2) pairs of basal and 1–2 upper, less distinct glands, spaced in the lower third of the blade, coriaceous, rather rigid, with some sparse glandular points beneath, glossy, entire, edge mostly distinctly revolute (dry), 3.5–6.5(–7.5) by (1–) 1.5–2.5(–3) cm, midrib ± impressed above, obtusely prominent beneath, nerves 1–2 basal and slightly suprabasal, high curved-ascendent and 1–2 upper, shorter and more spreading pairs, all anastomosing, ± raised above as is the dense, fine reticulation, ± indistinct below; petiole ± flattened, grooved above, 4–6(–7, –10) by 1–1.5 mm. *Racemes* from the upper 2–3 axils, ascendent, finally spreading to recurved, laxly 8–15(–20)-flowered, subsecund; rachis ± slender, angular, 3–6 cm, eperulate at anthesis. Pedicels stoutish, ± curved, 0.7–1.3(–2) cm. Bracts and bracteoles not known. *Calyx* tube cup-shaped, rugulose, *c.* 1.5 mm, limb ± spreading, hardly 1 mm, deeply 5-lobed, lobes ovate-deltoid, subacute, ciliolate, sometimes bearing an apical gland. *Corolla* elongate-urceolate, fleshy, pink to bright red or light carmine, glabrous at both sides, (8–)9–10 by 3–4 mm below, 2–3 mm ø distally, lobes whitish, ovate, obtuse, reflexed, 1 mm. *Filaments* subulate, wavy, densely hairy in the lower ¾, *c.* 2.5 mm; anther-cells oblong, echinulate, 1–1.2 mm, no spurs; tubules cylindric, as wide as the cells, erect, 0.5–0.6 mm, apex obliquely cut, back wall of tubules extended into 1–2 very short teeth. *Disk* prominent, glabrous. *Style* whitish, slenderly columnar, glabrous, finally exserted. *Fruit* globose, *c.* 5 mm ø, crowned by a much prominent disk which exceeds the calyx lobes.

Distr. *Malesia:* West New Guinea (Vogelkop Peninsula: Arfak Mts, Anggi Lakes).

Ecol. In shrubberies near lake shore, or undergrowth in *Nothofagus* forest or in forest edge on humous covered granite, scattered, 1840–2300 m. *Fl. fr.* Jan.-Dec.

228. Vaccinium laurifolium (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1061; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 39; O. KTZE, Rev. Gen. Pl. 2 (1891) 384; KOORD. Exk. Fl. Java 3 (1912) 18; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 109; J. J. S. in K. & V. Bijdr. 13 (1914) 166; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 11; DOCTERS VAN LEEUWEN, Pangrango (1933) 206, t. 13; MALM, in Fedde, Rep. 34 (1934) 284; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 4; SLEUM. Blumea 11 (1961) 98. — *Thibaudia laurifolia* BL. Bijdr. (1826) 859; HASSK. Cat. Hort. Bog. (1844) 161.

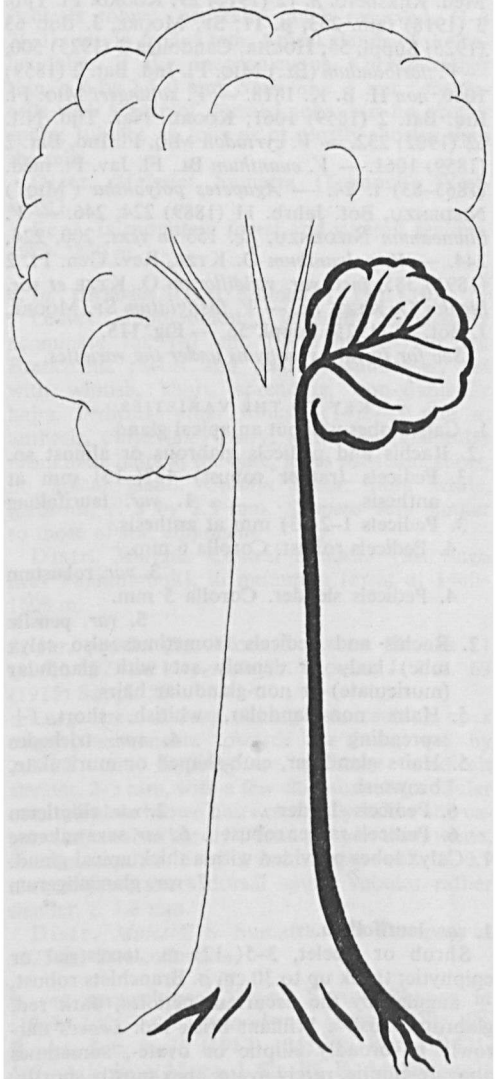

Fig. 115. *Vaccinium laurifolium* (BL.) MIQ. as a hemi-epiphyte, height *c.* 5 m, along road above Trètès, 1500 m, N. Slope of Mt Ardjuno, E. Java.

— *Thibaudia floribunda* BL. Bijdr. (1826) 859, *non* H. B. K. 1818; HASSK. Cat. Hort. Bog. (1844) 161. — *Agapetes laurifolia* (BL.) G. DON, Gen. Syst. 3 (1834) 862; DUNAL, in DC. Prod. 7 (1839) 555. — *Agapetes floribunda* (BL.) G. DON, Gen. Syst. 3 (1834) 862; DUNAL, in DC. Prod. 7 (1839) 555; MOR. Syst. Verz. (1846) 42; HASSK. Pl. Jav. Rar. (1848) 470; ZOLL. Syst. Verz. 2 (1854) 137. — *Thibaudia rosea* JUNGH. Nat. Geneesk. Arch. N.I. 2 (1845) 35; HASSK. Flora 5 (1847) 524; WALP. Ann. 1 (1849) 475. — *Epigynium laurifolium* (BL.) KL. Linnaea 24 (1851) 49. — *Epigynium floribundum* (BL.) KL. *l.c.* — *V. teysmannii* MIQ. Fl. Ind. Bat. 2 (1859) 1062; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 38; KOORD. Junghuhn Gedenkb. (1910) 185; Exk. Fl. Java 3 (1912) 13, *p.p.*; HALL. *f.* Med. Rijksherb. *n.* 12 (1912) 29; KOORD. Fl. Tjib. 3 (1918) fam. 233, p. 11; SP. MOORE, J. Bot. 63 (1925) Suppl. 55; HOCHR. Candollea 2 (1925) 500. — *V. floribundum* (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1060, *non* H. B. K. 1818. — *V. zollingeri* MIQ. Fl. Ind. Bat. 2 (1859) 1061; KOORD. Nat. Tijd. N.I. 62 (1902) 232. — *V. cyrtodon* MIQ. Fl. Ind. Bat. 2 (1859) 1061. — *V. euanthum* BL. Fl. Jav. Pl. inéd. (1863–83) t. 24. — *Agapetes polyantha* ('MIQ.') NIEDENZU, Bot. Jahrb. 11 (1889) 224, 246. — *V. blumeanum* NIEDENZU, *l.c.* 153 *in text*, 200, 224, 244. — *V. polyanthum* O. KTZE, Rev. Gen. Pl. 2 (1891) 385, *incl. var. viridiflorum* O. KTZE *et var. bicolor* O. KTZE, *l.c.* — *V. fastigiatum* SP. MOORE, J. Bot. 63 (1925) Suppl. 56. — **Fig. 115.**

See for further synonyms under the varieties.

KEY TO THE VARIETIES

1. Calyx lobes without an apical gland.
 2. Rachis and pedicels glabrous or almost so.
  3. Pedicels (rather robust) 4–7(–15) mm at anthesis . . . . . **1.** *var.* **laurifolium**
  3. Pedicels 1–2(–3) mm at anthesis.
   4. Pedicels robust. Corolla 6 mm. **3.** *var.* **robustum**
   4. Pedicels slender. Corolla 5 mm. **5.** *var.* **pensile**
 2. Rachis and pedicels (sometimes also calyx tube) laxly to densely set with glandular (muriculate) or non-glandular hairs.
  5. Hairs non-glandular, whitish, short, ± spreading . . . . . **4.** *var.* **trichodes**
  5. Hairs glandular, club-shaped or muriculate, brownish.
   6. Pedicels slender . . . . **2.** *var.* **ellipticum**
   6. Pedicels rather robust . **6.** *var.* **sarawakense**
1. Calyx lobes provided with a thick apical gland. **7.** *var.* **glanduligerum**

1. *var.* **laurifolium.**

Shrub or treelet, 3–5(–12) m, terrestrial or epiphytic; trunk up to 30 cm ø. Branchlets robust, ± angular by the decurrent petioles, dark red, glabrous; flush a brilliant brick red. *Leaves* narrowly to broadly elliptic or ovate-, sometimes obovate-elliptic, rarely ovate, apex mostly shortly, rarely more longish attenuate or acuminate, tip subacute or bluntish, or almost rounded, base ± broadly attenuate or cuneate and a little decurrent, (1–)2 pairs of marginal glands, ± coriaceous, glabrous and shining, entire, very edge revolute especially below, (4–)5–11(–12) by 2.3–6(–7.5) cm (in suckers up to 18 by 12 cm), midrib rather narrow and somewhat immersed above, as wide and red as is the petiole and strongly prominent beneath, nerves (5–)6–7(–8) spreading pairs (the lowest 1–2 ± from the base), subparallel and anastomosing, slightly raised or ± flat, or ± indistinct above, slightly prominent beneath, reticulation ± lax and ± raised beneath only; petiole broadened, ± distinctly grooved above, 3–10 by 1–2 mm. *Racemes* from numerous upper axils, usually secund, ∞-flowered, suberect or spreading, glabrous; rachis stoutish, angular, (3–)5–8(–9) cm, with several caducous suborbicular small perulae. Pedicels ± robust, 4–7(–15) mm, in *fr.* 15 mm; bracts ± elliptic, obtuse or subacute, membranous, 0.6–1(–1.4) cm, early caducous; bracteoles subulate, basal, up to 2 mm, early caducous. *Calyx* tube obconical-subcampanulate, *c.* 1.5 mm, limb ± spreading, deeply 5-lobed, lobes triangular, ± acutish, reddish, laxly ciliolate, 0.7–1.3(–1.5) mm. *Corolla* urceolate-cylindric, rather fleshy, white to pink, sometimes red, glabrous at both sides, sometimes (Sumatra) laxly hairy inside, 7–8(–10) by 2–3 mm, lobes ovate-triangular, obtuse, recurved, *c.* 1.3 mm. *Stamens* 10, alternately 4–4.5 and 5–5.5 mm; filaments subulate-linear, red and densely hairy below, *c.* 2.5 mm; anther-cells oblong, ± curved, 1–1.5 mm, whether or not with 2 dorsal spurs; tubules narrow-cylindric, 0.5–0.8 mm, at apex subobliquely cut, pore ± flaring, back wall of tubules often extended into 1(–2) irregular, erect or ± horizontally reflexed minute teeth, no glandular appendages. *Disk* glabrous. *Style* rather slender, glabrous, finally ± exserted. *Berry* globose, finally purplish to deeply bluish purple, 5–6 mm ø, crowned by the inflexed calyx lobes.

Distr. *Malesia:* Sumatra (typical only in S. Sumatra), Java, Bali, Lombok and Sumbawa (Mt Bantulanteh).

Ecol. In open parts or along edges of the montane and subalpine forest generally epiphytic, often near old solfataras, on humid sandy soil, terrestrial on more dry and stony ground in summit shrub vegetation, mostly remaining sterile at 800–2000 m, flowering abundantly between 2000 and 3000 m, common. *Fl. fr.* Jan.-Dec., with a pronounced flowering season in May, and fruiting season in January.

Pollination. After DOCTERS VAN LEEUWEN (*l.c.* 207) nectar is secreted on a yellow disk which runs round the base of the style and rests upon the ovary. The flowers are very fragrant, with a scent of sour apples (after others: hyacinth-like). When the corolla opens the stigma reaches to about two thirds of the corolla tube, and the anthers are somewhat higher. In bud the rather dry pollen is shed already, and collects at the bottom of the corolla tube, and partly also on the stigma. When the corolla falls off, more pollen may be shed on the stigma. As a matter of fact self-pollination is readily effected and is apparently the common

mode of fertilization, although visiting insects have been observed too.

Dispersal. The fruits are greedily eaten by birds, as this is the case with other widely distributed species of *Vaccinium*, especially *V. varingiaefolium*.

Galls. Flowers of *V. laurifolium* and its varieties are not rarely attacked by a gall-midge (*cf.* DOCTERS VAN LEEUWEN, Zoocecidia, 1926, 440, f. 830). This gall develops in the corolla, the calyx remaining unaltered. It develops into a hard cylindric, sometimes curved gall (*c.* 8 by 2 mm) which bears a small pinnacle. Inside, the stamens form a softer wall, on which rudiments of the anthers are to be seen. *V. cyrtodon* MIQ. was based on a specimen with such galled flowers.

The young shoots are subject to a fungus-disease: the whole shoot changes into a pink cylindrical gall bearing rudimentary leaves. On the leaves also fungus-galls often develop: at the upper side they appear as round brightly green specks with a pink centre, at the underside the black apothecia of the fungus (*Anhella tristis*, described by RACIBORSKI, Paras. Alg. & Pilze Javas, 2nd part, Batavia, 1900, p. 10) are formed.

Uses. The fruits are rather acid and are not palatable to man. The timber is very hard; due to the small dimension it is only used for handles and rice stampers.

Vern. *Batel, ki asahan, ki pěděs, ki sěndok, ki sireum, tjantigi, t. areuj, t. gědé*, S, *kěmatus, soro genen*, J, *kaju katjang, k. sěmbar bosi*, M.

2. *var.* **ellipticum** (BL.) SLEUM. Blumea 11 (1961) 100. — *Thibaudia elliptica* BL. Bijdr. (1826) 859. — *Agapetes elliptica* (BL.) G. DON, Gen. Syst. 3 (1834) 862; DUNAL, in DC. Prod. 7 (1839) 555. — *Gaylussacia elliptica* ZOLL. & MOR. in Zoll. Nat. Geneesk. Arch. N.I. 2 (1845) 9, repr. Flora 30 (1847) 601. — *V. javanicum* HOOK. Ic. Pl. 8 (1848) t. 740; WALP. Rep. 6 (1847) 413. — *Epigynium ellipticum* (BL.) KL. Linnaea 24 (1851) 49. — *V. ellipticum* (BL.) MIQ. Fl. Ind. Bat. 2 (1859) 1060, *excl. descr. et cit. p.p.*; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 39, *p.p.*; HALL. *f.* Med. Rijksherb. *n.* 1 (1910) 36; J. J. S. in K. & V. Bijdr. 13 (1914) 162; HOCHR. Candollea 2 (1925) 500; AMSH. in Back. Bekn. Fl. Java (em. ed.) 7 (1948) fam. 163, p. 4. — *V. laurifolium* (BL.) MIQ. *var. arborescens* O. KTZE, Rev. Gen. Pl. 2 (1891) 384. — *V. teysmannii* [*non* (BL.) MIQ.] KOORD. Exk. Fl. Java 3 (1912) 13, *p.p.*; KOORD.-SCHUM. Syst. Verz. 1 (1912) fam. 233, p. 111, *p.p.*

Habit and leaves as in *var. laurifolium*. Rachis relatively slender, laxly set, as are the pedicels, with short crisp glandular club-shaped or muriculate brown hairs, especially below the calyx. Pedicels slender, (2–)3–5 mm. *Calyx* limb short, sometimes merely undulate, lobes 0.5–0.7(–1.2) mm, ciliate. *Corolla* thin, (5–)6–7(–10) mm. Anther-cells with 2 distinct dorsal spurs; tubules slender, ± double as long as the cells.

These characters distinguish the so-called *V. ellipticum* from typical *V. laurifolium* in W. Java. In Sumatra no specimens with the full set of '*ellipticum*' characters are known; the same can be said from many specimens in Central and East Java, where true *V. ellipticum* is rather rare, and glabrescent forms become more frequent.

Distr. *Malesia*: Sumatra (not typical), Java (especially in its western part).

Ecol. As in *var. laurifolium*. but possibly more frequent at lower altitudes from (600–)900–2000 m, but once collected at 3000 m (on Mt Welirang, E. Java).

3. *var.* **robustum** (RIDL.) SLEUM. Blumea 11 (1961) 101. — *V. robustum* RIDL. J. Fed. Mal. St. Mus. 8 (1917) 57.

Leaves as in *var. laurifolium*, but sometimes more distinctly acuminate. *Inflorescences* glabrous, stouter (more woody) than in *var. laurifolium*. Pedicels robust, generally much recurved, (1–)2(–3) mm, in *fr.* 3–4 mm. Apical glands of the calyx lobes, if any, inconspicuous. *Corolla* rather thin, *c.* 6 by 2.5–3 mm. *Stamens c.* 3 mm; anther-cells with a pair of dorsal knobs, but no proper spurs; tubules as long as or mostly shorter than the cells.

Distr. *Malesia:* Sumatra (Tapanuli; West-coast).

Ecol. In mountain forest and summit regions, 1900–2800 m.

4. *var.* **trichodes** SLEUM. Blumea 11 (1961) 101.

Leaves elliptic-oblong, generally subacutely acuminate for 1–2 cm, 10–15 by (4–)5–6 cm. Branchlets, rachis and pedicels subdensely set with whitish, short, spreading, non-glandular hairs. Pedicels rather robust, (1–)2—3 mm at anthesis. *Calyx* laxly hairy, with a few glandular muriculate hairs at the base, lobes subacute, short, no apical gland. *Corolla* rather thin, white, glabrous, *c.* 8 by 2.5 mm. *Stamens* very similar to those of *var. ellipticum*.

Distr. *Malesia:* Central Sumatra (Mt Sago near Pajakumbuh), in mountain forest at 1400–1600 m.

5. *var.* **pensile** (SP. MOORE) SLEUM. Blumea 11 (1961) 102. — *V. pensile* SP. MOORE, J. Bot. 63 (1925) Suppl. 55.

Large tree. *Leaves* oblong-oblanceolate, apex obtuse, subcuneate towards the base, 4–6 by 1.3–1.8 cm. *Inflorescence* glabrous. Pedicels slender, 2–3 mm, with a few club-shaped glandular or muriculate brown hairs especially below the calyx. *Calyx* lobes hardly 1 mm. *Corolla* thin, white, sweet-scented, *c.* 5 by 2 mm. Anther-cells *c.* 0.9 mm, with 2 short dorsal spurs; tubules rather slender, *c.* 1.3 mm.

Distr. *Malesia:* S. Sumatra (Mt Dempo), at 1525 m. One collection.

6. *var.* **sarawakense** (MERR.) SLEUM. Blumea 11 (1961) 102. — *V. sarawakense* MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 105; En. Born. (1921) 467. — *V. hosei* MERR. J. Str. Br. R. As. Soc. *n.* 76 (1917) 106; En. Born. (1921) 466. — *V. ellipticum var. macrocalyx* J. J. S. in MS.; MERR. En. Born. (1921) 466, *nom. nud.*

Leaves oblong-elliptic or mostly elliptic, apex shortly obtusely acuminate or attenuate, or sometimes almost rounded. Rachis and pedicels rather robust, ± densely clad with brownish glandular-muriculate hairs. *Flowers* as in *var. laurifolium*, the dorsal spurs mostly distinct, sometimes rather obscure.

Distr. *Malesia:* Borneo.

Ecol. In mountain forest, 800–1525 m.

7. *var.* glanduligerum SLEUM. Blumea 11 (1961) 101; *ibid.* 12 (1963) 137.

Differs from *var. laurifolium* by a thick gland found at the apex of all (or most of the) calyx lobes; anther-cells provided with a pair of distinct dorsal spurs.

Distr. *Malesia:* Sumatra (Atjeh; Eastcoast), and Borneo (Sarawak).

Ecol. In Sumatra in mountain forest, flat forest ridges with old solfatara fields, or subalpine shrub vegetation, 1100–1850 m; in Sarawak epiphyte in *kerangas* forest at 300 m.

229. Vaccinium turfosum SLEUM. Blumea 11 (1961) 102; *ibid.* 12 (1963) 137. — *V. sp.*, RAPPARD, Nova Guinea n.s. 10 (1959) t. Vc, at right below (phot.).

Shrub up to 5 m, glabrous except the hairy filaments and calyx lobes. Branchlets rather slender, early covered with cork; buds subglobose. *Leaves* narrow-ovate or subelliptic- or oblong-ovate, apex subabruptly (sub)caudate-acuminate for 1–1.5 cm, subacute, base rounded, or contracted at the very base, with a marginal gland on each side next to the petiole, coriaceous, somewhat shining, entire, edge a little revolute, (3.5–)4–6(–7) by 1.5–2(–2.3) cm, midrib faintly impressed above, slightly prominent beneath, nerves 2–3 basal or a little suprabasal, high curved-ascending and anastomosing, and a few (or sometimes no) shorter upper pairs, subinconspicuous above, hardly perceptible beneath, reticulation lax, ± obsolete; petiole 4–6(–8) by *c.* 1 mm. *Racemes* from the upper 2 or 3 axils, obliquely ascendent, 12–20-flowered, flowers subdense and secund; rachis angular, ± robust, 3–6(–8) cm, eperulate at anthesis. Pedicels ± slender, 5–9(–12) mm, finally recurved. Bracts and bracteoles not known. *Calyx* tube subsemiglobose-campanulate, rugulose, 1–1.5 mm, limb spreading or lastly reflexed, deeply 5-partite, lobes deltoid, acute, ciliate, penicillate distally, *c.* 1.3 mm. *Corolla* urceolate-tubular, membranous, opal- or milk-white, glabrous outside, exclusively hairy at the lobes inside, 12–13 (–14) by 4(–5) mm, slightly narrowed below the lobes, the latter obtusely deltoid, suberect or finally reflexed, *c.* 1.5 mm. *Filaments* subsubulate, linear, alternately 3–4 and 4–5 mm, densely longish subpatent-hairy; anther-cells oblong, 1.3 mm, no spurs; tubules slightly narrower than the cells, cylindric, apex obliquely cut, 0.8 mm, back wall of each tubule not rarely extended in 1–2 suberect, often unequal teeth. *Disk* prominent, glabrous. *Style* slender, as long as the corolla, or finally ± exserted, glabrous or mostly laxly hairy at the base. *Fruit* globose, *c.* 6 mm ø, crowned by the bulky disk which exceeds the calyx lobes.

Distr. *Malesia:* West New Guinea (Wissel Lakes).

Ecol. In secondary (*Dacrydium*) forest in open peaty or sandy places, 1750–2300 m, rather common locally. *Fl.* Jan.-Dec.

Vern. *Koglè, korrè*, Kapauku.

230. Vaccinium gracilipes SLEUM. Blumea 11 (1961) 103.

Erect glabrous treelet; trunk *c.* 10 cm ø. Branchlets slender, subterete. *Leaves* lax, lanceolate-oblong or -elliptic, apex subabruptly to gradually caudate-acuminate for 1–1.5 cm, tip acutish, base cuneate, a small marginal gland on each side at 2–3(–4) mm from petiole, thin-coriaceous, glabrous, sparsely minutely glandular-punctate beneath, entire, very edge ± revolute, 4–7(–8) by (1.5–)2–3 cm, midrib very narrowly sulcate above, narrowly and obtusely prominent beneath, nerves 2–3 basal and slightly suprabasal, high curved-ascendent and 2–3 upper shorter, subparallel pairs, all anastomosing and minutely raised above, more distinctly so beneath, reticulation dense, slightly raised beneath only; petiole ± slender, subterete, 7–9(–11) by *c.* 1 mm. *Racemes* from the upper 2–5 axils, very slender, patent or recurved, laxly many-flowered, secund; rachis (5–)6–9 cm, slender, eperulate. Pedicels ± filiform, 10–15(–17) mm. Bract and bracteoles not known. *Calyx* tube obconical, hardly 1 mm, limb *c.* 0.5 mm, spreading, wavy or shallowly 5-lobed, lobes broadly deltoid, bluntish, not ciliate. *Corolla* urceolate-ventricose, contracted below the lobes, thin, pure white, very scented, glabrous outside, short-hairy below inside, 6–7 by 3–4 mm (in the middle), lobes ovate, obtuse, 0.7 mm, lastly reflexed. *Filaments* subulate, densely hairy or subvillous, *c.* 2.5(–3) mm; anther-cells oblong, 1 mm, no spurs; tubules narrower than the cells, elongate-cylindric, 1.2–1.5 mm, apex obliquely cut, back wall of each tubule extended into 2 erect teeth, 0.3 mm long. *Disk* prominent, glabrous. *Style* slender, glabrous, *c.* 7 mm, finally ± exserted.

Distr. *Malesia:* N. Sumatra (Atjeh: Gajo Lands).

Ecol. On bank of stream in thinned forest, 1200 m. *Fl.* Febr.

Vern. *Ronkěnil*, M.

231. Vaccinium pseudocaudatum SLEUM. Blumea 11 (1961) 103.

Treelet, 3–4 m, trunk *c.* 5 cm ø. Branchlets slender, innovations minutely puberulous, glabrous, striate and early corticate otherwise. *Leaves* lax, oblong-lanceolate, apex for 1–1.5(–2) cm subcaudate-acuminate, tip subacute or bluntish, base cuneate, basal gland on each side minute, as are sometimes a few other hardly perceptible spaced ones in upper third of blade, coriaceous, very laxly glandular-punctate beneath, otherwise glabrous, rather glossy, entire, edge very narrowly marginate, hardly revolute, 5–7(–8) by (1.5–)2–2.5 cm, midrib slightly sulcate above, obtusely prominent below, nerves 3 basal

and up to 1 cm suprabasal, high curved-ascending pairs, anastomosing, hardly raised above, more distinctly so beneath, reticulation subdense, mostly ± obsolete or perceptible beneath only; petiole compressed and grooved dorsally, 6–8 (–10) by *c.* 1 mm. *Racemes* from the upper 5–12 axils, subdensely 10–15-flowered, patent or recurved; rachis rather slender, subdensely minutely patent-pubescent or -puberulous as are the pedicels and the calyx, (2–)3–5 cm, eperulate at anthesis. Pedicels stoutish, 3–4(–5) mm, curved, in *fr.* 6–8 mm. Bracts not seen, bracteoles basal, subulate, 1 mm, early caducous. *Calyx* tube obconical-campanulate, base not rarely very shortly contracted and subtruncate, 1 mm, limb suberect, deeply 5-parted, hardly 1 mm, lobes deltoid, subacute, ciliolate at apex, sometimes ending in a minute gland. *Corolla* urceolate, membranous, white, glabrous on both sides, 6(–7) by 2.5 mm, lobes ovate, obtuse, reflexed, 0.7 mm. *Filaments* narrowly subulate-linear, long hairy but for the lower ¼, 2.5 mm; anther-cells oblong, 0.8 mm, no dorsal spurs; tubules narrowly cylindric, slightly narrower than the cells, erect, 1.5 mm, apex obliquely cut, back wall of each tubule shortly ± irregularly 2-dentate. *Disk* prominent, ± densely set with erect, white hairs. *Style* rather slender, glabrous, *c.* 6 mm. Immature *fruit* subglobose, 3 mm ø, laxly pubescent, crowned by the erect calyx lobes and the pubescent disk.

Distr. *Malesia*: Philippines (Mindanao).

Ecol. Near creek along the edge of grassland, at 670 m, perhaps also growing at higher altitude. *Fl.* Febr., Dec.

232. **Vaccinium benguetense** VIDAL, Rev. Pl. Vasc. Filip. (1886) 168; MERR. Philip J. Sc. 3 (1908) Bot. 376; *ibid.* 5 (1910) Bot. 372; En. Philip. 3 (1923) 248; COPEL. *f.* Philip. J. Sc. 42 (1930) 566, t. 3, f. 9–11; SLEUM. Blumea 11 (1961) 104.

Glabrous shrub or tree, 4–10 m. Branchlets rather slender, subterete, early striate and greyish corticate; buds small, subglobose. *Leaves* lax, oblong to narrow-elliptic, apex ± abruptly (sub)-caudate-acuminate, tip blunt, base cuneate, 1(–2) marginal glands near or mostly a little remote from the petiole, coriaceous, ± shining, entire, margin narrowly cartilaginous and a little or hardly revolute, 5–10 by 1.5–3(–4.8) cm, 5-plinerved from about the base, and with a few upper and shorter, similarly curved-ascending pairs of nerves, all minutely raised above, markedly so beneath, reticulation dense; petiole 6–8(–12) by 1.5(–2) mm, grooved above. *Racemes* axillary, ± spreading, (8–)12–20-flowered; rachis ± slender, 3–5(–8) cm, eperulate at anthesis. Pedicels stoutish, (3–)4–6 mm, in *fr.* 7–10 mm. Bracts and bracteoles not known. *Calyx* tube campanulate, 1–1.3 mm, limb low, *c.* 0.5 mm, rather fleshy, wavy, lobes shortly and broadly triangular-ovate, often rather obscure, obtuse, not ciliate, sometimes (and then not rarely but in part) ending with a small gland. *Corolla* urceolate, thin, glabrous outside, subdensely short-hairy in the lower half inside, red, pink or white, *c.* 6 by 3 mm, lobes ovate, finally reflexed, 1 mm. *Filaments* subulate, sigmoid, densely hairy at the base, 2–2.5 mm; anther-cells oblong, 1 mm, no spurs; tubules slenderly cylindric, ± half as wide as the cells and at a ± sharp angle, 2–2.5 mm, apex very obliquely cut, back wall ending in 1 or 2 erect teeth. *Disk* much prominent, glabrous. *Style* columnar, glabrous, as long as the corolla, or finally ± exserted. *Fruit* globose, finely rugulose, *c.* 6 mm ø; disk rather low.

Distr. *Malesia*: Philippines (Luzon; Panay).

Ecol. On forested slopes and in ravines, 500–1600 m. *Fl.* Jan.-Dec.

Vern. *Balbalasang*, Ting., *dusonug*, *lusung*, Ig., *talubutub*, If.

233. **Vaccinium caudatum** WARB. in Perk. Fragm. Fl. Philip. (1905) 173; MERR. Philip. J. Sc. 3 (1908) Bot. 376; En. Philip. 3 (1923) 248; COPEL. *f.* Philip. J. Sc. 42 (1930) 565, t. 3, f. 7–8; SLEUM. Blumea 11 (1961) 104; *ibid.* 12 (1963) 137. — *V. sp.*, VIDAL, Phan. Cum. Philip. (1885) 123.

Shrub or tree, sometimes epiphytic, glabrous. Branchlets slender, subangular, early striate and greyish corticate. *Leaves* lax, lanceolate or ovate-lanceolate, apex for 1.5–2 cm caudate-acuminate, curved, tip blunt, base cuneately narrowed, 1 pair of small marginal glands remote from petiole, ± thinly coriaceous, glabrous, ± shining and often glaucescent above, mostly rather dull and sparsely glandular-punctate beneath, entire, very edge narrowly marginate, hardly revolute, (3–)4–6 by (1–)1.3–2 cm, midrib faintly immersed above, raised beneath, nerves 2 basal and a few upper shorter, more spreading pairs, all steeply ascending and anastomosing, but slightly prominent on both faces, reticulation dense, rather obsolete above, finely raised beneath, if visible at all; petiole flattened, slender, grooved above, 5–6(–8) by *c.* 0,5 mm. *Racemes* from the upper 3–6 axils, laxly 10–20-flowered, spreading or somewhat recurved, flowers subsecund; rachis very slender, 3–5 cm, eperulate at anthesis. Pedicles slender, (4–)5–6 mm. Bracts and bracteoles not seen. *Calyx* tube shortly obconical-campanulate, base obtuse, 1 mm, limb low, membranous, ± spreading, finally reflexed, deeply 5-parted, lobes broadly deltoid, subacuminate or subacute, not ciliate, sometimes ending with a minute apical gland, 0.5–0.8 mm. *Corolla* urceolate, membranous, white, glabrous at both sides, 5(–6) by *c.* 2.5 mm, lobes obtuse, recurved, *c.* 1 mm. *Filaments* dilated below, subfiliform above, sigmoid, hairy at the base, 2.5 mm; anther-cells oblong, 0.7 mm, no spurs; tubules erect, slightly narrower than the cells, elongate-cylindric, *c.* 2.5 mm, apex very obliquely cut, pore elliptic, back wall of each tubule divided into 2 often irregular short teeth, which may end in a very minute gland. *Disk* low. *Style* slenderly columnar, 5–6 mm, finally ± exserted. *Fruit* globose, rugulose, 4–5 mm ø.

Distr. *Malesia*: Philippines (Luzon; Mindoro; Panay; Leyte; Mindanao).

Ecol. In damp primary forests at low altitudes, mostly below 500 m. *Fl.* Jan.-Dec.

234. Vaccinium steinii SLEUM. Bot. Jahrb. 72 (1942) 255; Blumea 11 (1961) 105.

Shrub. Branchlets terete, glabrous. *Leaves* ovate-elliptic, apex for 1.5–2 cm caudate-acuminate, subfalcate, tip bluntish, base cuneate, thin-coriaceous, glabrous, ± glossy on both faces, 5–8.5 by 2.5–4 cm, entire, edge ± revolute, midrib sometimes ± sunken, prominent beneath, nerves 1 basal and 4–5 upper subpinnate pairs, minutely raised or subinconspicuous above, ± prominent beneath, reticulation ± dense, minutely prominent beneath only; petiole 5–6 mm. *Racemes* from the upper axils, 10–12-flowered; rachis rather robust, puberulous, 2–2.5 cm. Pedicels slender, puberulous *c.* 4 mm. *Calyx* tube short-campanulate, subglabrous, *c.* 1.3 mm including the limb, limb 5-lobed to ⅓, lobes broadly ovate-deltoid, obtuse. *Corolla* urceolate, thin, glabrous, 4.5 mm, very shortly 5-lobed, lobes rounded-obtuse and reflexed. *Filaments* subulate, villous below, glabrescent distally, *c.* 2 mm; anther-cells oblong, ± curved, 0.9 mm, tubules as wide as the cells, 0.3 mm, apex obliquely cut, back wall of each tubule extended into an acute distinct tooth. *Disk* glabrous. *Style* slenderly columnar, glabrous, 4 mm, finally ± exserted.

