A REVISION OF AGANONERION PIERRE EX SPIRE, PARAMERIA BENTH. & HOOK. f. AND URCEOLA ROXB. (APOCYNACEAE)

DAVID J. MIDDLETON
Department of Botany, Trinity College, Dublin 2, Ireland

SUMMARY
The closely related genera Aganonerion, Parameria and Urceola are revised. One species of Aganonerion is recognised. Three species of Parameria are recognised and Parameriopsis is included in synonymy. Ecdysanthera, Chavannesia, Xylinabaria, Hymenolophus, Parabarium, Pezisicarpus, Xylinabariopsis and Chunechites are included in synonymy of Urceola in which 16 species are recognised. Within Urceola one new species is described.

INTRODUCTION
The genera Urceola, Parameria and Aganonerion constitute a closely related group within subfamily Apocynoideae of the Apocynaceae. The group composes the subtribe Urceolinae under the scheme by Pichon (1948, 1950) although he recognised a number of generic segregates, some of which he then excluded from the subtribe.

The largest of the three genera is Urceola, the history and composition of which has been discussed by Middleton (1994c). In that paper the genera Urceola, Ecdysanthera, Chavannesia, Parabarium, Xylinabaria and Xylinabariopsis were synonymised with Urceola taking priority. The position of Chunechites was left open as no material had been examined. Material of this genus has now been studied and it can be confirmed that there are no grounds for its maintenance separate from Urceola. The single species had already been placed in Xylinabariopsis (Ly, 1986) and Ecdysanthera (Li, 1990), genera which are now synonyms of Urceola. It would appear to be most closely related to Urceola napensis. Pezisicarpus is also inseparable from Urceola and, indeed, the single species P. montana is a synonym of Urceola minutiflora.

There are a number of problem areas in Urceola largely centred around the species found in Malesia and those from Indo-China, corresponding very roughly to the limits of the former Urceola and Parabarium respectively. Considerably more work has been done on the latter genus through the work of Spire (1905) and Ly (1978) who revised Parabarium. Ly insisted that Parabarium was separate from its related genera although subsequent authors largely included it in synonymy of Ecdysanthera until both genera were included in Urceola. His detailed work on morphology and anatomy resulted in the recognition of 16 species, a number of which also had varieties. Unfortunately many of the taxa he recognised have not been maintained here as it was felt that many of the characters used were insufficient to recognise distinct entities rather than normal variation within a species. I have not repeated the detailed

1) Present address: Royal Botanic Garden, Edinburgh EH3 5LR, Scotland, United Kingdom.
anatomical study conducted by Lý but the numbers of collections examined (most commonly only one per species) would leave one with serious concern whether observed differences between species were due to taxonomic differences rather than lack of sampling to detect infraspecific variation. Variation in leaf anatomy can be quite enormous in other genera and families and conclusions based on a small sample size can be misleading (see Middleton, 1993). I have not been able to observe some of the differences in hair type observed by Lý.

In Malesia the problems in recognising the species are quite considerable. Only *Urceola torulosa* in fruit is readily discernible and even then is frequently mistaken for a species of *Parameria*. *Urceola javanica*, *U. lucida* and *U. brachysepala* can be difficult to distinguish from each other at the extremes of variation of each species and *U. laevis* and *U. torulosa* are difficult to distinguish in flower.

There are few nomenclatural problems in the group except for some problems of typification. It was intended that a number of new combinations would be published by Middleton (1994c) and in that paper they were indicated as such. However, because of delays in publication two of the new combinations from that paper, *U. minutiflora* and *U. napeensis*, were actually published in Blumea a week or so earlier (Middleton, 1994b). Because of the necessity of having names in *Urceola* for the species occurring in China for the Flora of China some combinations were published earlier without any explanation of the generic questions in the group (Middleton, 1994a). It was indicated in this short communication that the list was preliminary and that not all the new combinations published may stand closer scrutiny and indeed this new work has reduced some of those species to synonymy. Care needs to be taken in interpreting a number of type specimens for the species published by Spire (1905) as his own collection numbers sometimes contain different species under the one number. For instance, *Spire 11*, the type number for *Parabarium vernetii*, has three specimens in the Paris herbarium representing *Urceola micrantha*, *U. latifolia* and *Parameria laevigata*. From Spire’s description and notes it is clear that the former is the type specimen for *P. vernetii*.

P.T. Li (1990) seems to regard the species published by Pierre (1902) as *nomina nuda* and he publishes some new combinations in *Ecdysanthera*. However, there appears to be no problem with the original descriptions to me and the original Pierre *Ecdysanthera* combinations did not need to be republished.

A glance at the list of synonymy for *Urceola* reveals that there have been a number of infrageneric groupings within *Urceola sensu stricto* and within *Parabarium*. These infrageneric taxa are not maintained. Within *Urceola* as previously defined there were two subgenera which have no basis whatsoever. Indeed the fruit and sepal characters used by Hooker (1882) to establish the subgenera do not hold up even for the species he cited under each. The scheme proposed by Lý (1978) for *Parabarium* has been found to be very unsatisfactory and some species placed in different subgenera and sections have now been synonymised under the same species, particularly *U. tournieri*. Middleton (1994c) noted that there were two recognisable groups although these groups could not be recognised as distinct taxa. This further work supports that conclusion. The two groups correspond more or less to *Urceola/Chavannesia/Xylinabaria/Pezisicarpus/Hymenolophus* on the one hand and *Ecdysanthera/Parabarium/Chunechites/Xylinabariopsis* on the other.
Parameria is instantly distinguishable from Urceola primarily in the aestivation of the corolla lobes which is to the left in Parameria and to the right or valvate in Urceola. Parameria also generally has larger, often salverform, flowers. It is debatable whether Parameria is sufficiently distinct from Urceola to be maintained in light of the fact that other genera in the Apocynaceae have species with left and right aestivation (e.g. Alstonia, Tabernaemontana) but there is no doubt that the species would be quite distinct within Urceola, even though Urceola itself is quite diverse, and therefore Parameria is maintained as a separate genus here.

Aganonerion has corolla lobes overlapping to the right in bud but is distinguishable from Urceola in its very much longer corolla tube and salverform flowers which are in small spike-like cymes.

MATERIALS AND METHODS

Herbarium material was studied from the following herbariums: A, AAU, ABD, B, BK, BKF, BM, BO, BR, BRI, C, CANB, CGE, E, G, GH, H, IBSC, K, KEP, KLU, K-W, KYO, L, LAE, NY, M, MEL, MO, NSW, P, PE, S, SING, SYS, TCD, TI, U, UPS, US, W, WRSL, Z (Holmgren et al., 1990). All specimens cited have been seen unless otherwise stated.

The dimensions given in the descriptions are for dried material except for the gynoecium and androecium characters which are for flowers rehydrated with water. Any type specimens associated with taxa described by Tsiang previously cited for LU or SYS now appear to be housed in IBSC and the holotypes are, therefore, cited IBSC. Lectotypification has become somewhat confused in Urceola. Lý (1978) designated lectotypes for several species but has not indicated so on the specimens themselves. This presents a problem when there are two or more duplicates in the herbarium making the lectotypification invalid. On these occasions the lectotypification is redone here.

KEY TO THE GENERA

1a. Corolla lobes in bud overlapping to the left ..................... 2. Parameria
   b. Corolla lobes in bud overlapping to the right or corolla lobes valvate ...... 2

2a. Inflorescence spike-like; corolla salverform, tube ≥ 3.5 mm long .............
   ................................................................. 1. Aganonerion
   b. Inflorescence paniculate or cymose; corolla urceolate or campanulate, tube < 2.5 mm long ............................................... 3. Urceola

SYSTEMATIC TREATMENT

1. AGANONERION

Fig. 1. *Aganonerion polymorphum* Pierre ex Spire. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit; f. seed (a–d: Larsen et al. 31366; e, f: Thorel 1099). Scale bars: a, e, f = 1 cm; b–d = 1 mm.
Climbers; producing latex. Branches lenticellate or not; branchlets puberulent to glabrous. Leaves: opposite, those of a pair equal; petiolate, with few glands in axils; papery, entire. Inflorescence a terminal congested cyme which appears like a spike. Flowers 5-merous, actinomorphic. Sepals with few colleters inside. Corolla: lobes in bud overlapping to the right, consisting of a wide tube which narrows to an acute or acuminate head; open corolla salverform; lobes with a projection to the right as viewed from the inside. Stamens completely included within the corolla tube, attached in a ring to the pistil head; filaments short; anthers narrow triangular, base sagittate, sterile at apex and base. Disc annular. Ovary of 2 separate carpels united into a common style, superior, ovoid, densely puberulent on top; ovules numerous; style glabrous, very short; pistil head ovoid with a projection on top. Fruit of paired follicles; long, narrow and torulose; longitudinally dehiscent. Seeds hirsute; ellipsoid, flattened; with a coma pointing towards the end of the fruit.


Aganonerion polymorphum Pierre ex Spire, Contr. Apoc. (1905) 43. — Fig. 1; Map 1

Branchlets short puberulent, becoming glabrous with age. Leaves: petiole 0.6–3.2 cm long; blade papery when dried, ovate to elliptic, apex acuminate, rarely to obtuse, base weakly cordate, rarely to cuneate, 2.1–11.3 × 1–5.4 cm, 1.2–2.7 × as long as wide, 3–7 pairs of lateral nerves, strongly ascending, puberulent in axils of lateral nerves with midrib, sometimes on midrib above. Inflorescence spike-like, puberulent, 3–9 cm long; pedicels 1.5–4.2 mm long. Sepals ovate to lanceolate, 1.8–3.5 × 0.9–1.7 mm, 1.4–3.2 × as long as wide, sparsely puberulent to glabrous. Corolla pink and yellow; bud tubular, acuminate at apex, open corolla salverform; tube 3.5–5.2 mm long; lobes falcate, 1.5–2.5 mm long, 0.4–0.7 × as long as tube; pubescent to glabrous outside, pubescent inside tube, densely so at top, more sparsely lower down. Stamens inserted at 1.5 mm from corolla base; filaments 0.5–0.7 mm long; anthers 3.2–4.2 × 0.6–0.7 mm, 5.3–6 × as long as wide. Disc annular, 0.3 mm long. Ovary 0.9–1.1 long; style + pistil head 2 mm long. Fruit long, narrow, weakly torulose, glabrous, 5.5–14.2 cm long, 4–6 mm wide. Seed grain 10–10.2 × 1.7–3.2 mm; coma 1.5–3.3 cm long.

Distribution — Thailand, Vietnam, Cambodia.
Habitat — In dry deciduous forest or scrub to 700 m altitude.

Selection of the 40 collections studied:
CAMBODIA. Siem Réab - Oddôr Méanchey: Kâmpong Khleang, Martin 12 (L).

2. PARAMERIA


Climbers; producing latex. Branches lenticellate or not; branchlets puberulent to glabrous. Leaves: opposite, those of a pair equal, very rarely in whorls of 3; petiolate, with glands in axils; papery to subcoriaceous, entire. Inflorescence of terminal and/ or axillary cymes often forming a panicle. Flowers 5-merous, actinomorphic. Sepals with colleters inside. Corolla: lobes in bud overlapping to the right, consisting of a narrow tube and a globose head or whole bud ovoid; open corolla salverform to campanulate; lobes falcate, broad and rounded or oblong and acute to obtuse. Stamens
completely included within the corolla tube, attached in a ring to the pistil head; filaments short; anthers narrow triangular, base sagittate, sterile at apex and base. Disc 5-crenate to 5 completely separate lobes. Ovary of 2 separate carpels united into a common style, superior, ovoid, densely puberulent on top; ovules numerous; style glabrous, very short; pistil head ovoid with a projection on top. Fruit of paired follicles; long, narrow and strongly to weakly torulose; longitudinally dehiscent. Seeds hirsute; ellipsoid, flattened; with a coma pointing towards the end of the fruit.

