

A REVISION OF LEPTONYCHIA (STERCULIACEAE) IN SOUTHEAST ASIA

J. F. VELDKAMP & R. C. H. FLIPPHI

Rijksherbarium, Leiden, The Netherlands

SUMMARY

Leptonychia Turcz. (Sterculiaceae) has three species in Southeast Asia, one of which was formerly included in the monotypic genus *Leptonychiopsis* Ridley. A new combination is proposed for it and a new variety described.

INTRODUCTION

Leptonychia Turcz. has about 45 species (Germain, 1963). Most of these occur in tropical Africa while a few have been described from Southeast Asia.

The genus was first described by Turczaninow (1858) with as the only species *L. glabra* Turcz. He placed it in the Byttneriaceae (now Sterculiaceae) close to *Trochetia* DC. (Sterculiaceae) and *Kydia* Roxb. (Malvaceae). Later authors regarded it as close to *Grewia* L. (Tiliaceae), to which it has a superficial resemblance. In fact several species were originally described in that genus as can be seen from the synonymy under the species. Being in the Sterculiaceae it seems clear that *Leptonychia* only bears a superficial resemblance to *Grewia*, yet it has fooled eminent taxonomists. Curators are advised to check under that genus for material, as well as under the Euphorbiaceae indeterminatae, as the capsules are sometimes (apparently) 3-valved and fruiting material can thus easily be misplaced in that family.

Bentham (1862) had *Leptonychia* in the Tiliaceae between *Tilia* and *Schoutenia* Korth. *Grewia* is a member of the Grewieae in his treatment. In 1867 he placed *Leptonychia* in the Sterculiaceae tribe Byttnerieae between *Scaphopetalum* Mast. and *Ayenia* L. (both Sterculiaceae), with which tribal position later authors, e.g. Masters (1874, still in Tiliaceae), King (1892, perhaps correctly denying a difference between Sterculiaceae and Malvaceae), and Germain (1961) have agreed. Baas' observations (oral comm.) of the presence of mucilaginous cavities in the petioles (see his remarks on the anatomy under *L. parviflora*) seem to support a place in this tribe.

Schumann (1890) has *Leptonychia* in the Sterculiaceae-Byttnerieae-Theobrominae, but if his key is to be believed, it does not fit there very well, for the petals are not large and conspicuous, but small and scale-like, as in his Lasiopetaleae. The genus does not seem to be well-placed there, either.

Some specimens of *Leptonychia* have been described in several other genera as well. Miquel (1860) most erroneously included one as a new species in *Turraea* L. (Meliaceae), from where Kurz (1865) removed it proposing the new genus *Binnendykia*. He said the arilloid would be yellowish; all other collectors have described it as orange to red; the specimens JFV saw in the field, and those photographed by Van Balgooy were red. In his later publications (1870, 1877) Kurz did not show that he was aware that *Binnendykia* was identical with *Leptonychia*, although this was already remarked by Bentham (1867).

Oudemans (1865) gave an excellent, most extensive description and discussion of a Malesian *Leptonychia*, which was the first collection with fruits. He suggested that the genus was closest to *Dubouzetia* Brongn. & Gris and *Tricuspidaria* R. & P. (= *Crinodendron* Mol.) (now both in the Elaeocarpaceae) and might perhaps represent a distinct tribe between the Sloaneae and the Elaeocarpeae.

No world revision of the genus is available; there are only local accounts, e.g. for Africa (Schumann, 1900) and for the Congo (Germain, ll.cc.).

For Southeast Asia a number of species has been described, which the various authors have rather whimsically merged or maintained.

Masters recognized 3 species, differing by the shape of the leaves, the number of the outer staminodes, and the pubescence of the inner ones.

We have been unable to follow him in this. When only little material is available (Masters cited only 7 specimens) distinct taxa may seem to be present. However, having seen a much greater amount, it turned out that as far as the Southeast Asian and West Malesian area is concerned these characters do not hold. The shape of the leaves is very variable even within a single collection. The number of staminodes to each phalanx may be variable within a flower as was already observed by King and Schumann (1900). The first concluded after having seen 'a large number of flowers' that the staminodes varied 'in a most perplexing way from 5 to 15' and that 'there is but one species of *Leptonychia*' (emphasis his).

We are perplexed by Masters' remark that the inner staminodes would be ciliate which has been repeated (copied?) by King and Ridley (1922). We have never seen any hairs there and must conclude that his material must have been mouldy. His remark that the flowers of the Indian specimens of what he called *L. glabra* available to him were not 'perfect' adds to this supposition.

King, followed by Ridley, distinguished a var. *mastersiana* based on Masters' *L. acuminata* adding differences in the pubescence of the young parts, size and shape of the flower buds, nervation of the sepals, pubescence of the outer staminodes, number of locules of the ovary, pubescence of the style and colour of the ripe fruit. Ridley even added that this variety would be more common at higher altitudes.

To this we can only say that the size and shape of the flowerbuds depends on their age, we have never seen any nerves in the sepals in our herbarium specimens also after boiling (but in the field they may perhaps be seen), the outer staminodes are always glabrous, the styles always hairy, at least in the lower half, and the ripe fruit as far as JFV and Van Balgooy have observed in Borneo is green to nearly the very end, when it becomes glabrous and dull blackish, thus setting off the shiny black seeds with their red arilloids.

Merrill (1929) rather casually mentioned the occurrence of the genus in Indochina without giving a basis for this remark. It is apparently very rare there: we have seen only two collections [*Clemens 4014* (Merrill's voucher?) and *Poilane 31768*; both in P]. The last one was the type of *Paragrewia* Gagnepain (1945), published without a Latin description and thus an invalid name. Gagnepain, too, thought it to belong to the Tiliaceae, placing it after *Grewia*. He called the petals nectaria, but we have failed to observe any secretive function in these thin structures. He mentioned a 10-lobed disk, but in his and other material we have failed to see it. He suggested that there would be 15 stamens; in fact there are two fertile ones and one outer staminode. His assumption that it was close to *Grewia*, where there are no staminodes, apparently misled him to think that some filaments had lost their anthers. In his plate the position of filaments and staminode in the phalanx is misrepresented.

Rao (1953, 1954) studying *Grewia* for India, validated *Paragrewia*, only later (1958) becoming aware of its true identity. It is rather fortunate that only a single species occurs in both India and Vietnam, for he made a nomenclatural mess of things.