Distr. *Malesia*: NW. New Guinea (Waigeu I.: Majalibit Bay), one collection.

Note. Description translated from original diagnosis; type †.

235. Vaccinium blepharocalyx SCHLTR, Bot. Jahrb. 55 (1918) 176; SLEUM. *ibid.* 72 (1942) 256; Blumea 11 (1961) 105.

Erect, much-branched shrub, 1–1.5 m, epiphytic. Branchlets slender, subterete, glabrous. *Leaves* subdensely arranged, narrow-oblong to lanceolate, long caudate-acuminate, base cuneate, subcoriaceous, ± flexible, glabrous, entire, 4–7 by 1.3–2 cm; petiole 3–5 mm. *Racemes* from the upper axils, laxly 6–12-flowered, glabrous; rachis rather robust, up to 6 cm. Pedicels slender, 7–8 mm. Bract and bracteoles not known. *Calyx* low, cup-shaped, *c.* 3 mm, lobes short, semiorbicular, apex obtuse, ciliate. *Corolla* broadly urceolate or ventricose, rather thin, *c.* 4 mm, glabrous outside, puberulous towards the base inside, pale pink (fresh), blackish (dry), lobes 0.8 mm. *Filaments* subulate, subvillous; anthers as long as the filaments; anther-cells oblong; tubules short, apex obliquely cut. *Disk* glabrous. *Style* columnar, ± swollen in the middle, glabrous, *c.* 4 mm.

Distr. *Malesia*: East New Guinea (Sepik Distr.: Hunstein Mts), in montane forest at 1300–1400 m. Once found; type †. *Fl.* March.

Note. Description translated from original diagnosis and key characters mentioned by me in Bot. Jahrb. 72 (1942) 245.

236. Vaccinium sparsum SLEUM. Blumea 11 (1961) 105; *ibid.* 12 (1963) 137.

Small tree, *c.* 4 m. Branchlets obtusangular, glabrous. *Leaves* lax, elliptic or subovate-elliptic, apex for 1–1.5 cm subabruptly acuminate, acute, base broadly attenuate, shortly contracted, provided at the base with a small gland on each side, coriaceous, sparsely appressedly glandular-hairy beneath, entire, ± glossy, 5–7 by (2.5)–3–4 cm, midrib narrowly sulcate above, much prominent beneath, nerves 3 basal and up to 1 cm suprabasal and a few upper, shorter, vein-like pairs, all suberect-ascending and anastomosing, ± raised above, more so beneath, reticulation dense, ± prominent on both faces, especially beneath; petiole grooved above, ± flattened, 4–6 by 1–1.5 mm. *Racemes* from the upper 2–3 axils, obliquely spreading, laxly 6–10-flowered; rachis rather robust, 1–1.5 mm ø at base, glabrous, angular. Pedicels stoutish, distally with the same glandular muriculate hairs as are found on the calyx, *c.* 1 cm by 0.5 mm. Bracts and bracteoles not known. *Calyx* tube cup-shaped, rugulose, 2 mm, limb erecto-patent, 1.5 mm, deeply 5-lobed, lobes depressed-ovate, obtuse, ciliate, 1 mm. *Corolla* broadly urceolate, thick-fleshy, pink, glabrous at both sides, *c.* 9 by 4–5 mm, lobes obtuse, subreflexed, *c.* 2 mm. *Filaments* subulate, 4 mm, densely hairy except for the dilated and glabrous base; anther-cells oblong, 1.6–1.8 mm, no spurs; tubules cylindric, a little divergent, almost half as wide as the cells, apex obliquely cut, 0.5–0.6 mm. *Disk* glabrous. *Style* thickish, glabrous, 6–7 mm.

Distr. *Malesia*: East New Guinea (Mt Wilhelm), in edge of forest on a high bank of creek, at 2700 m. One collection. *Fl.* July.

237. Vaccinium striicaule SLEUM. Bot. Jahrb. 72 (1942) 256; Blumea 11 (1961) 105. — *V. blepharocalyx* (*non* SCHLTR) LANE-POOLE, For. Res. Papua (1925) 130. — *V. longiporum* (*non* SCHLTR) DIELS, Bot. Jahrb. 62 (1929) 487.

var. **striicaule.**

Shrub or small tree, up to 5 m. Branchlets angular, glabrous or puberulous, striate, rather slender, early covered with greyish cork; buds ovoid, acute. *Leaves* lax, ovate-oblong to -lanceolate, apex shortly or mostly rather long (1–2 cm) caudate-acuminate, tip subacute or bluntish, base broadly attenuate to nearly rounded, pair of marginal glands strictly basal, coriaceous to subcoriaceous, glabrous, reddish when young, somewhat shining, entire, very edge ± recurved, 3.5–5 (–6) by (1–)1.3–2(–2.5) cm, midrib impressed above, markedly prominent beneath, nerves 2(–3) basal and slightly suprabasal, curved-ascending and 2–3 upper, shorter subparallel pairs, all anastomosing and faintly sulcate or rather obsolete above, raised beneath, reticulation dense, finely prominent or obsolete; petiole ± flattened, puberulous initially or glabrous, 3–4 by 1–1.5 mm. *Racemes* from the upper 2–3 axils, suberect, subdensely 8–12-flowered; rachis stoutish, angular, glabrous or mostly finely puberulous, (2–)3–4 cm, eperulate at anthesis. Pedicels stoutish, glabrous, 6–8 mm, curved. Bracts and bracteoles not observed. *Calyx* tube cup-shaped, base rounded, rugulose, glabrous, 2 mm, limb low, *c.* 1 mm, spreading, deeply 5-lobed, lobes broadly deltoid, obtuse or subacuminate, densely ciliate. *Corolla* rather broadly urceolate, fleshy, deep pink to purple, 6(–7) by *c.* 3 mm, glabrous at both sides

or ± hairy below inside, lobes ovate, obtuse, recurved, *c.* 0.7 mm. *Filaments* subulate-linear, patently hairy especially below, 2.5–3 mm; anther-cells oblong, 0.8–1(–1.2) mm, no spurs; tubules cylindric, narrower than the cells, 0.4–0.6 mm, ± curved, at apex obliquely cut, pore ± flaring, back wall of each tubule extended into 1 or 2 irregular, often reflexed teeth. *Disk* glabrous. *Style* columnar, glabrous, 6–7 mm, finally ± exserted. *Fruit* globose, blackish, *c.* 5 mm ø, disk remaining uncovered by the calyx lobes.

Distr. *Malesia*: East New Guinea (Minj-Nona Divide and Mt Saruwaged-Sattelberg area).

Ecol. On edge of grassland and forest, in mossy bush, 2300–3300 m. *Fl.* Jan., March, Oct.-Nov.

var. **pubiflorum** SLEUM. Bot. Jahrb. 72 (1942) 257; Blumea 11 (1961) 106.

Distinct from *var. striicaule* by a short pubescence on calyx, corolla and disk.

Distr. *Malesia*: East New Guinea (with *var. striicaule* on Mt Saruwaged), 3000–3300 m, once found.

var. **adenodes** SLEUM. Blumea 11 (1961) 106; *ibid.* 12 (1963) 137.

Shrub, 1.5–5 m. *Calyx* lobes, at least in part, provided with a distinct apical gland and *corolla* sometimes slightly larger, otherwise hardly different from *var. striicaule.*

Distr. *Malesia*: New Guinea (Southern, Western and Eastern Highlands, and Morobe Distr.).

Ecol. At the upper limit of the montane cloud (*Nothofagus*) forest, in forest edge, heath-like vegetation and tussock grassland swamps, also on limestone ridge, 2140–3600 m. *Fl.* July.

Vern. *Lohn*, Enga, *mengip, pfito*, Mendi, *kuruwagi*, Ialibu.

Note. Specimens of *var. adenodes* with hairy rachis and calyces found on Mt Giluwe seem to indicate hybrids with *V. cruentum* from the same place.

238. **Vaccinium gracillimum** J. J. S. Med. Rijksherb. *n.* 25 (1915) 12; Nova Guinea 12 (1917) 530; *ibid.* (1918) t. 219; SLEUM. Bot. Jahrb. 72 (1942) 254; Blumea 11 (1961) 106.

Glabrous shrub, 0.5–1 m. Branchlets slender. *Leaves* lax, lanceolate-ovate, apex for 2–3 cm caudate-acuminate, acute, base broadly cuneate to nearly rounded, a pair of small or minute glands on each side at some distance from the petiole, firmly subcoriaceous, sparsely muriculate-glandular beneath, otherwise glabrous, ± shining, entire, edge ± reflexed, 3.5–6 by 0.9–1.9 cm, 5 (or sub-7)-plinerved, nerves ± impressed above, raised beneath, anastomosing, reticulation dense, raised on both faces in young leaves, later ± obsolete above; petiole slender, dorsally compressed and grooved, minutely verruculose, 2–3 by 0.8 mm. *Racemes* from the upper 3–5 axils, spreading, very laxly 8–11-flowered; rachis very slender, 3.5–4.5 cm, eperulate. Pedicels subfiliform, thickened at the apex, 1.2–2 cm. Bract and bracteoles not known. *Calyx* tube campanulate, very base ± abruptly contracted, 2 mm, limb suberect, 1 mm, deeply 5-parted, lobes triangular, subacute, not ciliate. *Corolla* 7 mm, urceolate, 3–4 mm ø below, tube-like contracted 1 mm ø in upper $^3/_5$, fleshy, pale pink, lobes ovate, recurved, 0.5 mm. *Filaments* subulate-linear, densely hairy in lower half, sigmoid, 1.8 mm; anther-cells oblong, 0.8 mm, no spurs; tubules as wide as the cells, 0.3 mm, apex obliquely cut, back wall of each tubule extending into 2 very short teeth. *Disk* prominent. *Style* columnar, glabrous, 5.5 mm.

Distr. *Malesia*: West New Guinea (Oranje and Hellwig Mts).

Ecol. In summit shrub vegetation, 1520–1900 m. *Fl.* Dec.

239. **Vaccinium rubroviolaceum** SLEUM. Blumea 11 (1961) 106.

Weak shrub up to 3 m. Branchlets very slender, densely short-hairy, glabrescent and early corticate. *Leaves* lax, lanceolate, apex caudate-acuminate and subfalcate, bluntish, base broadly attenuate or rounded, basal marginal gland small, at *c.* 2 mm from petiole, subcoriaceous, very laxly glandular-muriculate or -punctate beneath, entire, 3–4.5 by 0.5–0.9(–1) cm, midrib impressed above, ± prominent beneath, nerves 1 basal and 2–4 upper pairs, faintly sulcate or obscure above, ± raised beneath, sometimes subinconspicuous, no reticulation; petiole slender, subterete, (2–)3(–4) mm, pubescent initially. *Racemes* from upper 1–3 axils, suberect, laxly (4–)5–8-flowered, glabrous; rachis very slender, (0.5–)1—4 cm. Pedicels very slender, ± horizontally spreading, (1.3–)1.5–1.8 cm, ± thickened below the calyx. Bract and bracteoles not seen. *Calyx* tube obconical, rugulose, 2.5–3 mm, limb suberect, about 2 mm, deeply 5-lobed, lobes subdeltoid, subacute, and paler margin ciliolate. *Corolla* narrowly urceolate, fleshy, red-purplish, glabrous at both sides, *c.* 9 by 2.5 mm (below), lobes *c.* 1 mm. *Filaments* subulate, 2.3 mm, from 0.3–0.8 mm above base densely long-hairy; anther-cells oblong, 0.9 mm, no spurs; tubules as wide as the cells, 0.2–0.3 mm, subobliquely truncate distally. *Disk* bulky, glabrous. *Style* thickish, glabrous, 9 mm. Submature *fruit* subglobose, *c.* 4 mm ø, dark purple, crowned by the erect calyx lobes.

Distr. *Malesia*: Central New Guinea (Mt Antares in the Star Mts), in semi-alpine vegetation with scattered trees at 3000 m. Once found. *Fl.* July.

Imperfectly known

Vaccinium sumatranum JACK, Mal. Misc. 2 (1822) 18, repr. HOOK. J. Bot. 1 (1834) 370; MIQ. Fl. Ind. Bat. 2 (1859) 1063; *ibid.* Suppl. 1 (1861) 251; COPEL. *f.* Philip. J. Sc. 47 (1932) 96, *nota*; MERR. J. Arn. Arb. 33 (1952) 249; SLEUM. Blumea 11 (1961) 106.

Branchlets smooth, red-brown. *Leaves* elliptic-ovate, entire, glabrous, coriaceous. *Racemes* axillary, shorter than the leaves. *Flowers* 4-merous. *Corolla* oblong-ovate, 4-lobed, lobes recurved. *Stamens* 8. *Ovary* 4-locular.

Distr. *Malesia*: Sumatra, Bencoolen, collected by JACK on Mt Bungo (or Bungsu, Bengkoh, Sugarloaf Mt), 1034 m, between Mt Kaba and the coast, not yet recollected there.

Note. The short description and the lack of type or topotype material do not allow to associate *V. sumatranum* with any other described species, though it is apparently close to *V. lauri-folium* (BL.) MIQ. and possibly conspecific with it.

Excluded

Vaccinium? *corymbiferum* MIQ. Fl. Ind. Bat. Suppl. 1 (1861) 588; SLEUM. Blumea 11 (1961) 107 = *Pyrus granulosa* BERTOL.; *cf.* STEEN. Blumea 12 (1963) 14 (*Rosaceae*).

11. AGAPETES

D. DON in G. Don, Gen. Syst. 3 (1834) 862; CLARKE in Hook. *f.* Fl. Br. Ind. 3 (1881) 443; AIRY SHAW, Kew Bull. (1935) 24; SLEUM. Bot. Jahrb. 70 (1939) 97; *ibid.* 71 (1941) 406, 409; AIRY SHAW, Kew Bull. (1948) 77, 103; *ibid.* (1958) 468, *incl. sect. Pseudagapetes* AIRY SHAW, *l.c.* 511; SLEUM. Nova Guinea, Bot. *n.* 1 (1960) 1–7; Blumea 12 (1964) 344, *non* RIDL. Fl. Mal. Pen. 2 (1923) 204 (= *Vaccinium* L.). — *Paphia* SEEM. J. Bot. 2 (1864) 77; Fl. Vit. (1866) 147, t. 28; BAILEY, Queensl. Fl. 3 (1900) 923; SCHLTR, Bot. Jahrb. 55 (1918) 182; A. C. SMITH, J. Arn. Arb. 36 (1955) 286. — *Pentapterygium* KLOTZSCH, Linnaea 24 (1851) 47; K. & G. J. As. Soc. Beng. 74, ii (1905) 60; RIDL. Fl. Mal. Pen. 2 (1923) 205. — **Fig. 116–119.**

Shrubs, often climbing, or epiphytic and with the stem much thickened at the base. *Leaves* spirally (in Mal.), glandular-toothed sometimes entire, ± coriaceous. *Flowers* axillary, rather large and ± fleshy, showy, solitary or in few-flowered fascicles or abbreviate corymbs. Pedicels thickened towards apex, almost always articulate with the calyx. Bracts and bracteoles small. *Calyx* tube adnate to ovary, subcylindrical or subglobose, whether or not with 5 prominent angles, ribs or wings alternating with the sepals, persistent, ± deeply 5-lobed. *Corolla* mostly tubular, rarely elongate-urceolate, shortly 5-lobed, often 5-angled or ± prominently lengthwise 5-ribbed, mostly bright coloured. *Stamens* 10, equal or nearly so; filaments linear, equal; anthers equal or sometimes slightly alternately unequal, anther-cells broad-oblong, mostly granular, (in Mal.) not spurred on the back, extending into 2 long narrow free tubules, which open by apical later introrse pores or slits. *Disk* an annular cushion. *Ovary* 5-celled; style filiform to columnar, often exserted; stigma truncate or subcapitate. *Fruit* baccate, 5-celled, in Mal. rarely 5-winged, crowned by the calyx and the disk. *Seeds* numerous, ellipsoid; testa reticulate.

Distr. About 95 *spp.*, the bulk of which is found from Sikkim, Bhutan, SE. Tibet to Assam, Burma, W. Yunnan, N. Tonkin and Siam; 2 *spp.* in NE. Australia (Cape York Peninsula), 1 *sp.* in New Caledonia, 1 *sp.* in Fiji; in *Malesia*: 11 *spp.*, of which 1 in the Malay Peninsula, the rest in the eastern half of New Guinea. Fig. 116.

Ecol. Predominantly in the upper rain-forest or moss forest, mostly epiphytic, in the Malay Peninsula at 1220–2030 m, in New Guinea at 1300–3600 m (and perhaps still higher), in general rare. The thickened, fleshy stems and roots apparently are capable to store water. The fleshy purplish or blackish berries may be eaten by birds *etc.*, but this has not yet been confirmed by observations.

KEY TO THE SPECIES

1. Pedicel continuous with the calyx. Calyx limb elongate, 1.2–1.5 cm high, at anthesis ± longer than the calyx tube . . . . . 1. A. scortechinii
1. Pedicel manifestly articulate with the calyx. Calyx limb rather (sometimes very) low, at anthesis as long as or mostly shorter than the calyx tube.
2. Corolla laxly to densely pubescent outside at least in the upper half or along the angles.
3. Leaves (1–)1.2–1.4(–1.8, –2) by 0.6–0.9(–1.2) cm. Filaments ± longer than the anthers (including tubules) . . . . . 2. A. helenae
3. Leaves at least (3–)3.5 by 2 cm. Filaments shorter than the anthers (including tubules).

4. Corolla urceolate, 0.8–0.9 cm long. Stamens up to 0.9 cm long . . . . . **3. A. sclerophylla**
4. Corolla tubular or inflate-tubular, (1–)1.2–3 cm long. Stamens at least 1.2 cm long.
5. Filaments up to 4.5 mm long. Leaves ovate or elliptic-ovate.
6. Leaves (3–)3.5–5 by (2–)2.5–3.3 cm; petiole 2 mm . . . . . **4. A. rubrocalyx**
6. Leaves (7–)8.5–10 by (3–)3.5–4.5 cm; petiole 5 mm . . . . . **5. A. carrii**
5. Filaments (7–)9–10(–14) mm. Leaves oblong . . . . . **6. A. brassii**
2. Corolla glabrous.
7. Filaments distinctly longer than the anthers (including tubules). Leaves elliptic or mostly obovate-elliptic or obovate, (1–)1.3–2(–5) by 0.7–1.4(–2) cm . . . . . **7. A. vitis-idaea**
7. Filaments mostly much shorter than the anthers (including tubules), rarely as long. Leaves lanceolate-ovate or ovate to elliptic, generally (much) larger.
8. Branchlets, undersurface of the leaves, and petioles at least initially patent-pubescent. (Corolla (3–)3.5–4 cm.) . . . . . **8. A. costata**
8. Branchlets, leaves and petioles glabrous from the beginning.
9. Calyx limb manifestly, suberect-tubular or but slightly spreading, *c.* 3 mm high in all (including lobes of 2 mm). (Corolla 3.5–4 by 0.6–0.7 cm.) . . . . . **9. A. alberti-eduardi**
9. Calyx limb (very) low and ± spreading, 0.5–1.5 mm high (including lobes which are more tooth-like).
10. Corolla 3.5–4 by *c.* 1 cm . . . . . **10. A. viridiflora**
10. Corolla 2–2.7(–3) by 0.3–0.5 cm . . . . . **11. A. stenantha**

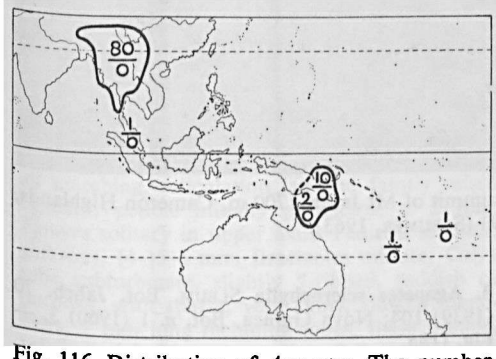

Fig. 116. Distribution of *Agapetes*. The number above the hyphen indicates the number of endemic species, that beneath the hyphen the number of non-endemic species in each island or district.

1. Agapetes scortechinii (K. & G.) SLEUM. Bot. Jahrb. 70 (1939) 105; AIRY SHAW, Kew Bull. (1958) 512; SLEUM. Nova Guinea, Bot. *n.* 1 (1960) 3; Blumea 12 (1964) 344. — *Pentapterygium scortechinii* K. &. G. J. As. Soc. Beng. 74, ii (1905) 60; RIDL. J. Fed. Mal. St. Mus. 4 (1909) 41; Fl. Mal. Pen. 2 (1923) 205; BURK. & HOLTT. Gard. Bull. S. S. 3 (1923) 75; HENDERS. J. Mal. Br. R. As. Soc. 5 (1927) 255; Mal. Nat. J. 6 (1950) 258. — **Fig. 117, 118f-g.**

A sprawling woody climber, sometimes epiphytic, rooting adventitiously, up to 6 m; stem 2–3 cm ø. Branchlets subterete, initially short-pubescent, early glabrescent. *Leaves* scattered, ovate to ovate-rounded, apex blunt or rarely subacute, base broad and rounded, or sometimes cordate, thick-coriaceous, glossy green above, paler and dull below, with a faint, early disappearing puberulence on both faces, shining especially above, laxly set with dark glandular and somewhat impressed points (the bases of ± early fallen subsetose brownish hairs) underneath, entire, edge much recurved when dry, (2.5–)4–7.5 by (2–)2.5–4(–5) cm, midrib strong, ± deeply immersed above, obtusely prominent below, nerves 4–5 pairs, the lower 2 basal or subbasal and more conspicuous than the higher ones, all curved, whether or not ± sulcate on the upper surface and prominent beneath, reticulation mostly indistinct, but sometimes ± raised beneath; petiole reddish, rugose as the lower part of the midrib above, 6–12 by *c.* 2 mm. *Flowers* red or pink, *c.* 2.5 cm long, (1–)few(–5) together in an axillary or subterminal fascicle or a short-axed corymb, sparsely grey-pubescent and with many setulose gland-tipped hairs, sometimes glabrescent. Pedicel reddish, thick, much broadened and nearly cup-like below the calyx, continuous with the latter, 1.5–2.5 cm, with 2 narrow ovate-acuminate bracts 3–4 by 1 mm at base. *Calyx* reddish, 5-angular or shortly 5-winged, tube ± conical, inflated at base, narrowed distally, 0.8–1 by 1.5–1 cm, limb tubular, ± erect, subcoriaceous, 1.2–1.5 cm high, 5-lobed to ½–⅔, lobes broad, acute, 5–6 mm wide at base. *Corolla* elongate-urceolate, the lower third included by the calyx lobes, fleshy, glossy carmine red outside, dull (almost glaucous-)carmine inside, base whitish, densely set outside with rufous, crisp, gland-tipped hairs in the upper half, glabrous inside, *c.* 2.6 by 1.3 cm in fresh specimens, dropping together with the stamens very early, lobes (2 mm) reflexed. *Filaments* laxly rufous-pubescent, 3–4 mm; anther-cells narrow-oblong, very granular, 5–6 mm; tubules bent aside, narrow, (4–)5–6 mm, opening by slits in the upper part. *Style* columnar, glabrous, 2 cm. *Disk* glabrous. *Fruit* subglobose, winged, red, waxy, shiny, crowned by the large calyx limb. *Seeds* compressed ovate-ellipsoid, 1–1.5 mm.

Distr. *Malesia*: Malay Peninsula (Main Range from Cameron Highlands to Frazer's Hill).

Ecol. In summit forest or heath scrub, local, 1220–2030 m. *Fl.* June-Sept.

2. Agapetes helenae (F. v. M.) F. v. M. *ex* SLEUM. Bot. Jahrb. 70 (1939) 99; Nova Guinea, Bot. *n.* 1 (1960) 3. — *Vaccinium helenae* F. v. M. Trans. R. Soc. Vict. n.s. 1, 2 (1889) 16. — *Paphia helenae* (F. v. M.) SCHLTR, Bot. Jahrb. 55 (1918) 182. — **Fig. 118h.**



Fig. 117. *Agapetes scortechinii* (K. & G.) SLEUM. on summit of Mt Jasar, 1700 m, Cameron Highlands, Malaya (SLEUMER 4669) (SLEUMER, 1963).

Small shrub. Branchlets obtusangular by decurrent leaf-cushions, erect, stiff, tips with short spreading hairs, older parts glabrous, early covered with greyish cork. *Leaves* elliptic- or oblong-ovate, sometimes suborbicular, apex blunt, base ± rounded, coriaceous, firm, initially finely pubescent, finally glabrous, rather shining, laxly gland-dotted beneath, entire, margin cartilaginous, sometimes slightly recurved, 1(–2) by 0.6–0.9(–1.2) cm, midrib and *c.* 3 pairs of curved-ascending nerves a little sulcate above, ± obscure beneath, reticulation invisible; petiole thickish, pubescent, 2(–3) mm. *Flowers* solitary or rarely in twos in the upper axils. Pedicels robust, angular, rather densely set with whitish spreading short hairs as is the calyx, 1.2–1.5 cm by 1 mm, with 2 ovate-acuminate bracts (3 mm). *Calyx* tube broad-cylindric, base obtuse or rounded, 5–6 by 3–4 mm, limb somewhat spreading, 3 mm high, 5-lobed to ⅔, glabrescent. *Corolla* cylindric, a little narrowed towards the base, slightly 5-angled, fleshy, probably red, at both sides initially subdensely clad with spreading, whitish, rather short hairs except the ± glabrous base, subglabrescent, 3.5–4 cm by 5–6 mm including the finally reflexed narrow-deltoid lobes, *c.* 4 mm. *Stamens c.* 2.8 cm; filaments *c.* 1.5 cm, pubescent in the middle third; anther-cells but slightly granular, *c.* 5 mm; tubules rather wide, 8–9 mm, opening by slits more than halfway. *Style* slender, glabrous, finally exserted. *Disk* glabrous.

Distr. *Malesia*: East New Guinea (Owen Stanley Ra.: Mt Victoria). One collection.

3. Agapetes sclerophylla SLEUM. Bot. Jahrb. 70 (1939) 104; Nova Guinea, Bot. *n.* 1 (1960) 3. — Fig. 118a.

Stiff, scandent, sparsely branched shrub, also epiphytic, 1–2 m. Branchlets subterete, tips puberulous, older parts early glabrous and covered with cork. *Leaves* ovate or oblong-ovate, apex rather shortly (1–2 cm) subcaudate-acuminate, ± acute and subfalcate, base broadly rounded, slightly inequilateral, coriaceous, rigid, dark green, glabrous except some very short, appressed, redbrown, glandular hairs or their bases beneath, entire, (5–)7–12 by (3–)3.5–6.5 cm, midrib and nerves ± strongly impressed above, prominent beneath, 3 pairs of main nerves from or from above the base, the outer pair immediately along the margin and much less distinct, all curved-ascending to the apex, inarching with higher nerves and veins, reticulation rather coarse, raised on both faces, or faintly impressed above, prominent beneath; petiole short-pubescent initially, early rugose or corky, 5–6(–8) by 1.5–2 mm. *Flowers* (1–)2–3 from upper axils, but said to be borne on old wood also. Pedicels dark red when fresh, rather robust, glabrous or with sparse short-stalked reddish glands, more densely so immediately below the calyx, 1–1.5(–2) cm. Bracts small. *Calyx* tube obconical, base subtruncate, distinctly 5-ribbed, laxly white-hairy, 5–6 mm long, limb completely 5-lobed, lobes deltoid, acute, 2 mm. *Corolla* urceolate, ± 5-angular, ± fleshy, pale red at the tube, cream or white at the lobes, laxly whitish hairy at least in the upper part and predominantly

so at the angles, moreover with lax brown, subappressed, glandular hairs all over outside, glabrous inside, 8–9 by 5–6 mm including the suberect lobes, 1 mm. *Stamens* nearly as long as the corolla; filaments glabrous, 2–2.5 mm; anther-cells very granular, ± recurved at base, 3–3.5 mm; tubules narrow, 2–2.5 mm, dehiscing by slits nearly to the base. *Disk* glabrous. *Style* 8 mm.

Distr. *Malesia*: SE. New Guinea (Main Range: Murray Pass, and in a slightly differing form near Mt Victoria).

Ecol. Locally common as forest undergrowth or epiphyte, 2840–2900 m. *Fl.* Jan., July.

4. Agapetes rubrocalyx SLEUM. Bot. Jahrb. 70 (1939) 102; Nova Guinea, Bot. *n.* 1 (1960) 4.

var. **rubrocalyx.**

Scandent or creeping shrub or shrublet. Branchlets very slender, terete, very shortly pubescent at the tips. *Leaves* elliptic-ovate, apex broadly acuminate, or attenuate and ± obtuse, with minute apical gland, base rounded or broadly attenuate, coriaceous or subcoriaceous, glabrous, entire, (3–)3.5–5 by (2–)2.5–3.3 cm, midrib faintly impressed above, obtusely prominent beneath, nerves ± prominent beneath only, in 1–2 high curved-ascendent pairs from or from above the base and 2(–3) shorter pairs higher up, all inarching, reticulation lax and faintly raised beneath; petiole initially pubescent, *c.* 2 mm. *Flowers* solitary in upper axils. Pedicels stoutish, glabrous, (4–)5–6 mm. Bracteoles minute. *Calyx* tube subturbinate, slightly 5-ribbed, reddish or purplish, with sparse, very short, stalked gland-hairs, 7 mm long including lobes, these broadly subovate-deltoid, ± spreading, 2–3 mm. *Corolla* cylindric, white with reddish tinge at base, rather fleshy, densely white-hairy outside, glabrous inside, 2–2.3 by *c.* 0.4 cm including the short lobes. *Filaments* glabrous, 4.5 mm; anther-cells 7–8 mm, but slightly granular, tapering to the slender tubules (9–10 mm), slits 3 mm. *Style* glabrous, 2.5 cm. *Disk* glabrous.

Distr. *Malesia*: New Guinea (Mt Saruwaged area: Ogeramnang), at 1830 m. Once found. *Fl.* Febr.

var. **pilicalyx** SLEUM. Nova Guinea, Bot. *n.* 1 (1960) 4; Blumea 12 (1964) 344.

Differs by a densely hairy, not-glandular calyx, and a smaller, more inflated corolla (10–)12–16 (–18) by 8–11 mm, the laxly long-haired or glabrous connective, shorter filaments (2.5 mm), cells (4 mm), tubules (5–7 mm) and style (10–15 mm). *Fruit* broadly obovoid, truncate, purplish brown, *c.* 1 by 0.6 cm. *Seeds* pale brown, 1 mm.

Distr. *Malesia*: New Guinea (Morobe Distr.: Matap, 1525–1830 m; Western Highlands: Nona-Minj Div. and Kubor Ra., 3250 m).

5. Agapetes carrii SLEUM. Bot. Jahrb. 70 (1939) 103; Nova Guinea, Bot. *n.* 1 (1960) 4. — **Fig. 118b.**

Scandent shrub. Branchlets terete, slender, glabrous at tips. *Leaves* lax, ovate, apex acutely subcaudate-acuminate for 1–1.5 cm, base rounded, or rarely subcordate, subcoriaceous, pale brown when dry, dull, glabrous except some sparse glandular points beneath, entire, (7–)8.5–10 by (3–)3.5–4.5 cm, midrib and nerves slightly prominent on both faces, nerves 3 subbasal pairs, the 2 inner ones more distinct, all curved-ascending to the apex, reticulation rather lax and but slightly raised on both sides; petiole *c.* 5 by 1 mm. *Flowers* solitary in upper axils. Pedicels slender below, laxly hairy, with some stalked glands at apex, 1.5–2 cm. *Calyx* tube turbinate-obconical, ± distinctly 5-ribbed, laxly white-pubescent, 5–6 mm long including the limb, the latter 5-lobed nearly to the base, lobes subpatent, broad-triangular, subacute, 1.5 mm. *Corolla* cylindrical, 5-angular, rose red, tipped cream when fresh, ± fleshy, all over densely short-hairy outside, glabrous inside, 18–20 mm when fully developed including the short lobes, *c.* 6 mm wide. *Stamens* nearly as long as the corolla; filaments glabrous, *c.* 2 mm; anther-cells 6–7 mm, markedly granular; tubules narrow, 9–10 mm, splitting nearly to the base. *Disk* glabrous. *Style* slender, *c.* 17 mm.

Distr. *Malesia*: New Guinea (Owen Stanley Ra.: Mt Victoria), in forest near and above the 'Gap', 2135–2440 m. Twice found. *Fl.* Dec.-Jan.

6. Agapetes brassii SLEUM. Bot. Jahrb. 70 (1939) 103; Nova Guinea, Bot, *n.* 1 (1960) 4. — **Fig. 118c.**

Small, slender, almost unbranched, subscandent shrub, *c.* 60 cm. Branchlets terete, smooth, glabrous. *Leaves* oblong, apex gradually shortly (1.5–2 cm) subcaudate-acuminate, very tip bluntish, base broadly cuneate to nearly rounded, slightly unequal, subcoriaceous to coriaceous, ± shining above, glabrous, but with sparse blackish glandular points all over beneath, entire or minutely remotely denticulate, 7–10 by 2–3.5 cm, midrib and nerves impressed above, slightly but distinctly raised beneath, 1–2 pairs of basal nerves, another 1–2 pairs from 5–10 mm above the base, other nerves or veins from the upper half of the midrib less distinct, reticulation subinconspicuous; petiole 4–5 by 1.5 mm. *Flowers* solitary in upper axils. Pedicels bibracteolate, articulate in the middle, glabrous or pubescent in upper part, 1.7–2 cm. *Calyx* tube narrow-obconical, markedly 5-ribbed, red, laxly white-hairy, 7–8 mm including limb, the latter 5-lobed to the base, but 1 mm high. *Corolla* tubular, pink, green tipped, rather fleshy, ± densely shortly white-hairy outside, glabrous inside, 2.6–3 cm by c. 0.5 mm including triangular lobes, 2 mm. *Stamens* as long as the corolla; filaments glabrous, (7–)9–10(–14) mm; anther-cells slightly granular, *c.* 1 cm; tubules slender, 7–8 mm, opening by slits half their length. *Disk* glabrous. *Style* slender, equalling the corolla.