Distribution — Three species from southern Burma, China to western Indonesia.

KEY TO THE SPECIES

1a. Corolla bud densely pubescent all over; anther apex acute or shortly acuminate; fruit weakly torulose ................................................................. 3. P. polyneura
   b. Corolla bud glabrous, pubescent only on tube or pubescent on tube and only very sparsely on head; anther apex long acuminate; fruit strongly and distantly torulose ................................................................. 2

2a. Leaves: puberulent only in nerve axil domatia or glabrous; inflorescence axis delicate; fruits glabrous ................................................................. 2. P. laevigata
   b. Leaves: puberulent all over beneath especially on nerves and veins; inflorescence axis robust; fruits pubescent ......................................................... 1. P. densiflora

1. Parameria densiflora Oliv.


Branchlets densely brown pubescent. Leaves: petiole 4.5–7 mm long; blade subcoriaceous, obovate, apex acuminate, base rounded to acute, 5.5–17.9 × 2.8–7.2 cm, 1.6–3.4 × as long as wide, 5–8 pairs of lateral nerves, curved ascending, tertiary venation lax, puberulent all over beneath, especially on nerves and veins. Inflorescence a dense terminal panicle, densely brown puberulent, 2.6–9.8 cm long; pedicels 2.1–4.8 mm long. Sepals oovate, apex acuminate to obtuse, 0.8–1.2 × 0.5–0.8 mm, 1.1–1.7 × as long as wide, puberulent. Corolla bud drumstick-shaped, open corolla salverform; tube 2.2–2.9 mm long; lobes falcate to the left, apex rounded, 3.5–5.9 mm long, 1.7–3.1 mm wide, 1.7–2.1 × as long as wide, 1.5–2.5 × as long as tube; densely pubescent on tube outside, sparsely pubescent or glabrous on parts of lobes exposed in bud, glabrous inside. Stamens inserted at 0.2–0.3 mm from corolla base, which is 0.1–0.2 of tube length; filaments 0.4–0.5 mm long; anthers 0.8–1.5 × 0.2–0.3 mm, 4–5 × as long as wide. Disc 5-dentate, 0.2–0.3 mm long. Ovary 0.4–0.5 mm long; style + pistil head 0.8–1 mm long. Fruit distantly torulose, sparsely puberulent, 20–35 cm long, 4–8 mm wide. Seed grain 10–11 × 1.9–2.5 mm; coma 2–2.5 cm long.

Distribution — Malaysia, Indonesia (Sumatra).

Collections studied:
MALAYSIA. Peninsula: Penang, Government Hill, Curtis 158 (K, P, SING, US, W – type), 1546 (SING), s.n. (SING), s.n. (K).
INDONESIA. Sumatra: s.l., van Romburgh s.n. (BO), Batten Pooll s.n. (SING).
2. Parameria laevigata (Juss.) Moldenke — Fig. 2; Map 2


Ecdysanthera griffithii Wight, l.c. Pl. 4 (1848) t. 1307. — Type: Griffith s.n. (CGE lecto; BM, CGE, K iso).

Echites torosa Llanos, Fragm. Pl. Filip. (1851) 59, non Jacq. (1760). — Type: Merrill Sp. Blanc. 140 (US neo; A, BM, BO, K, L, MO, P, W isoneo). There is a specimen collected by Llanos and labelled Echites torosa in the Geneva herbarium but it carries the date 1853 and is, therefore, unlikely to be the type collection. Ecdysanthera torosa appears in Index Kewensis and is credited to Llanos but this is a mistake.


Parameria vulneraria Radlk., Sitzber. Math.-Phys. Kl. K. Ak. Wiss. München 14 (1884) 519. — Type: Rothdauscher 1025 (M lecto). Epitype: Rothdauscher 1029 (M). The original material now consists of nothing more than twigs. Radikofe himself labelled Rothdauscher 1029 as Parameria vulneraria and it was also collected in Cebu so can be taken as an epitype of this species.


Branches often lenticellate; branchlets glabrous to densely and minutely puberulent. Leaves: petiole 1–4 mm long; blade papery when dried, elliptic to obovate, apex acute to caudate, most commonly acuminate, base obtuse to cuneate, 1.5–15 × 0.7–6.3 cm, 1.6–4.1 × as long as wide, 3–6 pairs of lateral nerves, curved ascending,
Fig. 2. *Parameria laevigata* (Juss.) Moldenke. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit; f. seed (a–d: van Beusekom & Santisuk 3220; e, f: Weber 1540). Scale bars: a, e, f = 1 cm; b–d = 1 mm.
tertiary venation lax and obscure, puberulent in domatia in lateral nerve axils with midrib or, rarely, glabrous. **Inflorescence** of axillary and/or terminal cymes often forming a panicle, glabrous to densely and minutely puberulent, 2–16 cm long; pedicels 1.2–7.5 mm long. **Sepals** ovate, apex obtuse to acuminate, 0.5–1.3 × 0.4–0.9 mm, 1–2 × as long as wide, puberulent, rarely glabrous. **Corolla** white, pink or red; bud drumstick-shaped, open corolla salverform; tube 1.2–2.5 mm long; lobes falcate to the left, apex rounded, 1.7–4 mm long, 1–2.7 mm wide, 1–1.8 × as long as wide, 0.9–2.5 × as long as tube; glabrous to puberulent on tube outside, glabrous inside. **Stamens** inserted at 0.2 mm from corolla base, which is 0.1 of tube length; filaments 0.2–0.5 mm long; anthers 0.8–1.4 × 0.3–0.4 mm, 2.7–5 × as long as wide. **Disc** 5-dentate to consisting of 5 separate lobes, 0.2–0.3 mm long. **Ovary** 0.3–0.6 mm long; style + pistil head 0.6–1.2 mm long. **Fruit** distantly torulose, glabrous, 12–32 cm long, 0.4–0.7 cm wide. **Seed** grain 5.7–12 × 1.1–4 mm; coma 1.7–3.2 cm long.

**Distribution** — India (Andaman Islands), Burma, China, Thailand, Laos, Vietnam, Cambodia, Malaysia, Singapore, western Indonesia, Philippines.

**Habitat** — In a wide variety of primary and secondary forests and thickets to 1500 m altitude.

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Map 2. Distribution of *Parameria laevigata* (Juss.) Moldenke (●).
Notes — This is an extremely variable species and the extremes of variation look very different from each other. There is, however, no clear line to separate the two extremes (lax cyme with minute hairs on the inflorescence and corolla tube to the congested cyme with longer hairs) even into varieties.

_Ecdysanthera griffithii_ is typified by a Griffith specimen from Malacca. There are two Griffith specimens from Malacca: one _Parameria laevigata_ and the other _Parameria polyneura_. Following Wight’s usage and the label on the specimen, _E. griffithii_ has been typified by the Griffith collection of _P. laevigata_. Pierre’s new combination, _Parameria griffithii_, however, is clearly based on the belief that the other Griffith collection, the _P. polyneura_, is the type of this species. Pierre has labelled the Paris isotype of _P. polyneura as P. griffithii._

_Squires 937_ from Vietnam is somewhat unusual for this species in its narrower corolla lobes although it is otherwise unremarkable. Its distinctness does not warrant a separate taxonomic status.

_Selection of the 370 collections studied:_

**INDIA.** Andaman Islands: South Andaman, Mileilalak, _Balakrishnan 713_ (E).


**CHINA.** Yunnan: Simao, _Henry 12681_ (A, E, K, MO).


**SINGAPORE.** _Lobb s.n._ (K).

3. Parameria polynear Hook. f. — Map 3


Branches lenticellate or not; branchlets glabrous to puberulent. Leaves: petiole 3–9 mm long; blade subcoriaceous, elliptic, obovate or oblong, apex acuminate to acute, base cuneate to obtuse, 3–12.8 × 1.1–6.2 cm, 1.8–3.1 × as long as wide, 4–9 pairs of lateral nerves, tertiary venation conspicuous, puberulent in domatia in nerve axils with midrib. Inflorescence terminal and/or axillary, often forming panicles, densely short puberulent, 5.5–12.4 cm long; pedicels 2–4.8 mm long. Sepals ovate, apex acute to obtuse, 0.8–1.6 × 0.6–1 mm, 1.1–2 × as long as wide, densely puberulent. Corolla white and pinkish; bud ovoid, open corolla salverform to campanulate; tube 1–1.8 mm long; lobes oblong, falcate to the left, 2.6–4.7 mm long, 1–1.6 mm wide, 2.4–4.3 × as long as wide, 1.7–3.6 × as long as tube; densely puberulent on tube and on parts exposed in bud outside, sparsely puberulent in tube inside. Stamens inserted at 0.3–0.4 mm from corolla base, which is 0.2 of tube length; filaments 0.3–0.7 mm long; anthers 1–1.4 × 0.2–0.5 mm, 2.6–5 × as long as wide. Disc 5-crenate or 5-dentate, 0.5 mm long. Ovary 0.3–0.5 mm long; style + pistil head 1–1.3 mm long. Fruit weakly torulose, sparsely lenticellate, 37–90 cm long, 0.4–0.5 cm wide. Seed grain 14.5–22 × 2.6–3 mm; coma 3–4.1 cm long.

Distribution — Southern Burma, Thailand, Malaysia, Singapore, Brunei, Indonesia (Sumatra, Kalimantan).

Habitat — In forest to 800 m altitude.

Collections studied:

BURMA. Mon: Moulmein, Lobb 432 (BM, CGE, E, G, TCD).


SINGAPORE. Garden Jungle, Ridley s.n. (BO).

BRUNEI. Seria district, en route from Kampong Mendaram to Bukit Teraja, Teraja Forest Reserve, Horta 12712 (L).

3. URCEOLA


**Pezisicarpus** Vernet, Bull. Econ. Indo-Chine 35 (1904) 1193. — Type species: *Pezisicarpus montana* Vernet [= *Urceola minutiflora* (Pierre) D.J. Middleton].


**Chunechites** Tsiang, Sunyatsenia 3 (1937) 305. — Type species: *Chunechites xylinabarioptoides* Tsiang [= *Urceola xylinabarioptoides* (Tsiang) D.J. Middleton].


Climbers; producing latex. Branches lenticellate or not; branchlets puberulent to glabrous. **Leaves**: opposite, those of a pair equal; petiolate, with or without glands in axils; papery to coriaceous, entire. **Inflorescence** cymose, terminal and/or axillary sometimes forming a panicle. **Flowers** 5-merous, actinomorphic. **Sepals** with few colleters inside or absent. **Corolla**: lobes in bud overlapping to the right or valvate, bud variable in shape from globose to ovoid to ellipsoidal; open corolla urceolate to campanulate; lobes triangular or falcate to the right often with a marked projection.
pointing to the right as viewed from the inside. *Stamens* completely included within the corolla tube, attached in a ring to the pistil head; filaments short; anthers narrow triangular, base sagittate, sterile at apex and base. *Disc* annular to 5-dentate. *Ovary* of 2 separate carpels united into a common style, superior, ovoid, densely puberulent on top; ovules numerous; style glabrous, very short; pistil head ovoid with a projection on top. *Fruit* of paired follicles; very variable in shape; longitudinally dehiscent. *Seeds* hirsute; ellipsoid, flattened; with a coma pointing towards the end of the fruit.

Distribution — 16 species from India and China through Indo-China and the Indonesian archipelago to Papua New Guinea.