More acceptable are some other taxa described. Ridley (1920, 1922) proposed *Leptonychiopsis* Ridley with as the only species *L. parviflora* Ridley. This was reduced with some doubt by Van Steenis (1976) to *Leptonychia* cf. *heteroclita*, a synonym of *L. caudata*. Because of the variability of the number of locules in the ovary he suggested that there might be a similar variability in the floral parts. The first has been observed by previous authors both in Asian and African material, but the second never. We have examined a great number of flowers, but we agree with his observation that the number of locules may vary, but that the number of sepals and petals does not. Trimerous flowers, together with exceptionally small petals, have only been seen in the type specimen and *KEP-FRI 7803* (*Cockburn*). The latter was collected about 45 km away from the former, so it would seem that this is a very local taxon.

Elmer (1908) described *Grewia banahaensis*, which Merrill (1909) correctly transferred to *Leptonychia*. The first mentioned the alternating (inner) staminodes, the second remarked on the absence of the outer ones (which feature by omission is corroborated by the first author). In later publications Merrill (1929, 1934) very much doubted the distinctness of the taxon. We have the impression that it is indeed distinct, both in a minor character of the basal inframarginal nerves, which appears to hold true in all Philippine material we have seen, and in the absence of the outer staminodes in the single flower we were able to inspect. Moreover, specimens from New Guinea lack the staminodes as well. This is never the case in the West Malesian and continental Asian material, while their presence or absence is of specific value in Africa. We have therefore maintained *L. banahaensis* as a distinct species with a vicariant variety in New Guinea and the Key Islands.

Notwithstanding several reports, probably all copied from Masters, the genus does not occur in Java. In Sumatra it seems to go no further South than the West Coast and Palembang Provinces.

Roxburgh (1814, 1832) said that his *Grewia heteroclita* Roxb. (cultivated in the Calcutta Botanical Gardens) came from the Moluccas. However, only a single other

collection from that area has come to our attention. This is *Jaheri s.n.* (A° 1888; L) from the Key Islands, where the first known collections were made in 1824, so after Roxburgh's publications. Because of its provenance so close to New Guinea and the minute domatia, we think that this collection belongs to *L. banahaensis* var. *papuana*. This species lacks the exterior staminodes, while Roxburgh mentioned their presence in his specimen: 'Stamina ... with a sterile filament'. In a presumed isotype (P) they are indeed present, although there were two to each phalanx. The number of staminodes per phalanx is variable, however, as was remarked before.

Dr. K. Iwatsuki (TI; in lit.) has reported a collection of *Leptonychia* from Ceram, but we have not seen it.

It is not impossible that Roxburgh's material actually came from the Malaysian Peninsula, e.g. Penang, the only locality mentioned by G. Don (1831). Such an erroneous provenance was also given by Roxburgh for e.g. *Wallichia* Roxb. and the type of *Agathis dammara* (Lamb.) L.C.M. Rich. (see Veldkamp & De Laubenfels, 1984).

The derivation of the arilloid is not quite clear. Schumann (1900) thought that it probably originated from the micropyle. Whether this is correct could not be ascertained due to lack of suitable material. It is attached opposite to the funicle, on the other side of the \pm ellipsoid seed, leaving a small scar when dissected. In Oudemans' fig. 11 this is probably what he thought was the hilum, while he also depicted a raphe. However, if the arilloid is indeed micropylar a raphe could not be there.

As far as known the radicle generally points to the micropyle, but here it is directed towards the upper pole of the seed, where no trace of a micropyle can be seen. Dr. W.A. van Heel (L, oral comm.) has informed us that in the Sterculiaceae (e.g. *Sterculia*) the direction of the radicle does not always indicate the place of the micropyle, so it might be possible that we have another exception here.

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LEPTONYCHIA

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- Paragrewia* Gagnep. [Fl. Gén. I.-C., Suppl. (1945) 459, nom. inval. sine descr. lat.] ex Rao, J. Bomb. Nat. Hist. Soc. 51 (1953) 671; Rao, ibid. 55 (1958) 376. — Type: *Paragrewia poilanei* Gagnep. ex Rao [= *Leptonychia caudata* (G. Don) Burret].

(Description for Southeast Asia, only).

Small shrub to tree, branching monopodially. Innovations stellately pubescent and velutinously simple-hairy. *Leafblades* simple, entire, triplinerved, domatia present.

Inflorescences axillary, cymose, 1–many-flowered. Bracteoles absent. *Flowers* bisexual, actinomorphic, 3- or 5-merous. *Sepals* reduplicative. *Petals* induplicative, shorter than the sepals. *Stamens* in three whorls. *Filaments* connate at base into a short annulus. Outer stamens 0–15, when present staminodial, epipetalous, inserted outside and in between each pair of the middle stamens, filiform, 1–3 together. Middle stamens fertile, 10, in 5 epipetalous pairs, one slightly longer than the other. Inner stamens episepalous, inserted on the inner side of the annulus, usually as small staminodial, solitary, fleshy bodies. *Ovary* 2–5-locular. Style 1, stigma 2–5-lobed. *Ovules* in 2 axillary rows, ascending, apotropous, 2–several per locule. *Capsule* pointing up, septi- and/or loculicide, 2–5-valvate, woody; the endocarp chartaceous, shiny, straw-coloured. *Seeds* with an ariloid originating opposite the funicle, not completely enveloping the seed, thin, nerved, red (i.v.); testa smooth, shiny brown to black. Endosperm copious, fleshy, no oil drops. Embryo straight; radicle pointing up, stout, cotyledons dorsoventrally flattened, thin, cordate to suborbicular.

Distribution. About 45 species, mostly in Africa, 3 in Southeast Asia.

Ecology. Primary and secondary lowland forests, swamp forests, kerangas, up to 1300 m alt. in Sumatra and S. India.

KEY TO THE TAXA

- 1 a. Sepals 5 2
 b. Sepals 3. *S. Johore* 3. **L. parviflora**
 2 a. Inframarginal nerves indistinct, but \pm well-developed and \pm straight before passing into the loops of the marginal nervature. Staminodes present. *Continental Asia, Malaya, Sumatra, Borneo* 2. **L. caudata**
 b. Inframarginal nerves indistinct, almost immediately passing into the loops of the marginal nervature. Staminodes absent 3
 3 a. Leaves with 3–5 pairs of lateral nerves; domatia distinct, 0.2–0.5 mm long, usually with some small hairs around them. *Philippines*
 1a. L. banahaensis var. banahaensis
 b. Leaves with 5–7 pairs of lateral nerves; domatia inconspicuous, 0.15–0.3 mm long, glabrous. *New Guinea, Key Islands*
 1b. L. banahaensis var. papuana

1. *Leptonychia banahaensis* (Elm.) Merr.

a. var. *banahaensis*

Leptonychia banahaensis (Elm.) Merr., Philipp. J. Sc. 4 (1909) Bot. 291; Enum. Philipp. Fl. Pl. 3 (1923) 48; Burrett, Notizblatt Bot. Gart. Berlin-Dahlem 9 (1926) 728; Merr., Contr. Arnold Arbor. 8 (1934) 103. – *Grewia banahaensis* Elm., Leaf. Philipp. Bot. 1 (1908) 319. – Type: *Elmer 7569* (PNH †, n.v.; L), Philippines, Luzon, Prov. Tayabas, Lucban, Mt Banahao, 800 m alt., May 1906.