Distr. *Malesia*: New Guinea (Central Distr.: Mt Awormange, Mt Tafa), in forest on mossy ground, at 2300–2835 m. *Fl.* Jan.-May.

7. Agapetes vitis-idaea SLEUM. Nova Guinea, Bot. *n.* 1 (1960) 4; Blumea 12 (1964) 344. — **Fig. 118j.**

Terrestrial, semiprostrate or subscandent shrublet, 10–50 cm. Branchlets angular at the tips, light brown, terete and glabrous below, laxly set with squamular leaflets below, early covered with

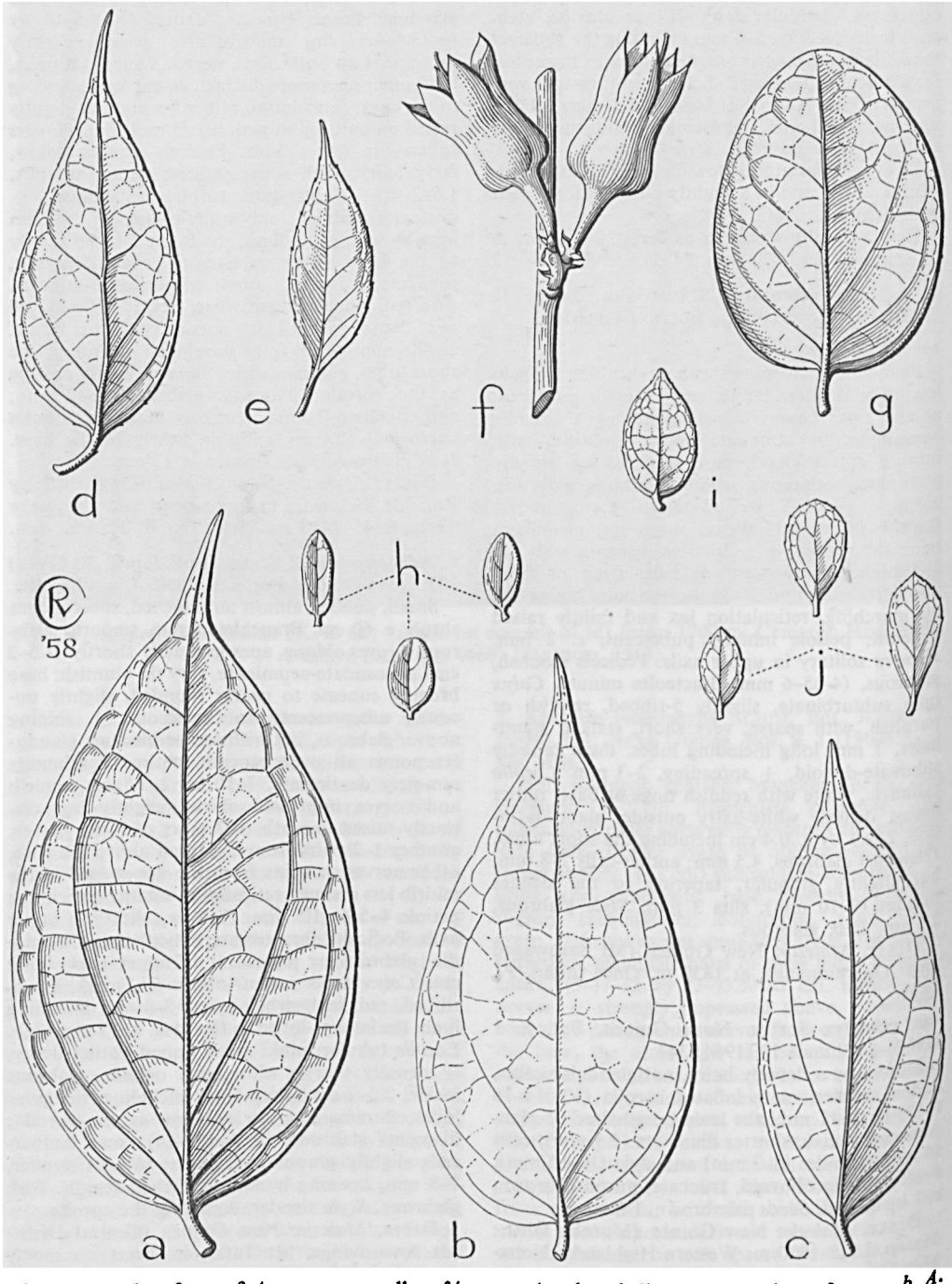

Fig. 118. Leaf surfaces of *Agapetes spp.*, all × ⅔. — *a. A. sclerophylla* SLEUM., undersurface. — *b. A. carrii* SLEUM., undersurface. — *c. A. brassii* SLEUM., undersurface. — *d. A. alberti-eduardi* SLEUM., undersurface, *e. ditto*, upper surface. — *f. A. scortechinii* (K. & G.) SLEUM., submature fruit, *g. ditto*, undersurface. — *h. A. helenae* F. v. M., upper surface. — *i. A. costata* C. H. WRIGHT, undersurface. — *i. A. vitis-idaea* SLEUM., undersurface (*a* BRASS 4566, *b* CARR 13708. *c* BRASS 4109, *d–e* BRASS 4380, *f* BURKILL 797, *g* WRAY 210, *h* MACGREGOR anno 1889, *j* GILLIARD *s.n.*, obtuse leaf, and NGF 51899 WOMERSLEY, two acute leaves).

a thin cork. *Leaves* mostly obovate-elliptic or obovate, or elliptic, apex mostly blunt or rounded or shortly acuminate and subacute, base cuneate, thinly coriaceous, glabrous except some scattered redbrown glandular hairs or their point-like bases, subserrate-crenulate, (1–)1.3–2(–2.5,–5) by 0.7–1.4 (–2) cm, midrib slightly immersed above, prominent beneath, nerves 2 basal pairs and 2–3 from upper part of midrib, rather obscure above, visibly raised beneath, and arches connected with the rather dense reticulation, the latter ± prominent beneath; petiole stoutish, ± flattened, 1(–2) mm, on a thickish cushion decurrent along the twig. *Flowers* 1(–2) in the axils of the upper normal or lower reduced (squamular) leaves. Pedicels glabrous, red, 5–7 mm. Bracteoles ± halfway. *Calyx* tube turbinate, 5-ribbed or- winged, red or brownish red, glabrous or with sparse shortly stalked glands, 3–4 mm long, limb 2 mm high, 5-lobed nearly to the base, lobes deltoid, subacute. *Corolla* tubular, slightly 5-angled, white, or pink with white tips, or cream suffused with pink, glabrous or with a stalked setular gland here and there at the angles, (1.3–)1.5–1.7(–2) cm, 4–5(–6) mm ø, including lobes 1.5–2 mm. *Stamens* as long as the corolla; filaments glabrous, 8–10 (–11) mm; anther-cells much recurved at base, granular, 2 mm; tubules as wide as the cells, *c.* 4 mm, slits almost to the base. *Disk* glabrous. *Style* glabrous, 1.5–1.8 cm.

Distr. *Malesia*: East New Guinea (Eastern and Western Highlands; Finisterre and Saruwaged-Cromwell Mts).

Ecol. On ridge crests and in alpine thickets, 1585–3720 m. *Fl.* April-Sept.

8. **Agapetes costata** C. H. WRIGHT, Kew Bull. (1899) 102; SLEUM. Bot. Jahrb. 70 (1939) 101; Nova Guinea, Bot. *n.* 1 (1960) 5. — *A. filicicola* SLEUM. Bot. Jahrb. 70 (1939) 102. – **Fig. 118i.**

Terrestrial or epiphytic shrub, rarely over 5 m. Branchlets terete, greyish, subpatent-pubescent in the younger reddish parts, glabrescent and early corticate. *Leaves* ovate to lanceolate-ovate, apex shortly or more longish acuminate, blunt or nearly so, base mostly rounded or broadly attenuate, subcoriaceous, ± stiff, lower part of midrib above with lax rather longish white hairs as are margin, midrib and nerves beneath at least in young leaves, glabrescent, furthermore beneath with lax short glandular subsetulose caducous hairs or finally glandular-punctulate, edge minutely glandular-crenulate or -dented, very edge ± recurved (dry), 1.5–4.5 by 0.8–1.5 cm, midrib slightly impressed above, prominent beneath, nerves *c.* 5 pairs, lower 2 curved-ascending from or ± from base, other ones higher up and more spreading, all inarching, whether or not impressed above, raised beneath as is the lax reticulation; petiole red, ± slender, hairy, 2–3 mm. *Flowers* from the upper axils 1–2(–3) in fascicles. Pedicels red, stoutish, glabrous or laxly patently white-hairy, bibracteolate at or slightly above the base, 1.2–1.8 cm. *Calyx* narrow-obconical at anthesis, becoming inflated later, red, manifestly 5-ribbed, glabrous, (8–)9–10 by 3–4 mm including limb, the latter low, 5-lobed to base, lobes ovate-deltoid, acute, 1.5–2 mm. *Corolla* cylindrical, 5-angled, ± fleshy, glabrous, pale green or greenish white, (3–)3.5–4 by 0.5–0.6 cm including the deltoid, erect lobes, 2–2.5 mm. *Stamens* ± as long as the corolla; filaments linear, glabrous, 12–15(–16) mm; anther-cells granular, (6–)8–9 mm, ± unequal; tubules rather broad, (9–)12–14 mm, splitting in the upper ½ to ⅔. *Style* slender, glabrous, equalling the corolla. *Disk* glabrous. Submature still green *fruit* oblong-ellipsoid, 5-ribbed, 9–10 by 6–7 mm, sepals inflexed.

Distr. *Malesia*: New Guinea (Main Range from Murray Pass and Mt Albert Edward to Mt Scratchley).

Ecol. Apparently common and gregarious, in forest borders, both terrestrial and epiphytic, also on trunks of grassland tree ferns, 2480–3680 (–3960) m. *Fl.* June-July.

9. **Agapetes alberti-eduardi** SLEUM. Bot. Jahrb. 70 (1939) 100; Nova Guinea, Bot. *n.* 1 (1960) 5. — **Fig. 118d-e.**

Small tree, 4–5 m, with stiff, somewhat scandent branches. Branchlets obtusangular, glabrous. *Leaves* ± narrowly ovate-oblong to lanceolate-oblong, apex shortly subcaudate-acuminate, very tip bluntish, base broadly attenuate to nearly rounded, coriaceous, brittle, brown and ± dull when dry, glabrous, very sparsely set with blackish points underneath, distinctly denticulate by callose, blackish, subsetulose glands, 4.5–8 by (1.5–)2–3 cm, midrib much impressed above, prominent beneath, nerves 5–6(–7) pairs, lower 2–3 ones ± basal and high curved-ascendent, the other higher ones more straight and spreading, all inarching near the edge, slightly impressed above, a little raised beneath, reticulation obscure; petiole rugulose, glabrous, (6–)8–10 by 1 mm. *Flowers* blackish red when dry, glabrous, 2–3 in the upper axils. Pedicels stout, 1.5–2 cm. Bract minute, bracteoles in upper third or even close to the calyx. *Calyx* urceolate, tube at anthesis 5–6 by *c.* 3 mm, limb suberect-tubular or but slightly spreading, *c.* 3 mm high, acutely 5-lobed to ⅔. *Corolla* cylindrical, base red, upper part greenish yellow, very shortly 5-lobed, 3.5–4 by 0.6–0.7 cm. *Stamens c.* 3 cm; filaments glabrous, *c.* 5 mm; anther-cells granular, (8–)9–12 mm; tubules ± slender, 1.5–1.6 cm, slits nearly to the base. *Disk* glabrous. *Style* slender, equalling the corolla. *Fruit* ellipsoid or subglobose, shining, purple-black, fleshy, *c.* 1.5 by 1.1–1.2 cm (fresh), suberect, calyx limb not much accrescent.

Distr. *Malesia*: East New Guinea (Central Distr.: Mt Albert Edward), common in forest or shrubberies at 3350–3600 m. *Fl.* June.

10. **Agapetes viridiflora** (SCHLTR) SLEUM. Bot. Jahrb. 70 (1939) 99; Nova Guinea, Bot. *n.* 1 (1960) 5. — *Paphia viridiflora* SCHLTR, Bot. Jahrb. 55 (1918) 183, f. 13.

Scandent, much branched and densely leaved, epiphytic shrub, up to 10 m. Branchlets subterete,

glabrous. *Leaves* elliptic, apex obtusely attenuate or subacuminate, base broadly attenuate, coriaceous, stiff, glabrous, laxly set with dark glandular points beneath, ± indistinctly crenulate or dented by very short callose, blackish, glandular bristles, 3.5–6 by 1.7–2.5 cm, midrib broadened at base, ± flat above, prominent beneath, nerves 4–5 pairs of which 2 basal or ± suprabasal and curved-ascending, the higher ones more spreading, all obscurely anastomosing and ± raised on both faces, reticulation indistinct; petiole 0.5–1(–1.2) by 1 mm. *Flowers* green, blackish when dry, glabrous, in 3–6-flowered fascicles. Pedicels stout, bibracteolate ± at base, *c.* 2 cm. *Calyx* tube broadly cylindrical, obscurely 5-ribbed, base truncate, *c.* 4 by 3 mm, limb barely 1 mm high, shortly 5-dented. *Corolla* subcylindrical, ± dilated towards the mouth, 3.5–4 by *c.* 1 cm, lobes erect, 3–4 mm. *Stamens* ± as long as the corolla; filaments glabrous, 5–6 mm; anther-cells subequal, slightly granular, 10–12 mm; tubules 16–18 mm, slits ± halfway. *Style* glabrous, slender, ± exserted. *Disk* glabrous.

Distr. *Malesia*: East New Guinea (Dischore Mts in Waria R. region), in mossy forest at *c.* 1300 m. One collection. *Fl.* June.

11. Agapetes stenantha (SCHLTR) SLEUM. Bot. Jahrb. 70 (1939) 99; Nova Guinea, Bot. *n.* 1 (1960) 5. — *Paphia stenantha* SCHLTR, Bot. Jahrb. 55 (1918) 184. — *A. obtusata* SLEUM. *ibid.* 70 (1939) 99. — *A. brevicuspis* SLEUM. *l.c.* 101. — **Fig. 119.**

Scandent or subscandent robust shrub, 2–5 m, occasionally climbing up to 20 m, with flexuous, not rarely drooping branches. Branchlets glabrous, tips obtusangular. *Leaves* ovate-elliptic to elliptic-oblong, rarely ovate or ovate-oblong, apex shortly acuminate, very tip mostly obtuse or subacute, base mostly broad-attenuate, sometimes ± rounded, coriaceous, laxly set with very short, bristle-like, blackish, glandular caducous hairs or punctulate by their bases, at edge minutely and ± regularly dented by thick, subsetose, black, ± impressed glands, 4–10 by 2–4.5 cm, midrib ±

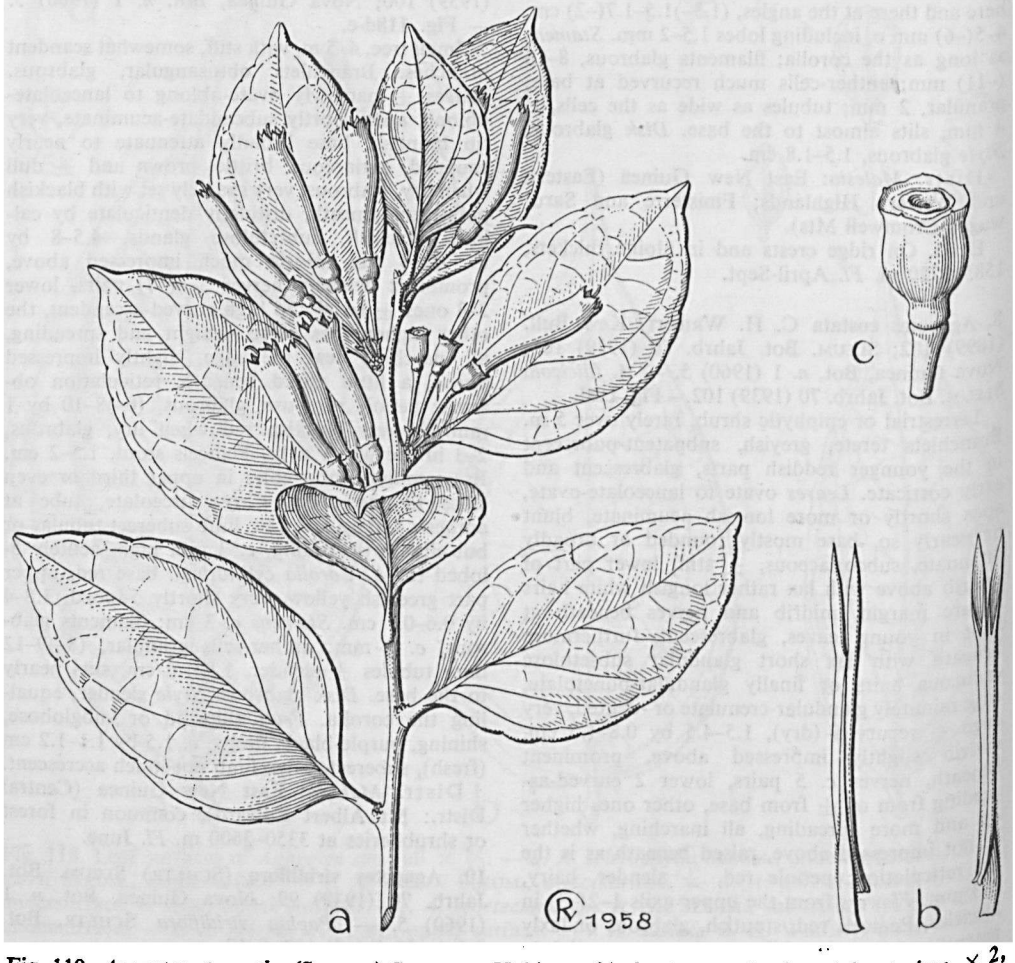

Fig. 119. *Agapetes stenantha* (SCHLTR) SLEUM. *a.* Habit, × ⅔, *b.* stamens, back and front view, × 2, *c.* ovary and disk, × 2 (*a–c* BRASS 22272).

impressed above, strongly raised beneath, nerves 3–4 basal or suprabasal pairs, high curved-ascending to apex, anastomosing, higher less distinct spreading nerves or veins from upper part of midrib, all ± prominent above, more so beneath, reticulation very lax, ± raised beneath or on both faces; petiole red, rugulose, often ± flattened, (4–)6–10(–12) by 1–1.5 mm. *Flowers* in (1–)2–3-flowered fascicles in the upper axils, glabrous. Pedicels bibracteolate at base, 1.3–1.8 (–2.3) cm. *Calyx* tube broadly obconical or subcylindric, mostly faintly, sometimes more distinctly 5-ribbed, base truncate, 3–4(–5) by 3–4 mm including the low limb 0.5–1.5 mm high, lobes or teeth often minute. *Corolla* tubular to tubular-ventricose, whether or not ± dilated upwards, ± fleshy, initially green or greenish yellow, often suffused with dull red, or later plain red, dark red to blackish when dry, 2–2.7(–3) by 0.4–0.6 cm ø below, 0.6–0.7 cm ø in upper third, lobes 2 mm, finally reflexed. *Stamens* ± as long as corolla; filaments glabrous, 2–3(–4) mm; anther-cells granular, 0.8–1 cm; tubules (1–)1.2–1.5 cm, slits long. *Style* slender, glabrous, as long as corolla or ± exserted. *Disk* glabrous. *Fruit* globose, apex truncate, said to be white, *c.* 1.5 cm ø (fresh).

Distr. *Malesia*: East New Guinea (Morobe Distr.: Waria R. region and Dishore Mts to Mt Maneao and Goodenough I. in Milne Bay Distr.).

Ecol. In mossy forest or forest margin, both terrestrial and epiphytic, on slopes, locally common, 1300–2865 m. *Fl.* Jan.-Dec.

Note. Rather variable in the form and size of the corolla and the length of the stamens.

12. DIMORPHANTHERA

F. v. M. in Wing's South. Sc. Rec. n.s. 2 (1886) *in text*, repr. Bot. Centralbl. 26 (1886) 163; Trans. R. Soc. Vict. n.s. 1, 2 (1889) 19; Descr. Not. 9 (1890) 63; WARB. Bot. Jahrb. 18 (1893) 203; J. J. S. Nova Guinea 12 (1914) 146; WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 89; J. J. S. Nova Guinea 12 (1917) 514; *ibid.* (1918) t. 208 & 209; SCHLTR, Bot. Jahrb. 55 (1918) 184; COPEL. *f.* Philip. J. Sc. 47 (1932) 100 (key), 105; J. J. S. Nova Guinea 18 (1936) 100; SLEUM. Bot. Jahrb. 70 (1939) 108; Nova Guinea, Bot. *n.* 7 (1961) 73–102; Blumea 12 (1963) 137; *ibid.* 12 (1964) 344. — *Agapetes* D. DON *subg. Dimorphanthera* (F. v. M.) DRUDE, in E. & P. Pfl. Fam. 4, 1 (1889) 55. — *Agapetes* (*non* D. DON) KOORD. Nova Guinea 8 (1912) 875, *in text*. — **Fig. 120–126.**

Trees up to 10 m, shrubs, large lianas, or epiphytic, stem base and roots not rarely thickened. *Leaves* spiral, petioled, entire or with minute crenations or teeth ending in a callous caducous setular hair or gland, ± coriaceous, plinerved ± from the base, with a basal, thickened, marginal gland on each side near the petiole. *Flowers* mostly large and showy, in (1–)few-many-flowered axillary or rami-cauliflorous fascicles or short racemes. Buds of inflorescences subglobular-ovoid, with numerous, concave, early caducous perulae. Pedicels ± distinctly articulate at both ends. Bracteoles 2, subbasal, mostly small. *Calyx* tube adnate to the ovary, cylindrical to semiglobose, very rarely with 5 angles or ribs alternating with the lobes. *Corolla* tubular to campanulate, 5-lobed. *Stamens* (8–)10, alternately unequally long and dimorphous; *major stamens*: filaments linear, dorsifixed; anther-cells oblong, mostly granular, at base not rarely beaked, sometimes bearing a small anchor-like appendage, or a tuft of hairs, at apex extending into a ± ear-shaped tubule splitting introrsely; connective often produced at apex into 2 processes; processes fixed in the gap between the tubules or fixed behind them, sometimes in various degree adnate to the back of the tubules (except at the tip); *minor stamens*: in all parts shorter than the major stamens. *Disk* annular. *Style* slender, often exserted; stigma truncate or minutely lobed. *Fruit* baccate, 5-celled, (sub)globular, ∞-seeded, with the persistent calyx limb. *Seeds* ellipsoid, small; testa reticulate.

Distr. *Malesia*: about 65 *spp.*, 2 in the Philippines, 1 in the Moluccas (Buru, Ceram, Ambon), 1 in New Ireland, the rest in New Guinea including also Waigeu, Japen, Goodenough and Normanby Is. — Fig. 120.

Ecol. Predominantly in the upper (moss) forest or forest edge with grassland, 1300–3560 m, rarely

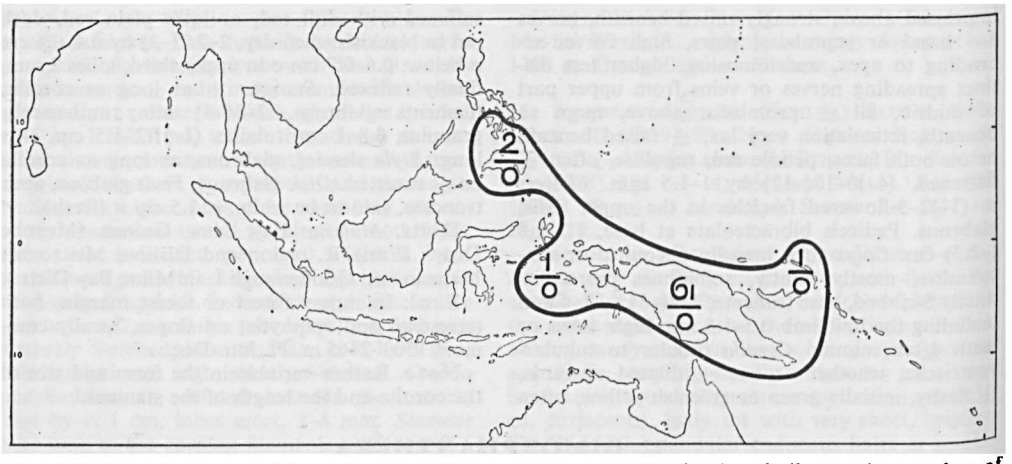

Fig. 120. Distribution of *Dimorphanthera*. The number above the hyphen indicates the number of endemic species, that below the hyphen the number of non-endemic species in each island or district.

in low country upwards of 75 m. The highest altitude is reached by *D. alpivaga*, a small shrub in the alpine savannah of Mt Carstensz at 3700–4300 m. A few *spp.* are found both epiphytically in patches of mossy forest and terrestrial in adjacent grassland.

Pollination. According to BECCARI the flowers of at least certain species are visited by honey sucking birds (*Amblyornis inornata* SCHLEG., *Myzomela rosenbergii* SCHLEG.). Remains of an apparently sugar containing liquid can be found sometimes in the flowers of recently collected material: corolla and stamens are then glued together. Possibly the disk functions as a nectary; it is also not certain whether pollination really is performed exclusively by birds, when they feed on the flowers.

Dispersal. The berries of many (perhaps all) species are soft, purplish to blackish and palatable at full maturity, are up to 1.5 cm ø, and regularly eaten by birds.

Uses. In New Guinea the flowers are occasionally used for ornamental purposes by Papuans, as can be observed from the colour picture published by E. TH. GILLIARD in Nat. Geogr. Mag. (1951) 669, which probably shows *D. amoena*.

KEY TO THE SPECIES

1. Calyx tube conspicuously 5-winged or -ribbed. (Corolla tubular.) 1. *Sect. Pteridosiphon.*
 2. Leaves 22–28 by 9–13 cm. Pedicels *c.* 10 mm. Corolla *c.* 2.6 cm . . . . . **1. D. macleaniifolia**
 2. Leaves 8–13 by (2.5–)3.5–5.5 cm. Pedicels 15–20(–25) mm. Corolla 1.8–2.2 cm . . **2. D. umbellata**
1. Calyx tube terete and smooth, not winged or ribbed.
 3. Corolla *at anthesis* clearly dilated distally, *i.e.* narrowly to widely campanulate or suburceolate campanulate, lobes *c.* ½–¼(–⅛) as long as the total corolla. 2. *Sect. Dimorphanthera.*
  4. Processes of the major stamens ± connate or very closely parallel, free from the tubules, and fixed in the gap between the generally (much) divergent tubules.
   5. Calyx and corolla (and disk) glabrous.
    6. Leaves entire. Rachis *c.* 1.5 cm. Anther-cells plus tubules of the major stamens *c.* 7 mm. **3. D. tridens**
    6. Leaves finely crenulate. Rachis 2.5–3 cm. Anther-cells plus tubules of the major stamens 5 mm. **4. D. declinata**
   5. Calyx and corolla ± densely shortly grey-pubescent.
    7. Disk glabrous or but very sparsely and shortly pubescent. Corolla 3–3.5 cm . . **5. D. magnifica**
    7. Disk ± densely hirtellous or tomentellous. Corolla up to 2 cm.
     8. Corolla 1–1.3(–1.5) cm. Anther-cells plus tubules of the major stamens 3.5 mm . **6. D. breviflos**
     8. Corolla 1.5–2 cm. Anther-cells plus tubules of the major stamens 5–6(–7) mm **7. D. kempteriana**
  4. Each of the two processes of the major stamens ligular, fixed to the back of and free or ± connate with and ± equalling the tubule, or ± evanescent upwards, or indistinct.
   9. Pedicels (very) slender, (1.6–)2–2.5(–3) cm, 2–3 times as long as the (pubescent) corolla. **8. D. intermedia**
   9. Pedicels more stoutish in general and ½–1½(–2) times as long as the corolla.
    10. Corolla glabrous, or sparsely puberulous distally.

11. Flowers in abbreviate racemes up to 5 cm long. Corolla (white) sparsely puberulous distally. **9. D. albiflora**
11. Flowers in very short racemes or in fascicles. Corolla quite glabrous.
12. Major stamens 4 mm . . . . . **10. D. mindanaensis**
12. Major stamens at least 6 mm.
13. Corolla widely (open) campanulate, 1.5–2(–2.5) cm. **11. D. amblyornidis *var.* moorhousiana**
13. Corolla shortly suburceolate-campanulate, (0.8–)1–1.3 cm . . . . . **12. D. dekockii**
10. Corolla short-pubescent all over.
14. Corolla densely to more laxly clothed with yellowish or subferrugineous, stoutish hairs. **13. D. apoana**
14. Corolla subdensely clothed with fine, whitish or greyish hairs.
15. Corolla shortly suburceolate-campanulate, (0.8–)1–1.3 cm . **12. D. dekockii *var.* pubiflora**
15. Corolla ± widely (open) campanulate, exceeding 1.5 cm.
16. Calyx and pedicel subdensely grey-pubescent. (Cells plus tubules of the major stamens *c.* 4.5 mm.) . . . . . **14. D. steinii**
16. Calyx and pedicel very laxly pubescent or mostly glabrous.
17. Cells plus tubules of the major stamens *c.* 8 mm. . . . . **15. D. pulchra**
17. Cells plus tubules of the major stamens (4–)5–6(–6.5) mm. **11. D. amblyornidis *var.* amblyornidis**

3. Corolla *at anthesis* strictly tubular (rarely slightly dilated distally in 29 *D. brevipes*), lobes up to *c.* $^1/_5$ as long as the total corolla. 3. *Sect. Trochilanthe.*
18. Processes of the major stamens free from the tubules at least in the upper third.
19. Flowers in distinct racemes; rachis 2–6 cm.
20. Corolla outside finely short-pubescent to subtomentose all over.
21. Rachis, pedicels and calyces velutinous or subtomentose.
22. Style with lax, long, appressed hairs. (Leaves entire, 10–18 by 2–3.5 cm.) . . **16. D. velutina**
22. Style glabrous.
23. Leaves entire. Stamens 13–16 and 10–12 mm . . . . . **17. D. amoena**
23. Leaves denticulate by small callose glands. Stamens 9–10 and 7.5 mm **54. D. calodon**
21. Rachis, pedicels, and calyces laxly and very shortly pubescent, or glabrous.
24. Cells of the major stamens provided with a basal anchor-like appendage . **35. D. anchorifera**
24. Cells of the major stamens without a trace of such appendage.
25. Corolla (minutely papillose puberulous) 2.3 cm . . . . . **18. D. latifolia**
25. Corolla 3–4.5 cm.
26. Corolla hirsute-tomentose. Cells plus tubules of the major stamens 15–16 mm. **19. D. hirsutiflora**
26. Corolla subdensely short-pubescent. Cells plus tubules of the major stamens up to 12 mm.
27. Cells plus tubules of the major stamens 11–12 mm . . . . . **20. D. brassii**
27. Cells plus tubules of the major stamens 8 mm . . . . . **21. D. wollastonii**
20. Corolla outside glabrous or sparsely pubescent at the lobes only.
28. Leaves (ovate, 7-plinerved) up to 25 by 14 cm. Major stamens 15 mm . . . **18. D. latifolia**
28. Leaves 12–20 by 4.5–8 cm. Major stamens 11–12 mm.
29. Leaves elliptic, 5–7-plinerved. Rachis 3.5–4 cm . . . . . **22. D. racemosa**
29. Leaves subovate- or lanceolate-oblong, 7(–9)-plinerved. Rachis 2-2.5 cm.
30. Pedicels 10–13 by 0.7–1 mm. Calyx tube 3 by 3 mm . . . . . **23. D. eymae**
30. Pedicels 8–10 by *c.* 2 mm. Calyx tube (4–)5 by 4–5 mm . . . . . **43. D. doctersii**
19. Flowers in abbreviate racemes or fascicles (clusters) or solitary; rachis rarely up to 1.5 cm.
31. Connective processes papillose or laxly muriculate, certainly not properly hairy.
32. Corolla membranous, red, (1.8–)2(–2.3) cm. Cells plus tubules of the major stamens 5–6 mm. **24. D. cornuta**
32. Corolla rather fleshy, greenish to white. Cells plus tubules of the major stamens 7–8 mm.
33. Corolla 2.5 cm . . . . . **25. D. torricellensis**
33. Corolla 1–1.3 cm . . . . . **26. D. brachyantha**
31. Connective processes laxly to densely hairy or even hirsutulous at least in the lower part, mostly so to or almost to the top.
34. Corolla outside subdensely or rarely more laxly short-hairy to subtomentose all over.
35. Corolla 1.3–1.8(–2) cm. Cells plus tubules of the major stamens up to 8(–9) mm.
36. Leaf margin entire or subentire, *i.e.* minutely or shallowly and remotely denticulate or subserrate-crenulate.
37. Calyx and pedicels quite glabrous . . . . . **27. D. gracilis**
37. Calyx and pedicels (the latter at least partly) shortly pubescent or tomentulose.
38. Calyx (and the entire inflorescence and young leaves) tomentulose . . . . **28. D. vestita**
38. Calyx laxly to subdensely short-pubescent. (Leaves glabrous from the beginning.)