KEY TO THE SPECIES

1a. Corolla lobes in bud overlapping to the right, sometimes only slightly .... 2
   b. Corolla lobes in bud valvate ........................................ 9

2a. Sepals papery and leafy; leaves punctate beneath .......... 12. *U. quintaretii*
   b. Sepals variable, not leafy; leaves only very rarely punctate beneath ........ 3
3a. Leaves: densely pubescent beneath ..................................... 4
   b. Leaves: glabrous or only very sparsely pubescent beneath ............ 6

4a. Leaf margin somewhat inrolled; follicles parallel, stipitate ................ 16. *U. xylinabariopsoides*
   b. Leaf margin not inrolled; follicles divergent or parallel, not stipitate .... 5

5a. Corolla densely pubescent outside; fruits divergent, 6–8 cm long ........ 3. *U. haaitingii*
   b. Corolla glabrous or only sparsely pubescent outside; fruits parallel, 13–17 cm long .......... 6. *U. latifolia*

6a. Flower buds acute or acuminate at apex; corolla lobes more or less symmetrical, pinkish or reddish .................. 13. *U. rosea*
   b. Flower buds rounded or obtuse at apex; corolla lobes falcate, white or greenish white .................................. 7

7a. Corolla lobes 1.3–2 × as long as tube; follicles parallel, stipitate .... 11. *U. napeensis*
   b. Corolla lobes 0.5–1(–1.3) × as long as tube; follicles divergent to sub-parallel, not stipitate .......... 8

8a. Branchlets densely pubescent; inflorescences mostly axillary; fruit thick-walled, wider near base, tapering to end .......... 15. *U. tournieri*
   b. Branchlets sparsely to densely pubescent; inflorescences axillary and terminal forming panicles; fruits thin-walled, generally linear, often very narrow ........ 9. *U. micrantha*

9a. Leaves pubescent all over beneath .................................... 10
   b. Leaves glabrous or pubescent only in nerve axils and sometimes also on the midrib .... 12

10a. Leaves: very thin and translucent when dry; corolla tube 0.8–1 mm long, lobes 0.3–0.6 mm long; follicles stipitate, parallel .......... 10. *U. minutiflora*
   b. Leaves: subcoriaceous to coriaceous; corolla tube 0.8–2.3 mm long, lobes 0.5–1 mm long; follicles only rarely stipitate, divergent .......... 11
11a. Sepals ovate or oblong, 0.6—2.1 mm long, 1—2.1 × as long as wide  7. U. lucida
   b. Sepals narrowly linear, 2.1—4 mm long, (2.3—)3.5—6 × as long as wide  . . . . 2. U. elastica

12a. Sepals oblong to spatulate, 1.9—4 mm long; leaves usually shiny above; fruits long and distinctly torulose  . . . . 14. U. torulosa
   b. Sepals ovate to oblong, 0.6—3 mm long; leaves not shiny above; fruits not torulose  . . . . 13

13a. Sepals longer than corolla tube, oblong  . . . . 14
   b. Sepals shorter than to as long as corolla tube, ovate to oblong  . . . . 15

14a. Corolla tube narrow, not noticeably wider at base; fruit dagger-shaped; Philippines, Sulawesi, Borneo  . . . . 5. U. laevis
   b. Corolla tube frequently noticeably wider at base; fruit fusiform to linear; wide-spread  . . . . 1. U. brachysepala

15a. Sepals strongly reflexed  . . . . 16
   b. Sepals not reflexed  . . . . 17

16a. Leaves: elliptic to obovate, base often cordate, coriaceous  . . . . 7. U. lucida
   b. Leaves: elliptic, base rounded, papery  . . . . 8. U. malayana

17a. Inflorescence densely pale puberulent; corolla bud globular; fruits dagger-shaped  . . . . 18
   b. Inflorescence densely to sparsely dark puberulent; corolla bud ovoid to subglobular; fruits linear to fusiform  . . . . 1. U. brachysepala

18a. Leaves: mostly obovate, base cordate, nerves very prominent beneath; fruit thick-walled  . . . . 7. U. lucida
   b. Leaves: mostly elliptic or oblong, base rounded to cuneate, nerves not or barely prominent beneath; fruit thin-walled  . . . . 4. U. javanica

1. Urceola brachysepala Hook. f. — Map 4


Branchlets glabrous to densely puberulent. **Leaves**: petiole 0.6–3.4 cm long; blade papery to subcoriaceous, ovate to elliptic, rarely obovate, apex acuminate, base cuneate to subcordate, 2.5–22 × 0.9–13 cm, 1.3–3.5 × as long as wide, 5–10 pairs of lateral nerves, curved ascending, sparsely puberulent on midrib and in nerve axils, only in nerve axils or glabrous, often punctate all over beneath. **Inflorescence** terminal and axillary, forming panicles, puberulent, especially in upper parts, 1.5–12.5 cm long; pedicels 0.9–3.6 mm long. **Sepals** ovate or oblong, apex acute to rounded, 0.7–3 × 0.5–1.4 mm, 1.1–2.8(–4.4) × as long as wide, puberulent. **Corolla** greenish white; corolla lobes valvate in bud which is subglobose to ovoid, open corolla urceolate; tube 1–2.3 mm long; lobes triangular, 0.6–1.2 mm long, 0.5–1 mm wide, 0.3–0.7 × as long as tube; pubescent outside, pubescent to almost glabrous inside. **Stamens** inserted at 0.2–0.5 mm from corolla base, which is 0.1–0.3 of tube length; filaments 0.3–0.9 mm long; anthers 1–1.6 × 0.3–0.6 mm, 2.2–4 × as long as wide. **Disc** 5-crenate to almost annular, 0.2–0.7 mm long. **Ovary** 0.3–0.7 mm long; style + pistil head 0.5–1.4 mm long. **Fruit** linear to fusiform, glabrous, 7–27 cm long, 3–10 mm wide. **Seed** grain 8.5–15.2 × 1.4–3.1 mm; coma 1.9–5.5 cm long.

**Distribution** — Malaysia, Singapore, Indonesia (Sumatra, Java, Borneo), Brunei, Philippines.

**Habitat** — In a wide variety of habitats from cliffs to primary forest or swamp forest to 1000 m altitude.

**Note** — This species is extremely variable with three indistinct groups corresponding roughly to the old *U. brachysepala*, *U. maingayi* and *U. imberbis*. These groups, however, merge into each other and cannot be recognised even at varietal level.
Selection of the c. 210 collections studied:


SINGAPORE. Sungei Jurong, *Ridley 10772* (K, SING).


2. *Urecola elastica* Roxb. — Fig. 3; Map 5


Branchlets densely brown puberulent. *Leaves:* petiole 0.8–3 cm long; blade coriaceous or subcoriaceous, elliptic to obovate, apex acuminate, rarely to obtuse, base weakly cordate to obtuse, margins often slightly inrolled, 3.5–19.5 × 1.6–8.5 cm, 1.4–2.6 × as long as wide, 8–16 pairs of lateral nerves, strongly prominent beneath, densely to sparsely puberulent all over beneath, sparsely so to glabrous above. *Inflorescence* axillary and terminal, forming panicles, densely brown puberulent, 5.2–19 cm long; pedicels 1.6–4 mm long. *Sepals* narrow linear, apex acuminate to obtuse, 2.1–4 × 0.5–1 mm, (2.3–)3.5–6 × as long as wide, puberulent. *Corolla* greenish white; corolla lobes valvate in bud; bud ovoid, open corolla urceolate; tube 1.2–2.3 mm long; lobes triangular, 0.7–1.1 mm long, 0.4–0.6 mm wide, 0.4–0.8 × as long as tube; pubescent outside, sparsely pubescent to glabrous inside. *Stamens* inserted
Fig. 3. *Urceola elastica* Roxb. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit (a–d: *Aban & Saikeh SAN 82306; e: Aban SAN 18618*). Scale bars: a, e = 1 cm; b–d = 1 mm.
at 0.2–0.6 mm from corolla base, which is 0.1–0.3 of tube length; filaments 0.4–0.7 mm long; anthers 1–1.6 × 0.4–0.5 mm, 3–4 × as long as wide. Disc weakly 5-crenate or 5-dentate, 0.2–0.4 mm long. Ovary 0.5–0.7 mm long; style + pistil head 0.9–1.5 mm long. Fruit linear to fusiform, divergent, thick-walled, sparsely puberulent, 8.5–26 cm long, 0.5–1.5 cm wide. Seed grain 10–20 × 2.6–3.6 mm; coma 2.9–6.2 cm long.

Distribution — Malaysia, Sumatra, Java, Borneo. Habitat — In primary, secondary or disturbed forest to 800 m altitude.

Map 5. Distribution of *Urceola elastica* Roxb. (●)

Selection of the c. 55 collections studied:


3. *Urceola huaitingii* (Chun & Tsiang) D. J. Middleton


Branchlets densely brown tomentose. **Leaves:** petiole 4–8 mm long; blade papery, elliptic, apex acuminate, base rounded to subcordate, 2.5–11 × 1.5–4.5 cm, 1.8–2.6 × as long as wide, 6–8 pairs of lateral nerves, strongly ascending, densely tomentose above and beneath. **Inflorescence** paniculate, densely tomentose, 4–7.5 cm long; pedicels 1–2.9 mm long. **Sepals** narrowly ovate, apex obtuse to acute, 1.2–2 × 0.5–1 mm, 2–2.4 × as long as wide, tomentose. **Corolla** yellowish; corolla lobes overlapping to the right in bud, open corolla campanulate; tube 1.3–2 mm long; lobes falcate, 1.6–2 mm long, 0.7–1 mm wide, 1–1.3 × as long as tube; pubescent outside, pubescent at base inside. **Stamens** inserted at 0.1 mm from corolla base, which is 0.1 of tube length; filaments 0.2 mm long; anthers 0.9 × 0.4 mm, 2.3 × as long as wide. **Disc** 5-crenate, 0.2 mm long. **Ovary** 0.4 mm long; style + pistil head 0.5 mm long. **Fruit** dagger-shaped, tapering, 6–8 cm long, 1.5–2 cm wide. **Seed** grain 10–16 × 2–3.5 mm; coma 3–4.6 cm long.

**Distribution** — China (Guangxi, Guangdong, Guizhou).

**Note** — I have only been able to see the type and two other collections of this species. The original description cites several collections which I have not been able to obtain although I have used some of the dimensions in the original publication in the above description.

**Collections studied:**


4. *Urceola javanica* (Blume) Boerl. — Map 6


Branchlets puberulent. **Leaves:** petiole 0.6–2 cm long; blade papery to subcoriaceous, elliptic to oblong, apex acuminate, base rounded to cuneate, 2.9–12.6 × 0.9–
5.1 cm, 1.4–3.4 x as long as wide, 4–11 pairs of lateral nerves, puberulent on mid-rib beneath and in lateral vein axils, rarely puberulent all over beneath or glabrous. Inflorescence terminal and axillary, forming panicles, delicate, densely pale pubescent, 1.9–13.1 cm long; pedicels 0.8–3.3 mm long. Sepals ovate, apex acute to acuminate, 0.6–1 x 0.5–0.7 mm, 1.1–1.8 x as long as wide, densely puberulent. Corolla white to yellowish; corolla lobes valvate in bud which is ovoid, open corolla urceolate; tube 0.8–1.8 mm long; lobes triangular, 0.5–0.8 mm long, 0.4–0.8 mm wide, 0.4–0.8 x as long as tube; densely pubescent outside and inside. Stamens inserted at 0.2 mm from corolla base, which is 0.1–0.2 of tube length; filaments 0.2–0.4 mm long; anthers 0.9–1.5 x 0.3 mm, 3–5 x as long as wide. Disc 5-crenate or 5-dentate, 0.3–0.6 mm long. Ovary 0.4–0.7 mm long; style + pistil head 0.6–0.9 mm long. Fruit shortly stipitate or not, dagger shaped, tapering, glabrous, 5–11.5 cm long, 0.4–1.9 cm wide. Seed grain 9.3–16.1 x 1.4–3.7 mm; coma 1.9–5.2 cm long.