Small shrubs or treelets, 1.5–7 m high. Innovations yellowish velutinous, young branches stellate velutinous, soon glabrescent to glabrous, bark then blackish-brown

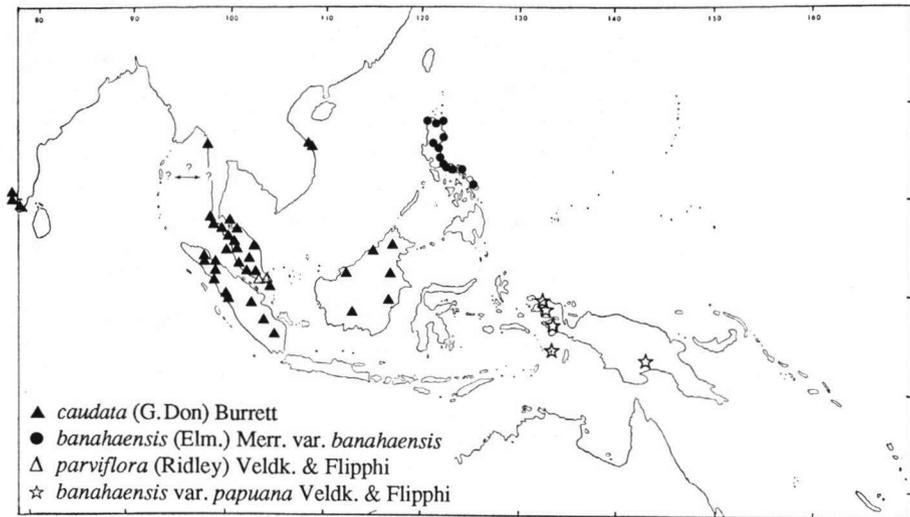


Fig. 1. Distribution of four taxa of the genus *Leptonychia*.

with a fine reticulate structure (i.s.), lenticels small, dot-like. Stipules early fugacious, triangular-oblong to lanceolate, up to 2 mm long, appressed pubescent. Petioles 8–13 by 0.75–1.3 mm diam., distally slightly thickened, stellately velutinous to glabrous. *Blades* oblong, 7–more than 16 by 3–5.3 cm, herbaceous, base cuneate, acute to slightly rounded, margin shallowly undulate upward, apex caudate, acumen 2–more than 3.5 cm long, basal inframarginal nerves usually similar to the marginal looping nervature, lateral nerves 3–5 on each side, above with a \pm inconspicuous nervature, main nerves immersed, glabrous, brown (i.s.), beneath with prominent nervature, sparsely stellate hairy to \pm glabrous, olive brown, domatia annular, crateriform, or cupuliform, pore round or ovate to oblong, 0.2–0.5 by 0.1–0.25 mm, usually with some simple erect hairs to surrounded by these, or glabrous. *Cymes* axillary, solitary, 1–6-flowered. Bracts triangular, c. 0.5 mm long. Pedicels articulated \pm in the middle, c. 6 by 0.5 mm diam., elongating and thickening in fruit, up to 18 by 1.5 mm diam., densely stellate hairy. *Sepals* 5, lanceolate, c. 6.75 by 1.25 mm, acute, fleshy, blackish (i.s.), outside moderately stellate hairy, inside velvety along the margins, moderately so in the midline and at base, on the spaces in between with some small papils. *Petals* 5, oblong, 1.75–3 by 1.25–1.5 mm, base rounded, claw minute, apex truncate, irregularly undulate, stiff hairy, outside with a few stellate hairs, inside also along margins and to the apex, membranous, brown (i.s.). Outer *staminodes* absent. *Stamens* 10, annulus c. 1 mm high; filaments c. 4 mm long; anthers c. 0.6 mm long. Inner staminodes 5, inserted below the rim of the annulus, triangular, c. 0.4 mm long, fleshy. *Ovary* obovoid, c. 1.75 by 1.1 mm diam., densely hairy, 2–4-locular; style c. 3 mm long, sparsely hairy; stigmas punctiform. *Capsules* globose, apiculate, 2–4-valvate, up to 2.3 cm diam. (i.s.), densely

pusticulate, stellate velutinous to glabrous, greyish green to green; endotesta straw-coloured, shiny (i.s.). *Seeds* 1 or 2 per locule, ellipsoid, up to 15.5 by 7.5 mm diam.; ariloid not completely enveloping the seed, white (i.s.); testa chestnut brown, shiny (i.s.); radicle stout, c. 2 mm long; cotyledons suborbicular, c. 8.5 by 8 mm.

Distribution. Philippines: Luzon (see Merrill, 1923, add Isabela), Samar (fide Merrill, l.c.). Fig. 1.

Ecology. Primary forest, 180–800 m alt.

Vernacular names. Baniakan (Ibn.), maladanglin (Tag.), malatungas (S.L.Bis.), musar (Tag.).

Collector's notes. Ultimate branches lax, slender, divaricate. Bark brown. Wood hard. Leaves not numerous, scattered, upper margins obscurely undulate. Flowers yellowish green; calyx leathery, brown puberulous, segments radially spreading. Fruits green. Seeds black and white, aril red. (Mainly after Elmer, 1908.)

Notes. The description of the flower is based on *BS 12473 (Loher)*, the only specimen seen with flowers, and on the original description by Elmer.

The domatia are not always present, e.g. apparently totally absent in *Merrill Phil. Pl. 1937 (Ramos)* (L, P).

Very similar to *Leptonychia caudata*, especially differing by the hardly developed basal inframarginal nerves, the smaller number of lateral nerves and the absence of the outer staminodes.

b. var. papuana Veldk. & Flipphi, var. nov. — Fig. 2.

Leptonychia glabra auct. non Turcz.: P. Royen, Man. For. Trees P.N.G. 3 (1964) 24.