39. Corolla rather subcampanulate-dilated distally. Connective processes (hairy and) surpassing the tubules . . . . . **29. D. brevipes**
39. Corolla strictly tubular. Connective processes a little shorter than the tubules.
40. Stamens alternately 7 and 5 mm; connective processes with subsetular, ± appressed hairs below, ± glabrescent distally. . . . . **30. D. crassifolia**
40. Stamens alternately 9–10 and 7–8 mm; connective processes subdensely with spreading fine whitish hairs all over.
41. Corolla glabrous inside. Disk glabrous. Bracteoles inserted at the base of the pedicel. **31. D. nigropunctata**
41. Corolla laxly hairy inside. Disk hairy. Bracteoles inserted 6–10 mm above the base of the pedicel . . . . . **32. D. thibaudifolia**
36. Leaf margin regularly and markedly subserrate-denticulate or -crenulate.
42. Calyx rounded at the base. Pedicel and calyx glabrous . **40. D. denticulifera** *var.* **pubens**
42. Calyx ± truncate at the base. Pedicel and calyx subdensely hairy . . . . **33. D. robbinsii**
35. Corolla(2.2–)2.5–4.5 cm. Cells plus tubules of the major stamens at least 9 mm, mostly longer.
43. Calyx tube cup-shaped, at anthesis rounded at the base.
44. Cells plus tubules of the major stamens 16–18(–20) mm . . . . . **34. D. clemensiae**
44. Cells plus tubules of the major stamens up to 14 mm.
45. Cells of the major stamens provided with a basal anchor-like appendage, 12–14 mm including the tubules . . . . . **35. D. anchorifera**
45. Cells of the major stamens without a trace of a basal appendage.
46. Cells plus tubules of the major stamens 9–10 mm. Corolla 2–2.3 cm . **36. D. beccariana**
46. Cells plus tubules of the major stamens (11–)12–13 mm. Corolla 3–3.5(–4) cm. **20. D. brassii**
43. Calyx tube broadly cylindric or obconical, markedly truncate or even apophysate at the base.
47. Corolla finely subdensely pubescent. Leaves glabrous.
48. Corolla white, 2.2–2.5(–2.7) cm . . . . . **37. D. forbesii**
48. Corolla red, 3–3.5(–4) cm . . . . . **38. D. splendens**
47. Corolla hirsutulous or velutinous. Leaves pubescent at the midrib and nerves beneath.
49. Leaves entire . . . . . **49. D. collinsii** *var.* **montis-wilhelmi**
49. Leaves rather regularly denticulate by minute blackish callose teeth . . . **39. D. alpina**
34. Corolla outside generally quite glabrous, at most pubescent at the lobes.
50. Base of calyx tube rounded at anthesis.
51. Leaves regularly and rather densely subserrate-crenulate or -denticulate.
52. Leaves (7–)10–14(–20) by (2.5–)3–4(–5.5) cm. Corolla 1¾–2 cm. **40. D. denticulifera** *var.* **denticulifera**
52. Leaves 2.5–3.5 by 1–1.5(–1¾) cm. Corolla 2¾–3 cm . . . . . **41. D. leucostoma**
51. Leaves remotely denticulate or subcrenulate, or entire.
53. Cells of the major stamens provided with a distinct anchor-like basal appendage. **42. D. meliphagidum**
53. Cells of the major stamens without such an appendage.
54. Leaves 7(–9)-plinerved from and from above the base. Cells plus tubules of the major stamens 10–12 mm . . . . . **43. D. doctersii**
54. Leaves 5–7-plinerved from and from above the base. Cells plus tubules of the major stamens 7–9 mm.
55. Corolla (white) 1.8–2 cm. Stamens alternately 8–9 and 6.5–7 mm. (Calyx quite glabrous.) **44. D. womersleyi**
55. Corolla 2.8–3 cm. Stamens alternately 12–15 and 10–13 mm.
56. Calyx laxly short-hairy. Leaves subcaudate-acuminate for 3–4 cm. Corolla white. **45. D. longifolia**
56. Calyx glabrous. Leaves broadly and for *c.* 1.5 cm acuminate or attenuate. Corolla light to dark red.
57. Leaves ovate, base rounded to subcordate, 5–9 by 3–5.5 cm . . . . **46. D. ovatifolia**
57. Leaves elliptic- or lanceolate-oblong, 9–16(–19) by (3.5–)4–6(–8, –10) cm (Corolla 1.5–1.8 cm) . . . . . **47. D. peekelii**
50. Base of calyx tube ± rectangularly truncate, sometimes slightly apophysate.
58. Leaves laxly to subdensely set with blackish setular glands or points on both faces. **48. D. kalkmanii**
58. Leaves laxly to very laxly glandular-punctulate beneath only.
59. Cells plus tubules of the major stamens 13–15 mm. (Corolla 2.8–3.5 cm.) **49. D. collinsii** *var.* **collinsii**
59. Cells plus tubules of the major stamens up to 11 mm.
60. Corolla (2.8–)3–3.5 cm. (Leaves shallowly and rather remotely subdenticulate-crenulate.) **50. D. elegantissima**

60. Corolla up to 2.5 cm.
61. Calyx tube including limb *c.* 8 mm. (Leaves entire or minutely callose-denticulate.) **51. D. megacalyx**
61. Calyx tube including limb up to 6 mm.
62. Leaves lanceolate (subcoriaceous, denticulate), 7–9.5 by 1.5–2 cm . **53. D. lancifolia**
62. Leaves oblong to elliptic or ovate-elliptic, 7.5–14 by 3–8.5 cm.
63. Leaves coriaceous or mostly subcoriaceous, markedly denticulate or subserrate-crenulate. Calyx lobes 1–1.5 mm . . . . . **40. D. denticulifera *var.* denticulifera**
63. Leaves thick-coriaceous, very slightly crenulate or almost entire. Calyx lobes very short, hardly 0.5 mm, often a mere apiculus. . . . . **52. D. militaris**

18. Processes of the major stamens merely indicated at the back of the tubules by a very slightly or not thickened, mostly quite glabrous line, or not perceptible at all.
64. Corolla pubescent or glandular-muriculate to various degree outside at least in the upper half.
65. Leaves manifestly and regularly denticulate by callose, subpersistent, bristle-like glands. Corolla 2.8–3 cm . . . . . **54. D. calodon**
65. Leaves entire or practically so. Corolla *c.* 1.5 cm.
66. Filaments of the major stamens *c.* 1.5 mm. Calyx and corolla laxly with subappressed, thickish, glandular, obtuse and yellowish hairs . . . . . **55. D. prainiana**
66. Filaments of the major stamens 3–4.5 mm. Calyx and corolla laxly to subdensely clothed with fine and short, non-glandular hairs.
67. Leaves coriaceous, ovate to oblong-ovate, 6–10 by 3–5.5 cm; petiole *c.* 2 mm. Pedicels 8–13 mm . . . . . **56. D. vonroemeri**
67. Leaves various; petiole (2.5–)4–7 mm. Pedicels 15–20 mm.
68. Leaves coriaceous, lanceolate or ovate-, sometimes oblong-lanceolate, 8.5–16 by 2.6–4.8 cm. **57. D. parviflora**
68. Leaves subcoriaceous, subovate- to oblong-elliptic, 5–7(–7.5) by (2–)2.5–3.5(–4) cm. **58. D. vaccinioides**
64. Corolla glabrous or practically so (*i.e.* sometimes with some sparse hairs at or near the apex, especially in bud).
69. Leaves 1.5–4.5 (very rarely in part in the same specimen –7) cm long.
70. Corolla 1.5–2 cm.
71. Leaves 0.4–0.9(–1) cm wide . . . . . **59. D. parvifolia**
71. Leaves (1–)1.2–2.5 cm wide.
72. Calyx tube including limb *c.* 7 mm long. . . . . **60. D. alpivaga**
72. Calyx tube including limb 4–5 mm long.
73. Cells plus tubules of the major stamens 5 mm. Leaves stiff-coriaceous . **61. D. obtusifolia**
73. Cells plus tubules of the major stamens 4 mm. Leaves coriaceous to subcoriaceous. **62. D. myzomelae**
70. Corolla (2.8–)3–3.5 cm.
74. Leaves 1–1.5(–1.7) cm wide. Pedicels pubescent at anthesis . . . . . **41. D. leucostoma**
74. Leaves 0.4–0.8(–1) cm wide. Pedicels glabrous at anthesis . . . . . **63. D. microphylla**
69. Leaves at least 6 cm long, mostly much longer.
75. Calyx 4.5–5.5 mm long in all, tube cup-shaped to subobconical, base rounded or attenuate (narrowed-truncate than at the very base), limb 1.5 mm. Pedicels rather slender. Bracteoles minute . . . . . **64. D. wrightiana**
75. Calyx (7–)8 mm long in all, tube broad-cylindric to obconical, base markedly truncate, limb 3–4 mm. Pedicels very robust. Bracteoles large, at anthesis ± including the pedicels at least halfway . . . . . **65. D. dryophila**

1. Section Pteridosiphon

WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 89; SLEUM. Bot. Jahrb. 70 (1939) 108; Nova Guinea, Bot. *n.* 7 (1961) 80.

Calyx conspicuously 5-winged or -ribbed, the wings or ribs alternating with the calyx lobes. *Corolla* tubular.

1. **Dimorphanthera macleaniifolia** WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 89 ('*macleaniaefolia*'); SLEUM. Bot. Jahrb. 70 (1939) 114; Nova Guinea, Bot. *n.* 7 (1961) 80.

Shrub. Branchlets glabrous. *Leaves* ovate to elliptic, apex shortly subacutely acuminate, base ± rounded and sometimes suboblique, coriaceous, glabrous, laxly minutely glandular-punctate beneath, entire, 22–28 by 9–13 cm, 5–7-plinerved from and from up to 5 cm above the base, midrib and nerves ± deeply impressed above, strongly raised beneath, reticulation ± lax, raised on both faces, especially above; petiole *c.* 10 by 3 mm. *Flowers* in few-flowered fascicles from old wood, outside rather densely covered with fine hairs. Pedicel stoutish, *c.* 10 mm. Bracteoles basal,

subulate, minute. *Calyx* tube subcylindric-obconical, base truncate, *c.* 4 by 3–4 mm, strongly 5-winged, wings still marked in the limb, the latter suberect, *c.* 2 mm, shortly 5-lobed or -dented (0.5 mm). *Corolla* tubular, rather thin and apparently red, short-pubescent outside, *c.* 2.6 cm by 5–6 mm, lobes *c.* 3 mm. *Stamens* 11 and 10 mm; *major stamens*: filaments puberulous dorsally, *c.* 4 mm; cells plus tubules 7.5 mm, base incurved and with a minute appendix; tubules ± divergent, *c.* 3 mm; connective obscure, no trace of any hairs. *Disk* deeply sunken, glabrous. *Style* very slender, glabrous, *c.* 2.5 cm.

Distr. *Malesia*: West New Guinea (on Utakwa R. at base of Mt. Carstensz), 640–760 m. One collection.

Note. It is not beyond doubt whether the detached flowers and leaves belong together.

2. Dimorphanthera umbellata WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 90; SLEUM. Bot. Jahrb. 70 (1939) 114; Nova Guinea, Bot. *n.* 7 (1961) 80.

Shrub. Branchlets slender, tips glabrous. *Leaves* subovate-oblong to lanceolate, apex subcaudate-acuminate, 1.5–2 cm, subacute, base broadly attenuate, coriaceous, glabrous, very laxly glandular-punctate beneath, entire, edge not or faintly revolute, 8–13 by (2.5–)3.5–5.5 cm, 5-plinerved from and from a little above the base, midrib and nerves slightly impressed above, markedly raised beneath, reticulation rather lax, raised beneath only; petiole 8–10 by 2–3 mm, somewhat flattened. *Flowers* in abbreviate, 4–6-flowered, almost fascicle-like racemes, ± densely and very shortly pubescent; rachis slender, 0.5–1 by 0.1 cm. Pedicels slender, 1.5–2(–2.5) cm. Bracteoles basal, subulate, 1–2 mm. *Calyx* strongly winged, wings *c.* 1 mm high (dry), tube broadly cylindric, *c.* 4 by 3–4 mm, base abrupt, limb suberect or ± spreading, *c.* 2 mm, minutely 5-denticulate. *Corolla* tubular, 1.8–2.2 cm, ± 5-angular, the angles corresponding to the wings of the calyx tube, thin, apparently red, densely short-pubescent outside, lobes 2–3 mm. *Stamens* 9–10 and 8–9 mm; *major stamens*: filaments slightly short-hairy upwards, 3 mm; cells plus tubules 7–8 mm, former beaked at the base inward; tubules 3.5–4 mm, ± divergent; connective obscure, indicated merely by some short hairs. *Disk* deepened, glabrous. *Style* very slender, glabrous, 2.2–2.5 cm, exserted to 4–5 mm at full anthesis.

Distr. *Malesia*: West New Guinea (ascent from Utakwa R. to Mt Carstensz), at 1675 m. One collection.

2. Section Dimorphanthera

SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 80. — *Dimorphanthera sect. Cyclosiphon* WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 90; SLEUM. Bot. Jahrb. 70 (1939) 109. — *Dimorphanthera sect. Brachychone* SCHLTR, *ibid.* 55 (1918) 185. — *Dimorphanthera subsect. Brachychone* (SCHLTR.) SLEUM. *ibid.* 70 (1939) 109.

Calyx tube ± terete or smooth, not winged or ribbed. *Corolla* much dilated distally, *i.e.* campanulate or more rarely widely urceolate at full maturity, rather deeply 5-lobed to (1/5–) ¼–½ of the total length of the corolla.

3. Dimorphanthera tridens J. J. S. Nova Guinea 18 (1936) 100, t. 22, f. 1; SLEUM. Bot. Jahrb. 70 (1939) 114; Nova Guinea, Bot. *n.* 7 (1961) 80.

Climbing shrub up to 6 m, tips subangular, glabrous. *Leaves* elliptic to ovate or ovate-oblong, apex shortly acutely or obtusely acuminate, base broadly attenuate to rounded, basal glands distinct, coriaceous, glabrous, very laxly minutely blackish punctate beneath, 5–7-plinerved, entire, nerves slightly raised or subimpressed above, distinctly prominent beneath, reticulation obscure, 7–13(–15) by 3–5(–7) cm; petiole robust, blackish (dry), 4–9 by 1.5(–2) mm. *Racemes* from defoliate axils and/or old wood, 10–12-flowered, glabrous; rachis *c.* 1.5 cm. Pedicels ± slender, (15–)20 mm. *Calyx* tube cup-shaped or subcylindric-semiglobose, subangular, 2 mm, limb much dilated and ± spreading, subentire, 2 mm high, *c.* 5 mm ø. *Corolla* narrowly campanulate at full maturity, bright red or pink, (1.8–)2–2.2(–2.5) cm, 0.4–0.5 mm ø at base, 1–1.3 cm across limb, lobes deltoid, 4–5 by 7–8 mm. *Stamens* 8 (or 10), 8 and 6.5 mm; *major stamens*: filaments above the base ± densely set with short and ± spreading hairs, *c.* 3.5 mm, extending into a single subhirsute free connective as long as the tubules; cells plus tubules *c.* 7 mm; cells broad-oblong, much narrowed at the base into a short, subacute and curved, spur-like appendage; tubules divergent, widely ear-shaped, 2.5 mm. *Disk* glabrous. *Style* *c.* 2.3 cm.

Distr. *Malesia*: New Guinea (lower course of the Mamberamo R.), in primary forest at 75–100 m. *Fl.* July, Aug., Nov.

4. Dimorphanthera declinata SLEUM. Blumea 12 (1963) 137.

Scandent glabrous shrub. Branchlets terete, purplish brownish. *Leaves* lax, elliptic-oblong, apex shortly subabruptly, acutely or obtusely acuminate, base broadly attenuate to ± rounded, coriaceous, with scattered, minute, glandular hairs beneath, at margin regularly crenulate, 2–5 mm spaced impressed glands, 8–13 by 4–6 cm, (5–)7-plinerved from and from up to 3 cm above the base, nerves impressed above, prominent beneath, no reticulation; petiole flattened, 4–6 by *c.* 2 mm. *Racemes* from several upper axils, 8–10-

flowered, purplish (dry); rachis angular, 2.5–3 cm. Pedicels robust, 10–20 by 1 mm; bracteoles basal or up to 5 mm above the base. *Calyx* tube cup-shaped, base almost rounded, 2–3 mm, limb spreading, 5-lobed almost to the base, lobes ovate-acuminate, apiculate, *c.* 2 mm. *Corolla* widely campanulate, fleshy, glabrous at both sides, pink, *c.* 2 cm, 2–2.5 cm across limb, lobes broadly triangular, obtuse, 5 mm. *Stamens* 7 and 6 mm; *major stamens*: filaments greyish pubescent upwards, *c.* 4 mm; cells obovate-oblong, base attenuate, 5 mm long including the narrowly auriculate, *c.* 1.5 mm long tubules; processes hirsutulous, ± connate, as long as the cells. *Disk* prominent, glabrous. *Style* slender, glabrous, *c.* 2.5 cm.

Distr. *Malesia*: East New Guinea (Western Highlands in Lai valley near Wapenamanda). One collection.

Ecol. In *Miscanthus* regrowth at 1980 m. *Fl.* July.

Vern. *Poro*, Enga.

5. Dimorphanthera magnifica SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 80.

Shrub, scrambling to 15–20 m. Branchlets obtusely subtriangular and ± densely pubescent in the youngest parts, glabrescent. *Leaves* elliptic-ovate to ovate-oblong, apex ± abruptly and shortly subacutely acuminate, base broadly attenuate to rounded, basal glands indistinct, coriaceous, glabrous above, subdensely pubescent at midrib and nerves beneath, laxly so on the intervenium which bears some sparse glandular points, or glabrescent, entire, 7(–9)-plinerved, nerves faintly immersed or flat above, prominent beneath, reticulation obscure, (8.5–)12–18 by (3–)4.5–7 cm; petiole initially pubescent, 9–13 by *c.* 2 mm. *Racemes* axillary, 6–10-flowered, laxly short-pubescent; rachis rather robust, 2.3 cm. Pedicels stoutish. Bracteoles in the lower third. *Calyx* tube subcylindric, subangular (dry), shortly and ± abruptly attenuate at base, rather swollen above, 5–6 by 3–4 mm, limb ± spreading or suberect, 2–3 by 7–8 mm, lobes very broadly ovate, subacuminate or apiculate, *c.* 1 mm. *Corolla* narrowly campanulate when fully expanded, tube reddish pink, tips white, 3–3.5 cm, *c.* 6 mm ø at base, 2.5–3 cm across limb, thin-fleshy, laxly pubescent outside, lobes 6–10 by 5–9 mm. *Stamens* 8 and 10(–11) mm; *major stamens*: filaments glabrous at the base, hirsutulous upwards, *c.* 5 mm; cells plus tubules 7–8 mm, cells connate at base into a curved appendix *c.* 1 mm long; tubules ear-shaped, thick, ± divergent, 2.5 mm; processes connate, hirsutulous, as long as the tubules. *Disk* glabrous or very sparsely and shortly hairy. *Style* ± slender, glabrous, not exserted.

Distr. *Malesia*: NE. New Guinea (E. slopes of Goodenough I. in Milne Bay Distr.), common, at 1570–1600 m in mossy oak forest. One collection. *Fl.* Oct.

6. Dimorphanthera breviflos SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 81; Blumea 12 (1963) 138.

Shrub, 0.5–2 m, epiphytic or scandent. Branchlets obtusangular and ± densely yellowish pubescent in young, subterete and glabrous in older parts. *Leaves* ± lax, elliptic-oblong or -lanceolate, attenuate at both ends, apex shortly subcaudate and subacute, thin-coriaceous, glabrous above, initially pubescent on midrib and nerves beneath, glabrescent, laxly subsetular-punctate beneath, basal glands visible, entire, 5-plinerved, midrib and nerves slightly impressed above, conspicuously prominent beneath, reticulation obscure; petiole initially pubescent, (4–)5–8 by *c.* 2 mm. *Racemes* axillary, not rarely found in the axils of uppermost 3 or 4 ± reduced leaves and forming a pseudoterminal corymb, 8–15-flowered, subdensely greyish pubescent, or glabrescent on rachis and pedicels; rachis slender, *c.* 1.5 cm. Pedicels 15–20 by ½ mm, bracteoles 5–7 mm above base. *Calyx* tube semiglobose, *c.* 1.5 mm long, limb spreading, wavy, indistinctly obtusely 5-lobulate, 1 mm high. *Corolla* campanulate, deep pink to carmine, subdensely yellowish or greyish pubescent outside, 1–1.3(–1.5) cm long, 0.3–0.4 cm ø at base, *c.* 1 cm across limb, lobes subtriangular, 3–4 mm. *Stamens* 5 and 6 mm; *major stamens*: filaments hirsutulous apically, 3 mm; cells oblong, 3.5 mm including the tubules, base obtuse; tubules ± divergent, *c.* 1.5 mm; processes connate, hirsutulous, as long as the tubules. *Disk* densely yellowish hirtellous. *Style* slender, glabrous, *c.* 1.4 cm, conspicuously exserted at full anthesis.

Distr. *Malesia*: N. New Guinea (Japen I. and Cycloop Mts), 1100–1250 m.

7. Dimorphanthera kempteriana SCHLTR, Bot. Jahrb. 55 (1918) 187, f. 14, E-J; SLEUM. *ibid.* 70 (1939) 115; Nova Guinea, Bot. *n.* 7 (1961) 81; Blumea 12 (1963) 138. — *D. intermedia* DIELS, Bot. Jahrb. 62 (1919) 487, *non* J. J. S. 1914. — *D. dielsiana* J. J. S. Nova Guinea 18 (1936) 100. — *D. profusa* J. J. S. *l.c.* 101, t. 22, f. 2.

Small slender shrub, or often large climber on tall forest trees, not properly epiphytic, although adventitious roots are produced from the stem, with sparse long, pendent, profusely flowering branches. Branchlets angular and ± densely hairy in younger, subterete and glabrescent in older parts. *Leaves* narrow-elliptic or oblong to ovate-lanceolate, apex mostly shortly subcaudate-acuminate, subacute, base mostly attenuate, rarely ± rounded, basal glands not much conspicuous, coriaceous, initially short-hairy, es pecially beneath, glabrescent and ± glossy later, laxly and very shortly glandular-subsetulose or -punctate beneath, entire, 7–15(–24) by 2.5–5(–8) cm, 5-plinerved, midrib and nerves ± impressed above, ± prominent beneath, reticulation obscure; flush pinkish brown (fresh); petiole initially pubescent, 6–10(–15) by 2(–2.5) mm. Very short *racemes* or clusters from defoliate axils, rarely axillary, (5–)8–15-flowered, shortly grey-pubescent; rachis 1–2.5 cm. Pedicels reddish, ± slender, 1.5–2(–3) cm, bracteoles in lower third or ± halfway. *Calyx* tube subobconical to semi-

globose, reddish (fresh), 2–3(–4) mm, limb spreading, 2 mm, shallowly 5-dented. *Corolla* campanulate, 5-lobed to ⅓, thin-fleshy, subdensely greyish puberulous, red to pale pink, 1.5–2 cm, *c.* 5 mm ø at base, *c.* 1.5 cm across limb. *Stamens* (8–)9–10 and (6–)7–8 mm; *major stamens*: filaments hirsutulous distally, *c.* 5 mm; cells oblong, confluent at base into a short beak, 5–6(–7) mm including the ear-shaped, divergent, 2 mm long tubules; processes connate, hairy, ± equalling the tubules. *Disk* tomentellous. *Style* slender, *c.* 2.5 cm, ± exserted, glabrous or papillate apically, very rarely ± pubescent. *Fruit* subglobose, top truncate, pubescent, 7–8 mm ø.

Distr. *Malesia*: New Guinea (widespread, in the Vogelkop and Wandammen Peninsula and the Main Range from the Wissel Lakes region to Mt Victoria, also in the Finisterre Mts, Hydrographers Ra. and Mt Saruwaged-Sattelberg area).

Ecol. In dense primary and secondary (*Castanopsis*, *Agathis*, and *Nothofagus*) forest, (650–)1000–2300(–3000) m, locally not rare. *Fl.* Jan.-Dec.

Vern. *Korè*, Kapauku.

8. Dimorphanthera intermedia J. J. S. Nova Guinea 12 (1914) 149, t. 39 A; SLEUM. Bot. Jahrb. 70 (1939) 115; Nova Guinea, Bot. *n.* 7 (1961) 82.

Large liana climbing to tree-tops. Branchlets obtusangular and glabrous distally, terete below, 6–10 mm ø in flower-bearing parts. *Leaves* lax, ovate to elliptic, apex gradually shortly obtusely acuminate, base obtuse to rounded, ± basal glands ± distinct, coriaceous, glabrous, sparsely punctate beneath, 5–7-plinerved from and from up to 1.5 cm above base, 6–13 by 3–6 cm, midrib and nerves slightly sulcate above except base of midrib, prominent beneath, reticulation ± inconspicuous or none; petiole 6–10 by *c.* 2 mm. *Flowers* 4–8 per fascicle, usually from defoliate axils or old wood. Pedicels (very) slender, glabrous, 1.6–3 cm. *Calyx* tube subcylindric, minutely muriculate or glabrous, rugulose, base truncate to rounded, *c.* 2.5 mm, limb subpatent, shortly 5-lobed, 1.5 mm, lobes apiculate. *Corolla* campanulate, orange-red (fresh), short-hairy, *c.* 1 cm, *c.* 8 mm ø at limb, lobes triangular, *c.* 3 mm. *Stamens* 5 and 4.2 mm; *major stamens*: filaments sparsely patently hairy in the apical part, 2.5 mm; cells narrow-oblong (each cell ending in a basal tooth), divergent, 3.5–4 mm including the ear-shaped, *c.* 2 mm long tubules; processes visible as a small, laxly to subdensely hairy, narrow ribbon on the back of each tubule, free in its uppermost part as a minute tooth, or ± evanescent towards the apex of the tubules. *Disk* puberulous. *Style* filiform, glabrous, 1.2–1.4 cm.

Distr. *Malesia*: SE. New Guinea (Upper Fly R.). Twice found. *Fl.* Aug.

9. Dimorphanthera albiflora SCHLTR, Bot. Jahrb. 55 (1918) 186; SLEUM. *ibid.* 70 (1939) 116; Nova Guinea, Bot. *n.* 7 (1961) 82.

Scandent shrub. Branchlets quite glabrous. *Leaves* rather dense, narrow-elliptic, apex acuminate, base cuneate, coriaceous, glabrous, 3-plinerved, nerves prominent beneath, 8–14 by 2.8–3 cm; petiole robust, 10–15 mm. *Racemes* abbreviate, sessile, densely 10–15-flowered, up to 5 cm. Pedicels *c.* 1 cm. *Calyx* cup-shaped, *c.* 4 by 4 mm, glabrous, limb very shortly 5-dented. *Corolla* campanulate, 5-lobed to ⅓, white, *c.* 1 cm, 7 mm across limb, sparsely puberulous towards the apex outside, lobes erect, triangular, bluntish. *Stamens* 6.5 and 5 mm; filaments glabrous; cells obovate; tubules divergent; processes glabrous, as long as the tubules and fixed behind them. *Disk* glabrous. *Style* slender, glabrous. (Copied from original diagnosis.)

Distr. *Malesia*: NE. New Guinea (Schrader Mts), in mountain forest at *c.* 2070 m. Once found; type †. *Fl.* May.

10. Dimorphanthera mindanaensis MERR. Philip. J. Sc. 20 (1922) 418; En. Philip. 3 (1923) 252; COPEL. *f.* Philip. J. Sc. 47 (1932) 92; SLEUM. Bot. Jahrb. 70 (1939) 116; Nova Guinea, Bot. *n.* 7 (1961) 82.

Glabrous shrub. Branches and branchlets rather stout. *Leaves* ovate to elliptic, apex shortly acuminate, base acute to rounded, thick-coriaceous, rather shining, 5(–7)-plinerved from and from above the base, reticulation lax, 4–8 by 2.5–4.5 cm; petiole ± stout, 4–8 mm. *Flowers* fascicled in uppermost axils. Young flower buds enclosed by numerous sparingly pubescent perulae, *c.* 1 cm ø. Pedicels up to 1 cm. *Calyx c.* 3.5 mm, shallowly 5-lobed, lobes broadly ovate, shortly and abruptly acuminate. *Corolla* somewhat widened upwards, glabrous, 0.8–1 cm, lobes ovate, 3 mm. *Stamens* glabrous, alternately 4 and 3 mm. *Style* 1.2 cm. (Copied from original diagnosis.)

Distr. *Malesia*: Philippines (Mindanao: Mt Malindang and Mt Lipa). Twice found; type †.

Ecol. In mossy forest at *c.* 1700 m.

11. Dimorphanthera amblyornidis (BECC.) F. v. M. in Wing's South. Sc. Rec. n.s. 2 (1886) *in text*, repr. Bot. Centralbl. 26 (1886) 164; K. SCH. & LAUT. Nachtr. (1905) 339, *in text*; J. J. S. Ic. Bog. 4 (1913) 177, *in text*; Nova Guinea 12 (1914) 148; SLEUM. Bot. Jahrb. 70 (1939) 114; Nova Guinea, Bot. *n.* 7 (1961) 82; Blumea 12 (1963) 138. — *Agapetes amblyornidis* BECC. Malesia 1 (1878) 208. — *D. arfakensis* J. J. S. Nova Guinea 12 (1914) 149, 152, t. 41; SLEUM. Bot. Jahrb. 70 (1939) 118; KANEH. & HATUS. Bot. Mag. Tokyo 45 (1942) 476. — *D. moorhousiana* (*non* F. v. M. *s. str.*) SCHLTR, Bot. Jahrb. 55 (1918) 186. — *Agapetes moorhousiana* (*non* F. v. M. *s. str.*) LANE-POOLE, For. Res. Papua (1925) 130; WHITE & FRANCIS, Proc. R. Soc. Queensl. 38 (1927) 252; *ibid.* 39 (1928) 68. — **Fig. 121–122.**

var. **amblyornidis.**

Terrestrial shrub, mostly climbing up to 30 m into the crown of tall trees, sometimes epiphytic. Branchlets subangular and slightly pubescent or glabrous at the tips. *Leaves* lax, lanceolate or

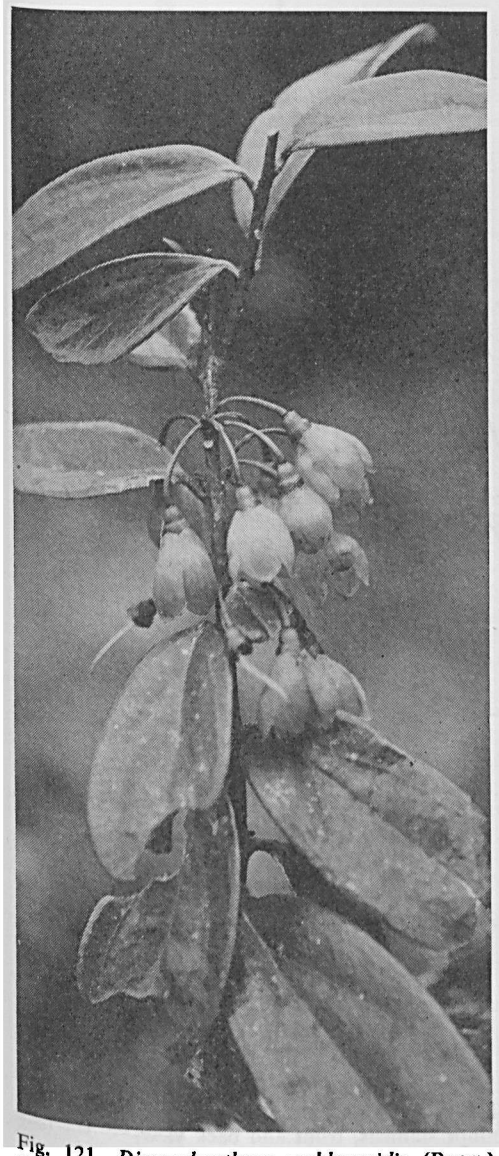

Fig. 121. *Dimorphanthera amblyornidis* (Becc.) F. v. M. *var. amblyornidis*. Mt Nettoti, 1750 m, Kebar valley, NW. New Guinea (Van Royen & Sleumer 7412) (Sleumer, 1961).

ovate-lanceolate to oblong-elliptic, apex gradually acuminate or attenuate, subacute, base ± cuneate, basal glands not much conspicuous, coriaceous, glabrous, sparsely glandular-punctate or -muriculate beneath, 5–7-plinerved from and ± above the base, entire, 5–15 by 1.5–5.5 cm, nerves and midrib ± impressed above, prominent beneath, reticulation subinconspicuous; petiole rugose, 6–10 by 1.5–2 mm. *Inflorescences* in (3–)5–8(–20)-flowered, much abbreviated racemes or clusters from foliate and/or defoliate axils, or from old wood. Perulae not seen. Pedicels ± stoutish, glabrous or laxly pubescent, 1.5–2(–3) cm, bracteoles ± above the base. *Calyx* green or suffused with red, tube semiglobose to obconical, base mostly rounded, sometimes obtuse, glabrous or sparsely short-pubescent outside, *c.* 2.5 mm, limb ± expanded, 2 mm, wavy and very shortly 5-dented or merely -apiculate. *Corolla* ± bell-shaped, pink to deep rose red or scarlet, subdensely short-pubescent, inside glabrous, thin-fleshy, 1.5–2(–2.5) cm, *c.* 4 mm ø at base, *c.* 1.5 cm across limb, lobes subdeltoid, bluntish, *c.* 4 by 5–7 mm. *Stamens* 7–8 and 5–6.5 mm; *major stamens*: filaments ± densely set with shorter or more coarse hairs upwards, 3–4 mm; cells narrow-oblong, shortly bifurcate at base, *i.e.* each cell ending in a sharp point, or cells confluent into one acumen, (4–)5–6(–6.5) mm including the broadly ear-shaped, much divergent tubules ± as long as the cells; processes extending as a narrow, short ribbon on the back of the lower part of each cell, adnate or sometimes ending in a minute free tooth, often merely indicated by some hairs and evanescent upwards, or hardly visible at all. *Disk* sparsely very short-hairy, or puberulent, or ± glabrous. *Style* slender, glabrous, ± exserted at full anthesis. *Fruit* subglobose, *c.* 7 mm ø, turning purplish at maturity.