Distribution — Indonesia, Papua New Guinea.

Habitat — In primary or secondary forest to 1500 m altitude.

Notes — The species as described here is somewhat different to the sense in which it was used by Backer & Bakhuizen van den Brink (1965). There are a number of specimens in Leiden labelled by Blume as Parsonia javanica any of which could be the type specimen of the species. Unfortunately these specimens belong to two different species: the one here described and U. brachysepala. Blume’s original description was vague enough to have applied to either but Miquel (1857) appears to have described the species in the sense it is used here. Using the name for this species avoids the need to replace the name of the common and widespread U. brachysepala.

There are two specimens in the Leiden herbarium with the number Blume 2182b. They represent two different collections comprising two different species and care
should be taken to note the Leiden Herbarium number. There is also a specimen of Urceola in the Leiden Herbarium with the number Blume 881. This same collection number is the type specimen of Willughbeia javanica Blume, but again they represent two distinct collections.

Selection of the c. 50 collections studied:


5. Urceola laevis (Elmer) Merr. — Fig. 4; Map 7


Branchlets puberulent to glabrous. Leaves: petiole 0.7–2.2 cm long; blade papery to coriaceous, ovate to elliptic, apex acumenate, base rounded to obtuse, 2.9–10.5 × 1.2–5.3 cm, 1.6–2.5 × as long as wide, 5–8 pairs of lateral nerves, glabrous or sparsely puberulent on midrib beneath and in vein axils. Inflorescence of few flowered terminal and axillary cymes, puberulent, 3.8–13 cm long; pedicels 0.7–3.5 mm long. Sepals oblong, imbricate, apex rounded, rarely obtuse, 1.7–2.7 × 0.5–1.3 mm, 1.4–4.4 × as long as wide, sparsely puberulent. Corolla white or greenish; corolla lobes valvate in bud which is ovoid, open corolla urceolate; tube 1.2–1.8 mm long; lobes triangular, 0.5–1.1 mm long, 0.4–0.8 mm wide, 0.3–0.7 × as long as tube; pubescent outside and inside. Stamens inserted at 0.2–0.3 mm from corolla base, which is 0.1–0.2 of tube length; filaments 0.4 mm long; anthers 1.3 × 0.3–0.5 mm, 2.6–4.3 × as long as wide. Disc 5-crenate, 0.3–0.6 mm long. Ovary 0.5–0.6 mm long; style + pistil head 0.9–1.3 mm long. Fruit stipitate, dagger-shaped, puberulent when immature, 5.3 cm long, 1 cm wide. Seeds not seen.

Distribution — Borneo (Sabah), Sulawesi, Philippines (Palawan).

Habitat — In forest to 1500 m altitude.

Collections studied:


INDONESIA. Sulawesi: Selatan, Todjamboe – Palopo, Kjellberg 1847 (BO, S); Malili, Kjellberg 2379 (BO, S); Todjamboe, Kjellberg 2979 (BO, S).

PHILIPPINES. Palawan: Mt Victoria, Trident Mine, Dransfield SMHI 1276 (K, L); Puerto Princesa, Mt Pulgar, Elmer 12837 (A, B, BISH, BM, BO, E, L, MO, NSW, NY, P, US, W, Z – type of Car-
Fig. 4. *Urceola laevis* (Elmer) Merr. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit (a–d: Sulit 12367; e: Podzorski SMHI 616). Scale bars: a, e = 1 cm; b–d = 1 mm.
Map 7. Distribution of *Urceola laevis* (Elmer) Merr. (○); *U. latifolia* (Pierre ex Spire) D.J. Middleton (★); *U. lucida* (Wall. ex G. Don) Benth. ex Kurz (▲).

*ruthersia laevis*; Irawan River valley, head on lower slopes of Mt Beaufort, Podzorski SMHI 605 (A, K, L), SMHI 616 (A, BO, K, L); Panacan, Aborlan, Victoria Mountains, Sulit PNH 12324 (BO, L, SING), PNH12367 (A, BO, L); St. Paul's Bay, Mt Bloomfield, WNW to W face, Ridsdale SMHI 1617 (K, L).

### 6. Urceola latifolia* (Pierre ex Spire) D.J. Middleton — Map 7


Branchlets densely hirsute. *Leaves*: petiole 0.9–1.6 cm long; blade papery, elliptic to weakly obovate, apex acuminate, base acute to obtuse, 9.3–23 × 3.8–7.4 cm, 1.8–3.3 × as long as wide, 7–9 pairs of lateral nerves, strongly ascending, sparsely pubescent above, densely pubescent beneath. *Inflorescence* axillary and/or terminal,
often forming a panicle, densely pubescent, 9.5–14 cm long; pedicels 1–2 mm long. 

Sepals ovate, apex acute to obtuse, 0.6–1 × 0.5–0.8 mm, 1.2–1.3 × as long as wide, puberulent. Corolla yellowish; corolla lobes overlapping to the right in bud which is ovoid or tubular, open corolla campanulate; tube 1–1.6 mm long; lobes falcate, 1–1.3 mm long, 0.8 mm wide, 0.8–1.1 × as long as tube; glabrous to sparsely puberulent outside, glabrous to pubescent inside. Stamens inserted at 0.2 mm from corolla base, which is 0.1 of tube length; filaments 0.2–0.5 mm long; anthers 1.2–1.3 × 0.3–0.4 mm, 3–4 × as long as wide. Disc 5-dentate, 0.2–0.3 mm long. Ovary 0.5 mm long; style + pistil head 0.7 mm long. Fruit narrow, tapering, parallel, sparsely puberulent, 13–17 cm long, 8–9 mm wide. Seed grain c. 13 × 3 mm; coma c. 3 cm long.

Distribution — Laos, Thailand.

Habitat — The few collections are recorded from evergreen forest at 1400–1500 m altitude.

Note — The type of U. latifolia, Spire 14, has a number of supposed duplicates in Paris, some of which, however, are actually U. micrantha.

Collections studied:


7. Urceola lucida (Wall. ex G. Don) Benth. ex Kurz — Map 7


Urceola reticulata King & Gamble, J. As. Soc. Beng. 74 (1907) 477. — Type: Ridley 2745 (K lecto, selected here; NSW iso).

Branchlets glabrous or sparsely and minutely puberulent. Leaves: petiole 0.8–2.8 cm long; blade coriaceous, obovate to elliptic, apex acuminate to caudate, base weakly cordate to obtuse, 3–26 × 0.9–11.2 cm, 1.6–2.6 × as long as wide, 7–13 pairs of lateral nerves, prominent beneath, glabrous or, more rarely with hairs on midrib beneath and in vein axils or sparsely all over beneath. Inflorescence of axillary and terminal cymes forming a panicle, puberulent, 9.6–29 cm long; pedicels 0.9–3.2 mm long. Sepals ovate to oblong, often imbricate and reflexed, apex obtuse to weakly retuse, 0.6–2.1 × 0.5–1.2 mm, 1–2.1 × as long as wide, puberulent. Corolla white; lobes valvate in bud which is ovoid, open corolla urceolate to campanulate; tube 0.8–1.5 mm long; lobes triangular, 0.5–1 mm long, 0.5–0.7 mm wide, 0.5–1 × as long as tube; puberulent outside, sparsely puberulent inside. Stamens inserted at 0.2–0.3
mm from corolla base, which is 0.1—0.2 of tube length; filaments 0.2—0.5 mm long; anthers 0.9—1.3 × 0.2—0.4 mm, 2.8—4.3 × as long as wide. Disc 5-crenate, 0.2—0.4 mm long. Ovary 0.3—0.5 mm long; style + pistil head 0.7—1.9 mm long. Fruit dagger-shaped, tapering, rarely stipitate, glabrous, rarely puberulent, 4.5—11 cm long, 0.7—2 cm wide. Seed grain 10—17 × 3—5 mm; coma 3.4—5.4 cm long.

Distribution — Burma, Thailand, Malay Peninsula, Singapore, Sumatra.

Habitat — In evergreen or deciduous, primary or secondary forest to 950 m.

Note — This species is similar to *U. javanica* but is distinguished by the generally less densely puberulent inflorescences, the coriaceous leaves, the normally imbricate, reflexed sepals and the thicker fruit wall.

Selection of the c. 70 specimens studied:

BURMA. s.l., *Wallich 1671* (BM, G-DC, K-W – type of *Chavannesia esculenta*); Thaung Yin, Sw Ka Li Chg, *Maung Ba Pe 12914* (K).


SINGAPORE. Pulau Ubin, *Ridley 2745* (K, NSW – type of *Urceola reticulata*), 5628 (K - syntype of *Urceola reticulata*).


8. Urceola malayana D.J. Middleton, *spec. nov.* — Fig. 5

*Urceola lucida* affinis sed floribus plerumque parvioribus et foliis chartaceis differt. — Typus: *Nur SF.32823* (L holotype; A, K, SING iso).

Branchlets densely brown puberulent. Leaves: petiole 0.7—1.4 cm long; blade papery, elliptic, apex acuminate, base obtuse, 3.6—14.5 × 1.5—7.5 cm, 1.6—2.8 × as long as wide, 7—9 pairs of lateral nerves, puberulent on midrib and veins beneath. Inflorescence a terminal panicule, densely puberulent, 8.7—12.5 cm long; pedicels 2.2—3.8 mm long. Sepals ovate, reflexed, apex obtuse, 0.7—0.9 × 0.4—0.5 mm, 1.8 × as long as wide, long pubescent. Corolla lobes valvate in bud; bud narrow ovoid, open corolla tubular; tube 0.9—1 mm long; lobes triangular, 0.6—0.9 mm long, 0.6 mm wide, 0.7—0.9 × as long as tube; pubescent outside and inside. Stamens inserted at 0.3 mm from corolla base, which is 0.3 of tube length; filaments 0.4 mm long; anthers 1 × 0.3 mm, 3.3 × as long as wide. Disc 5-crenate, 0.2 mm long. Ovary 0.3 mm long; style + pistil head 0.8 mm long. Fruit unknown.

Distribution — Malay Peninsula.

Note— This species is close to *U. lucida* from which it differs in leaf shape and thickness and in its generally smaller flowers and longer hairs on the inflorescence.
Collections studied:
MALAYSIA. Pahang: Lubok Jamang, Symington 36202 (K, KEP); Cameron Highlands, Nur SF 32823 (A, K, L, SING – type).

Fig. 5. Urceola malayana D.J. Middleton. a. Habit; b. flower in bud; c. open flower; d. flower dissection (Nur SF 32823). Scale bars: a = 1 cm; b–d = 1 mm.
9. Urceola micrantha (Wall. ex G. Don) D.J. Middleton — Fig. 6; Map 8


_Ecdysanthera annamensis_ Vernet, Bull. Econ. Indo-Chine 7 (1904) 1189. — Type: _Vernet s.n._ (P holo).

_Ecdysanthera langbianii_ Vernet, Bull. Econ. Indo-Chine 7 (1904) 1185. — _Parabarium langbianii_ (Vernet) Pichon, Mém. Mus. Nat. Hist. Nat. Paris, sér. B, Bot. 1 (1950) 82; Lý, Feddes Rep. 89 (1978) 265; _Parabarium langbiennense_ Lý, Feddes Rep. 97 (1986) 665. orth. var. — Type: _Vernet s.n._, Dec. 1902 (P lecto, selected here). Lý designated _Vernet 8_ (5-2-1901) as the type of this name. This seems to have no basis other than that it was collected in Lang Biang and must be rejected in favour of _Vernet s.n._, a plant also collected in Lang Biang and labelled _Ecdysanthera langbianii_ by Vernet himself, unlike _Vernet 8_.


Fig. 6. Urceola micrantha (Wall. ex G. Don) D. J. Middleton. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit (a–d: Charoenphol, Larsen & Warncke 4188; e: How 73491). Scale bars: a, e = 1 cm; b–d = 1 mm.