A varietate typica laminis domatiis inconspicuis ad quasi absentibus glabris, poris 0,15–0,3 mm longis 0,15–0,2 mm latisque, nervis lateralis pluribus differt. — *Typus:* *Aet 24 (Exp. Lundquist)* (L, holo; BO, n.v.), New Guinea, South McCluwer, Muturi near Babo, 5 m alt., 11 May 1941.

Blades with (4 or) 5–7 lateral nerves on each side, domatia punctiform, pore round, 0.15–0.3 by 0.1–0.2 mm, glabrous.

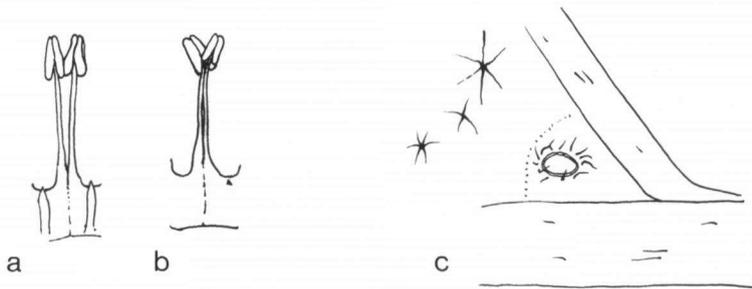


Fig. 2. *Leptonychia banahaensis* (Elm.) Merr. var. *papuana* Veldk. & Flipphi. Variability in the phalanges of the stamens (inside view). a. Inner staminodes distinct x 10 (*NGF 8069*); b. inner staminodes virtually absent, x 10 (*Aet 11*); c. domatium, x 30 (*van Royen 3161*).

Distribution. Moluccas: Key Islands; New Guinea: Irian Jaya (Vogelkop), Papua New Guinea (Gulf Dist.). Fig. 1.

Ecology. Primary and secondary lowland forest, swamp forest, locally common.

Collector's notes. Shrubs to trees, 9 m high. Leaves dark green, shiny above. Flowers axillary, fascicled, yellowish green, light yellow. Fruit green, glaucous.

Vernacular names. Agmauwin (Maibrat), teomi (Kiwai).

Notes. The only record from the Moluccas is *Jaheri s.n.*, which is in fruit. The domatia are as in the present taxon, while in its provenance it is also more fitting. This is the only verified record from the Moluccas (see Introduction).

Only once collected in Papua New Guinea near Middletown along the Seribi River (NGF 8069, *Floyd, Gray & Middleton*).

2. *Leptonychia caudata* (Wall. ex G. Don) Burret – Fig. 3.

Leptonychia caudata (Wall. ex G. Don) Burret, Notizblatt Bot. Gart. Berlin-Dahlem 9 (1926) 729. – *Grewia caudata* Wall. [Cat. (1829) nr. 1099, nomen] ex G. Don, Gen. Hist. Dichl. Pl. 1 (1831) 547. – Type: Wallich Cat. 1099 (LINN, holo, n.v.; K, L, P), Malaya, Penang, August or November 1822.

Grewia heteroclita Roxb. [Hort. Beng. (1814) 93, nomen] Fl. Ind. 2 (1832) 590. – *Leptonychia heteroclita* Kurz, J. As. Soc. Beng. 39, 2 (1870) 67; For. Fl. Br. Burma 1 (1877) 150; K. Schum. in E. & P., Nat. Pfl. Fam. III, 6 (1890) 86 (pro comb. nov.); in Engl., Mon. Afr. Pfl. Fam. 5 (1900) 94; Merr., Enum. Born. Pl. (1921) 378; Craib, Fl. Siam. Enum. 1, 1 (1925) 180; Burret, Notizblatt Bot. Gart. Berlin-Dahlem 9 (1926) 729, 730, 732; Merr., Contr. Arnold Arbor. 8 (1934) 103; Burkill, Dict. Econ. Prod. Mal. Pen. 2 (1935) 1334; Steen., Blumea 23 (1976) 139. – Type: *Hb. Roxburgh s.n.* (BM, holo, n.v.; P), Moluccas (but see note), cultivated in Calcutta.

Leptonychia glabra Turcz., Bull. Soc. Imp. Nat. Moscou 31 (1858) 223; Oudemans, C.R. Ac. Roy. Sc. II, 1 (1865) 1, fig. [copied by Walp., Ann. 7 (1868) 449]; Benth. in Benth. & Hook.f., Gen. Pl. 1 (1867) 983; Masters in Hook.f., Fl. Br. Ind. 1 (1874) 379; Kurz, For. Fl. Br. Burma 1 (1877) 150; King, J. As. Soc. Beng. 60, 2 (1892) 94; Brandis, Ind. Trees (1906) 92; Backer, Schoolfl. Java (1911) 146; Ridley, Fl. Mal. Pen. 1 (1922) 289; Burret, Notizblatt Bot. Gart. Berlin-Dahlem 9 (1926) 730. – *Leptonychia glabra* var. *glabra*: King, J. As. Soc. Beng. 60, 2 (1891) 95 (by implication, see *L. acuminata*, below). – Type: *Lobb 418* (CW, holo; K, n.v.; L), Singapore, 1852 (?).

Turraea trichostylis Miq., Fl. Ind. Bat., Suppl. 1 (1860) 195 ('*trichostyla*'), 502. – *Binnendykia trichostylis*, Kurz, Nat. Tijdschr. Ned.-Ind. III, 3 (1865) 164. – Type: *Teijsmann s.n.* (L, nr. 908.242-310, holo; P), Sumatra, Palembang, Muara Dua, Ogan Ulu.

Grewia acuminata Bedd., Madras J. III, 1 (1864) 38; Trans. Linn. Soc., London, Bot. 25 (1866) 210, pro sp. nov.; Masters in Hook.f., Fl. Br. Ind. 1 (1874) 393, sp. dub.; non Juss. (1804). – *Leptonychia acuminata* Burret, Notizblatt Bot. Gart. Berlin-Dahlem 9 (1926) 727, non Masters (1874). – Type: *Beddome s.n.* (?), holo, n.v.), India, Madras, Anaimalai Mts., Wynad, Devallicottah, 915 m alt. (same locality as next one, different altitude; no material found in BM, see note).