Distr. *Malesia*: NW. and SE. New Guinea (various places in Vogelkop Peninsula, and again in Morobe Distr. to Milne Bay Distr., not yet known from Central New Guinea).

Ecol. In mountain forest or forest edge, 400–1900 m, rather common locally. *Fl.* Jan.-Dec.

Vern. *Mengaam*, Hattam.

var. **moorhousiana** (F. v. M.) Sleum. Nova Guinea, Bot. *n.* 7 (1961) 83; Blumea 12 (1963) 138. — *D.moorhousiana* F. v. M. in Wing's South. Sc. Res. n.s. 2 (1886) *in text*, repr. Bot. Centralbl. 26 (1886) 163; J. J. S. Nova Guinea 12 (1914) 148; Sp. Moore, J. Bot. 61 (1923) Suppl. 28; Copel. *f.* Philip. J. Sc. 47 (1932) 88; Sleum. Bot. Jahrb. 70 (1939) 117. — *Agapetes moorhousiana* F. v. M. in Wing's South Sc. Rec. n.s. 2 (1886) *in text*, repr. Bot. Centralbl. 26 (1886) 163; Descr. Not. 8 (1886) 46. — **Fig. 122.**

Different mainly by a quite glabrous *corolla*. *Disk* mostly glabrous, as are the pedicels and the calyx.

Distr. *Malesia*: SW. New Guinea, a common species in E. New Guinea, once in W. New Guinea (Fak Fak), 600–1280 m.

Vern. *Biliki*, Pernambata: Hydrographers Ra.

12. Dimorphanthera dekockii J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 55; Nova Guinea 12 (1914) 147, t. 38 B, 148; Sleum. Bot. Jahrb. 70 (1939) 116; Nova Guinea, Bot. *n.* 7 (1961) 83; Blumea 12 (1963) 138; *ibid.* 12 (1964) 344.

See for further synonyms under the varieties.

KEY TO THE VARIETIES

1. Corolla glabrous outside.
2. Corolla pinkish to violet-, sometimes almost blackish red . . . . . **1.** *var.* **dekockii**

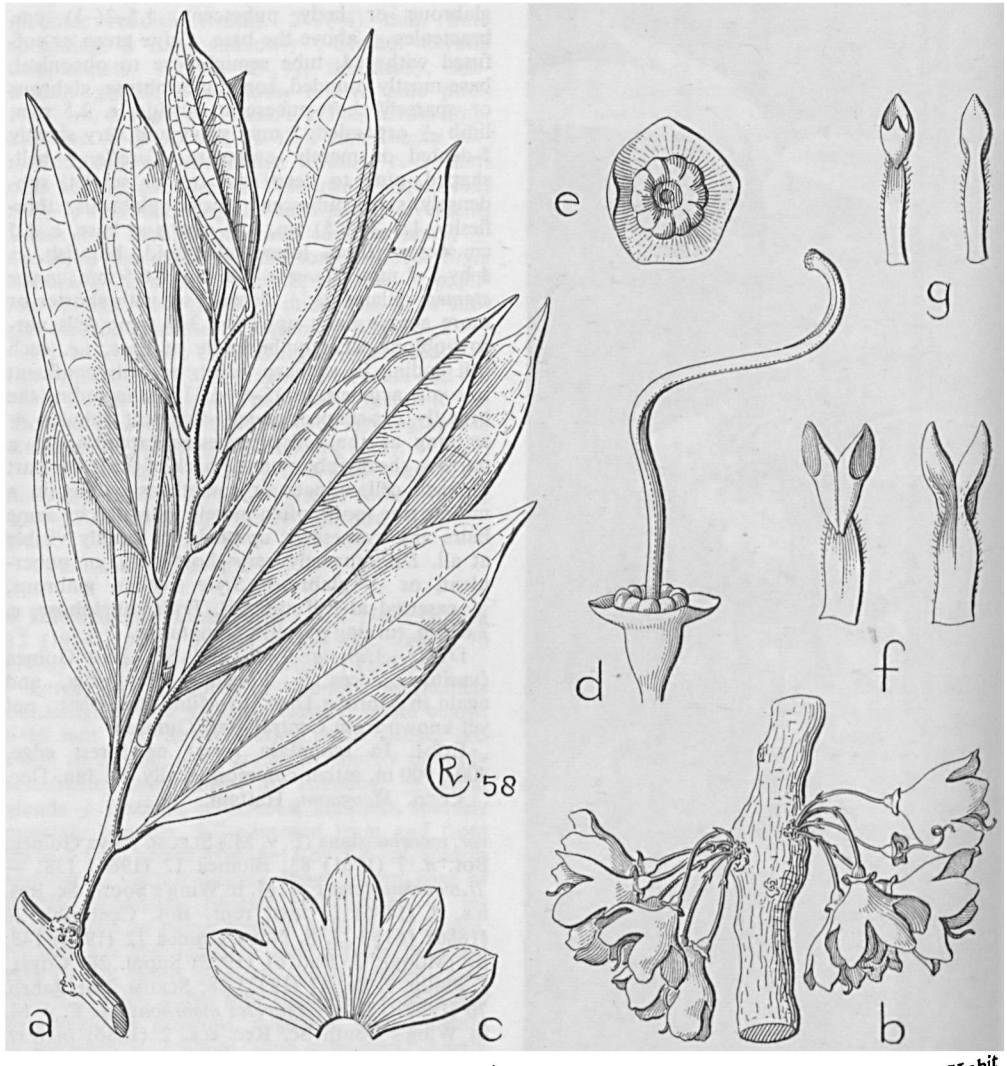

Fig. 122. *Dimorphanthera amblyornidis* (BECC.) F. v. M. *var. moorhousiana* (F. v. M.) SLEUM. *a.* Habit × ⅔, *b.* inflorescence, × ⅔, *c.* corolla, expanded, × 1⅓, *d.* ovary, disk and style, × 3⅓, *e.* disk, × 3⅓, *f.* major stamens, front and back view, × 3⅓, *g.* minor stamens, front and back view, × 3⅓ (*a–g* FORBES 784).

2. Corolla white, or cream, or pale green **2. *var.* chlorocarpa**
1. Corolla subdensely pubescent outside, dark red. . . . . **3. *var.* pubiflora**

1. *var.* dekockii.

Epiphytic or terrestrial, scrambling shrub, up to 3 m. Branchlets obtusangular, glabrous. *Leaves* ovate-oblong, or oblong-lanceolate, apex subcaudate-acuminate (2–3 cm), subacute, base ± cuneate, basal glands ± obscure, coriaceous, glabrous, sparsely punctate or muriculate beneath, finely and remotely denticulate by ± impressed glandular, early caducous hairs, or subentire, 6.5–14(–17) by 2.5–6(–7) cm, midrib and nerves impressed above, raised beneath, reticulation obscure; petiole (8–)10–13 by 2–3 mm. Perulae ♂, ovate to orbicular, pubescent or subglabrous, up to 1–2 by 1 cm. *Inflorescences* 8–10(–15, –20)-flowered clusters or very abbreviate racemes; rachis stout, obconical, to 1 cm. Pedicels stoutish, 0.8–1.2(–1.5) cm; bracteoles (4–5 by 1.5 mm) at or ± above base. *Calyx* green or suffused with red, narrowly cup-shaped, tube subcylindric, ± 5-angled, base obtuse or truncate, 3–4 mm, 4–5 mm ø, limb suberect, 2–2.5 mm, lobes subovate-acuminate, ± apiculate, (1–)1.5–2 mm. *Corolla* shortly suburceolate-campanulate (or widely urceolate), rather fleshy, pinkish to violet-, sometimes almost blackish red, (0.8–)1–1.3 cm long,

c. 5 mm ø at base, *c.* 1 cm halfway, *c.* 0.8 cm ø at base of lobes; lobes suberect or ± reflexed, deltoid, 2–3 by *c.* 3 mm. *Stamens* (6–)7 and (5–)6 mm; *major stamens*: filaments sparsely ciliate to subdensely hairy distally, 2.5–3.5 mm; cells oblong, base ± contracted into a beak, sometimes bearing a tuft of short hairs, *c.* 5 mm including the rather narrow, divergent, 2–2.5 mm long tubules; processes a dark glabrous ribbon mostly shorter than, rarely as long as the tubule and free at the tip. *Disk* glabrous. *Style* ± stoutish, glabrous, *c.* 1.2 cm, generally exserted at full anthesis. *Fruit* subglobose, apex truncate and crowned by the calyx lobes, blackish red, *c.* 7 mm ø (dry).

Distr. *Malesia*: New Guinea (Cycloop Mts; in Main Range from the Oranje and Star Mts: Mt Antares, Mt Sirius, to the Western Highlands, once found at Bernhard Camp on Idenburg R.).

Ecol. In openings of (mossy) forest or in subalpine shrubberies, or in undergrowth of *Quercus* forest, locally common, 1250–3600 m. *Fl.* Jan.-Dec.

Vern. *Rambau*, Enga.

2. *var.* **chlorocarpa** (SLEUM.) SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 83; Blumea 12 (1963) 138; *ibid.* 12 (1964) 344. — *D. chlorocarpa* SLEUM. Bot. Jahrb. 70 (1939) 116.

Differs by a white, or cream, or pale green corolla. *Fruit* green (perhaps not fully ripe?). *Leaves* in specimens from altitudes above 3000 m smaller, shortly acuminate or even obtuse.

Distr. *Malesia*: New Guinea (Central, Southern and Western Highlands: Telefomin, Yaki R. valley, Mt Sugarloaf, Mt Giluwe, Mt Hagen; Mt Saruwaged area, and Mt Shungol in Morobe Distr.).

Ecol. Climber in open secondary or mixed riverine forest, or terrestrial in alpine shrubbery, (850–)1900–3650 m.

Vern. *Por, poro*, Enga, *walya, wela*, Mendi.

3. *var.* **pubiflora** SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 83.

Corolla subdensely pubescent outside, dark red. *Leaves* ± ovate, 4–7 by 2–4 cm.

Distr. *Malesia*: Central New Guinea, in fire induced grassland and subalpine shrub vegetation of Mt Antares (Star Mts) and the Doma Peaks, 3000–3520 m. *Fl.* July.

13. **Dimorphanthera apoana** (MERR.) SCHLTR, Bot. Jahrb. 55 (1918) 185, *in text*; MERR. En. Philip. 3 (1923) 252; COPEL. *f.* Philip. J. Sc. 47 (1932) 89, t. 7, f. 6–7, t. 8, f. 1–4; SLEUM. Bot. Jahrb. 70 (1939) 115; Nova Guinea, Bot. *n.* 7 (1961) 83. — *Vaccinium apoanum* MERR. Publ. Gov. Lab. Philip. *n.* 29 (1905) 39; Philip. J. Sc. 3 (1908) Bot. 372; ELM. Leafl. Philip. Bot. 3 (1911) 1091. — *Vaccinium calelanum* ELM. *l.c.* 1096.

Epiphytic, often dense shrub with numerous stems from the same root cluster, 2–3 m, or climbing up to 6 m. Branchlets reddish brown, subangular and mostly glabrous at the tips, rarely pubescent. *Leaves* subdense, elliptic-, rarely subovate-or lanceolate-oblong, apex shortly and ± bluntly attenuate or subacuminate, base broadly attenuate to almost rounded, basal glands ± obscure, coriaceous, glabrous above, laxly caducously glandular-muriculate or punctate beneath, entire, 5(–7)-plinerved from and somewhat from above the base, the outer pair of nerves ± obsolete, the others faintly impressed above, prominent beneath, reticulation subinconspicuous, (6–)7–11(–14) by (2–)2.5–4(–6) cm; petiole stout, pubescent initially or glabrous, 0.5–0.8(–1) cm. *Inflorescences* (3–)5–7-flowered, sessile clusters. Perulae broad-oblong to suborbicular, densely subferrugineous-hairy all over or at least at apex, up to 1 by 0.6 cm. Pedicels robust, glabrous, (6–)8–10 mm, in *fr.* 10–15 by 1 mm. Bracteoles below or halfway ovate, sharply acuminate, fimbriate, 2 mm. *Calyx* tube cylindric, subangular, glabrous, dark green, 3–5 by 3(–4) mm, base truncate, limb erect, 1 mm, broadly and shortly 5-dented. *Corolla* campanulate, 9–10(–13) mm, densely and ± coarsely subferrugineous-hairy in bud, laxly and yellowish so at full anthesis, deep to pale red, lobes subacuminate, 2–3 mm, finally revolute. *Stamens* 4–5 and 3–4 mm; *major stamens*: filaments linear, glabrous or with a few hairs distally on back and margin, 1.5–2 mm; cells oblong, base ending in an obtuse beak, *c.* 2 mm; tubules flaring, 1 mm, divergent; processes a sparsely hairy ribbon on the back of the cells, adnate or free at the tip, ± as long as the tubules. *Disk* glabrous. *Style* slender, glabrous, reddish, *c.* 1.5 cm. *Fruit* subglobular, truncate, blackish and fleshy, 8–9 mm ø. *Seeds c.* 1 mm, brown.

Distr. *Malesia*: Philippines (Mindanao; Negros; Panay).

Ecol. In mossy forest, often on exposed ridges or in summit vegation, 1200–2350 m. *Fl.* Jan.-Dec.

Vern. *Kalumping, tagima*, Bagob.

14. **Dimorphanthera steinii** SLEUM. Bot. Jahrb. 70 (1939) 117; Nova Guinea, Bot. *n.* 7 (1961) 84; Blumea 12 (1963) 139.

Shrub, occasionally apparently large and scrambling. Branchlets subterete, glabrous or finely pubescent at the tips. *Leaves* lax, narrowly oblong, sometimes subovate-oblong, gradually acuminate, attenuate at base, subcoriaceous to coriaceous, ± stiff, glabrous, laxly brownish punctate beneath, entire or faintly glandular-denticulate, (8–)10–12(–15) by (2.5–)3–4 cm, 5-plinerved from and a little from above the base, midrib and nerves faintly to distinctly impressed above, prominent beneath, veins laxly reticulate or hardly visible underneath; petiole robust, 0.8–1.2 cm. *Racemes* from foliate or defoliate axils, few-flowered, shortly grey-pubescent; rachis rather stoutish, 1–1.5 cm. Pedicles ± robust, red, 1.5–2.2 cm. Bracteoles at or above the base. *Calyx* purplish red, tube semiglobose, (3–)4 by 4 mm, limb much spreading, 2–3 mm, shortly obtusely 5-lobed or -dented. *Corolla* broadly campanulate, red or pink, ± fleshy, 1.7–2 cm long, 2–2.5 cm across limb, lobes obtuse, 5–6 mm. *Stamens*

6(–7) and 5 mm; *major stamens*: filaments patently hairy in the middle, *c.* 3 mm; cells oblong, base apiculate, 2.5 mm; tubules widened and much divergent, *c.* 2 mm; processes a dark, dorsal, entirely adnate ribbon in the lower part of the tubules, sparsely hairy, evanescent upwards. *Disk* grey-pubescent. *Style* stoutish, glabrous, at full anthesis ± exserted from the corolla.

Distr. *Malesia*: West New Guinea (Weyland Mts, Swart R. and Balim R. valleys).

Ecol. In (secondary) forest, 1600–2100 m. *Fl.* June.

Vern. *Soodnieken*, Dani.

Note. Apparently much related to *D. amblyornidis var. amblyornidis.*

15. Dimorphanthera pulchra J. J. S. Ic. Bog. 4 (1913) 175, t. t. 353; in Fedde, Rep. 30 (1932) 174; SLEUM. Bot. Jahrb. 70 (1939) 115; Nova Guinea, Bot. *n.* 7 (1961) 84. — *D. moluccana* J. J. S. in Fedde, Rep. 30 (1932) 174; SLEUM. Bot. Jahrb. 70 (1939) 115.

Shrub or small tree (reported up to 15 m), apparently scandent occasionally. Branchlets angular or subterete, glabrous or pubescent at the tips, glabrescent. *Leaves* lax, ovate-oblong or -elliptic, apex shortly obtusely acuminate, base ± rounded or broadly attenuate, coriaceous, initially sparsely puberulous at the base above and all over beneath, glabrescent, or glabrous from the beginning, laxly glandular-punctulate beneath, entire, 7–15 by 3.5–5.5(–6.5) cm, 5–7-plinerved, midrib and nerves ± impressed above, prominent beneath, reticulation obscure; petiole rugulose, 0.8–1.4 cm by 1.5–2 mm. *Inflorescences* (3–)6–10-flowered, fascicles or very short racemes from foliate or defoliate axils; rachis puberulous initially, up to 0.5 cm. Pedicels stoutish, laxly pubescent or glabrous, 2–2.5(–2.7) cm. Bracteoles at the base. *Calyx* tube obconical, base subtruncate to almost rounded, mostly glabrous, sometimes laxly pubescent, *c.* 3 mm high, 5–7 mm ø below the limb, the latter spreading, 2–3 mm, shortly obtusely or subacutely 5-lobed. *Corolla* campanulate, (dark) red, subdensely grey-pubescent at full anthesis (sometimes glabrescent in later stages?), rather fleshy, 2–2.5(–2.7) cm long, 5–6 mm ø at base, 2–2.5 cm across limb, lobes broad, *c.* 5 mm. *Stamens* 10–12 and 9–10 mm; *major stamens*: filaments ± patently subhirsute upwards, *c.* 4.5 mm; cells oblong, base contracted into a kind of beak, *c.* 8 mm including the moderately divergent, *c.* 3 mm long tubules; processes ribbon-like on back of each tubule and equalling it, adnate except the tip, hirsutulous below, sparingly hairy upwards. *Disk* subglabrous to subdensely short-hairy. *Style* slender, glabrous, 3–3.5 cm.

Distr. *Malesia*: Moluccas (Buru, Ceram, Ambon).

Ecol. In primary forest, also on limestone, 600–1200 m. *Fl.* July, Oct.

Note. Much allied to *D. amblyornidis var. amblyornidis*, but with probably constantly larger flowers.

3. Section Trochilanthe

SCHLTR, Bot. Jahrb. 55 (1918) 185; SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 84. — *Dimorphanthera subsect. Trochilanthe* (SCHLTR) SLEUM. Bot. Jahrb. 70 (1939) 110.

Calyx tube ± terete or smooth, not winged or ribbed. Corolla tubular, but slightly or not dilated distally, shortly lobed, lobes up to $^1/_5$ as long as the total corolla.

16. Dimorphanthera velutina SCHLTR, Bot. Jahrb. 55 (1918) 193, f. 14, A-D; SLEUM. *ibid.* 70 (1939) 118; Nova Guinea, Bot. *n.* 7 (1961) 84.

High climbing or sometimes epiphytic shrub, *c.* 3 m. Branchlets velutinous. *Leaves* lax, lanceolate-elliptic, apex shortly acutely acuminate, base cuneate, basal glands covered by hairs or indistinct, coriaceous, initially laxly hairy on both faces, glabrescent above, 5(–7)-plinerved from and a little from above the base, entire, 10–18 by 2–3.5 cm, midrib and nerves slightly prominent above, strongly so beneath, reticulation lax, somewhat raised especially beneath; petiole 5–7 by *c.* 2 mm. *Racemes* axillary, densely yellowish or brownish velutinous, 6–12-flowered; rachis robust, 5–6 cm. Pedicels *c.* 1.5 by 0.2 cm. Bracteoles halfway. *Calyx* tube ± semi-globose, *c.* 3 mm, limb much spreading, 2–3 mm, shallowly 5-denticulate. *Corolla* cylindrical, *c.* 3 by 0.6–0.9 cm, white, lobes erect, deltoid, *c.* 4 mm. *Stamens* 14–16 and 11–13 mm; *major stamens*: filaments *c.* 5 mm, upwards densely appressed-hirsutulous; cells elongate-oblong, with a short anchor-like ± bearded dorsal appendage at base, very base pointed and slightly curved inward, *c.* 9 mm long including the narrow, ± divergent, *c.* 3 mm long tubules; processes hirsutulous, inserted ± behind the tubules, free and ± divergent in the upper part, exceeding the tubules by 3–4 mm. *Disk* densely hairy. *Style* slenderly columnar, with sparse, long, appressed hairs, ± exceeding the corolla.

Distr. *Malesia*: N. Central New Guinea (Sepik Distr.: April R.). Two collections.

Ecol. In dense mountain forest, 850–1000 m. *Fl.* Sept.-Dec.

17. Dimorphanthera amoena SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 84; Blumea 12 (1963) 139; *ibid.* 12 (1964) 344.

High climbing liana or epiphytic bush up to 4 m, with long, pendent branches. Branchlets slender, pale rusty tomentose. *Leaves* ± lax, narrow-oblong to ovate, apex shortly obtusely acuminate, base broadly attenuate, truncate or cordate, with a pair of thick glands, subcoriaceous, hairy at midrib and nerves, above densely soft-hairy to

tomentulose along midrib and nerves, laxly so on the intervenium beneath, with sparse, very short, appressed glandular hairs all over beneath, (3.5–)7–16 by (1–)2–5 cm, entire, 5-plinerved, midrib much impressed above, prominent beneath, nerves ± impressed above, raised beneath, reticulation lax, ± prominent beneath only; petiole tomentose, 3–5 by 1.5 mm. *Racemes* from the upper, partly defoliate axils, laxly 6–8(–10)-flowered, tomentulose; rachis angular, (2–)3.5–6 cm by 2–3 mm. Pedicels (1–)1.2–2 cm by *c.* 1.5 mm. Bracteoles (*c.* 5 by 2–3 mm) in the lower third to almost at base. *Calyx* tube cylindric, *c.* 3 mm, base truncate or a little apophysate, limb ± spreading, 3–4 mm, lobes broadly ovate, apiculate, 2–2.5 mm. *Corolla* tubular, glabrescent towards base, fleshy, base pale yellowish or greenish, turning pink towards the (sometimes lighter) lobes, (3–)3.5–4 by 0.8–1 cm (*c.* 4.5 by 1.3 cm fresh), lobes erect, deltoid, *c.* 5 mm. *Stamens* 13–14(–16) and 10–11(–12) mm; *major stamens*: filaments hirsute in upper half, *c.* 4 mm; cells narrow-oblong, base shortly acuminate and inflexed, (0.9–)1–1.3 cm including the narrow, divergent, *c.* 3 mm long tubules; connective a narrow hirsute ribbon in front connecting the cells, much broader on the back of the cells, processes slightly divergent, *c.* 2 mm longer than the tubules. *Disk* hirsutulous. *Style* slender, glabrous, as long as the corolla. *Fruit* dark purple, lower half semiglobose, upper one more cylindric, with a shallow contraction between, 1–1.3 cm ø.

Distr. *Malesia*: East New Guinea (Eastern Highlands: Goroka Subdistr.; Morobe Distr.: Edie Creek area).

Ecol. In forest, 1980–2500 m, common locally. Fruits eaten by birds. *Fl. fr.* May-Sept.

18. Dimorphanthera latifolia SCHLTR, Bot. Jahrb. 55 (1918) 192; SLEUM. *ibid.* 70 (1939) 118; Nova Guinea, Bot. *n.* 7 (1961) 85.

Epiphytic, much ramified shrub. Branchlets glabrous. *Leaves* ovate, apex obtusely acuminate, base rounded, coriaceous, glabrous, entire, large up to 25 by 14 cm, 7-plinerved, nerves prominent beneath; petiole robust, 7–10 mm. *Racemes* subdensely 5–8-flowered; rachis *c.* 2 cm. Pedicels glabrous, 7–9 mm. *Calyx* cup-shaped, glabrous, 4 mm in all, limb very low, obtusely 5-lobed. *Corolla* cylindric, minutely papillose-puberulous outside, dark rose red, *c.* 2.3 by 0.5 cm, lobes erect, subovate, acute, *c.* 3 mm. *Stamens* 15 and 9 mm; *major stamens*: filaments broadly linear, shortly substrigose hairy dorsally; cells narrow-oblong; tubules somewhat divergent; connective processes conical-subulate, substrigose-villous, distinctly exceeding the tubules. *Disk* glabrous. *Style* filiform, glabrous, as long as the corolla. *Ex descr. typ.*

Distr. *Malesia*: New Guinea (West Ra., Sepik Distr.). One collection; type †.

Ecol. In mountain forest, 1400–1500 m. *Fl.* Aug.

19. Dimorphanthera hirsutiflora SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 85.

Scandent shrub. Branchlets subterete, obtusangular at the tips, glabrous, red brown when dry. *Leaves* lax, subovate-lanceolate or lanceolate-oblong, shortly (1.5–2 cm) subcaudate-acuminate, acutish, base subtruncate-rounded and with 2 distinct glands, stiff-coriaceous, glabrous above at full age, subappressedly yellowish tomentulose in the lower part of midrib and nerves beneath, intervenium laxly glandular-muriculate or -punctate beneath, entire, (8–)9–20 by (2–)2.5–6 cm, 5-plinerved from and from above the base, with several other, less distinct nerves higher up, midrib above thick-prominent to the base, gradually decreasing upwards, raised for its entire length beneath, nerves ± immersed above, ± prominent beneath, reticulation lax, raised beneath only; petiole glabrous above, tomentulose beneath, (3–)5–7 by 2–3 mm. *Racemes* axillary, 5–7-flowered, laxly pubescent or glabrous; rachis 2–4 cm by 3–4 mm. Pedicels 0.8–1.2 cm by 2–3 mm. Bracteoles in lower third. *Calyx* green, tube broad-cylindric, *c.* 4 by 5 mm, base truncate, limb erect, 3 mm, lobes deltoid, subacute, *c.* 1.5 mm. *Corolla* cylindric, 3.5–4(–4.5) by 0.5–0.6 cm, red, tipped white, fleshy, hirsute-tomentose, lobes erect, *c.* 4 mm. *Stamens* 16–17 and 11–12 mm; *major stamens*: filaments broadly linear, *c.* 5 mm, appressed-hirsutulous upwards; cells narrow-oblong, base obtuse, 1.5–1.6 cm including the narrow, ± divergent, *c.* 3 mm long tubules; processes ± connate, appressed-hirsutulous, exceeding the tubules by *c.* 1 mm. *Disk* glabrous. *Style* slender, glabrous, exserted for *c.* 3 mm.

Distr. *Malesia*: New Guinea (Wahgi Divide area, Western Highlands). One collection.

Ecol. Scandent over shrubs and rocks, 2900 m. *Fl.* Sept.

20. Dimorphanthera brassii SLEUM. Bot. Jahrb. 70 (1939) 122; Nova Guinea, Bot. *n.* 7 (1961) 86; Blumea 12 (1963) 139. — **Fig. 123.**

Large, stiff-branched climber, up to 6 m. Branchlets subterete, glabrous. *Leaves* lax, oblong to elliptic-oblong, rarely subovate, apex shortly obtusely acuminate, base broadly attenuate to almost rounded, the 2 basal glands ± indistinct, coriaceous, glabrous, laxly blackish punctate beneath, entire, 14–23 by (4–)5–6(–9) cm, 7-plinerved from and from above the base, midrib and nerves ± immersed above, much prominent beneath, reticulation rather dense, finely raised on both faces; petiole 1–1.5 cm by *c.* 2 mm. *Racemes* from defoliate axils or from old wood, 5–10-flowered; rachis (1–)2–2.5 cm, robust, laxly hairy or subglabrous. Pedicels laxly hairy or subglabrous, (10–)12–15 by 1.5 mm. Bracteoles 2, large (3 by 2 mm), basal ± pubescent. *Calyx* cup-shaped, green, laxly short-pubescent, tube 4–5 mm, base rounded in outline, but shortly truncate at the very base, limb expanded, 2–2.5 mm, shortly obtusely 5-lobed nearly to the base. *Corolla* tubular, obscurely angled, fleshy, bright or coral red, rather densely shortly fulvous- or greyish hairy outside, 3–3.5(–5) by 0.6–1 cm in dry, 4–4.5 by 1.3 cm in fresh specimens, lobes *c.*

4 mm. *Stamens* 10, (16–)17(–20) and (8–)9–10 (–14) mm; *major stamens*: filaments 5–6 mm, short-pubescent distally; cells narrow, base apiculate, without appendage, (1.1–)1.2–1.3 cm including the ± divergent, 2.5 mm long tubules; processes distinct, subdensely to laxly and longish fulvous-hairy, connate, ± as long as the tubules. *Disk* ± densely hairy or tomentulose. *Style* slender, glabrous, ± as long as the corolla.

Distr. *Malesia*: New Guinea (Central and Morobe Distr., not rare in the Edie Creek area).

Ecol. In mountain forest, locally plentiful, (610–)1600–2050 m. *Fl.* Febr.—Oct.

Vern. *Loloulolou*, Kuepa: Movoi, Upper Akaifu valley.

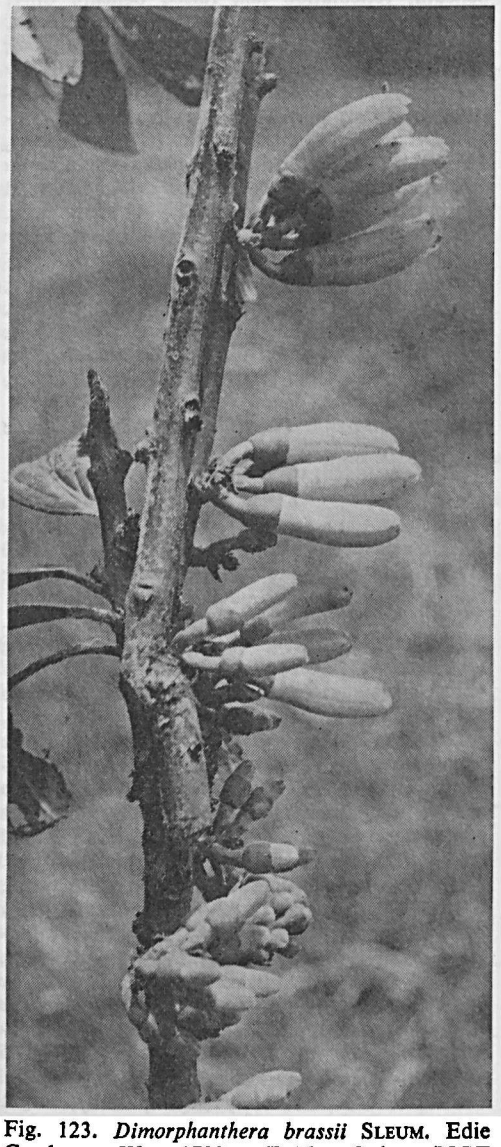

Fig. 123. *Dimorphanthera brassii* SLEUM. Edie Creek near Wau, 1700 m, E. New Guinea (NGF 13487 WOMERSLEY & SLEUMER) (SLEUMER, 1961).

21. Dimorphanthera wollastonii WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 90; SLEUM. Bot. Jahrb. 70 (1939) 122; Nova Guinea, Bot. *n.* 7 (1961) 86.

Shrub. *Leaves* oblong-elliptic, apex very shortly (1–1.5 cm) subacutely and ± abruptly acuminate, base broadly attenuate, coriaceous, glabrous but laxly minutely glandular-pointed beneath, 16–21 by 6–8.3 cm, entire, 9(–11)-plinerved from and from up to 4 cm above the base, midrib and nerves strongly impressed above, prominent beneath, reticulation rather dense, minutely raised on both faces; petiole glabrous, 1.2–1.5 by 0.3 cm, ± flattened. Abbreviate *racemes* or fascicles 6–8-flowered, from defoliate axils or old wood; rachis stoutish, *c.* 2 cm, ± glabrous. Pedicels *c.* 10 by 1.8 mm, laxly puberulous. Bracteoles oblong-ovate, 4–5(–7) by 2–3 mm, glabrous. *Calyx* laxly and very shortly pubescent, tube cup-shaped, base rounded, *c.* 4(–5) by 4 mm, limb slightly spreading, 2 mm, deeply 5-lobed, lobes depressed-ovate, apiculate. *Corolla* tubular, fleshy, laxly very shortly pubescent outside, (3–)3.5 by *c.* 0.5 cm, lobes deltoid, obtuse, *c.* 4 mm. *Stamens* 13 and 11 mm; *major stamens*: filaments *c.* 5 mm, hairy distally; cells elongate, 8 mm including the tubules, hooked inward below; tubules ± divergent, 2.5 mm; processes hirsute, connate, as long as the tubules. *Disk* glabrous. *Style* rather slender, glabrous, *c.* 3 cm.

Distr. *Malesia*: SW. New Guinea (ascent from Utakwa R. to Mt Carstensz), at *c.* 945 m. One collection, incompletely known.

22. Dimorphanthera racemosa SCHLTR, Bot. Jahrb. 55 (1918) 191; SLEUM. *ibid.* 70 (1939) 119; Nova Guinea, Bot. *n.* 7 (1961) 86.

Epiphytic shrub. Branchlets subterete, glabrous. *Leaves* elliptic, apex obtusely acuminate, base almost rounded, glands inconspicuous, coriaceous, glabrous, very laxly glandular-punctate beneath, entire, 5–7-plinerved from and from above the base, nerves prominent beneath, reticulation very lax and but slightly raised on both faces, 12–18 by 5–7 cm; petiole 7–10 by 2.5 mm. *Racemes* axillary, laxly many-flowered, glabrous; rachis 3.5–4 cm. Pedicels slender, 10–13 mm. *Calyx* cup-shaped, 4 mm long in all, limb low, indistinctly 5-lobed. *Corolla* cylindric, rose red, *c.* 2.4 cm. *Stamens* 11 and 8 mm; *major stamens*: filaments papillose-puberulous dorsally; tubules acute, divergent; processes much divergent, minutely papillose-puberulous, markedly longer than the tubules. *Disk* glabrous. *Style* filiform, glabrous, ± as long as the corolla. Floral characters copied from type description.

Distr. *Malesia*: New Guinea (April R. in Sepik Distr.), in dense primary forest, at 200–400 m. Only one collection. *Fl.* Nov.