Branches with pale lenticels; branchlets minutely puberulent, rarely glabrous. Leaves: petiole 0.6–2 cm long; blade papery to subcoriaceous, elliptic to ovate, apex acuminate, base cuneate to rounded, 2.8–18 × 1.1–5.7 cm, 1.7–3.7 × as long as wide, 3–7 pairs of lateral nerves, strongly ascending, tertiary venation weakly scalariform and reticulate, glabrous or with a puberulent petiole, usually with hairs in the axils of the secondary nerves with the midrib, occasionally completely glabrous, sometimes punctate beneath. Inflorescence of axillary and terminal cymes, usually forming a panicle, puberulent, rarely glabrous, 5.8–18 cm long; pedicels 0.6–6.2 mm long.

Map 8. Distribution of Urceola micrantha (Wall. ex G. Don) D.J. Middleton (●).
Sepals ovate, sometimes reflexed, apex abruptly acuminate, obtuse or apiculate, 0.5–1 × 0.4–0.8 mm, 0.9–2 × as long as wide, puberulent or glabrous, ciliate. Corolla white or greenish white; lobes overlapping to the right in bud which is ovoid, open corolla campanulate; tube 0.7–1.5 mm long; lobes falcate to the right, 0.6–1.2 mm long, 0.4–1 (–1.3) × as long as tube; glabrous outside, rarely sparsely pubescent on upper parts, pubescent inside. Stamens inserted a 0.2–0.5 mm from corolla base, which is 0.1–0.4 of the tube length; filaments 0.1–0.5 mm long; anthers 0.9–1.3 × 0.3–0.4 mm, 2.3–3.3 × as long as wide. Disc 5-crenate, 0.2–0.4 mm long. Ovary 0.3–0.7 mm long; style + pistil head 0.6–0.9 mm long. Fruit not stipitate, linear, follicles mostly divergent, lenticellate, glabrous, 6.7–25 cm long, 0.3–1 cm wide. Seed grain 7.3–18 × 2.2–3.9 mm;coma 2.8–6 cm long.

Distribution — China, Taiwan, India, Nepal, Burma, Vietnam, Laos, Cambodia, Thailand, Malaysia, Japan (Ryukus).

Habitat — In evergreen or secondary forest to 1500 m altitude.

Note — This is a very variable and widespread species, most closely related to U. tournieri. Sometimes the part of the corolla lobe which is curved over and covered in the flower bud is very small which is probably what led to the synonym U. montana being described in Urceola at a time when the genera were distinguished on valvate versus overlapping corolla lobes.

Collections studied:


TAIWAN. Nantou: Lian-hwa-chytr, Lu 15492 (A); Taipei County, Ta-chi-tou-shan, Kuo, Chiang & Lü 15436 (MO); Tiran, Wilson 10155 (A, BM, K, US).

INDIA. Pundua: Wallich 1667 (BM, CGE, E, G, K – type of Echites micrantha), 1668 (BM, BR, G, K, P – type of Ecdysanthera brachiatia); Manipur, Trong, Meebold 5358 (K).


CAMBODIA. Kampot: Mt Bokor, Smitinand 6528 (K).


JAPAN. Ryukus: Iriomote, along Nakara River, Hatusima 18773 (TI, US).
10. Urceola minutiflora (Pierre) D.J. Middleton — Map 9


*Pezisicarpus montana* Vernet, Bull. Econ. Indo-Chine 35 (1904) 1193. — Type: *Vernet s.n.* (P lecto, selected here). The original description makes reference to flowering and fruiting collections but the fruiting specimen has not been found.

Branches sparsely lenticellate or not; branchlets brown pubescent. *Leaves*: petiole 0.5–1 cm long; blade papery, elliptic to oblong, apex acuminate to retuse, base obtuse to weakly cordate, 3.3–10 × 1.7–5.5 cm, 1.7–2.9 × as long as wide, 6–12 pairs of lateral nerves, tertiary venation scalariform and reticulate, puberulent on midrib and veins beneath, occasionally sparsely so above. *Inflorescence* of axillary and terminal cymes, sometimes forming a panicle, puberulent, 3.5–10 cm long; pedicels 1–2.1 mm long. *Sepals* ovate, apex acute to obtuse, 0.7–1.2 × 0.3–0.7 mm, 1.5–3.3 × as long as wide, sparsely puberulent. *Corolla* yellowish; lobes in bud valvate; bud ovoid, open corolla urceolate; tube 0.8–1 mm long; lobes triangular, 0.3–0.6 mm long, 0.4 mm wide, 0.4–0.6 × as long as tube; sparsely pubescent outside and inside. *Stamens* inserted at 0.1–0.2 mm from corolla base; filaments 0.4–0.5 mm long; anthers 0.7–
1.1 × 0.3–0.4 mm, 2.8–3.7 × as long as wide. Disc 5-crenate, 0.2–0.3 mm long. Ovary 0.4–0.5 mm long; style + pistil head 0.6–0.9 mm long. Fruit stipitate, widest near base and tapering, parallel, glabrous, 3.8–8 cm long, 0.7–0.9 mm wide. Seed grain 8.5–9 × 3.3–5.2 mm; coma 1.9–2.7 cm long.

Distribution — Thailand, Cambodia, Vietnam.

Habitat — In open thickets or evergreen forest to 400 m altitude.

Selection of the 20 collections studied:


VIETNAM. Dong Nai: Moi de Pourteng, Vernet s.n. (P — type of Pezisicarpus montana). Khanh Hoa: between Nha Trang & Minh Hoa, Poilane 8297 (P).

11. Urceola napeensis (Quintaret) D.J. Middleton — Fig. 7; Map 9


Branches sparsely lenticellate or not; branchlets puberulent, sometimes turning glabrous when older. Leaves: petiole 0.5–2.3 cm long; papery, elliptic to ovate, apex acuminate to subcuneate, base rounded to cuneate, 2.6–12.7 × 1.3–7.2 cm, 1.9–3.4 × as long as broad; 3–8 pairs of lateral nerves, tertiary venation scalariform and reticulate; with hairs in the lateral nerve axes with the midrib and sometimes sparsely so on midrib beneath. Inflorescence of axillary and terminal cymes usually forming a panicle, puberulent, 2–9 cm long; pedicels 1.1–2.8 mm long. Sepals ovate, apex acute, rarely obtuse, 0.6–1.3 × 0.4–0.7 mm, 1.1–2.6 × as long as wide, puberulent. Corolla white; corolla lobes overlapping to the right in bud which is ovoid, open corolla campanulate; tube 0.7–1.5 mm long; lobes strongly falcate to the right as viewed from inside, 1.1–2.3 mm long, 0.5–0.8 mm wide, 1.3–2 × as long as tube; glabrous outside, densely pubescent to almost glabrous inside. Stamens inserted at 0.2 mm from corolla base, which is 0.2 of tube length; filaments 0.1–0.3 mm long; anthers 0.7–0.8 × 0.2–0.3 mm, 2.3–3.5 × as long as wide. Disc 5-crenate, 0.2–0.3 mm long. Ovary 0.3–0.6 mm long; style + pistil head 0.5–0.7 mm long. Fruit stipitate, widest near base and tapering, parallel or slightly diverging, glabrous, 4.1–5.8 cm long, 0.4–1 cm wide. Seed grain 10–17 × 2.3–3 mm; coma 2.6–3.8 cm long.

Distribution — China (Guangdong, Guangxi, Hainan), Hong Kong, Thailand, Laos, Vietnam.
Fig. 7. *Urceola napeensis* (Quintaret) D.J. Middleton. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit; f. seed (a–d: Poilane 26110; e, f: Eberhardt 3769). Scale bars: a, e, f = 1 cm; b–d = 1 mm.
Habitat — In a wide variety of habitats, frequently in thickets and on dry sandy soil.

Notes — Middleton (1994c) designated a neotype for this species on the grounds that the type could not be traced. Since then, however, a specimen has come to light in the Paris herbarium which was collected by Quintaret in Nape in Kham Mouan Province; it has numerous handwritten notes and is almost certainly the type of this species.

There seems to have been some confusion between this species and *Urceola micrantha* in the various Chinese works on the Apocynaceae. Illustrations of *Parabarium micranthum* in Tsang & Li (1977) and Ying & Li (1983) actually represent *Urceola napeensis*.

*Selection of the c. 60 collections studied:*


**LAOS.** Tran Ninh: *Spire 11* (A, P). Kham Mouan: Nape, *Quintaret s.n.* (P — type of *Micrechites napeensis*).


12. *Urceola quintaretii* (Pierre) D.J. Middleton — Fig. 8; Map 10


Branches lenticellate; branchlets sparsely puberulent or glabrous. *Leaves*: petiole 4–9 mm long; blade papery to subcoriaceous, elliptic to obovate, apex acuminate, base cuneate to acute, 2.5–14.8 × 0.8–3.2 cm, 1.8–5.3 × as long as wide, 4–8 pairs of lateral nerves, strongly ascending, tertiary venation obscure or reticulate, punctate beneath, with or without hairs in the axils of the lateral nerves and midrib. *Inflorescence* of axillary, long peduncled cymes, densely short puberulent, 1.7–8 cm long;
Fig. 8. *Urceola quintarelii* (Pierre) D.J. Middleton. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit; f. seed (a–d: Tsang 22262; e, f: How 73670). Scale bars: a, e, f = 1 cm; b–d = 1 mm.
pedicels 1.6–3.5 mm long. *Sepals* thin and leafy, ovate or oblong, apex rounded to obtuse, strongly imbricate, 1.4–2.4 × 0.6–1.7 mm, 1.4–2.8 × as long as wide, glabrous or sparsely puberulent. *Corolla* white or greenish white; corolla lobes overlapping to the right in bud which is ovoid, open corolla campanulate; tube 1.4–1.7 mm long; lobes slightly falcate, 1–1.1 mm long, 0.7 mm wide, 0.6–0.8 × as long as tube; pubescent outside at base of lobes, pubescent inside. *Stamens* inserted at 0.3 mm from corolla base, which is 0.4 of tube length; filaments 0.2 mm long; anthers 1.4 × 0.4 mm, 3.5 × as long as wide. *Disc* 5-crenate, 0.3 mm long. *Ovary* 0.5 mm long; style + pistil head 1 mm long. *Fruit* not stipitate, widest at base, tapering to ends, divergent, glabrous, 3.7–7.2 cm long, 0.5–0.9 cm wide. *Seed* grain 11–17 × 3–4 mm; coma 1.5–4 cm long.

**Distribution** — China, Vietnam, Laos.

**Habitat** — In forest, sometimes on swampy ground, to 760 m altitude.

**Selection of the 20 collections studied:**

**CHINA.** Guangdong: Wan Tong Shan, Liang 60632 (A, IBSC, W – type of *Parabarium chunianum*); Sup-man-ta Shan, Tso 23547 (A – paratype of *Parabarium chunianum*). Guangxi: Tung Hoo, N of Luchen, Ching 5611 (A, W – type of *Parabarium handelianum*); Sen-feng Dar Shan, S Nan-


LAOS. Cam-mon: Quintaret 6618 (P – type of Ecdysanthera quintaretii).

13. Urceola rosea (Hook. & Arn.) D.J. Middleton — Fig. 9; Map 11


Antirrhoea esquirolii Lév., Fl. Kouy-Tcheou (1914) 364. — Type: Esquirol 867 (E holotype; scrap in A).