Leptonychia moacurroides Bedd., Fl. Sylv. Madras Presid. 1 (1869) 114, f. 114 (nom. nov. for *Grewia acuminata* Bedd., non Juss.?, see note); Masters in Hook.f., Fl. Br. Ind. 1 (1874) 379; Gamble, Fl. Presid. Madras. 1 (1915) 112; Rao, J. Bomb. Nat. Hist. Soc. 55 (1958) 377; Subramanyam & Henry, Bull. Bot. Surv. India 12 (1972) 3. – Lectotype: *Beddome 687* (BM, holo), India, Madras, Carcoor Ghat in the Wynad, 1220 m alt. (here appointed) (Bot. Surv. India photo 1957).

Leptonychia acuminata Masters in Hook. f., Fl. Br. Ind. 1 (1874) 379, non Burret (1926). — *Leptonychia glabra* var. *mastersiana* King, J. As. Soc. Beng. 60, 2 (1891) 95; Ridley, Fl. Mal. Pen. 1 (1922) 289. — Type: Maingay [? 3001 = KD 251 (K, holo, n.v.; L: the specimen does not quite fit the original description, it may be a duplicate of the Maingay collection mentioned by Masters also under *L. glabra*, but the staminodes are filiform)], Malaya, Malacca, 1868.

Paragrewia poilanei Gagnep. [Fl. Gén. I.-C., Suppl. (1945) 459, t. 55, f. 1–7, nom. inval.: descr. franc.] ex Rao [J. Bomb. Nat. Hist. Soc. 51 (1953) 671, f. 1–9, nom. inval.?] J. Bomb. Nat. Hist. Soc. 52 (1954) 190. — Type: Poilane 31768 (P, holo), S. Vietnam, Prov. Quang Nom, Mòi de Mang Tra village, c. 1500 m alt., 26 January 1941 (see note).

Shrubs or treelets, 0.6–12 m high. Innovations white to yellowish velutinous, sooner or later glabrescent to glabrous, bark then olive- to black-brown, with a fine reticulate structure (i.s.) and black lenticels. Stipules lanceolate, broadly sessile, 2–5.6 by 0.5–1.5 mm, apex acute, outside velutinous, inside glabrous. Petioles pulvinate in the upper half, 4–11(–13) by 0.9–1.7 mm diam., velutinous to glabrous. *Blades* ovate or obovate to ovate- or obovate-lanceolate, 4.5–22 by (1.2–)1.5–6.5 (–8) cm, herbaceous, base acuminate to obtuse, margin obscurely undulate, apex acute to caudate, acumen 1–3 cm long, outer inframarginal pair of nerves inconspicuous, but usually at least initially quite distinct from the looping marginal nervature, lateral nerves in 3–8(–9) pairs, above with little prominent nervature,

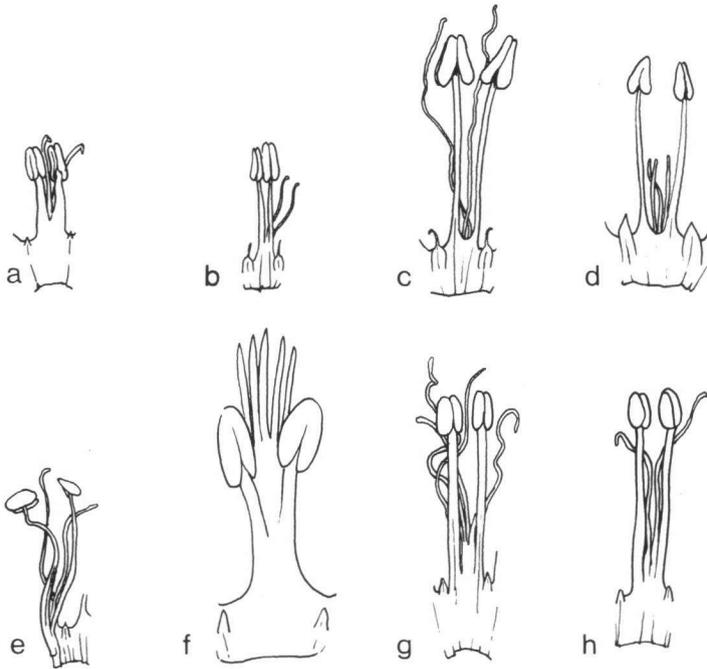


Fig. 3. *Leptonychia caudata* (G. Don) Burret. Variability of the phalanges of the stamens (inside view). a. Haviland 610; b. KEP 76074; c. Kato et al. B-11793; d. SAN 25896; e. SAN 30583; f. S 36669; g. Veldkamp 8300A; h. Veldkamp 8300B. All x 10.

glabrous, underneath with prominent nerves, nearly glabrous to velutinous with stellate hairs and especially on the nerves with simple curved hairs and sometimes with minute red papils, at least the axils of the principal nerves usually with \pm translucent, annular to crateriform, sometimes triangular domatia, pore circular to oblong, 0.25–0.6 by 0.25–0.5 mm diam., its margin glabrous to pubescent with simple and stellate hairs. *Cymes* axillary, solitary, 1–7-flowered. Bracts ovate to triangular-oblong, 1.2–3 by 0.5–1 mm, subglabrous to velutinous outside. Pedicels articulated in the middle, 2.5–6.25 by c. 0.4 mm diam. *Sepals* 5, ovate to oblong, shortly connate at base, (3–)5–8(–10.5) by 1–2(–3) mm, fleshy, outside stellately hairy, inside sometimes velvety at base, margins with a velvety rim, surface appressed strigose and papillose, sometimes with a distinct hairy midline, to papillose only. *Petals* 5, shortly clawed, \pm concave, \pm rectangular, (1–)1.5–2.25 by (0.7–)1–1.6(–2.1) mm, outside glabrous to sparsely hairy, cohering by their hairy margins, apex obtuse to emarginate to 2- or 3-dentate. The outer *staminodes* (solitary or) 2–5 together, sometimes connate at base, filiform, twisted, 1.8–7 mm long, 0.5–1.5 times as long as the filaments. *Stamens* 10; annulus \pm 1 mm high; filaments 1.2–5 mm long; anthers ovoid to sagittiform, 0.75–1.6 mm long. Inner staminodes 5, usually \pm completely connate to the annulus, apex triangular, rarely filiform, up to 0.75 mm long, fleshy. *Ovary* 2–5-locular, \pm globose, 0.7–1.8 mm diam. *Style* 2–6 mm long, sparsely hairy, glabrescent upwards, hooked back below the apex to straight, stigma indistinctly 2–5-lobed. *Capsule* 2–5-valvate, \pm globose, shortly acuminate, 10–22 by 10–18 mm diam., finely verrucose outside, sometimes densely yellow velvety, greyish green or blackish brown; endocarp \pm separating from the valves, chartaceous, shiny, straw-coloured (i.s.). *Seeds* 1–3 per fruit, ellipsoid to obovoid, 11–13 by 6–9 mm diam., testa shiny black, smooth.