23. Dimorphanthera eymae SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 86.

Shrub. Branchlets subterete, glabrous. *Leaves* lax, subovate- or lanceolate-oblong, apex shortly gradually acuminate, bluntish, base broadly at-

tenuate, or more rarely obtuse to almost rounded, basal glands not much conspicuous, subcoriaceous, glabrous, laxly blackish punctate beneath, entire, 7(–9)-plinerved from and from high above the base, 15–20 by 4.5–7(–8) cm, midrib and nerves slightly impressed above, prominent beneath, reticulation rather dense, distinct beneath only; petiole 8–20 by 2–3 mm. *Racemes* axillary, 5–7-flowered, glabrous; rachis 2–2.5 cm. Pedicels 10–13 cm by ¾–1 mm. Bracteoles basal. *Calyx* tube subsemiglobose, base ± rounded, 3 by 3 mm, limb ± spreading, 2 mm, 5-lobed nearly to the base, lobes broadly ovate-acuminate, apiculate. *Corolla* tubular, fleshy, 2–2.3 cm by *c.* 5 mm, lobes obtuse, *c.* 4 mm. *Stamens* 12 and 10 mm; *major stamens*: filaments ciliate in the upper ¼, *c.* 4 mm; cells elongate-oblong, base obtuse, 1 cm including the 2 mm long tubules; connective subdensely or more laxly hirsutulous, processes connate and ± as long as the tubules. *Disk* glabrous. *Style* glabrous, *c.* 2.4 cm, hardly exserted.

Distr. *Malesia*: SW. New Guinea (Wissel Lakes region). Twice found. *Fl.* Oct.—Nov.

24. Dimorphanthera cornuta J. J. S. Bull. Jard. Bot. Btzg II, 8 (1912) 54; Nova Guinea 12 (1914) 148, 150, t. 39 B; SLEUM. Bot. Jahrb. 70 (1939) 122; Nova Guinea, Bot. *n.* 7 (1961) 87; Blumea 12 (1963) 139.

var. **cornuta.**

Small or large scrambling shrub, or small tree. Branchlets slender, terete, subdensely hairy. *Leaves* lax, ovate or oblong-ovate (to ± oblong), apex shortly and rather abruptly acuminate, the very tip subacute or bluntish, base mostly ± subtruncate-rounded, rarely broadly attenuate, glands minute, thin-coriaceous, when juvenile with some spreading hairs at the lower part of the midrib and nerves beneath, later glabrous, very laxly punctate beneath, minutely subserrate-crenulate, (3.2–)4–7 by (1–)2–3 cm, 5 (or indistinctly 7)-plinerved from and from above the base, midrib and nerves ± sunken above, prominent beneath, reticulation ± obscure; petiole short-pubescent, (3–)4–7 by 1–1.5 mm. Perulate ovate-orbicular to oblong, obtuse, glabrous, ciliate, up to 1.6 by 1 cm. *Inflorescences* in axillary 3–5-flowered clusters. Pedicels rather stoutish, glabrous or with some sparse hairs distally, 5–6 mm. *Calyx* tube cylindric-obconical, base ± truncate, *c.* 3 mm, limb 1–1.5 mm, erect, minutely 5-dented. *Corolla* almost tubular, base ± contracted, thin, red or crimson, subdensely short-pubescent outside, (1.8–)2(–2.3) cm long, *c.* 4 mm ø below, 5–6 mm across the mouth, lobes 2.5 mm. *Stamens* 7 and 6 mm; *major stamens*: filaments glabrous, 1.5–2.5 mm; cells elongate-oblong, base subacute, slightly curved inward and whether or not provided with some short hairs there, 5–6 mm including the ± divergent, 1.5–1.8 mm long tubules; connective very laxly long-hairy below, processes slender, dark, much divergent and fixed ± behind the tubules, free only in the upper part, ± as long as the tubules, glabrous or muriculate. *Disk* glabrous. *Style* rather slender, glabrous, 2–2.2 cm, ± exserted in full anthesis.

Distr. *Malesia*: New Guinea (Mt Goliath, Lake Habbema and Bele R. areas, Hindenburg Ra., Western and Southern Highlands).

Ecol. In grassy, secondary growth forest along river, on moss covered rocks or margin of secondary scrub, usually solitary, common locally, 2200–3250 m. *Fl.* March—Nov.

Vern. *Poro*, Enga.

var. **tenuiflora** SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 87; Blumea 12 (1963) 139; *ibid.* 12 (1964) 344.

Branchlets glabrous. *Leaves* lanceolate or ovate-lanceolate. *Corolla* glabrous, deep red or crimson.

Distr. *Malesia*: East New Guinea (Western and Southern Highlands), (1585–)2300–3350 m.

Ecol. In undergrowth of open *Nothofagus* forest or forest edge. *Fl.* July—Oct.

Vern. *Kurink*, Enga, *weta*, Mendi.

25. Dimorphanthera torricellensis SCHLTR, Bot. Jahrb. 55 (1918) 190; SLEUM. *ibid.* 70 (1939) 119; Nova Guinea, Bot. *n.* 7 (1961) 87.

Epiphytic shrub. Branchlets subterete, glabrous. *Leaves* scattered, ovate- lanceolate, apex obtusely acuminate, base rounded, glands minute, thin-coriaceous, glabrous, very laxly glandular-punctate beneath, edge minutely dented or subentire, (10–)12–15 by (4–)5–6.5 cm, 5-plinerved from and from above the base, midrib and nerves slightly immersed above, prominent beneath, reticulation rather lax, faintly raised beneath; petiole 5–8 by 1.5 mm. *Inflorescences* short, 5–8-flowered racemes; rachis *c.* 1.5 cm. Pedicels 7–10 by *c.* 1 mm, glabrous or slightly pubescent. *Calyx* glabrous or laxly short-pubescent, tube narrowly cup-shaped, 3 mm, base subtruncate, limb erecto-patent, 2 mm, shallowly and obtusely 5-lobed halfway. *Corolla* cylindric, fleshy, greenish whitish, glabrous, 2.5 cm by 8 mm in dry, *c.* 3.7 cm by 8–9 mm in fresh specimens, lobes triangular, *c.* 5 mm. *Stamens* 9 and 7 mm (14 and 9 mm in fresh state); *major stamens*: filaments shortly hairy and ciliate in the upper part, *c.* 4 mm; cells oblong, base obtuse, 7(–8) mm including the ± divergent, 2.5 mm long tubules; processes fixed behind the tubules as a dark glabrous ribbon, free in their uppermost part and slightly surpassing the tubules. *Disk* glabrous. *Style* slender, glabrous, distinctly exserted at anthesis.

Distr. *Malesia*: East New Guinea (Torricelli Mts). One collection.

Ecol. In forest at *c.* 1000 m. *Fl.* Sept.

26. Dimorphanthera brachyantha SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 87; Blumea 12 (1963) 139.

Climbing shrub. Branchlets robust or more slender, obtusangular at the tips, quite glabrous. *Leaves* lax, lanceolate or lanceolate-oblong, apex shortly subacutely acuminate, base broadly cuneate (very base subtruncate, glands ± obscure), coriaceous or subcoriaceous, glabrous, laxly

glandular-muriculate or -punctate beneath, subentire, *i.e.* edge with ± regular, very short, caducous, setular glands, 5–12.5 by 2–3.5 cm, sometimes even smaller, 5–7-plinerved from and a little from above the base, midrib and nerves slightly impressed above, prominent beneath, veins ± transverse, forming a lax network with the veinlets, faintly raised beneath or rather obscure; petiole 8–13 by 1.5–2 mm, as the base of the midrib blackish when dry. *Fascicles* axillary, 10–15-flowered, sometimes few–1-flowered, glabrous, initially enclosed by chartaceous, ovate- to subspathulate-oblong perulae (1–1.5 by 0.5–1 cm). Pedicels ± robust, *c.* 1 cm. Bracteoles basal. *Calyx* tube cylindric, *c.* 2.5 mm, base truncate, limb erecto-patent, 2 mm, shortly 5-dented or -apiculate. *Corolla* subcylindric, ± dilated distally, rather fleshy, white or green, 1–1.3(–1.8) cm by 4–5 mm ø at base, 6–7 mm across the mouth, glabrous, lobes 2.5 mm. *Stamens* 9 and 7.5 mm; *major stamens*: filaments laxly long-ciliate distally, *c.* 3 mm; cells narrow-oblong, base shortly acute, 7–7.5 mm long including the much divergent *c.* 3 mm long tubules; connective glabrous below, processes divergent, fixed on the back of the tubules, glabrous or papillose-muriculate, free in their upper part only and ± as long. *Disk* glabrous. *Style* slender, glabrous, hardly exserted. Immature *fruit* subglobose, truncate at the apex, *c.* 8 mm ø.

Distr. *Malesia*: East New Guinea (Eastern and Western Highlands: Wabag Subdistr. and Okapa area).

Ecol. In rain-forest, high climbing liana or climbing over tree stumps, 1950–2285 m. *Fl.* July, Sept.

27. Dimorphanthera gracilis SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 89.

Epiphytic shrub, hanging from tree trunk. Branchlets slender, subterete, glabrous. *Leaves* lax, oblong-ovate, 1.5–2 cm subcaudate-acuminate at the apex, tip bluntish, rounded or more rarely broadly attenuate at the base, glands subinconspicuous, thin-coriaceous, glabrous, minutely denticulate or subentire, 7–11 by (2.5–)3–4.5 cm, 7-plinerved from and from somewhat above the base, midrib and nerves faintly immersed above, prominent beneath, reticulation lax and visibly raised beneath only; petiole terete, rugulose, *c.* 5 by 1.5 mm. *Fascicles* axillary, (1–)2–3-flowered; rachis ± absent. Pedicels glabrous, 8–12 by *c.* 1 mm. Bracteoles basal. *Calyx* glabrous, green (fresh), tube subcylindric-obconical in outline, broadly attenuate towards the very shortly truncate base, *c.* 5 mm, limb suberect, 2 mm, 5-lobed halfway, lobes ovate-acuminate, acute. *Corolla* cylindric, white, *c.* 1.3 cm by 3–4 mm, rather fleshy, very shortly subdensely hairy outside, lobes 2–3 mm. *Stamens* 9 and 7 mm; *major stamens*: filaments *c.* 4 mm, appressed-hirsutulous distally; cells oblong, base obtuse, *c.* 7 mm including the hardly divergent, 2 mm long tubules; processes hirsutulous, ± connate, surpassing the tubules by *c.* 1 mm. *Disk* glabrous. *Style* slender, glabrous, *c.* 5 mm exserted at full anthesis. *Fruit* subglobose, apex truncate and crowned by the constricted calyx limb, red when fully ripe, *c.* 8 mm ø (dry).

Distr. *Malesia*: East New Guinea (Central Highlands, near Goroka), at 2370 m. *Fl. fr.* Nov.

28. Dimorphanthera vestita SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 88.

Slender shrub, 1.5–2 m, or high climbing liana, also epiphytic. Branchlets densely patently yellowish hairy in the youngest parts, glabrescent. *Leaves* scattered, elliptic or oblong-elliptic, apex shortly (0.5–1 cm) acuminate, tip ± bluntish, base very broadly attenuate or rounded, basal glands indistinct, coriaceous, initially shortly subdensely or more laxly hairy on both faces, first glabrescent on the intervenium, remaining hairy on midrib and nerves for a long time beneath, laxly glandular-punctate beneath, 5-plinerved from and a little from above the base, (4–)5–8 (–10) by 2–4 cm, edge ± revolute and subdenticulate, midrib and nerves much impressed above, prominent beneath, reticulation obscure; petiole rather densely hairy, 4–7(–8) by 1.5–2 mm. *Fascicles* axillary, 4–6(–10)-flowered, ± densely and shortly yellowish tomentulose; rachis up to 5 mm. Pedicels rather robust, 10–17 mm, bracteolate in lower third. *Calyx* cup-shaped, tube semiglobose, *c.* 1.5 mm, limb spreading, 1 mm, 5-denticulate. *Corolla* subcylindric, red or pink, 1.5–1.7(–1.8) cm long, *c.* 4 mm ø at base and 5 mm across distally, lobes subdeltoid, obtuse, 2 mm. *Stamens* 7(–8) and 5–5.5 mm; *major stamens*: filaments *c.* 3 mm, densely appressedly yellowish hirsutulous distally; cells oblong, base acute, *c.* 5 mm including the ± divergent, *c.* 2 mm long tubules; processes hirsutulous, narrow, connate, but free at tip, ± as long as tubules. *Disk* yellowish tomentulose. *Style* slender, glabrous, 1.7–1.9 cm. Submature *fruit* subglobose, truncate at apex, disk thick and slightly surpassing the calyx limb.

Distr. *Malesia*: West New Guinea (Bernhard Camp, Idenburg R.).

Ecol. In rain-forest at 850 m, epiphytic on trees overhanging the river, or high climbing liana in oak forests at 1200 m, and as a slender shrub in the mossy forest in dense scrub on exposed summit at 2150 m. *Fl.* Febr.–March.

29. Dimorphanthera brevipes SCHLTR, Bot. Jahrb. 55 (1918) 187; SLEUM. *ibid.* 70 (1939) 119; Nova Guinea, Bot. *n.* 7 (1961) 88.

Epiphytic, much branched shrub. Branchlets glabrous. *Leaves* lax, elliptic-oblong, apex obtusely acuminate, base broadly attenuate, basal glands ± inconspicuous, subcoriaceous, glabrous, very laxly glandular-punctate beneath, edge shallowly remotely crenulate, sub-5–7-plinerved from and from up to 2 cm above the base, 10–19 by 4–7 cm, nerves and midrib ± impressed above, prominent beneath, reticulation lax, a little raised beneath only; petiole 7–10 by *c.* 1.5 mm. *Inflorescences* ± many-flowered abbreviate

racemes or clusters from defoliate axils. Pedicels rather stoutish, short-pubescent distally, 5–7 mm. *Calyx* tube cylindric, *c.* 2 mm, minutely pubescent, base subtruncate, limb erecto-patent, entire or hardly 5-denticulate or -apiculate, 1.5 mm. *Corolla* subtubular, *c.* 1.3 cm, subcampanulate-dilated and *c.* 8 mm across the lobes, rose red, or white with rose red stripes outside and light red inside, short-pubescent outside, lobes triangular, bluntish. *Stamens* 7.5–8 and 6.5 mm; *major stamens*: filaments 3 mm, densely subsericeous-hirsutulous distally as is the connective; cells narrow-oblong, 6 mm including the *c.* 2 mm long, ± divergent tubules, base acute and a little curved inward; processes ± connate, subdensely hirsutulous, slightly longer. *Disk* glabrous. *Style* slender, *c.* 2 cm, distinctly exserted.

Distr. *Malesia*: East New Guinea (Sepik Distr., April R. vicinity; base of the Central Ra.; Telefomin).

Ecol. In dense, also secondary mountain forest at *c.* 850–1520 m. *Fl.* Oct.

Note. In the remaining type material no open flowers were left.

30. Dimorphanthera crassifolia SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 89.

Shrub, scandent up to 5 m. Branchlets subtrigonous-compressed at the tips, glabrous. *Leaves* lax, oblong- or more rarely subovate-elliptic, apex shortly (0.5–1 cm) subabruptly acuminate, tip bluntish, base broadly attenuate into the petiole, sometimes almost rounded, basal glands ± indistinct, coriaceous, stiff, glabrous, entire or mostly minutely subserrate-crenulate, very laxly or not glandular-punctate beneath, 8–13 (–15) by 3–5(–8) cm, 7(–9)-plinerved from and from above the base, midrib and nerves ± impressed above, much prominent beneath, veins transverse, ± raised beneath only, veinlets laxly reticulate, rather obscure; petiole rugose, 8–13 by 2.5–4 mm. *Fascicles* from foliate and defoliate axils, 5–7-flowered, subdensely short-pubescent; rachis ± absent. Pedicels 10–13 by 1 mm. Bracteoles basal. *Calyx* green (fresh), broadly cylindric, tube *c.* 3 mm, base rounded-obtuse, limb ± spreading, 2 mm, broadly 5-lobed up to halfway, or merely -apiculate. *Corolla* cylindric, (1.2–) 1.3–1.4 cm by 5 mm, more densely hairy than calyx and pedicels or almost tomentulose, deep carmine, lobes erect, *c.* 3 mm. *Stamens* 7 and 5 mm; *major stamens*: filaments glabrous, 3 mm; cells oblong, base apiculate, 5–6 mm including the hardly divergent, 1.5 mm long tubules; connective laxly appressedly substrigose below, muriculate; processes ± connate, free but for their upper part, shorter than the tubules. *Disk* glabrous. *Style* thick-filiform, glabrous, *c.* 1.7 cm, ± exserted at full anthesis.

Distr. *Malesia*: New Guinea (Western Highlands: Nondugl at Al R.). One collection.

Ecol. Scandent in trees on river bank, at *c.* 2100 m. *Fl.* Sept.

31. Dimorphanthera nigropunctata SLEUM. Blumea 12 (1963) 139.

Pendent epiphytic shrub, 2–4 m. Branchlets obtusangular, glabrous. *Leaves* lax, elliptic-oblong, apex for *c.* 1 cm subabruptly acuminate, subacute, more rarely broadly acuminate-attenuate, coriaceous, glabrous, sparsely blackish punctate beneath, entire, 10–15(–20) by (3–)3.5–6(–7) cm, 7–9-plinerved from and from up to 3.5 cm above the base, midrib prominent in the lower, slightly impressed (as are the nerves) in the upper part above, much prominent beneath, nerves decurrent considerably along the midrib, veins and veinlets reticulate, rather obscure above, ± prominent beneath; petiole blackish, transversely rugose, (8–)10–12 by 2–3 mm. *Racemes* axillary, abbreviate, 5–8(–10)-flowered; rachis 5–10(–15) mm, glabrous. Bracteoles oblong-ovate, basal. Pedicels 7–10 by *c.* 1 mm, ± accrescent, laxly puberulous especially distally. *Calyx* green, cupular, more densely pubescent than the pedicels, tube *c.* 2.5 by 3–4 mm, limb expanded, 5-denticulate, *c.* 1 mm. *Corolla* tubular, fleshy, red, rather densely short-hairy, *c.* 1.5 by *c.* 0.5 cm, lobes 2 mm. *Stamens* 9–10 and 7–8 mm; *major stamens*: filaments 3 mm, hirsutulous distally as is the connective; cells rostrate at base, *c.* 8 mm including tubules; processes ± connate, ± shorter than the tubules. *Disk* glabrous. *Style* slender, *c.* 2 cm. Mature *fruit* subglobular, blackish purple, *c.* 9 mm ø.

Distr. *Malesia*: NW. New Guinea (Vogelkop Peninsula: Nettoti Ra.).

Ecol. In riverine and in mossy crest forest, 1550–1750 m. *Fl. fr.* Nov.-Dec.

Galls. The species sometimes bears big leafy galls replacing the inflorescences.

32. Dimorphanthera thibaudifolia SLEUM. Blumea 12 (1963) 140.

Terrestrial shrub, 2–3 m, much branched. Branchlets obtusangular, short-pubescent. *Leaves* dense, narrow-oblong, apex shortly acutely or mostly rather obtusely acuminate or attenuate, base cuneate, coriaceous, stiff, entire or obscurely crenulate, marginate, 4–7 by 1.2–1.5(–3) cm, glabrous, laxly glandular-blackish punctulate beneath, midrib and nerves not much distinct above, though prominent beneath, nerves 2 or 3 pairs from and from above the base, high curved-ascendent, several others more irregular, more patent and less conspicuous, reticulation ± obscure; petiole (5–)6–9 by 1 mm, pubescent. *Fascicles* (2–)3–4(–5)-flowered, from foliate and defoliate axils; rachis 0–5 mm. Pedicels and calyx subdensely short-pubescent, (1.5–)1.8–2(–2.5) cm by 1 mm. Bracteoles ovate-acuminate, 2 mm, inserted at 6–10 mm above base. *Calyx* subsemiglobose after anthesis, *c.* 4 by 4 mm, limb erecto-patent, 5-dentate almost to base, 2 mm. *Corolla* tubular, probably red, 1.8 cm (found dry on the fruit), *c.* 5 mm ø, densely short-hairy outside, with lax, rather long hairs inside, lobes 2 mm. *Stamens* 9 and 7 mm; *major stamens*: filaments except the very base subdensely hairy as is the connective, *c.* 3 mm; cells hairy along the midline in front, 7 mm; processes at the back of tubules, subdensely

clad with rather long hairs, ± shorter than the tubules. *Disk* subdensely and ± appressedly hairy. *Style* slender, glabrous, *c.* 2.3 cm. Immature *fruit* subglobose, contracted at the limb.

Distr. *Malesia*: New Guinea (Arfak Mts: Mt Gwamongga).

Ecol. In ± open, low *Nothofagus* forest edge at 2200 m. *Fl. fr.* Jan.

33. Dimorphanthera robbinsii SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 90; Blumea 12 (1963) 140; *ibid.* 12 (1964) 344.

Scandent or scrambling shrub, ascending to 20 m, with long trailing branches, or epiphytic. Branchlets angular, slender, glabrous. *Leaves* lax, elliptic-oblong, apex for *c.* 1 cm subacutely acuminate, base broadly attenuate, basal glands ± distinct, subcoriaceous, glabrous, laxly appressedly glandular-muriculate or -punctate beneath, regularly subserrate-crenulate, the crenation 2–3 mm spaced, *c.* 0.3 mm long, 6.5–9.5 by 2.5–3.5 cm, 5–7-plinerved from and from a little above the base, midrib and nerves slightly impressed above, prominent beneath, reticulation lax, ± faintly raised especially beneath; petiole (6–)7–9 by 1–1.5 mm. *Fascicles* from foliate and defoliate axils, (3–)4–7(–9)-flowered, subdensely and shortly pubescent at pedicels and calyces, slightly longer and more densely so at the corolla; rachis ± absent. Perulae pubescent dorsally, up to 5 by 3 mm, early caducous. Pedicels stout, gradually thickened distally, 10–13 mm, in *fr.* 15 mm. *Calyx* tube cylindric, *c.* 3 by 3 mm, green, base obtuse or subtruncate, limb erecto-patent, 2.5–3 mm, 5-lobed almost halfway, lobes depressed-ovate and apiculate. *Corolla* subcylindric, 1.8–2 cm long, 4–5 mm ø at base, 6–8 mm across the mouth, very dark, blackish red, whitish at the lobes, rarely paler, densely red-hairy on the tube, white-hairy at the lobes outside, lobes obtuse, *c.* 4 mm. *Stamens* 8 and 6.5 mm; *major stamens*: filaments densely shortly substrigose distally as is the connective, *c.* 3 mm; cells narrow-oblong, *c.* 7 mm including the tubules, hairy in front between cells and at acute base; tubules *c.* 2 mm, ± divergent; processes free, ± equalling the tubules. *Disk* laxly very shortly hairy at the inner margin. *Style* slender, glabrous, 2–2.5 cm, much exserted at anthesis. *Fruit* subglobose, truncate, with a calycine rim of 5 short teeth, laxly pubescent, 7–8 mm ø (dry).

Distr. *Malesia*: East New Guinea (Eastern Highlands).

Ecol. In mossy forest, 2315–3300 m, maybe on limestone ridges. *Fl.* Jan.-Nov.

Vern. *Darkai, dekoba*, Chimbu.

34. Dimorphanthera clemensiae SLEUM. Bot. Jahrb. 70 (1939) 123; Nova Guinea, Bot. *n.* 7 (1961) 91; Blumea 12 (1964) 345. — **Fig. 124.**

Large, subscandent shrub, up to 6 m, or climbing vine with woody stem *c.* 2.5 cm ø. Branchlets angular at the tips, glabrous. *Leaves* scattered, oblong, sometimes subovate-oblong, apex rather shortly acuminate, subacute, base broadly attenuate to ± rounded, basal glands minute, but mostly well discernible, ± coriaceous, glabrous at maturity, laxly to subdensely glandular-punctate beneath, entire, 14–21 by (4–)5–7.5(–9) cm, 5–7-plinerved from and from somewhat above the base, nerves and midrib mostly ± deeply immersed above, much prominent beneath, reticulation subdense, generally raised beneath only; petiole rugose, 10–15 by 2–3 mm. *Racemes* abbreviate, 5–8(–12)-flowered, from lower, mostly defoliate axils or old wood, densely shortly whitish greyish pubescent; rachis 5–15 mm. Pedicels (8–)10–15 by 1.5(–2) mm. Bracteoles basal. *Calyx* tube semiglobose, 3–4 mm, limb spreading, 2 mm, shortly obtusely 5-denticulate. *Corolla* tubular or ± dilated distally, fleshy, dark rose pink to deep red or bright crimson, (3–)3.5 (–4.5) cm by 7–8(–10) mm, lobes 3–4 mm. *Stamens* (20–)23(–25) and 17–19 mm; *major stamens*: filaments *c.* 7 mm, densely ± appressedly fulvous-hairy in the upper part; cells elongate, base subacute, 16–18(–20) mm including the ± divergent, 2.5–3(–4) mm long tubules; processes densely substrigose, ± connate, ± as long as the tubules. *Disk* tomentellous. *Style* robust, glabrous, ± exserted. *Fruit* globose, apex truncate and hairy, *c.* 1 cm ø, finally purplish.

Distr. *Malesia*: E. New Guinea (W. and E. Highlands Hindenburg Ra. and Mt Saruwaged area).

Ecol. In tall fern grassland along creek, in shrubby (re)growth of a landslip in *Nothofagus* forest, 1675–2700(–3000?) m. *Fl.* May–Sept.

Vern. *Biguni*, Asaro: Kefamo, Miruma, *dehgumba*, Chimbu: Masul, *keildagan*, Waghi: Minj, *borregugu*, Hagen: Togoba, *ansami*, Wain.

35. Dimorphanthera anchorifera J. J. S. Nova Guinea 12 (1914) 151, t. 40; SLEUM. Bot. Jahrb. 70 (1939) 118; Nova Guinea, Bot. *n.* 7 (1961) 91; Blumea 12 (1963) 140.

Scandent epiphytic shrub, up to 4 m. Branchlets robust, glabrous, tips obtusangular, lower parts terete. *Leaves* scattered, oblong or subovate-oblong, apex shortly and abruptly or more gradually acuminate, base attenuate to rounded, basal glands ± conspicuous, coriaceous, glabrous, laxly glandular-punctate beneath, entire, 7(–9)-plinerved from and from above the base, midrib and nerves shallowly impressed above, prominent beneath, reticulation conspicuous, rather densely raised on both faces, 12–22 by (4–)4.5–7.5(–10) cm; petiole (7–)10–14 by 2–3 mm. Abbreviate *racemes* or clusters from the foliate or defoliate axils or from old wood; rachis robust, 10–15(–25) mm, glabrous or sometimes short-pubescent. Pedicels robust, glabrous or short-pubescent, 12–15 mm. Bracteoles basal. *Calyx* green, cup-shaped, laxly hairy, tube semiorbicular, 5 mm (7–8 mm fresh), limb low, spreading, hardly 2 mm, obtusely 5-lobed halfway. *Corolla* cylindric, pink to deep scarlet, ± densely yellowish or whitish pubescent, 2.5–3 by 0.5–0.6 cm (3.4–4 cm by 9 mm fresh), lobes paler, erect, obtusely deltoid, 1–2 mm. *Stamens* (15–)16–18 and 12–13 mm; *major stamens*: filaments white, linear, appressed-hairy

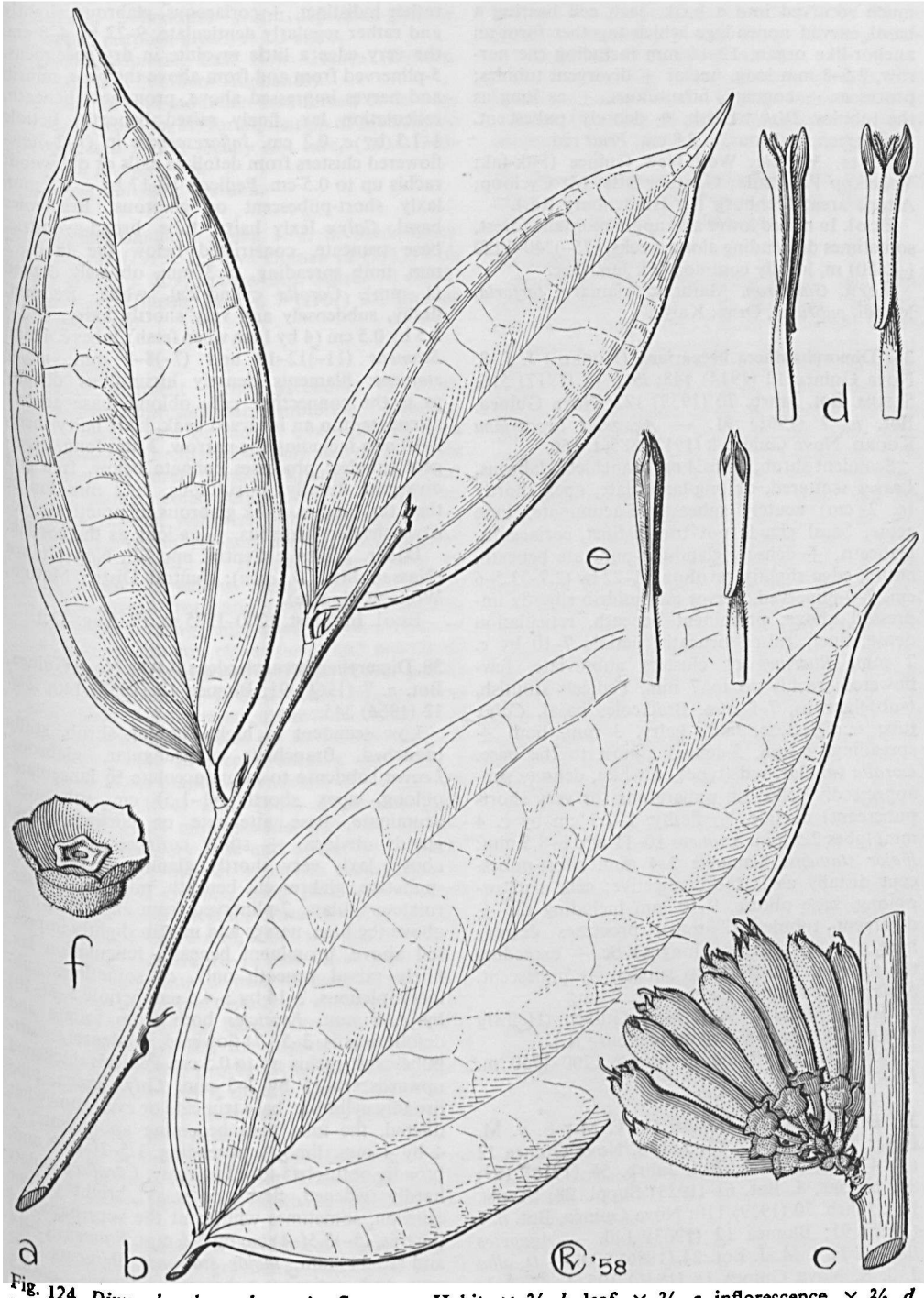

Fig. 124. *Dimorphanthera clemensiae* SLEUM. *a.* Habit, × ⅔, *b.* leaf, × ⅔, *c.* inflorescence, × ⅔, *d.* major stamens, back and front view, × 2, *e.* minor stamens, back and front view, × 2, *f.* calyx and disk, × 2 (*a–f* HOOGLAND & PULLEN 5380).

distally, 4(–5) mm; cells narrow-oblong, base much recurved into a beak, each cell bearing a basal curved appendage which together form an anchor-like organ, 12–14 mm including the narrow, 2.5–3 mm long, not or ± divergent tubules; processes ± connate, hirsutulous, ± as long as the tubules. *Disk* whitish, ± densely pubescent. *Style* green, glabrous, *c.* 2.8 cm. *Fruit* red.

Distr. *Malesia*: West New Guinea (Fak-fak; Vogelkop Peninsula; Gauttier Mts; Mt Cycloop; Aitape area; Idenburg R.; Hindenburg Ra.).

Ecol. In mixed lower and upper montane forest, sometimes descending along creeks, (75–)240–1220 (–2450) m, locally common. *Fl.* Jan.-Dec.

Vern. *Gabebron*, Maibrat: Ajamaru, *forforia*, Mendi, *pubrume*, Orne: Kaiye.

36. Dimorphanthera beccariana (KOORD.) J. J. S. Nova Guinea 12 (1914) 148; *ibid.* 12 (1917) 516; SLEUM. Bot. Jahrb. 70 (1939) 122; Nova Guinea, Bot. *n.* 7 (1961) 91. — *Agapetes beccariana* KOORD. Nova Guinea 8 (1912) 885, t. 156.

Scandent shrub, up to 4 m. Branchlets glabrous. *Leaves* scattered, oblong-lanceolate, apex shortly (*c.* 2 cm) acutely subcaudate-acuminate, base acute, basal glands not too distinct, coriaceous, glabrous, ± densely glandular-punctate beneath, entire, edge slightly revolute, 11–22 by (2.7–)3.5–6 cm, 7–9-plinerved, nerves and midrib slightly impressed above, prominent beneath, reticulation dense, finely raised beneath; petiole 7–10 by *c.* 2 mm. *Racemes* or clusters abbreviate, few-flowered; rachis up to 7 mm. Pedicels stoutish, (sub)glabrous, 7–9 mm. Bracteoles basal. *Calyx* tube semiglobose, laxly hairy, 3 mm, limb ± spreading, 2 mm, 5-dented almost to the base. *Corolla* tubular, red (type) or white, densely subappressedly yellowish puberulous (or very short-pubescent) outside, ± fleshy, 2–2.3 cm by *c.* 4 mm, lobes 2.5 mm. *Stamens* 10–11 and 8–8.5 mm; *major stamens*: filaments 3–4 mm, short-pubescent distally as is the connective; cells narrow-oblong, base obtuse, 9–10 mm including the ± divergent tubules (2 mm); processes densely hairy, ± divergent, as long as or ± exceeding the tubules. *Disk* laxly to subdensely pubescent. *Style* rather slender, glabrous, *c.* 2 cm.

Distr. *Malesia*: West New Guinea (Hellwig Mts and Bernhard Camp on Idenburg R.).