Branchlets glabrous or sparsely puberulent when young. Leaves: petiole 0.8–2.2 mm long; blade papery, elliptic to obovate, apex acuminate to obtuse, base cuneate, 1.7–8.8 × 0.7–3.9 cm, 1.3–2.9 × as long as wide, 3–6 pairs of lateral nerves; with domatia in lateral vein axes, usually hair-filled. Inflorescence of axillary and terminal cymes forming panicles, puberulent, 5–17 cm long; pedicels 2–6 mm long. Sepals ovate, apex acute to obtuse, 1–2.1 × 0.5–1.2 mm, 0.9–2.4 × as long as wide, puberulent. Corolla pink and/or red; corolla lobes overlapping to the right in bud which is ovoid, acuminate or acute, open corolla campalpanulate; tube 1.4–2.4 mm long; lobes elliptic, rounded, 1.5–2.9 mm long, 0.8–1.7 mm wide, 0.9–1.6 × as long as tube; glabrous to minutely puberulent outside, densely pubescent inside. Stamens inserted at 0.5–1.5 mm from corolla base, which is 0.3–0.4 of corolla length; filaments 0.2–0.5 mm long; anthers 1.5–1.9 × 0.3–0.5 mm, 3.8–6.3 × as long as wide. Disc annular to weakly 5-crenate, 0.3–0.6 mm long. Ovary 0.4–0.9 mm long; style + pistil head 1–1.4 mm long. Fruits linear, parallel, densely lenticellate, 2.8–22 cm long, 0.5–1.8 cm wide. Seed grain 10.6–14.3 × 2.4–3.8 mm; coma 2.9–5.5 cm long.

Distribution — Southern China, N Eastern India, Taiwan, Burma, Thailand, Vietnam, Laos, Cambodia, Malaysia, Indonesia (Sumatra, Java), Japan (?).

Habitat — In evergreen or secondary forest to 1600 m altitude.

Note — There is a single collection labelled ‘Japan’. It is not clear where this specimen was collected. It may be that it was collected in the Ryukus, thereby exhibiting a distribution similar to U. micrantha. If it was collected further north it would certainly be a far outlier. Fernandez-Villar (1880) suggests this species (under the name Parameria pedunculosa) has been collected in the Philippines on the island of Panay. I have seen no material from the Philippines.

Selection of the c. 170 collections studied:

Fig. 9. *Urceola rosea* (Hook. & Arn.) D.J. Middleton. a. Habit; b. flower in bud; c. open flower; d. flower dissection; e. fruit; f. seed (a–d: Wang 40839; e, f: Rock 1961). Scale bars: a, e, f = 1 cm; b–d = 1 mm.

TAIWAN. Hualien Hsien, Yuli Town, Yushan NP en route from Nanan to Shanfeng, Liao et al. 1579 (E). Taipei, Yum Ho Tume, Cheun et al. s.n. (MO).

INDIA. Arunachal Pradesh: Mishmi Hills, Kingdom Ward 18583 (BM). Nagaland, Prain's coll. 948 (A).


14. Urceola torulosa Hook. f. — Map 10


— Type: Maingay 3304A [Kew Distr. no. 1086] (K lecto, designated here; GH, L iso).


[Echites monilifera Wall., Num. List (1829) 1660, nom. nud.]

Branchlets minutely puberulent, rarely glabrous. Leaves: petiole 0.8–2.6 cm long; blade ovate to elliptic, apex acuminate, base rounded to cuneate, 2.6–17.5 × 0.9–6.7 cm, 1.6–5 × as long as wide, 5–9 pairs of lateral nerves; with hairs in lateral vein axils, rarely glabrous. Inflorescence of axillary and terminal congested cymes, minutely puberulent, 2.5–5.5 cm long; pedicels 1.4–4.1 mm long. Sepals oblong to spathulate, apex rounded to obtuse, 1.9–4 × 0.7–1.5 mm, 2.1–4.6 × as long as wide, puberulent. Corolla lobes in bud valvate; bud elongate ovoid, open corolla tubular; tube 1.4–1.9 mm long; lobes triangular, 0.7–0.8 mm long, 0.6–0.7 mm wide, 0.4–0.5 × as long as tube; puberulent outside, sparsely puberulent inside. Stamens inserted at 0.2 mm from corolla base, which is 0.1 of tube length; filaments 0.4 mm long; anthers 1.5 × 0.4 mm, 3.8 × as long as wide. Disc 5-crenate, 0.5 mm long. Ovary 0.6 mm long; style and pistil length 1.3 mm long. Fruit long, torulose, glabrous, 4.6–45 cm long, 3–7 mm wide. Seed grain 7.8–11.2 × 3.2–5.4 mm; coma 1.5–3.3 cm long.

Distribution — Malaysia, Singapore, Sumatra, Borneo, Brunei.

Habitat — In evergreen or secondary forest to 550 m altitude.

Note — This species is most clearly recognised in fruit when it is quite unlike any other species of Urceola but could be confused with Parameria laevigata. Previously there seemed to be a clear situation where fruiting material of this genus was ascribed to U. torulosa and flowering material to U. malaccensis. Hooker (1882) described the fruits of U. malaccensis as 'elongate filiform' but there are immature fruits on the type material which are clearly torulose.
15. *Urceola tournieri* (Pierre) D.J. Middleton — Fig. 10; Map 12


Branchlets puberulent. *Leaves*: petiole 0.7–1.6 cm long; blade papery to subcoriaceous, narrow elliptic to oblong, apex acuminate to cuneate, base rounded to cuneate, 5.6–21.5 × 1.4–6.8 cm, 2.1–6.5 × as long as wide, 5–10 pairs of lateral nerves; with hairs in domatia in lateral nerve axils, rarely puberulent on midrib beneath. *Inflorescence* mostly axillary, rarely also terminal, puberulent, rarely glabrous, 2.7–16 cm long; pedicels 1–3.4 mm long. *Sepals* ovate, apex acute to obtuse, 0.5–1.3 × 0.4–0.8 mm, 1–2.5 × as long as wide, puberulent or glabrous, ciliate. *Corolla* white; corolla lobes overlapping to the right in bud which is long ovoid, open corolla campanulate to subsalverform; tube 0.9–1.7 mm long; lobes falcate, 0.6–0.9 mm long, 0.5–0.9 × as long as tube; glabrous or sparsely pubescent on upper parts outside, pubescent inside tube. *Stamens* inserted at 0.2 mm from corolla base, which is 0.2 of tube length; filaments 0.1–0.2 mm long; anthers 0.9–1.3 × 0.3–0.4 mm, 2.8–4 × as long as wide. *Disc* 5-crenate, 0.2–0.4 mm long. *Ovary* 0.3–0.6 mm long; style + pistil head 0.7–0.9 mm long. *Fruit* wider near base, tapering to end, 4.7–10.5 cm long, 0.9–1.7 cm wide. *Seed* grain 14.3–25 × 3.6–6 mm; coma 2.6–4.9 cm long.


Habitat — In forest at 600–1900 m altitude.

Note — This species is close to *U. micrantha* and they are difficult to distinguish in flower. The clearest difference is in the fruit which is thick and tapering in *U. tournieri* and narrower and more linear in *U. micrantha*. *Urceola tournieri* more commonly has pubescent branchlets, the inflorescences are usually axillary and do not form a terminal panicle, and the hairs of the inflorescence are longer.
Selection of the c. 50 collections studied:

BHUTAN. Samchi district, Tamangdhanra forest, Samchi, Grierson & Long 3494 (E).
NEPAL. Tamur Valley, Tapplejung, Stainjon 5843 (BM).
CHINA. Yunnan: Szemao, Henry 13289 (A, K).
BURMA. Southern Shan States, MacGregor 196 (E); Kachin Hills, Mokim s.n. (U, UPS, Z – type of Parabarrium burmanicum).
THAILAND. Chiang Mai: Pha Hom Pok, Fang, Niyomdham 1133 (AAU).
VIETNAM. Dong Nai; Tai Tia, S of Dolat, Poilane 24799 (P). Gia Lai–Kon Tum Ngok Pan, Poilane 35746 (P).

16. Urceola xylinabariopsoides (Tsiang) D.J. Middleton — Map 12


Map 12. Distribution of Urceola tournieri (Pierre) D.J. Middleton (○); U. xylinabariopsoides (Tsiang) D.J. Middleton (▲).
Branches not lenticellate; branchlets densely hirsute. Leaves: petiole 3–5 mm long; blade papery, elliptic or oblong, apex acuminate, base obtuse to weakly cordate, 2.3–8.1 x 0.7–3 cm, 2.6–4.1 x as long as wide, 6–9 pairs of lateral nerves, tertiary venation reticulate; densely hirsute on petiole and on blade beneath, sparsely so above. Inflorescence of numerous axillary and terminal cymes, densely brown hirsute, 1.6–4.2 cm long; pedicels 1.5–3 mm long. Sepals narrowly ovate, apex acute, 1.1–1.5 x 0.4–0.5 mm, 2.2–3.8 x as long as wide, densely hirsute. Corolla orange; bud cylindrical with a flat or rounded head; tube 1.4–1.5 mm long; lobes strap shaped, slanting to the right, 1.7 mm long, 0.8 mm wide, 1.2 x as long as tube; glabrous outside, sparsely pubescent or glabrous inside. Stamens inserted at 0.2 mm from corolla base, which is 0.1–0.2 of tube length; filaments 0.2–0.3 mm long; anthers 0.8 x 0.2 mm, 4 x as long as wide. Disc 5-crenate, 0.2 mm long. Ovary 0.4 mm long; style + pistil head 0.6 mm long. Fruit stipitate, parallel, widest near base and tapering to end, 6.3–7 cm long, 0.5–0.6 cm wide. Seeds not seen.

Distribution — China (Hainan, Zhejiang).
Habitat — Reported from thickets on sandy soil.

Collections studied:

INSUFFICIENTLY KNOWN TAXA

I have been unable to get hold of material of this species. The description and illustration provided are reminiscent of Urceola rosea.

Ecdysanthera barbata var. β Miq., Fl. Ind. Bat. 2 (1857) 452. — Type: Korthals.
There are a number of Korthals collections of both Parameria laevigata and P. polyneura, species of the genus to which this variety probably belongs, in the Leiden herbarium and it is not obvious which was intended to be the type.


Hooker only tentatively placed Maingay 1069 in Urceola but suggested it could be a new undescribed genus. I have been unable to find this specimen but from the description it sounds like it could be a Chonemorpha or an Anodendron.

SPECIES EXCLUSAE


Ecdysanthera myrtifolia (Miq.) K. Schum. in Engl. & Prantl, Nat. Planzenfam. 4, 2 (1895) 163 = Trachelospermum sp.


Parameria esquirolii Lév., Feddes Rep. 9 (1911) 325 = Sindechites henryi Oliv.


Urceola vandelli Roem. & Schult., Syst. 3 (1818) 99. — This species is described from Brazil where Urceola does not occur. I am unable to ascertain its current identity.

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Takahashi T-63593 — Thorel 1099.