Distribution. India: Kerala (Coimbatore Hills, Nilambur), Tamil Nadu [Anaimalai Hills (but not mentioned by Ellis, Bull. Bot. Surv. India 10, 1968, 149–160), Tirunelveli Hills, Courtallum (Masters)], South Andamans (Kurz, 1877; the only collection seen by us was *Helper KD 658*, which may have come from either here or Tenasserim; the present species was cited as two distinct ones by Kurz, one from each area, Masters cited a *Helper* collection for Tenasserim, only); Burma [Salween (fide Rao, 1953), Moulmein, fide Masters), Tenasserim (fide Kurz)]; Vietnam (Quang Nam–Da Nang); Peninsular Thailand (Ranong, Surat, Phuket, Nakohn Si Thammarat, Trang, Satun, Narathiwat, Pattani); Malesia: Sumatra (Aceh, Tapanuli, West and East Coast, Indragiri, Jambi, Palembang), Malaya (all states except Langkawi, Kelantan, Negeri Sembilan, but to be expected in the latter two), Sarawak, Brunei, Sabah, Kalimantan (Pontianak, Central to East). Fig. 1.

Reported for the Moluccas (Roxburgh, 1814, 1832), Celebes (Burkill, 1935), and Java (Masters, 1874; Schumann, 1900; Backer, 1911, in dub.), the first two areas may not be ruled out, the latter is erroneous.

Ecology. Primary and secondary forest, kerangas, peat swamps, lowland, occasionally up to 1300 m alt. in Sumatra.

Collector's notes. Undershrub or treelet (also reported as a climber, which seems unlikely), 1–12 m high, bole crooked to straight, up to 20 cm diam. Bark grey, mottled, dark green, light to dark brown, rust red, purplish, with fine

lenticels, smooth, rarely fissured; inner bark pale greenish, green with brown rays and white patches, yellowish, brownish; cambium pale, white, red; sapwood medium hard, white, yellowish. Branches spreading, light brown. Leaves distichous, mid- to darkish green, shiny, slightly plicate above. Inflorescences of bundled pendulous flowers. Flowers whitish to greenish in bud, stellate when open, fragrant or not (Kurz, 1865). Sepals recurved, green to light yellow with a silvery tinge. Petals irregular, greenish, white, whitish yellow, cream. Filaments erect, pale green, white, light yellow; anthers white, yellow, orange. Pistil green, style white, light yellow; stigma light yellow, brown. Fruits pointing up, at first yellowish, then pale green to glaucous, ultimately blackish when ripe, lobed. Seeds dangling from a short funicle, black, shiny, covered for halfway to 3/4ths by the thin, firm orange- to bright red, scarlet arilloid.

Vernacular names. Bungsi (Iban), ceremai hantu, c. burung, demang, galan, jarum, (Malaya), karai (Malay, Sabah), kayu balut² (Toba), k. lilin (Belayan), mengkelah (Malaya), pakan manok (Dohoi, C. Kalimantan), rubiyo (Jambi), rungut² (Dusun), sekincak, selusoh semang (Malaya), setaja hitam, sibassa (Palembang), tingau (for tinjau?: Malaya).

Uses. The roots may be made into a decoction to be taken during childbirth and for fever. The leaves may be used as a poultice for ulcerated noses and their juice as a cooling lotion in fever (Burkill, 1935). Pounded leaves are applied on the stomach against stomach ache (*Van Balgooy* 2422, Pahang, Taman Negara).

Notes. Beddome (1864, 1866) described *Grewia acuminata* which is a later homonym of *Grewia acuminata* Juss. (1804). No specimen bearing Beddome's combination seems to exist, as was also observed by Masters (1874, p. 393). As Beddome (1871) gave a virtually identical description of *Leptonychia moacurroides* mentioning among others the same provenance as that of *Grewia acuminata* Bedd. we suspect that he actually changed the specific epithet having become aware of the homonymy. The main argument against this assumption is that on his original sheets (BM) there is no mention of *G. acuminata*, while the altitude is given as 4000 ft and not 1000 to 3000 as in the text.

The nomenclature of *Paragrewia poilanei* Gagnep. is rather curious. It was described in the Tiliaceae by Gagnepain based on *Poilane* 31768 (from S. Vietnam), but in French and after 1935, hence invalidly published. Rao (1953) identified specimens from Burma and S. India with it, admitting that he had not seen Gagnepain's specimen. Although he explicitly said that he gave a Latin description for the genus only and an English one for the species based on Indian material Art. 42.1 seems to apply and both the name and the combination appear to have been validly published here. Or is it? It is of little importance in the present case, anyway, for in 1954, still not having seen *Poilane* 31768, he translated the specific description into Latin, so the combination has been validated anyway. In 1958 he finally had seen the specimen and also had realized that *Paragrewia poilanei* was 'nothing but *Leptonychia moacurroides* Bedd.', a Sterculiaceae. Indeed a single species was involved, otherwise the nomenclatural situation would be rather complicated as the interested reader will realize.

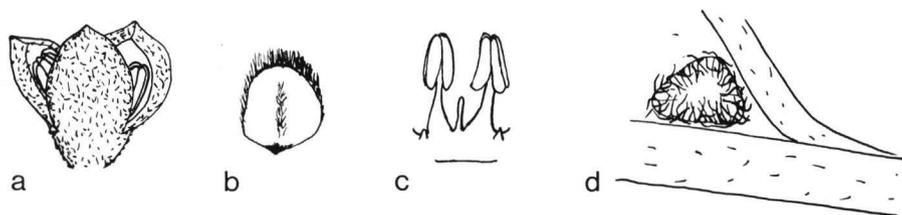


Fig. 4. *Leptonychia parviflora* (Ridley) Veldk. & Flipphi. a. Young flower, x 10; b. petal, x 40; c. phalanx of stamens (inside view), x 12; d. domatium, x 30 (KEP-FRI 7803).

3. *Leptonychia parviflora* (Ridley) Veldk. & Flipphi, *comb. nov.* – Fig. 4.

Leptonychiopsis parviflora Ridley, J. Str. Br. Roy. As. Soc. 82 (1920) 173; Fl. Mal. Pen. 1 (1922) 290. – *Leptonychia cf. heteroclita* Kurz: Steen., Blumea 23 (1976) 139. – Type: Ridley 3743 (Mat) (SING, holo, K: photocopies of both in L), Malaya, Johore, G. Pulai, 1892.