Ecol. Canopy liana in forest, 1200–1750 m. *Fl.* Nov.–Febr.

37. Dimorphanthera forbesii (F. v. M.) F. v. M. Descr. Not. 9 (1890) 63; J. J. S. Nova Guinea 12 (1914) 148; SCHLTR, Bot. Jahrb. 55 (1918) 189; SP. MOORE, J. Bot. 61 (1923) Suppl. 28; SLEUM. Bot. Jahrb. 70 (1939) 118; Nova Guinea, Bot. *n.* 7 (1961) 91; Blumea 12 (1963) 140. — *Agapetes forbesii* F. v. M. J. Bot. 24 (1886) 290. — *D. alba* J. J. S. Nova Guinea 18 (1936) 105, t. 24, f. 1; SLEUM. Bot. Jahrb. 70 (1939) 118.

Large epiphyte, sending roots down to the ground. Branchlets robust, somewhat angular, glabrous. *Leaves* scattered, ovate- to oblong-lanceolate, apex short-acuminate, subacute, base broadly attenuate to rounded, the 2 basal glands rather indistinct, ± coriaceous, glabrous, slightly and rather regularly denticulate, 9–22 by 4–8 cm, the very edge a little revolute in dry specimens, 5-plinerved from and from above the base, midrib and nerves impressed above, prominent beneath, reticulation lax, finely raised beneath; petiole 1–1.3 by *c.* 0.2 cm. *Inflorescences* in (1–2–)few-flowered clusters from defoliate axils or old wood; rachis up to 0.5 cm. Pedicels 10–17 by *c.* 1.5 mm, laxly short-pubescent or glabrous. Bracteoles basal. *Calyx* laxly hairy, tube broad-cylindric, base truncate, constricted below the limb, 2 mm, limb spreading, *c.* 3 mm, obtusely dented (1 mm). *Corolla* cylindrical, white, fragrant, fleshy, subdensely and very shortly hairy, (2.2–)2.5 by 0.5 cm (4 by 1 cm when fresh), lobes *c.* 4 mm. *Stamens* (11–)12–13 and (7–)8–9 mm; *major stamens*: filaments densely hirsutulous distally as is the connective; cells oblong, base acutely attenuate into an incurved beak, laxly hairy there, 9–10 mm including the narrow, 3 mm long, divergent tubules; processes connate below, free and divergent distally, hirsutulous, *c.* 2 mm longer than the tubules. *Disk* glabrous or practically so. *Style* slender, glabrous, ± as long as the corolla.

Distr. *Malesia*: Central and SE. New Guinea (Nassau Mts (*D. alba*); Central Distr.: Mafulu, Woitape, Sogere).

Ecol. In forest, 1200–1525 m. *Fl.* Aug.–Oct.

38. Dimorphanthera splendens SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 91; Blumea 12 (1963) 140; *ibid.* 12 (1964) 345.

Low scandent to high climbing shrub, stiffly branched. Branchlets obtusangular, glabrous. *Leaves* subdense to lax, lanceolate to lanceolate-oblong, apex shortly (1–1.5) cm subacutely acuminate, base attenuate or cuneate, basal glands obvious, ± stiffly coriaceous, glabrous above, laxly very shortly glandular-setulose or -punctate, glabrescent beneath, minutely subserrulate-crenulate, 7-plinerved from and from high above the base, nerves and midrib slightly impressed above, prominent beneath, reticulation lax, finely raised beneath only, or sometimes subinconspicuous, 7–14 by 2–4.5 cm; petiole 5–8(–10) by *c.* 2 mm. *Fascicles* both from foliate and defoliate axils, 3–5(–7)-flowered, subdensely short-pubescent; rachis up to 0.5 cm. Pedicels thickened upwards, 10–15 by 2–3 mm. *Calyx* green, tube broadly cylindric, base truncate or even somewhat dilated, the tube than becoming apophysate, *c.* 4 by 4 mm, limb ± spreading, 1.5–2(–2.5) mm, broadly obtusely 5-lobed halfway. *Corolla* tubular, hardly widened, fleshy or waxy, bright red or crimson, sometimes whitish at the very base and the tips, (3–)3.5(–4) cm by 5–6 mm. *Stamens* 13–14 and 10–11 mm; *major stamens*: filaments narrow and sericeous-pubescent upwards, *c.* 4.5 mm; cells narrow-oblong, connective hairy in front, base thickened and very shortly curved inward, 1.1–1.2 cm including the slightly divergent, 4 mm long tubules; processes ± connate, densely appressedly hirsutulous, ± equally long. *Disk*

glabrous. *Style* glabrous, thick-filiform, *c.* 5 mm exserted. Submature *fruit* depressed-globose, truncate, purplish green, *c.* 1.3 cm ø.

Distr. *Malesia*: East New Guinea (Eastern, Western and Southern Highlands).

Ecol. In mid-mountain rain-forest, or in edge of open (*Nothofagus*) forest, margin of *Metroxylon* swamp and forest, locally not rare, (760–)1740–2150 m. *Fl.* Jan.–Oct.

Vern. *Yalupubi*, Kutubu.

39. Dimorphanthera alpina J. J. S. Med. Rijksherb. *n.* 25 (1915) 7; Nova Guinea 12 (1917) 516; *ibid.* (1918) t. 209; SLEUM. Bot. Jahrb. 70 (1939) 121; Nova Guinea, Bot. *n.* 7 (1961) 92; Blumea 12 (1963) 140.

var. **alpina.**

Large scandent shrub, ascending to 7 m. Branchlets obtusangular, subterete, glabrous. *Leaves* lax, ovate or mostly ovate-elliptic, apex very shortly (1 cm) subacutely acuminate, base rounded, or rarely broadly attenuate or acute, basal glands conspicuous, firmly coriaceous, glabrous above, yellowish pubescent beneath on lower part of midrib and nerves, laxly blackish punctate beneath, ± regularly denticulate by minute blackish callous teeth, 5–15 by 2–8 cm, 5(–7)-plinerved from and from above the base, midrib and nerves ± immersed above, prominent beneath, reticulation rather dense and prominent beneath, much less so or obscure above; petiole densely pubescent, 5–10 by 2–3 mm. *Inflorescences* in axillary 4–7-flowered abbreviate racemes or clusters, glabrous; rachis up to 1.5 cm. Pedicels 9–14 by 2 mm. Bracteoles basal. *Calyx* tube ± cylindric, base markedly truncate, *c.* 5 by 6 mm, limb erect, 3(–4) mm, lobes ovate-acuminate, apiculate, 2(–3) mm. *Corolla* cylindric, ± contracted at the very base and dilated towards the mouth, fleshy, densely yellowish hirsutulous or -subvelutinous outside, deep pink with whitish lobes, or white to cream, suffused with red distally, 4(–4.5) cm by 8–10 mm, lobes triangular, obtuse, 4(–5) mm. *Stamens* 16–17 and 13–14 mm; *major stamens*: filaments 3 mm, densely appressedly pubescent and ciliate distally as is the connective; cells narrow-oblong, base acute and protracted, 13–14 mm including the slightly divergent, 2.5 mm long tubules; processes hirsutulous, ± connate below, divergent distally and ± as long as the tubules. *Disk* glabrous. *Style* glabrous, ± stoutish, 3–5 mm exserted.

Distr. *Malesia*: New Guinea (Oranje Mts: top of Mt Kajan; Western Highlands: from the N. slopes of Mt Sugarloaf; Southern Highlands, Mt Giluwe).

Ecol. In edge of *Nothofagus* forest, alpine shrubberies and in grassland, 2600–3200 m. *Fl.* Febr.–Aug.

Vern. *Kangip*, Enga, *waita*, Mendi.

var. **pubigera** SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 92.

Branchlets and undersurface of the leaves densely softly hairy initially, pedicels, calyces and bracteoles more laxly so. *Corolla c.* 3 by 0.6 cm. *Stamens* alternately 14 and 12 mm. *Fruit* globose, *c.* 1 cm ø, red, sweet and palatable.

Distr. *Malesia*: New Guinea (Oranje Mts: Habbema Lake; Western Highlands: near Sirunke.

Ecol. Climbing on trees edging forest openings, common, 2800–3225 m. *Fl.* Oct., *fr.* Aug.

40. Dimorphanthera denticulifera SLEUM. Bot. Jahrb. 70 (1939) 120; Nova Guinea, Bot. *n.* 7 (1961) 92; Blumea 12 (1963) 141.

var. **denticulifera.**

Shrub of weak, spreading habit, not rarely (sub)scandent, up to 5 m, glabrous. Branchlets red brown, subterete. *Leaves* scattered, oblong, sometimes subovate-oblong, apex shortly (1–1.5 cm) subacutely acuminate, base broadly attenuate, rarely rounded, basal glands distinct, subcoriaceous or coriaceous, sparsely blackish punctate beneath, 7–20 by 2.5–5.5 cm, regularly subserrate-denticulate or -crenulate by minute, ± callose, caducous, ± blackish, 2–4 mm spaced glandular teeth, 5(–7)-plinerved from and from above the base, midrib and nerves ± plain above, prominent beneath, reticulation lax, distinct beneath only; petiole 6–8(–12) by 2–1.5 mm, blackish. *Fascicles* axillary, 3–10-flowered; rachis rarely up to 1 cm. Pedicels rather stout, *c.* 10 mm. Bracteoles basal. *Calyx* green, tube subcylindric, base ± truncate, 3–4 mm, limb erect, 2–1.5 mm, broadly subacutely 5-lobed. *Corolla* tubular, 1.8–2(–2.2) cm by 4 mm, thin-fleshy, from crimson in various shades to pure white, lobes *c.* 2.5 mm. *Stamens* (8–)10(–11) and *c.* 7 mm; *major stamens*: filaments 4 mm, hirsutulous distally as is the connective; cells oblong, base obtuse, (6–)7–8(–9) mm including the 2 mm long slightly divergent tubules; processes behind or between the tubules, surpassing or equalling them. *Disk* glabrous. *Style* slender, glabrous, 2.3–2.7 cm, much exserted. *Fruit* subglobose, soft, blackish blue, *c.* 1.2 by 1 cm.

Distr. *Malesia*: East New Guinea (Western Highlands to Morobe Distr.).

Ecol. Undergrowth of mossy *Castanopsis* or *Nothofagus* ridge forest, occasionally in low second grow or on sides of cuttings along high-road, in shrubberies on debris of an old landslip, locally plentiful, 1700–2600 m. *Fl.* April–Sept.; *fr.* July–Sept.

Vern. *Poror*, Enga, *walain*, Mendi.

var. **pubens** SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 92; Blumea 12 (1963) 141.

Corolla subdensely pubescent especially towards the apex.

Distr. *Malesia*: New Guinea (Eastern Highlands: Mt Wilhelm, Mt Michael and Mt Otto; Morobe Distr.: Wau-Edie creek area), locally common in young forest secondary growth, 1830–3290 m. *Fl.* July-Sept.

41. Dimorphanthera leucostoma SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 92; Blumea 12 (1963) 141.

Subscandent shrub, 2–5 m. Branchlets slender, glabrous or sometimes pubescent on one side. *Leaves* ± dense, oblong or oblong-elliptic, apex shortly subacutely acuminate, base broadly attenuate, glands ± conspicuous, ciliate in the young shoots, glabrous and ± coriaceous at maturity, regularly, minutely subserrulate-crenulate, 2.5–3.5 by 1–1.5(–1.7) cm, 5-plinerved from and a little from above the base, some other less distinct nerves higher up, nerves and midrib ± faintly impressed above, subinconspicuous beneath, reticulation none; petiole initially pubescent, early glabrescent, 3–5 by *c.* 1 mm. *Flowers* 1–3 per fascicle in the upper axils. Pedicels robust, laxly hairy at least below the calyx, 1–1.3 (–1.5) cm at anthesis. Bracteoles basal. *Calyx* green, tube subcylindric, base subtruncate, laxly very shortly pubescent below and glabrescent distally, or glabrous, *c.* 3 by 4 mm, limb widened, suberect, 4–5 mm, 5-lobed halfway, lobes ovate, subacute. *Corolla* tubular, ± dilated distally, glabrous, rather fleshy, red or orange at the tube, white or cream at the lobes, 2.8–3 cm by *c.* 5 mm, lobes deltoid, obtuse, 3 mm. *Stamens* 13–14 and 11–12.5 mm; *major stamens*: filaments towards apex subdensely long-hairy, 3.5 mm; cells narrow-oblong, apiculate and curved inward at the very base, 11 mm including the hardly divergent, 2 mm long tubules; processes appressedly long-hirsutulous, ± divergent, usually ± half as long, rarely as long as the tubules, sometimes very short and represented by long ± appressed hairs at the lower part of the back of and between the tubules. *Disk* glabrous. *Style* slender, glabrous, *c.* 5 mm exserted. *Fruit* subglobose, black, 8–10 mm ø.

Distr. *Malesia*: New Guinea (Eastern Highlands: Mt Wilhelm, near the lakes), 3350–3650 m, in alpine shrubbery or remains of *Podocarpus* forest. *Fl. fr.* July–Sept.

42. Dimorphanthera meliphagidum (BECC.) F. v.M. in Wing's South. Sc. Rec. n.s. 2 (1886), repr. Bot. Centralbl. 26 (1886) 164; WARB. Bot. Jahrb. 18 (1893) 204 ('*meliphagidium*'); K. SCH. & LAUT. Nachtr. (1905) 338; J. J. S. Nova Guinea 12 (1914) 148; SLEUM. Bot. Jahrb. 70 (1939) 121; Nova Guinea, Bot. *n.* 7 (1961) 93. — *Agapetes meliphagidum* BECC. Malesia 1 (1878) 208.

Epiphytic glabrous shrub. Branchlets rather slender. *Leaves* lax, ovate- to lanceolate-elliptic, apex shorter or longer subcaudate-acuminate, tip bluntish, base broadly attenuate, basal glands inconspicuous, subcoriaceous to coriaceous, laxly set with blackish glandular muriculate hairs or points beneath, remotely minutely subserrate-crenulate or ± entire, 8–14 by 3–5.5 cm, 5(–sub–7) plinerved from and from *c.* 1.5 cm above the base, midrib and nerves faintly impressed above, prominent beneath, reticulation subdense, not much raised beneath, even less so above; petiole 8–10 by *c.* 1.5 mm. *Flowers* in 5–7-flowered abbreviate racemes or fascicles from foliate and defoliate axils; rachis up to 1 cm. Pedicels 10–15 by 1 mm. Bracteoles basal. *Calyx* tube subcampanulate-obconical, truncate, 4 mm, limb ± spreading, 2 mm, 5-lobed almost halfway, lobes depressed-ovate, apiculate. *Corolla* tubular, fleshy, 2.5–2.8 cm by 5 mm (4 by 1 cm fresh), wine-red, lobes erect, obtusely triangular, *c.* 3 mm. *Stamens* 13–14 and 11–12 mm; *major stamens*: filaments short-hairy distally as is the connective in its lower part, 5 mm; cells narrow-oblong, base acute with a dorsal anchor-like appendage, 10–11 cm including the ± divergent tubules; processes close long-hairy or subhirsute, ± as long as the tubules. *Disk* glabrous. *Style* slender, glabrous, *c.* 3.2 cm.

Distr. *Malesia*: NW. New Guinea (Vogelkop Peninsula: Mt Morait near Sorong), One collection. *Fl.* Febr.

43. Dimorphanthera doctersii J. J. S. Nova Guinea 18 (1936) 104, t. 23, f. 2; SLEUM. Bot. Jahrb. 70 (1939) 119; Nova Guinea, Bot. *n.* 7 (1961) 93; Blumea 12 (1963) 141.

Epiphytic shrub, *c.* 2 m. Branchlets robust to slender, angular, glabrous. *Leaves* lax, oblong or subovate-oblong, apex subabruptly and shortly (*c.* 2 cm) acuminate (very tip bluntish), base broadly attenuate to rounded, basal glands ± indistinct, ± stiff by coriaceous, glabrous, sparingly glandular-punctate beneath, 14–20 by 5–8 cm, entire, 7(–9)-plinerved from and from (high) above the base, midrib and nerves slightly sunken above, prominent beneath, reticulation rather dense, finely raised beneath, less so above; petiole rugose, 10–12 by *c.* 2.5 mm. *Racemes* abbreviate, few-flowered, from foliate and defoliate axils, glabrous; rachis robust, 1–1.5(–2) cm. Pedicels stout, 8–10 by *c.* 2 mm. Bracteoles basal. *Calyx* green, tube cup-shaped, base ± rounded to subtruncate, 4–5 by 4(–5) mm, limb low, *c.* 2 mm, broadly 5-lobed halfway. *Corolla* cylindric, ± contracted at base, 2.5(–3) cm by *c.* 5 mm, bright to dark red, fleshy, lobes obtusely triangular, *c.* 2.5 mm. *Stamens* 13–14(–16) and 11–12(–14) mm; *major stamens*: filaments densely shortly appressedly hairy and ciliate distally as is the connective in its lowest part; cells narrow-oblong, base subacute and curved inward, 11–12 mm including the ± divergent, *c.* 2.5 mm long tubules; connective sparsely short-hairy or almost glabrous, laxly to subdensely long-hairy at the processes, these near together, between or partly behind the ± equally long tubules. *Disk* very shortly hairy or puberulous, or glabrous. *Style* rather robust, glabrous, ± exserted. *Fruit* subglobose, purplish blackish, *c.* 1 cm ø.

Distr. *Malesia*: West New Guinea (Rouffaer R. at 175 m; a slightly different form in the Kebar valley, Vogelkop Peninsula, at 1060–1800 m).

Ecol. In edge of forest or ravine. *Fl. fr.* March, Sept., Nov.

44. Dimorphanthera womersleyi SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 93; Blumea 12 (1964) 345.

Shrub with long trailing branches or small tree, rarely scandent vine. Branchlets obtusangular, glabrous. *Leaves* scattered or narrow-oblong, apex shortly gradually acuminate, subacute, base cuneate, basal glands small but well discernible,

coriaceous, glabrous, very laxly or not glandular-punctate beneath, 10–20 by (2–)2.5–5 cm, minutely and remotely denticulate or subcrenulate, 5(–7)-plinerved from and from 2–3 cm above the base, midrib and nerves faintly impressed above, prominent beneath, reticulation lax, raised beneath only; petiole 6–8 by *c.* 2 mm. *Racemes* abbreviate, axillary or often from the stem, 5–6(–15)-flowered, glabrous; rachis thick, *c.* 1 cm. Pedicels 15–20 by 1–1.5 mm. Bracteoles ± connate at the base, ciliate, subbasal. *Calyx* cupshaped, tube semiglobose, base rounded, *c.* 3 mm, articulation with the pedicel indistinct, limb ± spreading, 2 mm, wavy, very shortly 5-lobed or -denticulate. *Corolla* subcylindric, ± dilated distally, fleshy, white or creamy white, 1.8–2 cm by 4–5 mm ø at base, 6–7 mm across the mouth (1.8–2.2 cm, 7 mm and 10–13 mm fresh), lobes deltoid, *c.* 3 mm. *Stamens* 8–9(–10) and 6.5–7(–8) mm; *major stamens*: filaments densely fulvous-substrigose distally as are the connective and its processes, *c.* 4 mm; cells narrow-oblong, base apiculate, 7(–8) mm including the ± divergent, 2 mm long tubules; processes very close or ± connate, at least 0.5 mm longer. *Disk* glabrous. *Style* rather slender, glabrous, (2–)2.2(–2.7) cm.

Distr. *Malesia*: East New Guinea, typically only known from the Western Highlands; a form with slightly larger flowers is known from Gurakor, Lae-Wau road, at 450 m.

Ecol. In depleted primary forest or on eroded clay ridges with *Gleichenia*, 1585–2100 m. *Fl. fr.* Jan.–Aug.

Vern. *Garěm, koikgaggem*, Hagen: Chimbu.

45. Dimorphanthera longifolia KANEH. & HATUS. Bot. Mag. Tokyo 56 (1942) 476, f. 4; SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 94.

Scandent shrub, laxly branched, up to 5 m. Branchlets subterete, glabrous. *Leaves* (narrow-) oblong to oblong-lanceolate, apex subcaudate-acuminate (3–4 cm), acute, base broadly acutely attenuate, basal glands ± indistinct, coriaceous, glabrous, very laxly glandular-punctate beneath, 20–30 by 4–6(–8) cm, entire or very remotely subcallose-denticulate or -crenulate, 5(–7)-plinerved from and from above the base, midrib and nerves faintly impressed above, prominent beneath, reticulation lax, slightly raised beneath only; petiole 5–10 by 2 mm. *Fascicles c.* 2-flowered, from defoliate axils. Pedicels robust, glabrous, *c.* 10 mm. Bracteoles basal, laxly pubescent. *Calyx* green, widely cup-shaped, laxly short-hairy, tube obconical, very base ± truncate, 3–4 mm, limb spreading, 2 mm, but very shallowly 5-lobed. *Corolla* cylindrical, fleshy or waxy white, 2.8–3.2 cm by *c.* 5 mm, papillose-puberulous, sometimes with some hairs at the deltoid, subacute lobes, *c.* 4 mm. *Stamens* 13–14 and 10–12 mm; *major stamens*: filaments 4–5 mm, appressedly fulvous-hirsutulous in the upper third as is the whole connective; cells elongate-oblong, base apiculate, *c.* 9 mm including the ± divergent, 2.5 mm long tubules; processes ± connate, up to 2 mm longer. *Disk* glabrous. *Style* white, slender, glabrous, *c.* 4 mm exserted.

Distr. *Malesia*: West New Guinea (Geelvink Bay: Nabire). One collection.

Ecol. In edge of rain-forest, *c.* 400 m. *Fl.* March.

46. Dimorphanthera ovatifolia SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 94.

Slender shrub, up to 3 m, with pendent branches. Branchlets subterete, glabrous. *Leaves* lax, ovate, shortly (0.5–1 cm) acuminate towards the obtuse apex, base rounded to subcordate, basal glands indistinct, coriaceous, glabrous, laxly glandular-punctate beneath, entire, 7-plinerved from and from somewhat above the base, 5–9 by 3–5.5 cm, midrib and nerves flat above, slightly prominent beneath, reticulation ± dense and minutely raised beneath only; petiole glabrous, 5–8 by 1.5–2.5 mm. *Fascicles* 3–5-flowered, axillary, glabrous; rachis almost 0. Pedicels *c.* 15 by 1.5 mm. Bracteoles subbasal. *Calyx* tube obconical, 4–5 mm, base subtruncate and 2.5 mm, apex *c.* 5 mm ø, limb spreading, wavy and obscurely obtusely 5-lobed. *Corolla* tubular, rather fleshy, light red, *c.* 3 cm by 7 mm, lobes reflexed, *c.* 5 mm. *Stamens* 12 and 10 mm; *major stamens*: filaments subdensely hirsutulous distally, *c.* 6 mm; cells narrow-oblong, base acute and curved inward, 8 mm including the divergent, *c.* 2.5 mm long tubules; processes much divergent, slightly shorter than the tubules, free only in their upper part and more laxly hirsutulous there. *Disk* glabrous or sparsely hairy. *Style* slender, glabrous, as long as the corolla.

Distr. *Malesia*: NW. New Guinea (Waigeu I., slope of Mt Nok, E. side of Majalibit Bay), in shrubby vegetation at *c.* 820 m. One collection. *Fl.* Jan.

47. Dimorphanthera peekelii SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 95.

Epiphytic shrub, *c.* 1 m. Branchlets obtusangular at the tips, glabrous. *Leaves* scattered, elliptic- or lanceolate-oblong, apex shortly (1–1.5 cm) acuminate, blunt, base broadly attenuate, basal glands indistinct, coriaceous, glabrous, laxly glandular-punctate beneath, entire, edge ± revolute, 9–16(–19) by 3.5–8(–10) cm, 5–7-plinerved from and from above the base, nerves and midrib almost flat above, prominent beneath, reticulation rather dense, ± raised above, more distinctly so beneath; petiole rugose, 8–10 by *c.* 2 mm. *Fascicles* from foliate and defoliate axils, glabrous, (3–)4–5-flowered; rachis up to 1 cm. Pedicels 12–15 by *c.* 1 mm. Bracteoles basal. *Calyx* tube cup-shaped or semiglobose, base rounded, *c.* 3 mm, limb ± spreading, 2–3 mm, 5-lobed obtusely to ⅔, lobes minutely apiculate. *Corolla* tubular, fleshy, deep red, *c.* 3 cm by 6–7 mm (3.5–4 cm by 10–12 mm fresh), lobes erect, obtuse, *c.* 3.5 mm. *Stamens* 15 and 13 mm; *major stamens*: filaments ± dilated towards base, subdensely hairy in the upper half, 7–8 mm; cells oblong, base obtuse, (8–)9 mm including the much divergent, 3 mm long tubules; connective

subdensely hirsute below, less so and more patently hairy at the processes, the latter as long as the tubules, free and much divergent in their upper part. *Disk* glabrous. *Style* rather slender, glabrous, ± exserted.

Distr. *Malesia*: New Ireland (Schleinitz Mts, W. side of the Lelet plateau). Two collections.

Ecol. In primary forest, 300–600 m. *Fl.* April.

48. Dimorphanthera kalkmanii SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 95.

Treelet up to 8 m, trunk *c.* 2 m. Branchlets ± slender, obtusangular at the tips, glabrous. *Leaves* lax, ovate-elliptic or elliptic-, more rarely ovate-oblong, apex rather abruptly (1–1.5 cm) acuminate, bluntish, base broadly attenuate or rounded, glands ± marked, coriaceous, glabrous, laxly to subdensely set on both faces with blackish glandular points, regularly minutely subserrate-denticulate or subentire, 5–9(–14) by 2.5–4.5(–5.5) cm, 5–7-plinerved from and from up to 2 cm above the base, midrib and nerves slightly impressed above, prominent beneath, reticulation lax to rather dense, only raised beneath; petiole blackish, rugulose, 6–10 by 1.5–2(–2.5) mm. Abbreviate *racemes* or clusters from foliate and/or defoliate axils, 4–5(–7)-flowered, glabrous; rachis ± robust, 0.5–1(–1.5) cm. Pedicels stout, 8–12 mm. Bracteoles basal. *Calyx* tube subcylindric, green, 3–4 by 4 mm, base truncate, limb ± spreading, 2 mm, 5-lobed halfway, lobes depressed-ovate, apiculate. *Corolla* subcylindric, 1.5–1.8 cm by 3–4 mm at base, 5–6 mm ø at apex, red, ± fleshy, lobes deltoid, obtuse, 2.5 mm. *Stamens* 8–9 and 6.5–7 mm; *major stamens*: filaments linear, densely yellowish hirsutulous and ciliate above base, *c.* 3.5 mm; cells narrow-oblong, base acute and laxly short-hairy, *c.* 6 mm including the ± divergent, *c.* 2 mm long tubules; processes ± connate, densely hirsutulous, *c.* 1 mm longer than the tubules. *Disk* glabrous. *Style* rather thick, glabrous, *c.* 3 mm exserted. *Fruit* subglobose, apex truncate, shining, purplish when fresh, 8–9 mm ø.

Distr. *Malesia*: Central New Guinea (Star Mts: Mt Antares). Two collections.

Ecol. In mossy forest at 2360 m. *Fl.* July.

49. Dimorphanthera collinsii SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 96; Blumea 12 (1963) 141. — **Fig. 125.**

var. **collinsii.**

Terrestrial shrub, sometimes scandent, 2–3 m. Branchlets angular, red brown, glabrous. *Leaves* lax to subdense, elliptic-oblong, more rarely elliptic, apex shortly subacutely acuminate, broadly attenuate towards the base, glands marked, subcoriaceous, subdensely pubescent on both faces, later still pubescent or hirsutulous partly beneath, tardily glabrescent except the midrib, furthermore laxly set with appressed glandular-muriculate, subsetulose hairs or points beneath, entire, 4–6(–7.5) by 1.5–2.5(–3) cm, 5-plinerved from and from a little above the base, midrib and nerves ± raised above, more prominent beneath, reticulation rather dense and somewhat prominent beneath; petiole transversely rugose, initially pubescent, glabrescent, 4–6(–8) by 1–2 mm. *Fascicles* axillary, 3–4-flowered, glabrous and ± lustrous; rachis 0. Pedicels curved, 6–8 by 1.5–2 mm. Bracteoles basal, ovate, ciliate, up to 5 mm. *Calyx* tube broadly obconical, base abruptly truncate, 4–5 by 4 mm ø at base, 6–7 mm across limb, the latter 3–4 mm, 5-lobed almost to the base, lobes ovate-acuminate, apiculate. *Corolla* cylindric, deep red, sometimes pinkish at base, not rarely paler to whitish at the tips, fleshy, glabrous or with some hairs at the lobes, (2.8–)3–3.5 cm by 6–8 mm, lobes deltoid, rather bluntish, 3–4 mm. *Stamens* 18–20 and 15–17 mm; *major stamens*: filaments sparsely hairy at apex, 4–5(–6) mm; cells elongate, with a short basal, sometimes barbulate appendage, 13–15 mm including the ± divergent, *c.* 3 mm long tubules; processes laxly longish fulvous-hirsutulous, ± connate, 1–2 mm longer than the tubules. *Disk* glabrous. *Style* thickish, glabrous, 3.2–4 cm.

Distr. *Malesia*: East New Guinea (Eastern and Southern Highlands.

Ecol. Fairly common in forest-grassland edge or in patches of subalpine forest, 3300–3560 m. *Fl.* July–Aug.

var. **montis-wilhelmi** SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 97; Blumea 12 (1963) 141; *ibid.* 12 (1964) 345. — **Fig. 125.**

Leaves similar to those in *var. collinsii*, 5–8(–15) by 2–3(–4, –6) cm; flush pink, glossy. *Inflorescences* densely tomentose, partly glabrescent, calyx and pedicels becoming lustrous then. *Calyx* green. *Corolla* paler or darker pink, lobes (and maybe base) white, up to 5 by 1 cm when fresh. *Stamens* 14–15(–17) and 11–12(–13) mm; *major stamens*: filaments *c.* 4 mm, densely appressedly hirsutulous distally as is the connective; cells elongate, base subacute, ± curved inward, 11–14 mm including the ± divergent, *c.* 3 mm long tubules; processes ± connate, much longer than the tubules. *Disk* glabrous or slightly hairy. *Style* glabrous. *Fruit* subglobose, purple black when ripe, *c.* 1.5 cm ø, with persistent bracteoles.

Distr. *Malesia*: East New Guinea (Eastern Highlands: E. slope of Mt Wilhelm and down to Pengagl creek; Western Highlands: on the Nona-Minj Divide-Kubor Ra.).

Ecol. A stiff, subscandent shrub, frequent in edges of subalpine forest, ascending to 7 m, at 2600–3560 m. *Fl. fr.* June–Sept.

50. Dimorphanthera elegantissima K. SCH. in K. SCH. & LAUT. Nachtr. (1905) 338; SCHLTR, Bot. Jahrb. 55 (1918) 190; SLEUM. *ibid.* 70 (1939) 121; Nova Guinea, Bot. *n.* 7 (1961) 97; Blumea 12 (1964) 345. — *D. forbesii* [*non* (F. v. M.) F. v. M.] WARB. Bot. Jahrb. 18 (1893) 203; K. SCH. & LAUT. Fl. Schutzgeb. (1901) 488. — *D. kaniensis* SCHLTR, Bot. Jahrb. 55 (1918) 190, f. 15.

Shrub, scandent and ascendent to the top of high trees, sometimes epiphytic. Branchlets stoutish,

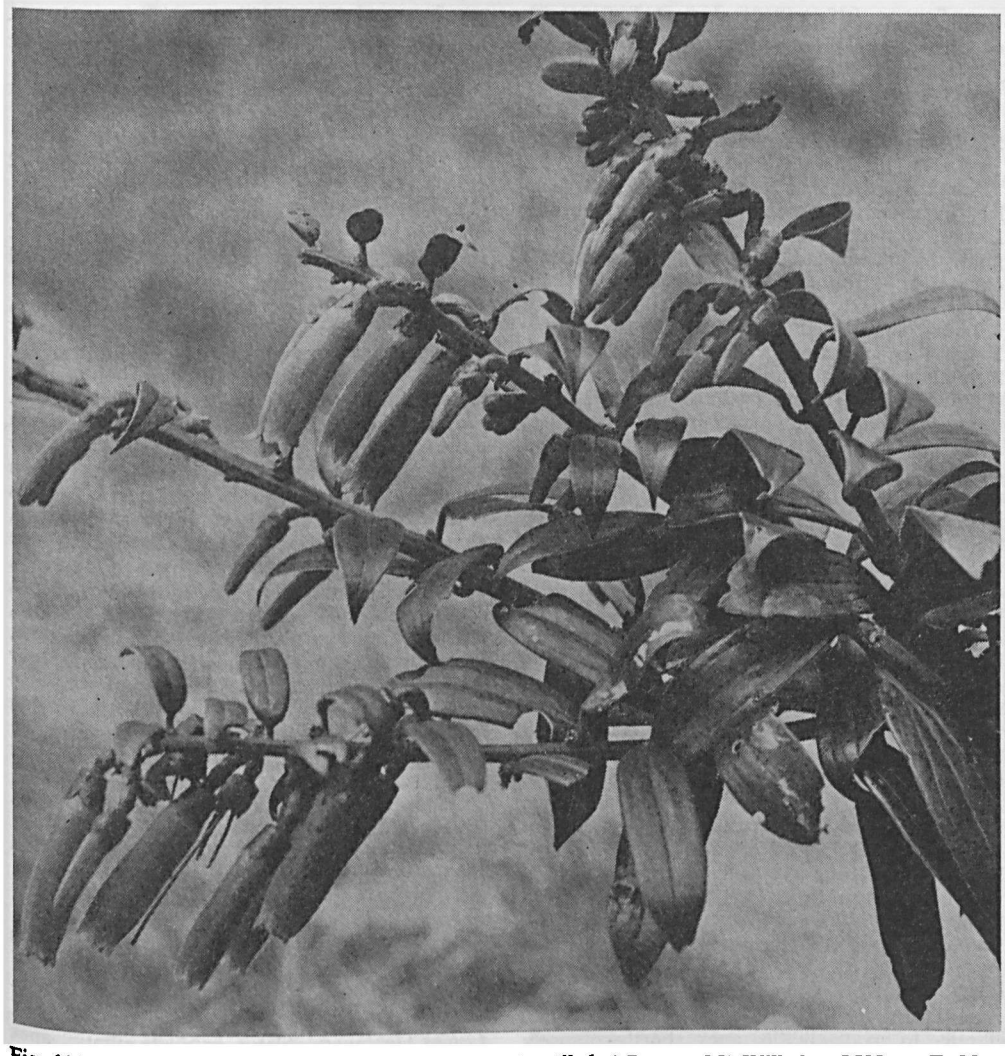

Fig. 125. *Dimorphanthera collinsii* SLEUM. *var. montis-wilhelmi* SLEUM. Mt Wilhelm, 3500 m, E. New Guinea (SLEUMER 4149) (SLEUMER, 1961).

sometimes compressed at apex, glabrous. *Leaves* lax, oblong or narrowly elliptic-lanceolate, apex shortly (*c.* 2 cm) acutely acuminate, base broadly attenuate, basal glands small and ± inconspicuous, coriaceous, glabrous, very laxly or practically not glandular-punctulate beneath, shallowly and rather remotely subdenticulate-crenulate (callous points early caducous), 5(–7)-plinerved from and from above the base, 11–20(–23) by 3–6(–8) cm, midrib and nerves a little impressed above, slightly raised beneath, reticulation rather obscure; petiole 8–10(–13) by 2 mm. *Fascicles* (3–)5–10-flowered from defoliate parts, glabrous. Pedicels 10–13 by 2–3(–4) mm. Bracteoles basal. *Calyx* tube cylindrical-obconical, base truncate, 4–5 by 5 mm, limb suberect, (2–)3–4 by 6–7 mm, obtusely lobed or dented up to halfway. *Corolla* cylindrical, fleshy or waxy, deep (crimson) red or rose red, with white or pale tips, (2.8–)3–3.5 by 0.6–0.8 cm (3.5 by 1.3–1.6 cm fresh), lobes erect, deltoid, obtuse, 4–5 mm. *Stamens* (12–)13–14 and (9–)10–11 mm; *major stamens*: filaments *c.* 5 mm, upper ⅓ subdensely hairy distally as is the connective in its lower part; cells elongate-oblong, base contracted, apiculate and much curved inward, (8–)9–10 mm including the divergent, 2.5–3 mm long tubules; processes subdensely to more laxly and longish substrigose, ± connate with or close, 1–3 mm longer than the tubules. *Disk* glabrous. *Style* ± slender, 3.5–4 cm, ± exserted.