**For Parameria**

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Backer 2857, 17195, 22124, 23502, 23968, 30624, 32665 (lae) — Bakhuizen van den Brink 2957, 5898 (lae) — Balakrishnan 713, 714 (lae) — Barnes 84, 352 (lae) — Bermejos 222, 259, 1552 (lae) — Beunne 554, 679, 703, 761, 3543, 3876, 3999, 4375, 4560, 4916, 5208, 6042 (lae) — van Beusekom & Charenoeph 1964, 1966 (lae) — van Beusekom & Santosuk 3220 (lae) — van Beusekom et al. 3841 (lae) — BKF 9506, 10572 (lae) — Blume 1073 (lae) — Bodner 146 (lae) — van Borssum Waalkes 791 (lae) — Bradley 72 (lae) — Burkill & Haniff 2026, 15651 (pol) — Burley et al. 770 (pol).
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Danser 6443 (lae) — Darnton 411 (lae) — David 166 (pol) — Den Berger 42 (lae) — Derry 910, 943 (lae), 1013, 1206 (pol) — Dewol et al. SAN 109230 (lae) — Dilmy 1088 (lae) — Docters van Leeuwen 409, 442, 606 (lae).
For *Urceola*

Aban 18618 (ela) — Aban & Saikhe SAN 82306 (ela) — Abas SAN 85642 (ros) — Ahmad 1057 (bra) — Afrinasthi 450 (bra) — Agama 492 (bra) — Ahmad SA 307, SAN 1269, 1417 (tor) — Alvins 37 (lar), 322, 310 (bra) — Ambrian 1722 (mic), 3538 (nap), 4390 (luc) — ATK series 5218 (luc), 11242 (ros), 58469 (luc), 92001 (min) — Blume 184, 881 (jav), 2182b p.p. (bra), 2182b p.p. (jav), [L 898.112-186] s.n. (bra) — Rahmat et al. 8593, 9419 (bra) — Bar 658 (ros), 4786 (nap) — Boshwezen 2194 (bra) — Brooke 8886 (bra) — Bruggerman 9, 777 (jav), 1184 (bra) — Bruinsma 17 (bra) — Bujang 13498 (bra) — Bunchi 1638 (min) — Bunnah 198, 273 (lac) — Bunnak 109 (ros) — Burkill 535 (bra), HMB 4542 (tor) — Burk & Haniff 12560 (bra) — But- scan 20 (nap) — Buwalda 6855 (ela), 6954 (jav), 7688 (bra).

Canicosa 9772 (bra) — Cantley 109, 121 (tor) — Carr 12781 (jav) — Castellini 22 (nap) — Champion 209 (ros) — Chan 1493 (ros), FRI 16917 (tor) — Charoenphol et al. 4188, 4269 (mic) — Cheern 9695 (ros) — Chen 1001 (ros) — Chevalier 38604, 39873 (mic) — Ching 5421 (ros), 5611 (qui), 7567 (nap), 8152 (mic), 8283 (qui) — Chuang 4864 (mic) — Chu 5027, 5547 (hua), 6438, 6466 (nap), 4095 (ros) — Chen & Ting 414 (nap) — Chen & Tsao 43733 (qui), 44620 (ros) — Chung 3324, 7580 (ros) — Chung’s coll. 4005 (ros) — Clarke 21928, 27669A, 36792C/B, 43592B, 45841A, 45853D/E (tou) — Clemens & Clemens 1098 (bra), 4036 (nap), 22252, 26758 (bra), 29858, 29885 (luc) — Cockburn FRI 8186 (tor), SAN 83295 (luc) — Colani 3224 (ros) — Collette 3779 (ros) — Collins 913, 1684 (min) — Congdon 465 (lac) — Corner 21310 (bra), 30044 (tor), SF 30409 (bra), 34529 (tor) — Curtis 403 (bra), 661 (lac), 823a, 823b, 823c (ela), 941 (luc), 2395 (tor), 3477 (ela), 3478 (bra).

David 168 (tor) — Derry 122, 333 (luc), 404 (ela), 527, 978 (luc) — 1024, 1031 (ela) — 1096 (tor), 1158 (luc) — Dewol et al. (all SAN) 71156 (bra), 77544 (ros), 90353 (ela), 99418 (bra) — Dransfield SMHI 1276 (luc) — Dunn 2914 (ros).

Eberhardt 2569, 2660, 2683, 2869 (mic), 3769 (nap), 4271 (ros), 4807 (nap) — Eadano 40157 (bra) — Elmer 9239 (bra), 12837 (luc), 16608 (bra) — Endert 2271 (ela), 2450, 3205 (bra) — Eng- goh 10211, 10663 (bra) — Esquire 867 (ros) — Evangelista 273 (bra).

Faurie 269 (mic), 8202 (ros) — Fedilis & Sumbing SAN 88361 (bra) — Forbes 886, 938 (jav) — Ford 21354 (mic) — Forman & Blewett 844 (bra) — Forrest 18351 (ros) — Foxworthy 1144 (ela) — Free & Sumbing SAN 79175 (bra) — Fukuo & Ito T-34760 (min).

Gamble 564A, 6867A (tou) — Geesink & Hattink 6421 (luc) — Geesink et al. 6728 (ros) — Gentry & Tagi 33885 (bra) — Gillison & Kairo NGF 25781 (jav) — Goodenough 10600 (ela) — Grasshoff 89, 214 (bra), 875, 1089 (jav) — Gregorio & Eadano 40158 (bra) — Gressitt 44 (ros), 885, 1141 (nap), 1334 (ros) — Grierson & Long 3494, 4117 (tou) — Griffith 310, 965 (tou), 981 (mic) — Guard 2 (luc).

Yates 1475 (luc).

Zollinger 1201 (luc).
Hallier 349 (bra), 623a (jav), 868 (bra), 985 (jav) — Hamid 8897, 37252 (ela), 37581 (ros) — Hance 474 (ros) — Hance & Simson 691 (ros) — Handel-Mazzetti 134 (ros) — Hannif 375, 3569 (luc) — Hannif & Nur 4048 (luc) — Hara et al. 13956 (tou) — Hartley 10395 (jav) — Hasskarl [L 898.112-539] s.n. (bra) — Hatusima 18773 (mic) — Haviland 1525, 1527, 1767, 3043, 3497 (bra) — Henderson 23472, 23486, 23601 (mic) — Henry 388, 616, 838 (ros), 8534 (nap), 12760 (ros), 13289 (tou) — Herb. Hongkong 9057 (ros), 10169 (mic) — Holttum s.n. (tor) — Hoogland & Craven 10436 (jav) — Horsfield 19 (jav), 26, 27, 62 (bra) — Hose 268 (bra) — How 70175 (ros), 71677, 72685 (nap), 72734, 73209 (qui), 73491 (mic), 73670 (qui) — How & Chun 70257 (mic) — Hsu 2242 (ros), 5251 (mic), 5403 (ros) — Hu 5276, 7628, 10367, 11703, 11942 (ros) — Hu & But 20315 (mic) — Huang 10246 (ros), 10471 (mic) — Huang et al. 15600 (ros) — Hullett 395 (bra), 425, 860 (luc), 909 (tor) — Hwang 242 (ros).

Isles & Vinas LAE 59039 (jav).

Jaamat 47037 (ela) — Jacobs 4566 (jav), 8359 (ros) — Jusuali 3501 (tor).

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Lanjouw 46 (bra) — Larsen et al. 31166 (luc) — Lau 325, 1600 (ros), 1648 (xyl), 3161 (ros), 3292, 3570, 3670 (mic), 3782, 5211 (ros), 5611 (qui), 25629, 25859 (mic), 25930 (qui), 26337 (ros), 26863, 27035 (xyl), 27046 (ros), 27299 (qui), 28065 (nap) — Launomonier TFB 4521 (jav) — Lay 47 (ros) — Lei 253 (nap), 420 (mic), 582 (ros), 881 (mic) — Leighton 113 (bra) — Lesger 257 (ros) — Leu & Hu 982 (ros) — Liang 60632 (qui), 63473 (ros), 63513 (qui), 64025 (ros), 65271, 65271 (qui), 66379, 69754 (ros), 69795 (qui) — Liao et al. 1579 (ros) — Lingnan no. 16555 (ros) — Loher 13336, 14480 (bra) — Lu 15492 (mic) — LÝ 72 (nap), 562 (mic).

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Nangkat NN 244 (tor) — Native coll. 449, 856, 1058 (bra), 1700 (tor), 1814, 1868 (bra), 5863, 5924, 5968 (tou) — Newman 216 (mic) — Ngadiman 34744 (bra) — Niyomdham et al. 216 (luc), 1133 (tou) — Nur SF 7796 (bra), SF 32823 (mal) — Nurta & Hasan 16 (jav).

Ogata 10515 (tor) — Ohwi 1360 (ros) — Oldham 328 (ros).

Parker 2305 (mic) — Parry 411 (tou) — Peng 10004 (ros) — Pélotel 2392 (nap), 2433 (mic), 2439, 2444 (nap), 3224 (ros), 4694, 4805 (nap), 5282 (ros), 5784 (nap), 5986 (ros), 10326, 11004, 1717 (ros) — Pengkhialai 679, 3552 (min) — Phloenchit 697 (luc) — Phuosaeng 93 (luc) — Pierre 1434 (mic), 4501 (min) — Piper 512, 545 (bra) — Podzorski SMH 605, SMHI 616 (lae), SMHI 889 (bra) — Poilane 933, 1090, 1877, 1996 (mic), 2003 (nap), 2472 (tou), 5996 (mic), 8291 (min), 10291, 10844, 13450 (nap), 18830, 21234, 21780 (mic), 22053...
(min), 22244 (ros), 23822, 23828 (mic), 24163, 24799 (tou), 26065 (ros), 26110 (nap), 31470 (mic), 32269, 35746 (tou) — Polak 298 (jav) — Poore 890 (tor) — Prain’s coll. 540, 787, 806 (mic), 948 (ros) — Price 186, 210 (mic), 727 (ros) — Pursglove P 5405 (bra) — Put 873 (luc), 3575 (mic).

Quintaret 6618 (qui).

Rabil 374 (luc) — Rachmat 95 (tor) — Rahim et al. SAN 100356 (ros) — Ramos 1826, 40957 (bra) — Ramos & Pascasio 34760, 35144 (bra) — Rant 683 (bra) — Reksodiharjo 274 (jav) — Reynaud H. Pierre 6617 (nap) — Ridley 152, 1564, 1610 (bra), 2416 (luc), 2717 (bra), 2722 (tor), 2727 (bra), 2745 (luc), 3188, 3602a, 4433, 4960 (tor), 5628, 5658 (luc), 6317, 6523 (tor), 6937, 8397, 9125, 9158 (bra), 9666 (tor), 10772 (bra), 11132 (tor), 11348 (bra), 12572 (tor) — Ridley & Derry 1169 (luc) — Ridsdale PBU 182, SMHI 1518 (bra), SMHI 1617 (lae), SMHI 1631 (bra) — Robbins 2098 (jav) — Rock 1961 (ros) — van Romburgh [BO 936.20.51] s.n., [BO 936.20.54] s.n. (jav), 1, 2, 3 (bra), 4 (ela), 6, 22, 27 (bra), 38 (jav), 50 (ela), 76, 77 (bra) — van Rossum 214, 215, 761 (bra) — RRI 36 (ela) — Rutten 1916 (jav) — Rutton 21890c (tou).

Sampson 412 (ros) — Sanan 288, 992 (luc) — Sangkhachand 1507 (ros) — Sasaki 264, 380466 (mic) — Schodde & Craven 4651 (jav) — Scortechini 17b (luc) — Shah & Ali MS 3070 (tor) — Shah & Shukor MS 2366 (bra) — Shah & Sidek MS 4073 (bra) — Shah et al. MS 2621 (tor) — Shiri 14691 (nap) — Shimizu 12644, 12731 (ros) — Sidiyasa 1051 (bra) — Simada-Hidetaro SH 723 (ros) — Simpson 2019 (bra) — Sinanggul SAN 57254 (bra) — Sinclair 5530, 6403, 10751 (tor), 10844 (bra), s.n. (tor) — Sirirugsa 771 (luc) — Sitam 12223 (bra) — Smithan nad 939 (luc), 6528, 7166 (mic), 11918 (mic) — Smythe’s S 14076 (tor) — Sour & Tachuan 16856 (ros) — Spare 1042 (tor) — Spire 1 (tou), 6 (ros), 11 p.p. (lat), 11 p.p. (mic), 11 p.p. (nap), 14, 15 (lat), 20 (mic), 21 (qui), 206 (ros), s.n. (tou) — Squires 160 (mic) — Stanton 5843 (tou) — van Steenis 2839 (bra) — Steward & Cheo 800 (hua), 857 (ros) — Stone & Sidek 12275 (tor) — Stone et al. 15233 (tor) — Sulit 2620 (bra), 12324, 12367 (lae), 14564 (bra) — Sumbing SAN 12207 (bra) — Suzuki 4476, 4478 (ros) — Symington 36202 (mal).