Small trees, height unknown. Innovations greyish velutinous, glabrescent to glabrous, bark then olivebrown, with a fine reticulate structure (i.s.), no lenticels seen. Stipules triangular, soon deciduous, broadly sessile, ca. 4 by 1.5 mm, acute, outside velutinous, inside glabrous. Petioles pulvinate in the upper half, 6–11 by 1–2 mm diam., yellowish velutinous. *Blades* obovate-oblong, 11–18 by 5–7.5 cm, herbaceous, base rather broadly cuneate, apex abruptly caudate, acumen 2–2.5 cm long, outer inframarginal pair of nerves inconspicuous, but at least initially quite distinct from the looping marginal nervature, lateral nerves in 8 or 9 pairs, above with little prominent nervature, glabrous, underneath with prominent nerves, sparsely appressed pubescent with stellate and especially on the nerves with small, curved, simple hairs and some minute red-tipped papils, domatia crateriform, pore ovoid to triangular, 0.25–7.5 mm diam. *Cymes* axillary, solitary, 1–3-flowered. Bracts triangular-oblong, 1.5 by 0.3 mm, as the stipules. Pedicels articulated in the middle, c. 5 by 1 mm diam. *Sepals* 3, elliptic to obovate, shortly connate at base, c. 4 by 2 mm, fleshy, outside stellately velvety, inside velvety in the lower third, otherwise with some minute red papils, margins with velvety rims. *Petals* 3, apert, \pm cupular, \pm circular, c. 0.5 mm diam., margin pubescent, not cohering, otherwise subglabrous. The outer *staminodes* solitary or paired, filiform, twisted, c. 3 mm long, about as long as the filaments. *Stamens* 6; filaments c. 3 mm long; anthers \pm ovoid, c. 0.9 mm long. Inner staminodes 3, inserted on the annulus, triangular. *Ovary* 3-locular, \pm obovoid, c. 0.5 mm diam., ovules 2 per locule. *Style* c. 2.5 mm long, long hairy in the lower half, stigma 3-lobed. *Capsule* (immature) 3-valvate, \pm obovoid and shortly acuminate, c. 9 mm diam., finely verrucose outside, densely greyish velvety *Seeds* not seen.

Distribution. Malaya, S. Johore (G. Panti, G. Pulai). Fig. 1.

Ecology. Disturbed hillside forest at 30 m alt. Probably similar to that of *L. caudata*.

Anatomy. Van Steenis (1976) reported an anatomical study by Dr. P. Baas, Leiden, who kindly allowed us to quote his observations: 'The anatomy of *Ridley 3743* was compared with that of a specimen of *L. caudata* (*Burkill 1867*, Johore, Kuala Sedili; L). Leaves with stellate to tufted hairs, with infrequent (*Ridley 3743*) to frequent (*Burkill 1867*) glandular uniseriate hairs and with unicellular thick-walled non-glandular hairs. Petiole with mucilage cavities, crystals solitary to clustered, vascular stele more or less closed. Stomata anisocytic to complex anisocytic. Lamina with large, bulging epidermal cells and little chlorenchyma. The anatomy is so similar that the view is strongly supported that these specimens belong to the same genus. Conspecificity is not certain because the frequencies of the different hair types are so different in the two specimens.'

Collector's notes. Small tree. Fruits green, white hairy.

Note. Very similar to *L. caudata*, but significantly different by the 3-merous flowers and the minute petals (see Introduction).

INDEX OF COLLECTORS

Only numbered collections have been included. Collections cited in literature, but not seen, have their probable identity between brackets.

- A 46 (Kadir), 2346 (Cuadra): 2 – Adduru 257, 276 – Aet 11, 24: 1b – Agama 9460 – Alston 13235, 13237 – Amdjah 393, 618: 2; see also Nieuwenhuis – Amin, Ampuria, see SAN-series – Anderson, see S-series – Angian 10297: 2 – Asah, Ashton, see S-series – Asri, see KEP-FRI-series.
- Balgooy, van 2422, 2471: 2 – Banang, see SAN-series – Banyeng or Banying, see S-series – Bangham 1158: (2) – Bartlett & LaRue 208 – Beccari 656, 695 – Beddome 685, 686, 687, 688, 689: 2 – van Beusekom & Phengkhlai 867: 2 – BF 22327 (Mariano), 26877 (Villaflor): 1a – Binideh, see SAN-series – BKF 12125 (Hansen & Smitinand), 35992 (Sangkhachand & Nimanong), 36188 (Sangkhachand), 36207 (id.), 37177 (Phengnaren), 39934 (Hansen & Smitinand), 51810 (Suvanakoses): 2 – Brooke 9009, 9960, 10891: 2 – BS 1894 (Native Coll.): (2); 1937 (Ramos), 22100 (id.), 27252 (id.), 28132 (Fénix), 34145 (Ramos & Edaño), 41858 (Ramos): 1a – Bünnemeijer 567: 2 – Bujang, see S-series – Buntar, see SAN-series – Burkill 1867: 2 – Buwalda 6481, 7577: 2 – BW 7382 (Versteegh), 12253 (Schram): 1b.
- Chai, see S-series – Chan, see KEP-FRI-series – Charington, see SAN-series – Chelliah, Cheng, see KEP-FRI-series – Chew 53, 306, 641, 1195, 1338: 2 – Chin 2567, 2713, 2754: 2; see also KLU-series – Chin & Sider 1296: 2 – Chow, see SAN-series – Clemens 4014: 2, 11152: (2), 21100, 21342: 2 – Cockburn, see KEP-FRI-series – Cuadra, see A-series – CU 34021 (Mathew): 2 – Curtis 407, 1523: 2.
- Danimihardja 2228: 2 – Dewol, see SAN-series.
- Edaño, see BS-series – Elmer 7569, 20817: 1a – Endert 2989, 3050, 3458, 5102, 5405: 2 – Everett, see KEP-FRI-series.
- Fedilis, see SAN-series – Fénix, see BS-series – Flemmich, see KEP-series – Floyd, see NGF-series – Forbes 1458, 2616, 2834, 2949a – Forman 451, 453, 461: 2.
- Gansau, see SAN-series – Geesink et al. 7503, Geesink & Santisuk 4957, 5363: 2 – George, Ghazalli, see S-series – Gibbs 2804: (2) – Gibot, see SAN-series – Gutierrez, see PNH-series.
- Hallier f. 1390, 2280, 2834, 2985: 2 – Hansen, see BKF-series – Hardial & Sidek 447: 2 – Hassan Kadim 9: 2 – Haviland 610, 713, 983: 2 – Helfer KD 658 – Hennipman 3715, 3731: 2 – Hotta 13075: 2. – Ding Hou 656, 658: 2.
- Ismaël, see KEP-series – Ismawi, see S-series – Iwatsuki et al. TS 470: 2.
- Jacobs 5184, 5225: 2 – Jugah, see S-series.