Distr. *Malesia*: East New Guinea (Eastern Highlands, Madang, Morobe, and Milne Bay Distr.).

Ecol. Locally frequent in *Castanopsis* forest or other dense mossy forest or forest clearing, 800–1830 m. *Fl.* Jan.–Dec.

Vern. *I-uó*, Jabim, *unangai*, Daga.

51. Dimorphanthera megacalyx SLEUM. Bot. Jahrb. 70 (1939) 119; Nova Guinea, Bot. *n.* 7 (1961) 97.

Small scandent and recumbent shrub. Branchlets ± slender and subterete, red brown, glabrous. *Leaves* scattered, narrow-oblong, apex shortly gradually acuminate, subacute, base broadly cuneate or ± rounded, basal glands distinct, subcoriaceous, laxly punctate beneath, entire or minutely callose-denticulate, 10–12(–14, –19) by 3–4.5(–7.5) cm, 7-plinerved from and from a little above the base, midrib and nerves plain or ± raised above, more distinctly prominent beneath, reticulation minutely raised on both faces or beneath only; petiole stoutish, 6–8 mm. *Fascicles* axillary, 5–7-flowered, glabrous. Pedicels thick, 1 cm. Bracteoles 2.5 mm, basal. *Calyx* tube broadly cylindric, base truncate, *c.* 5 mm, limb suberect, 3 mm, deeply 5-lobed, lobes broad-triangular, bluntish, 1.5–2 mm. *Corolla* cylindric, *c.* 2 cm by 5 mm, ± fleshy, red or pink, tips whitish, lobes 2.5 mm. *Stamens* 9–10 and 8 mm; *major stamens*: filaments glabrous, fulvous-hirsutulous for upper ⅓ as is the whole connective, *c.* 3 mm; cells elongate-oblong, 8–9 mm including the ± divergent, 2 mm long tubules, base obtuse; processes thick, obtuse, close together, fixed between and partly behind the tubules, slightly longer. *Disk* glabrous. *Style* slender, glabrous, *c.* 2.3 cm, ± exserted. *Fruit* subglobose, purple, *c.* 8 mm ø, crowned by the erect calyx lobes, *c.* 4 mm.

Distr. *Malesia*: New Guinea (Morobe Distr.: Sattelberg and Mt Saruwaged vicinity).

Ecol. In forest, 800–2745(–3050?) m.

52. Dimorphanthera militaris J. J. S. Nova Guinea 18 (1936) 102, t. 23, f. 1; SLEUM. Bot. Jahrb. 70 (1939) 121; Nova Guinea, Bot. *n.* 7 (1961) 98.

Shrub. Branchlets angular, glabrous. *Leaves* lax, elliptic- to ovate-elliptic, apex shortly obtusely acuminate, base broadly attenuate and contracted or obtuse, rarely ± rounded, basal glands ± inconspicuous, coriaceous, ± rigid, glabrous, sparsely glandular-punctate beneath, 5–7-plinerved from and from above the base, subentire, 7.5–13 by 3.5–6(–8.5) cm, midrib and nerves only prominent beneath, reticulation faintly raised beneath; petiole transversely rugose, 7–10 by 2–3 mm. *Inflorescences* few-flowered fascicles from defoliate axils or old wood, glabrous; rachis up to 5 mm. Pedicels 10–12 by 1.5 mm. Bracteoles basal. *Calyx* cup-shaped, tube obconical, *c.* 4 mm, base decidedly truncate, limb suberect, 2 mm, 5-dented in the upper third or merely apiculate. *Corolla* (submature) cylindric, fleshy, dark red, 2–2.5 by *c.* 0.5 cm, shortly 5-lobed. *Stamens* 11–12 and 7–8 mm; *major stamens*: filaments linear, *c.* 3 mm, ± densely hairy and ciliate from above base as is the connective; cells elongate-oblong, 9–10 mm including the slightly divergent, *c.* 3 mm long tubules, base apiculate, curved inward and set with some hairs; processes ± connate, appressedly hirsutulous, *c.* 1.5 mm longer. *Disk* glabrous. *Style* slender, glabrous, *c.* 2.5 cm.

Distr. *Malesia*: NW. New Guinea (Rouffaer R.), in forest, at *c.* 250 m. *Fl.* Sept.

53. Dimorphanthera lancifolia SLEUM. Blumea 12 (1963) 141.

Epiphytic shrub, glabrous. Branchlets slender, obtusangular. *Leaves* scattered, lanceolate, apex subcaudate-acuminate for *c.* 2 cm, ± falcate and acute, base narrowed, subcoriaceous, rather regularly and finely crenulate by ± impressed, setular, ± caducous, 3–5 mm spaced glands, 7–9.5 by 1.5–2 cm, 5-plinerved from and from *c.* 1 cm above the base (outer pair often ± indistinct), midrib and nerves ± impressed or flat above, prominent beneath, veins slightly raised beneath only, reticulation ± obscure; petiole 4–6(–7) by 1–1.5 mm. *Fascicles* 3–6(–8)-flowered, from foliate and defoliate axils; rachis almost 0. Pedicels 8–12 by 1 mm. Bracteoles subbasal, subulate, glandular-fimbriate. *Calyx* tube subcylindric, base truncate, 1.5–2 mm, limb erecto-patent, 2–2.5 mm, lobes much depressedly ovate, apiculate or obtuse, *c.* 0.6 mm. *Corolla* tubular, fleshy, white, glabrous, *c.* 1.4 cm, *c.* 4 mm ø at base, *c.* 6 mm across limb, lobes acute, *c.* 2 mm. *Stamens* 9 and 7 mm; *major stamens*: filaments appressed-hairy upwards, *c.* 4 mm; cells narrow-oblong, base rostrate, 7 mm including the 2.5 mm long tubules; processes ± connate, hirsutulous, *c.* 1 mm longer. *Disk* glabrous. *Style* slender, glabrous, *c.* 2 cm.

Distr. *Malesia*: New Guinea (Torricelli Mts). One collection.

Ecol. Epiphyte on tall tree in high forest, *c.* 1525 m. *Fl.* Sept.

Vern. *Emingo*, Wapi: Wigote.

54. Dimorphanthera calodon SLEUM. Bot. Jahrb. 70 (1939) 121; Nova Guinea, Bot. *n.* 7 (1961) 98.

Large scandent shrub, *c.* 8 m. Branchlets subangular, densely short-pubescent, glabrescent. *Leaves* lax, ovate-oblong or ovate-elliptic, apex acuminate (1 cm), bluntish, base broadly truncate-rounded or mostly subcordate, coriaceous, stiff, initially laxly pubescent, finally glabrous the midrib excepted, laxly and shortly yellowish pubescent beneath, tardily glabrescent on midrib and nerves, moreover laxly glandular-subsetulose or finally -punctate beneath, 6–9 by 3–4 cm, margin regularly subserrate-denticulate by distinct, blackish, callose-thickened, subpersistent, bristle-like, *c.* 3 mm spaced glands, *c.* 0.2 mm long, 5–7-plinerved from and from above the base, with another higher pair of curved-ascending nerves, all ± impressed above, ± prominent beneath, reticulation obscure above, faintly raised beneath; petiole densely hairy, 5–7 by 1.5–2 mm. *Racemes* axillary, 8–12-flowered, densely yellowish hairy to -subtomentose, glabrescent; rachis stout, 2–2.5 cm. Pedicels 8–10 by 1 mm. Bracteoles basal. *Calyx* tube ± semiglobose, *c.* 3 mm, limb suberect or ± spreading, 2.5 mm, 5-lobed halfway, lobes broadly ovate-acuminate, apiculate.

Corolla cylindric, ± dilated distally, ± fleshy, red, white tipped, 2.8–3 cm by *c.* 5 mm, lobes 4 mm. *Stamens* 9–10 and 7.5 mm; *major stamens*: filaments *c.* 3 mm, above the base densely set with appressed fulvous substrigose hairs as is the connective; cells narrow-oblong, base subacute, *c.* 7 mm including the divergent, 2 mm long tubules; proper processes replaced by ferrugineous hairs at the back of the tubules to almost their top. *Disk* glabrous. *Style* thick-filiform, glabrous, *c.* 3.6 cm, much exserted. *Fruit* subglobose, ± glabrous, *c.* 8 mm ø.

Distr. *Malesia*: SE. New Guinea (Central Distr., Wharton Ra.: Murray Pass). One collection.

Ecol. In forests, at 2840 m, locally fairly common. *Fl.* July.

55. Dimorphanthera prainiana (KOORD.) J. J. S. Nova Guinea 12 (1914) 148; SLEUM. Bot. Jahrb. 70 (1939) 124; Nova Guinea, Bot. *n.* 7 (1961) 98; Blumea 12 (1963) 142. — *Agapetes prainiana* KOORD. Nova Guinea 8 (1912) 886. — **Fig. 126.**

Shrub. Branchlets stout, terete, glabrous, tips slender, finely pubescent. *Leaves* ovate-lanceolate, apex caudate-acuminate (*c.* 1.5 cm), base broadly attenuate, basal glands inconspicuous, coriaceous, glabrous, laxly blackish punctate beneath, entire or practically so, (4–)6–14 by (1.5–)2–5.5 cm, 5–7-plinerved from and from a little above the base, nerves slightly impressed above, prominent beneath, veins laxly reticulate and raised beneath, finer reticulation rather faint; petiole ± flattened, 4–5 by 2 mm. Stipule-like perulae in the upper axils, or slightly supra-axillary, finally caducous. *Fascicles* axillary, (5–)6–10-flowered. Pedicels very slender, glabrous or with some sparse bristle-like glandular hairs, 10–15 mm. Bracteoles subbasal. *Calyx* tube cup-shaped or semiglobose, 2 by 2 mm, base rounded, with short, lax, ± crisped or subappressed subglandular setular hairs, limb spreading or reflexed, 1 mm, subacutely 5-dented almost to the base. *Corolla* tubular, membranous, scarlet to almost carmine, 1.3–1.5 cm by *c.* 4 mm, outside with lax glandular bluntish yellowish hairs as found on pedicel and calyx, lobes *c.* 2 mm. *Stamens* 4.5–5 and 3.5 mm; *major stamens*: filaments 1.5 mm, laxly hairy upwards; cells narrow-oblong, 3.5–4 mm including the widely divergent, *c.* 1.8 mm long tubules, membranous, base apiculate; connective laxly hairy at the back of the cells, ± indistinct, evanescent upwards and not continued on the back of the very thin tubules. *Disk* glabrous. *Style* filiform, glabrous, *c.* 2 cm.

Distr. *Malesia*: W. New Guinea (Vogelkop Peninsula: Nettoti Mts; Oranje Mts: Mt Hellwig). *Fl.* Nov.–Dec.

56. Dimorphanthera vonroemeri (KOORD.) J. J. S. Nova Guinea 12 (1914) 148; SLEUM. Bot. Jahrb. 70 (1939) 124; Nova Guinea. Bot. *n.* 7 (1961) 98. — *Agapetes vonroemeri* KOORD. Nova Guinea 8 (1912) 886. — *D. obovata* J. J. S. Med. Rijksherb. *n.* 25 (1915) 8 (as to flowers); Nova Guinea 12 (1917) 514; *ibid.* (1918) t. 208, as to flowers, *nom. illeg.*

Shrub scandent, up to 10 m. Branchlets pubescent, slender. *Leaves* scattered, on top of 1–4 cm long lateral branchlets, ovate to oblong-ovate, apex subcaudate-acuminate (*c.* 2 cm), tip bluntish, base rounded, basal glands ± imperceptible, coriaceous, glabrous, smooth and rather lustrous above, laxly glandular-punctate beneath, entire, 6–10 by 3–5.5 cm, 5-plinerved from and from a little above the base, nerves faintly raised above, more distinct beneath, reticulation obscure; petiole *c.* 2 mm. *Fascicles c.* 3-flowered from old wood, ± densely short-pubescent. Pedicel slender, 8–13 mm. Bracteoles minute, subbasal. *Calyx* tube



Fig. 126. *Dimorphanthera prainiana* (KOORD.) J. J. S. Mt Nettoti, Kebar valley, NW. New Guinea (VAN ROYEN & SLEUMER 7401) (SLEUMER, 1961).

obconical, base ± attenuate, articulation ± indistinct, 2.5 by 2.5 mm, limb spreading, ± reflexed, 1.5 mm, obtusely 5-lobed ± halfway. *Corolla* tubular, thin, red with white stripes, *c.* 1.5 cm by 4 mm, lobes *c.* 2 mm. *Stamens* 9 and 7.5 mm; *major stamens*: filaments glabrous or distally with some very short hairs, *c.* 4.5 mm; cells narrow-oblong, granular at the obtuse base, *c.* 6 mm including the thin, ± divergent, *c.* 3 mm long tubules; connective represented by some very short hairs at the back of the cells, evanescent distally. *Disk* glabrous. *Style* rather slender, 1.8 cm.

Distr. *Malesia*: Central New Guinea (Oranje Mts: Wichmann and Perameles Mts).

Ecol. In forest, 900–3000 m. *Fl.* Nov.

Note. The leaves of *D. obovata* J. J. S. belong to a *Diplycosia*; the name must hence be rejected.

57. Dimorphanthera parviflora J. J. S. Nova Guinea 18 (1936) 106, t. 24, f. 2; SLEUM. Bot. Jahrb. 70 (1939) 124; Nova Guinea, Bot. *n.* 7 (1961) 98.

Epiphytic shrub or small liana. Branchlets obtusangular, glabrous. *Leaves* lax, lanceolate or ovate-, sometimes oblong-lanceolate, apex ± gradually acuminate, or subcaudate, subacute, base broadly attenuate to obtuse, sometimes rounded, basal glands minute, coriaceous, glabrous, entire or nearly so, 8.5–16.5 by 2.6–4.8 cm, 7-plinerved from and from somewhat above the base, nerves and midrib ± prominent above, more distinctly so beneath, reticulation lax, ± raised beneath only; petiole (2.5–)4–7 by 1.5–2 mm. *Fascicles c.* 3-flowered from defoliate axils or old wood. Pedicels slender, puberulous, 16–19 mm. Bracteoles basal. *Calyx* dark red, tube broadly tubular, slightly 5-angular, base truncate, subdensely to laxly short-pubescent, 2–3 mm, limb ± spreading, 1.5–2 mm, very shortly 5-dented, or subentire. *Corolla* tubular, membranous, light red, whether or not with dark red longitudinal stripes, *c.* 1.5 cm by 3 mm, subdensely to laxly short-pubescent at least in upper half, lobes *c.* 2 mm. *Stamens* 7–9 and 6–6.5 mm; *major stamens*: filaments very laxly hairy upwards, *c.* 4 mm; cells narrow-oblong, base with an acute, inward-curved beak, echinulate, *c.* 4 mm including the ± divergent, *c.* 2 mm long tubules; connective laxly hairy at the back of the cells, no processes. *Disk* glabrous. *Style* slender, *c.* 1.6 cm.

Distr. *Malesia*: West New Guinea (Rouffaer R.), in thin-stemmed primary forest, 250–300 m. Two collections. *Fl.* Sept.

58. Dimorphanthera vaccinioides SLEUM. Blumea 12 (1963) 142.

Scandent shrub. Branchlets terete, slender, glabrous. *Leaves* lax, subovate- or oblong-elliptic, apex acuminate, tip obtuse, base cuneate, subcoriaceous, glabrous, remotely and ± indistinctly subserrate-crenulate, 5–7 by 2–4 cm, midrib and nerves slightly prominent above, more distinctly so beneath, nerves 2(–3) pairs, high curved-ascending from and a little from above the base; petiole 4–6(–7) by *c.* 1 mm. *Flowers* in 1–3-flowered axillary fascicles. Perulae minute. Pedicels slender, subdensely puberulous in upper half, reddish, 1.5–2 cm. *Calyx* finely pubescent, tube green, cupular, 1.5–2 by *c.* 3 mm, limb erect, denticulate, 1–1.5 mm. *Corolla* tubular, thin, light red, *c.* 2.2 cm long, *c.* 4 mm ø, finely pubescent outside, glabrous inside, lobes erect, 1.5 mm. *Stamens* 6.5 and 5 mm; *major stamens*: filaments *c.* 3 mm, laxly hairy towards the connective; cells including tubules 5 mm, tubules close together, connective hardly distinct at their back, indicated merely by a few hairs. *Disk* glabrous. *Style* very slender, *c.* 1.5 cm.

Distr. *Malesia*: West New Guinea (Wissel Lakes), in primary *Agathis* forest on sandy clay at 1800 m.

Vern. *Korè*, Kapauku.

59. Dimorphanthera parvifolia J. J. S. Nova Guinea 18 (1936) 106, t. 25, f. 1; SLEUM. Bot. Jahrb. 70 (1939) 124; Nova Guinea, Bot. *n.* 7 (1961) 98.

Shrub, *c.* 2 m. Branchlets obtusangular, tips minutely patent-puberulous. *Leaves* dense, oblong to lanceolate-elliptic, apex gradually acuminate, obtuse, base broadly cuneate, bluntish, basal glands ± inconspicuous, coriaceous, rigid, glabrous, margin markedly subserrate-crenulate, thickened, 1.5–2.5 by 0.4–0.9(–1) cm, midrib impressed above, obtusely prominent beneath, nerves 1–2 pairs ascending from the base, faintly raised beneath or obscure, reticulation 0; petiole rather robust, 2–4 mm. *Flowers* 1–2 in upper axils, nodding, glabrous. Pedicel robust, *c.* 10 mm. Bracteoles basal. *Calyx* cup-shaped, tube subcylindric, base ± rounded, 3 mm, limb 2 mm, subacutely 5-lobed almost to the base. *Corolla* subtubular, ± dilated towards the mouth, rather fleshy, dark red, 1.8–2 cm by 3–4 mm ø at base, *c.* 6(–8) mm across the limb, lobes *c.* 2 mm. *Stamens* 7.5 and 6 mm; *major stamens*: filaments *c.* 3 mm, glabrous or laxly ciliate in the upper part and at the connective; cells narrow, base acute and echinulate, 5.5 mm including the much divergent, 2 mm long tubules. *Disk* glabrous. *Style* rather slender, ± as long as the corolla or but shortly exserted.

Distr. *Malesia*: West New Guinea (Doormantop), in sheltered ravine at 3200 m. One collection. *Fl.* Oct.

60. Dimorphanthera alpivaga SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 98.

Low shrub. Branchlets obtusangular, laxly pubescent at the tips. *Leaves* subdense, oblong-elliptic, elliptic, or obovate-elliptic, apex broadly and shortly acuminate, obtuse, rarely ± rounded, base broadly cuneate or attenuate, basal glands subinconspicuous, coriaceous, glabrous, laxly blackish punctate beneath, regularly subserrate-crenulate (teeth minute, 2–4 mm spaced), 2–3.5 by 1–1.5 cm, midrib faintly impressed above, obtusely prominent beneath, nerves 2 basal and 3–4 upper pairs, mostly obscure above, slightly

raised beneath, reticulation lax, ± prominent beneath only; petiole rather robust, 2–4 mm. *Fascicles* 2–4-flowered, axillary, glabrous. Pedicels stoutish, *c.* 1 cm, with several thick papillae or emergencies below the calyx. Bracteoles basal. *Calyx* tube cylindric, base subtruncate, *c.* 4 by 3 mm, limb ± spreading, 3 mm, 5-lobed to ⅔, lobes subacutely ovate-acuminate. *Corolla* tubular, slightly dilated distally, rather fleshy, *c.* 2 cm by 4 mm ø at base, *c.* 6 mm across limb, lobes *c.* 3 mm, reflexed. *Stamens* 8–8.5 and 6.5–7 mm; *major stamens*: filaments very laxly long-hairy or ciliate distally; cells narrow-oblong, very granular, base obtuse, 6 mm including ± divergent, *c.* 2 mm long tubules; connective very laxly hairy or glabrous, evanescent towards the tubules. *Disk* glabrous. *Style* filiform, glabrous, 2.2 cm.

Distr. *Malesia*: New Guinea (Mt Carstensz), in alpine meadows, 3700–4300 m. One collection. *Fl.* Nov.-Dec.

61. Dimorphanthera obtusifolia SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 99.

Scandent shrub. Branchlets rigid, tips angular, glabrous. *Leaves* ± dense, mostly obovate or elliptic-obovate, more rarely subobovate-oblong, apex shortly and broadly attenuate, obtuse or rounded, base cuneate or attenuate, basal glands ± distinct, very coriaceous, glabrous, laxly blackish punctate beneath, edge slightly revolute, rather densely 2–5 mm spaced subserrate-crenulate, 2–5.5 by 1–2.5 cm, midrib narrowly immersed above, obtusely prominent beneath, nerves 1–2 basal or slightly suprabasal and curved-ascending, and 3–4 upper, less distinct pairs, all faintly or not impressed above, slightly raised beneath, reticulation none; petiole rugulose, 3–5 by 1–1.5 mm. *Fascicles* axillary, (1–)2–4-flowered, glabrous. Pedicels 5–9 by *c.* 1 mm. Bracteoles 3 mm, basal. *Calyx* tube subcylindric, 2–2.5 mm ø and long, base subtruncate, limb ± spreading, 2 mm, 5-dented ± halfway. *Corolla* cylindric, 1.5–1.8 cm by *c.* 4 mm, ± fleshy, red, lobes *c.* 2 mm. *Stamens* 6–7 and 5–6 mm; *major stamens*: filaments 2 mm, with some sparse distal papillae; cells narrow, echinulate, base obtuse, 5 mm including the divergent, 1.5 mm long tubules; connective indistinct, indicated merely by a few papillae. *Disk* glabrous. *Style* slender, *c.* 2 cm, much exserted.

Distr. *Malesia*: West New Guinea (Lake Habbema), in margins of (subalpine) forest, at 3225 m. Two collections. *Fl.* Aug.

62. Dimorphanthera myzomelae (BECC.) J. J. S. Nova Guinea 12 (1917) 514; SLEUM. Bot. Jahrb. 70 (1939) 124; Nova Guinea, Bot. *n.* 7 (1961) 99; Blumea 12 (1963) 142. — *Agapetes myzomelae* BECC. Malesia 1 (1878) 209.

Epiphytic and scandent shrub, glabrous. Branchlets obtusangular, ± slender, reddish and papillose at the tips. *Leaves* ± dense to elliptic, in part subobovate, apex shortly and broadly attenuate, obtuse to almost rounded, base broadly attenuate, basal glands indistinct, coriaceous to subcoriaceous, glabrous, laxly blackish punctate beneath, minutely to more distinctly subserrate-crenulate, 2.5–5.5(–7) by 1.5–2.5 (rarely –4) cm, nerves 2–3 basal, slightly suprabasal, curved-ascending, and a few upper, equally ascending but much shorter nerves, all anastomosing and ± prominent on both faces, reticulation ± dense, finely raised on both faces or ± obscure; petiole 3–5 by 1–1.5 mm, ± flattened. *Flowers* axillary, 1–3(–6) per fascicle. Pedicel stoutish, 1–1.5 cm. Bracteoles at ⅓ or halfway. *Calyx* tube narrow-obconical, base ± rounded, *c.* 3 by 2.5 mm, limb much spreading, 1.5 mm, deeply 5-lobed, lobes ovate-acuminate, subacute. *Corolla* pink to red, sometimes green, tubular, thin, 1.5–2 cm by *c.* 4–5 mm, lobes finally reflexed, *c.* 2.5 mm. *Stamens* 6 and 5 mm; *major stamens*: filaments *c.* 3 mm, glabrous or papillose; cells oblong, granular, base obtuse, 4 mm including the ± divergent, 1.5 mm long tubules; connective indicated merely by some very short hairs at the back of the cells. *Disk* glabrous. *Style* very slender, glabrous, ± as long as the corolla.

Distr. *Malesia*: NW. New Guinea (Arfak and Wondiwoi Mts), at 800–2000 m. *Fl.* March-July.

Vern. *Anggam, mengaamkubei, nĕrettingoi*, Hattam.

63. Dimorphanthera microphylla SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 100; Blumea 12 (1963) 142; *ibid.* 12 (1964) 345.

Erect, subscandent shrub or treelet, up to 4 m. Branchlets subtrigonous and deeply grooved at the youngest, quite glabrous parts. *Leaves* dense, lanceolate, oblong-lanceolate or ovate-oblong, apex shortly acuminate, subacute or bluntish, base broadly attenuate or obtuse, basal glands indistinct, ± rigidly coriaceous, convex above, edge revolute (dry), laxly long-ciliate when young, later glabrous, 1.5–3 by 0.4–0.8(–1) cm, 2–4 mm spaced subserrate-crenulate, midrib ± deeply impressed above, obtusely prominent beneath, nerves 1 basal and 2–3 upper pairs, faintly impressed or obscure above, minutely raised beneath, not rarely inconspicuous, reticulation none; petiole 2–4 by 0.5–1 mm. *Flowers* 1–3 per fascicle in the upper axils, nodding, glabrous. Pedicels robust, (0.7–)1–1.5 cm. Bracteoles basal. *Calyx* tube subsemiglobose or almost obconical, 4–5 by 3–4 mm, limb erecto-patent, 3–4 mm, lobes broad-ovate, apiculate, 2–3 mm. *Corolla* tubular, slightly widened towards the mouth, ± fleshy, glossy, bright red or orange, with white to cream tips, throat pink, 2.8–4 cm by 6 mm ø at base, *c.* 10 mm across limb (5 by 1.2 cm, fresh), lobes deltoid, 4–5 mm, finally reflexed. *Stamens* 10–12 (–14) and 8.5–10(–12) mm; *major stamens*: filaments ciliate upwards, *c.* 4 mm; cells narrow-oblong, base obtuse, echinulate, 8–9(–11) mm including the ± divergent, *c.* 3 mm long tubules; connective subdensely to laxly long-hairy, or glabrous, a dark ribbon connate with the tubules, or ± evanescent distally. *Disk* glabrous. *Style* ± slender, glabrous, 5–8 mm exserted. *Fruit* blackish, subglobular, *c.* 8 mm ø.

Distr. *Malesia*: East New Guinea (E. slope of Mt Wilhelm and Mt Kinkain in the Kubor Ra.).

Ecol. In edges of patches of subalpine forest, or rarely alpine grassland, 3350–3650 m, locally common. *Fl. fr.* June–Sept.

64. Dimorphanthera wrightiana (KOORD.) J. J. S. Nova Guinea 12 (1914) 148; *ibid.* 12 (1917) 516; SLEUM. Bot. Jahrb. 70 (1939) 124; Nova Guinea, Bot. *n.* 7 (1961) 100; Blumea 12 (1963) 142. — *Agapetes wrightiana* KOORD. Nova Guinea 8 (Sept. 1912) 887, t. 157. — *D. d'armandvillei* J. J. S. Bull. Jard. Bot. Btzg II, 8 (Oct. 1912) 54; Nova Guinea 12 (1914) 146, 148, t. 38 A.

Shrub, *c.* 2 m. Branchlets subterete, glabrous. *Leaves* lax, ovate to oblong-ovate, apex caudate-acuminate (2–3 cm), subacute, base broadly attenuate, sometimes ± rounded, basal glands small though distinct, coriaceous, glabrous, very laxly or not glandular-punctate beneath, remotely denticulate to subentire, 6–15 by 2.5–8 cm, 5(–7)-plinerved from and from somewhat above the base, nerves and lax reticulation ± impressed above, raised beneath, veinlets prominent-reticulate only beneath; petiole 4–6 by 1.5–2 mm. *Flowers* 1–3 per fascicle, glabrous. Pedicels ± slender, 10–13 mm. Bracteoles minute, basal. *Calyx* tube cup-shaped to subobconical, base rounded or attenuate, 3–4 by *c.* 3 mm, limb suberect or ± spreading, 1.5 mm, very shortly obtusely 5-lobed. *Corolla* tubular, bright red, 1.5–1.8 (–2) cm by 4–5 mm, lobes subacute, *c.* 2.5 mm. *Stamens* 7–7.5 and 5.5–6 mm; *major stamens*: filaments 2.5 mm, sparingly hairy or ciliate upwards; cells narrow-oblong, base subacute, 5–5.5 mm including the ± divergent, 1.5 mm long tubules; connective sparsely hairy at the back of the cells, evanescent upwards. *Disk* glabrous. *Style* slender, glabrous, ± exserted.

Distr. *Malesia*: West New Guinea (Wissel Lakes, Hellwig and Johannes Keyts Mts, and Bele R. near Lake Habbema).

Ecol. In forest and forest openings, 2000–2600 m. *Fl.* Nov.–Jan.

65. Dimorphanthera dryophila SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 101.

var. **dryophila.**

Shrub or large liana, up to 20 m. Branchlets obtusangular, glabrous. *Leaves* lax, ovate, ovate-lanceolate or- oblong or elliptic-oblong, apex shortly (1–1.5 cm) acuminate, tip bluntish, base broadly attenuate to ± rounded, basal glands distinct, coriaceous, ± densely 1–3 mm spaced subserrate-denticulate, glabrous above, laxly set with minute appressed glandular bristles initially beneath, at full age very laxly or not glandular-punctate there, 7–16 by 2.5–7 cm, 5–7-plinerved from and from a little above the base, midrib and nerves impressed above, prominent beneath, reticulations ± dense, subinconspicuous above, ± prominent beneath; petiole 7–10 by *c.* 2 mm. *Fascicles* 3–5-flowered, axillary, glabrous; rachis nearly 0. Pedicels 7–10 by 1.5–2 mm. Bracteoles 2 concave, ovate, 5–7 by 3–5 mm. *Calyx* tube broad-cylindric to obconical, 4–5 by *c.* 5 mm, base ± rectangularly truncate, limb erect, 3–4 mm, lobes deltoid, subacute, 2–3 mm. *Corolla* tubular, fleshy, red, *c.* 2 cm by 5–6 mm, lobes 2 mm. *Stamens* 10 and 8.5 mm; *major stamens*: filaments 3 mm, glabrous or very laxly long-hairy upwards; cells narrow-oblong, base contracted into an inward curved beak, 7 mm including the ± divergent, 2.5 mm long tubules; connective thickened at the back of the cells, glabrous or very sparsely hairy, evanescent towards the tubules. *Disk* glabrous. *Style* ± slender, glabrous, *c.* 2.3 cm. *Fruit* subglobose, apex truncate, *c.* 8 mm ø (dry submature).

Distr. *Malesia*: SE. New Guinea (Milne Bay Distr. mainland and Goodenough and Normanby Is.).

Ecol. Frequent in mossy oak forest, 820–1600 m. *Fl.* Oct.

var. **trichoclada** SLEUM. Nova Guinea, Bot. *n.* 7 (1961) 101.

Branchlets and *leaves* (especially underneath) covered by a ± dense almost velutinous tomentum. Bracteoles ciliate. *Corolla* pink. Mature *fruit* black, soft, palatable, *c.* 1.5 cm ø.

Distr. *Malesia*: New Guinea (Milne Bay Distr.: N. slope of Mt Dayman), frequent in mossy forest at 2230 m. One collection. *Fl. fr.* May.

Excluded

Catanthera F. v. M. J. Bot. 24 (1886) 289; Descr. Not. 9 (1890) 63; SCHLTR, Bot. Jahrb. 55 (1918) 193 = *Melastomataceae.*

Mischopleura WERNH. Trans. Linn. Soc. II, Bot. 9 (1916) 99 = *Sericolea* SCHLTR, *cf.* GIBBS, Arfak (1917) 148; SCHLTR, in Fedde, Rep. 16 (1919) 30 (*Elaeocarpaceae*).