Taam 1748 (nap), 2128 (ros) — Tahir 9225 (bra) — Talip & Ejan SAN 86998 (ros) — Tanaka & Shimada 11055 (ros) — Tang 1316 (ros) — Teo 401 (ela), 1032 (tor) — Teijmann HB 987 (ros), 1135b (jav), HB 4305 (ros), 11340 (jav) — Thavorn 992 (luc) — Thorel 2107, 2802 (min) — Ting & Shih 604 (nap), 1043 (qui), 1494 (ros) — Tong S 34964 (ela) — Tournier 6615 (tou) — Trimen s.n. (luc) — Tsai 61579, 61622 (mic) — Tsang 107 (nap), 284, 21471 (ros), 22104, 22158, 22165 (nap), 22262 (qui), 22625, 23875, 24034 (nap), 24151, 24589 (mic), 26523, 26643, 27253 (nap), 27294 (ros), 27522 (nap), 28858, 29006 (ros), 29161 (nap), 29802 (ros), 29846 (nap), 30071 (qui), 30252 (nap) — Tsang et al. 660, 67 (ros) — Tsang 90 (mic), 2105 (nap) — Tso 2354 (qui) — Tsou & Lin s.n. (mic) — Tsui 239, 553 (ros).

Umbai KL 1599 (bra), KL 1749 (mic).

Vachell 144 (ros) — Versteegh & Vink BW 8293 (jav) — Villamil 189 (bra) — Vink BW 12157 (jav) — de Vogel 2512, 3738 (jav).

Wallich 1667, 1668 (mic), 1670, 1671 (luc) — Walsingham 58496 (ros) — Wang 393, 35043 (ros), 39139 (nap), 39302 (ros), 39901 (ros), 40421 (mic), 40839, 40850 (ros), 74119 (tou), 74616 (ros), 75276 (tou), 75554, 75934, 77466, 77725, 77742 (ros), 78243 (tou), 79791, 80353 (ros), 80693 (mic) — Wenzel 689, 1167, 3405 (bra) — Whitmore (all FRI) 478, 842 (ros), 12426 (ela) — Wilford 401 (ros) — Williams S 17136 (bra) — Wilson 4092, 10007 (ros), 10077, 10153 (mic) — Winckel 991B (bra) — Winit 1829, 1834 (ros) — Wiradinata 3457 (ela) — Wissmann 1041 (ros) — Wong, K.M. FRI 32412 (tor) — Wood 818 (bra), SAN 16724 (ela) — Wood et al. SAN 17554 (bra) — Wray 595, 1812, 2308A, 2599, 4273 (ela) — Wright 329 (ros), 331, 487 (mic).

Zou 912 (ros).
The letters and numbers in brackets are the first three letters and the number of the species under which each name can be found except (mor) = Aganonerion polymorphum, (pde) = Parameria densiflora, (pla) = Parameria laevigata, (ppo) = Parameria polyneura. Accepted names are in Roman type; synonyms, excluded species and insufficiently known species in italics; new species and combinations in bold type; (x) = species exclusae; (ik) insufficiently known species.

Aegiphila laevigata Juss. (pla)
Aganonerion Pierre ex Spire
   dongnaiense Pierre ex Planchon (x)
   polymorphum Pierre ex Spire (mor)
Anodendron candalleteum Wight (x)
Antirrhoea esquirii Lév. (ros 13)
Carruthersia imberbis Elmer (bra 1)
   laevis Elmer (lae 5)
Chavannesia A.DC.
   brachysepalu (Hook. f.) Pichon (bra 1)
   esculenta A. DC. (luc 7)
   imberbis (Elmer) Pichon (bra 1)
   javanica (Blume) Miq. (jav 4)
   lucida (Wall. ex G. Don) A. DC. (luc 7)
   montana (M. R. Hend.) Pichon (mic 9)
   philippinensis (Merr.) Pichon (bra 1)
   torulosa (Hook. f.) Pichon (tor 14)
Chunechites Tsiang
   xilinabariopsisoides Tsiang (xyl 16)
Cleghornia malaccensis (Hook. f.) King & Gamble (x)
Dendrocharis rubescens Teijsm. & Binn. (x)
Ecdysanthera Hook. & Arn.
   annamensis Vernet (mic 9)
   barbata Miq. (pla)
   var. angustior Miq. (pla)
   var. β Miq. (ik)
   brachiatum A. DC. (mic 9)
   cambodiensis Pierre (mic 9)
   densiflora Miq. (pla)
   glandulifera (Wall. ex G. Don) A. DC. (pla)
   var. pierrei Heim (pla)
   godefroyana Pierre (x)
   griffithii Wight (pla)
   huaitingii (Chun & Tsiang) P.T. Li (hua 3)
   inflata (Blume) K. Schum. (x)
   lakhimpurensis Srivastava & Mehrotra (ik)
   langbianii Vernet (mic 9)
   linearicarpa Pierre (mic 9)
   micrantha (Wall. ex G. Don) A. DC. (mic 9)
   multiflora King & Gamble (mic 9)
   myrtifolia (Miq.) K. Schum. (x)
   napeensis (Quintaret) Pierre (nap 11)
   paramerooides Tsiang (qui 12)
   pedunculosa Miq. (ros 13)
   (Ecdysanthera)
   quintaretii Pierre (qui 12)
   rosea Hook. & Arn. (ros 13)
   rubescens Boerl. (x)
   scandens Hassk. (x)
   schrickeii Heurck & Müll. Arg. (x)
   torosa Llanos (pla)
   tournieri Pierre (tou 15)
   utilis Hayata & Kawakami (mic 9)
   xilinabariopsisoides (Tsiang) P.T.Li
   (xyl 16)
Echites brachiata Wall. (mic 9)
   densiflora Blume (pla)
   esculenta Wall. (luc 7)
   glandulifera Wall. ex G. Don (pla)
   lucida Wall. ex G. Don (luc 7)
   micrantha Wall. ex G. Don (mic 9)
   monilifera Wall. (tor 14)
   torosa Llanos (pla)
Hymenolophus Boerl.
   romburghii Boerl. (jav 4)
Ichnocarpus serpilifolius Heurck & Müll. Arg. (x)
   warianus (Schlitr.) D. J. Middleton (x)
Micrechites minutiflora (Pierre) Li (min 10)
   napeensis Quintaret (nap 11)
Parabarium Pierre ex Spire
   brachiatum (A. DC.) Pierre ex Spire (mic 9)
   burmanicum Ly (tou 15)
   cambodiense (Pierre) Pierre ex Spire (mic 9)
   candollei Pierre ex Spire (nap 11)
   chevalieri Pitard (mic 9)
   chunianum Tsiang (qui 12)
   diu-do Dub. & Eberh. (mic 9)
   var. longifolia Dub. & Eberh. (mic 9)
   godefroyana (Pierre) Pierre ex Spire (x)
   hainanense Tsiang (qui 12)
   handelianum Tsiang (qui 12)
   hookeri Pierre ex Spire (tou 15)
   huaitingii Chun & Tsiang (hua 3)
   langbianii (Vernet) Pichon (mic 9)
   langbiensis Ly (mic 9)
   latifolium Pierre ex Spire (lat 6)
   linearicarpum (Pierre) Pichon (mic 9)
   linocarpum Pierre ex Spire (mic 9)
(Parabarium)

**micranthum** (Wall. ex G. Don) Pierre ex Spire (mic 9)
**multiflorum** (King & Gamble) Lý (mic 9)
**napeensis** (Quintaret) Jum. ex Spire (nap 11)
**quintaretii** (Pierre) Pierre ex Spire (qui 12)
**spireanum** Pierre ex Spire (mic 9)
**tournieri** (Pierre) Pierre ex Spire (tou 15)
  var. **guignardii** Pierre ex Spire (tou 15)
**utile** (Hayata & Kawakami) Lý (mic 9)
  var. **kerrii** Lý (mic 9)
**velutinum** Pitard (lat 6)
  var. **koratianum** Lý (lat 6)
**vernetii** Pierre ex Spire (mic 9)

Parameria Benth.

**angustior** (Miq.) Boerl. (pla)
**barbata** (Blume) K. Schum. (pla)
  var. **pierrei** Pitard (pla)
**densiflora** Oliv. (den)
  esquirolii Lév. (x)
**glandulifera** (Wall. ex G. Don) Benth. ex Kurz (pla)
  var. **phillipinensis** (Radlk.) Stapf (pla)
  var. **pierrei** Pitard (pla)
  var. **poilanei** Pitard (pla)
**griffithii** Pierre (ppo)
  laevigata (Juss.) Moldenke (pla)
**pedunculosa** (Miq.) Benth. ex Boerl. (ros 13)
  philippinensis Radlk. (pla)
**pierrei** Baill. (pla)
**polyneura** Hook. f. (ppo)
**vulneraria** Radlk. (pla)
  variana Schltr. (x)

Parameriopsis Pichon

**polyneura** (Hook. f.) Pichon (ppo)
Parsonia **barbata** Blume (pla)
  javanica Blume (jav 4)
**Pezisicarpus** Vernet
  montana Vernet (min 10)
Sindechites henryi Oliv. (x)
Tabernaemontana **elastica** (Roxb.) Spreng.
  (ela 2)
Trachelospermum **inflatum** (Blume) Pierre ex Pichon (x)

Urceola Roxb.

**acute-acuminata** Boerl. (bra 1)
  var. **polyneura** Boerl. (ik)
brachyspela Hook. f. (bra 1)
  var. **poliosa** Boerl. (ela 2)
elastica Roxb. (ela 2)
**esculenta** (A. DC.) Benth. ex Kurz (luc 7)
hualtingii (Chun & Tsang) D. J. Middleton (hua 3)
**imberbis** (Elmer) Elmer (bra 1)
  javanica (Blume) Boerl. (jav 4)
laevis (Elmer) Merrill (lai 5)
  latifolia (Pierre ex Spire) D. J. Middleton (lat 6)
**linearicarpa** (Pierre) D. J. Middleton (mic 9)
**longisepala** Elmer (tor 14)
lucida (Wall. ex G. Don) Benth. ex Kurz (luc 7)
  maingayi Hook. f. (bra 1)
**malaccensis** Hook. f. (tor 14)
**malayana** D. J. Middleton (mal 8)
micrantha (Wall. ex G. Don) D. J. Middleton (mic 9)
  minutiflora (Pierre) D. J. Middleton (min 10)
**montana** M. R. Hend. (mic 9)
  napeensis (Quintaret) D. J. Middleton (nap 11)
**philippinensis** Elmer (bra 1)
  pilosa Boerl. (jav 4)
quintaretii (Pierre) D. J. Middleton (qui 12)
  reticulata King & Gamble (luc 7)
**rosea** (Hook. & Arn.) D. J. Middleton (ros 13)
  torulosa Hook. f. (tor 14)
tournieri (Pierre) D. J. Middleton (tou 15)
**vandelli** Roem. & Schult. (x)
  xylinabariopsoides (Tsiang) D. J. Middleton (xyl 16)

Xylinabaria Pierre

**bantamensis** Pierre ex Pichon (jav 4)
  esculenta (Wall. ex G. Don) Pierre ex Spire (luc 7)
  koordersii Pierre ex Koord.-Schum. (jav 4)
  minutiflora Pierre (min 10)
  reynaudii Jum. (nap 11)
  spirei Pierre ex Spire (lai 6)

Xylinabariaopsis Pitard

**napeensis** (Quintaret) Metalie (nap 11)
  reynaudii Jum. (nap 11)
  ventii Lý (xyl 16)
  xylinabariopsoides (Tsiang) Lý (xyl 16)