- Kadim & Noor 125, 143: 2 – Kadir, see A-series – Karim, see SAN-series – Kato et al. B-11793, 11898: 2. – KEP 34449 (Flemmich), 76074 (Wood), 85252 (Kochummen), 97937 (Ismaël): 2 – KEP-FRI 2158 (Kochummen), 2639 (id.), 2776 (id.), 2977 (id.), 3525 (Whitmore), 6592 (Chelliah), 6699 (Chan): 2; 7803 (Cockburn): 3; 8819 (Whitmore), 11580 (Suppiah), 11920 (id.), 12848 (Whitmore), 13724 (id.), 13860 (Everett), 14698 (Sohadi), 15183 (Whitmore), 15923 (id.), 16772 (Kochummen), 17617 (Chan), 19958 (id.), 23337 (Cheng), 25005 (Chan), 25510 (Asri): 2 – Kerr 7613, 12170: 2 – Kiah, see SF-series – King's Collector 441, 1295, 1997, 5360: 2 – KLU 11089 (Stone), 11797 (Stone), 13842 (Stone & Chin), 14034 (Stone): 2 – Kochummen, see KEP-, KEP-FRI-series – Korthals 115, 119: 2 – Kostermans 75/76, 4883, 5742, 6828, 7956, 12066, 13432, 13436, 13789, 14014, 14080, 21126, 21298: 2 – Kumin, see SAN-series.
- Lee, see S-series – Leighton 1744: 2 – Lobb 418: 2 – Loher 12473: 1a – Lörzing 5738, 5844, 6357, 6706, 7353, 14123: 2 – Ludong, see S-series.
- Madani, see SAN-series – Main 488: 1b – Maingay KD 251 = 3001: 2 – Maradjo 117: 2 – Mariano, see BF-series – Martin, see S-series – Maskuri 297, 793, 1120: 2 – Mat, see Ridley – Mathew, see CU-series – Maxwell 84-475, 85-146, 85-865: 2 – Meebold 16898: (2) – Meijer 200, 3800, 3950: 2; see also SAN-series – Mogeia 3472, 3523, 4135, 4387: 2.
- Native Coll. C-35: 2; see also BS-series – Nedi 736: 2 – NGF 8069 (Floyd et al.): 1b – Niel 4081: 2 – Nieuwenhuis 39, 497, 498: 2 – Nimanong, see BKF-series – Noor 42: 2 – Nooteboom 1616, 4185, 4718, 4858: 2.
- Ogata, see SAN-series – Othman, see S-series.
- Paie, see S-series – Phengnaren, see BKF-series – Phusomsaeng 458: 2 – Pitty, see SAN-series – Pleyte 374: 1a – PNH 8031 (Quisumbing), 78099 (Gutierrez), 78263 (id.): 1a – Poilane 31768: 2 – Posthumus 1028: 2.
- Quisumbing, see PNH-series.
- Rahmat si Toroes 213, 3522: 2 – Ramos 1518: 2; 1937: 1a; see also BS-series – Ridley 3743 (Mat): 3 – van Royen 3161: 1b.
- S 12827 (Ghazalli & Asah), 12982 (Bujang), 16402 (Anderson), 18284 (Ashton), 18525 (Chai), 20826 (Anderson), 21519 (Banying & Sibat), 22034 (Ashton), 22257 (Suib), 22933 (Paie), 22998 (Wright), 23371 (Suib), 27995 (Wright), 28059 (Paie), 28111 (id.), 28124 (Banying & Sibat), 28581 (Paie), 28624 (Anderson & Paie), 31666 (Anderson), 31841 (Banyang & Ludong), 32249 (Wright & Ismawi), 33180 (Chai et al.), 35984 (Paie & Jugah), 36669 (Martin & Ismawi), 37374 (Chai et al.), 38230 (Lee), 40077 (id.), 41210 (Othman et al.), 42854 (George et al.): 2 – Sadau, see SAN-series – SAN 17125 (Smythies et al.), 21277 (Meijer), 21372 (Singh), 22277 (Charington), 25896 (Buntar), 28400 (Meijer), 30583 (Gibot), 30601 (id.), 32851 (Ampuria), 33253 (Madani), 34178 (Ampuria), 35881 (Gibot), 36931 (Banang), 40213 (Ampuria), 40463 (Madani), 47805 (Gansau), 50489 (Sadau), 54495 (Gansau), 63275 (Pitty & Ogata), 65197 (Binideh), 68508 (Kumin), 75695 (Chow), 78210 (Dewol & Karim), 89840 (Fedilis), 90279 (Amin), 90614 (Gibot), 91393 (Fedilis & Sumbing), 95653 (id.), 95678 (id.), 95694 (id.), 96044 (Fedilis): 2 – Sangkhachand, see BKF-series – Sangkhachand et al. 1078: 2 – Schram, see BW-series – SF 34485 (Spare), 38985 (Kiah), 39359 (Sinclair), 39860 (Sinclair et al.): 2 – Shah 160, 168, 907, 1361, 1527: 2 – Sibat, see S-series – Sinclair, see SF-series – Singh, see SAN-series – Siriruga 937, 960a: 2 – Smitinand, see BKF-series – Smythies, see SAN-series – Sohadi, see KEP-FRI-series – Sørensen et al. 675: 2 – Spare, see SF-series – van Steenis 10050, 10080: 2 – Stone, see KLU-series – Suib, see S-series – Sumbing, see SAN-series – Suppiah, see KEP-FRI-series – Suvanakoses, see BKF-series.
- Tagawa et al T-6718: 2 – Teijmann 10928, 11336: 2.
- Vajravelu 60479: 2 – Veldkamp 8300A, B: 2 – Versteegh, see BW-series – Villaflor, see BF-series.
- Wallich 1099: 2 – Whitmore, see KEP-FRI-series – de Wilde & de Wilde-Duyfjes 12371, 12918, 13654, 14779, 15054, 15611: 2 – Winkler (Hans) 1196: 2 – Winkler (Hubert) 3338: 2 – Wiradinata 199, 591: 2 – Wood, see KEP-series – Wray 148: 2 – Wright, see S-series.