



Convolvulaceae

George Staples

Flora of Cambodia, Laos and Vietnam

Volume 36



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Ipomoea sumatrana (Miq.) Ooststr. Photo by Thamarat Phutthai.

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Argyreia mollis (Burm. f.) Choisy. Photo by Preecha Karaket.

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FAUNE ET FLORE TROPICALES

CONVOLVULACEAE

**Flora of
Cambodia, Laos and Vietnam**

volume 36

George Staples

Publications scientifiques du Muséum
Royal Botanic Garden Edinburgh
IRD Éditions
2018

Taxonomic novelty

Merremia sagittoides (Courchet & Gagnep.) Staples, comb. nov.

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The series comprises more than forty published titles. The series publishes, in French or English, books for the identification of animals, plants and fungi from tropical regions. Hitherto published by the Institut de Recherche pour le Développement (IRD), the series is since 2002 continued jointly by that institution and the Muséum. The editorial policy of the series favours works concerning countries with IRD branches and/or based on the Muséum national d'Histoire naturelle collections. It aims to disseminate the most recent knowledge on the systematics and distribution of the different groups, with contents ranging from taxonomic focus to complete illustrated fauna and flora. The volumes include many line figures but for some groups, the collection can take the form of large format albums, illustrated in color. It covers books on vertebrates, invertebrates and plant species in the tropics.

"Flora of Cambodia, Laos and Vietnam"

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Each volume in the series provides identification criteria and keys for the determination of the genera and species listed in these three countries. The morphological description of each species is accompanied by colour illustrations and photographs, a map of the geographical distribution and information on biology and ecology. Taking into account the classification recognized at the time of publication, special attention is given to the taxonomic status and nomenclature of the different groups.

This volume on Convolvulaceae is the 36th volume in the *Flora of Cambodia, Laos and Vietnam* (ISSN: 0071-5867) and the first to be published as part of the *Tropical Fauna and Flora* series (ISSN: 1286-4994).

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Convolvulaceae Jussieu

Gen. Plant. 132 (1789), *nom. cons.*; C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 179–228, 734 (1883); Prain, J. Asiatic Soc. Bengal, Pt. 2, Nat. Sci. 63 (2): 83–115 (1894); Gagnep. & Courchet, Notul. Syst. 3: 134–155 (1915a); Gagnep. & Courchet, Fl. Indo-Chine 4: 228–313 (1915b); Ooststr., Blumea 3: 62–94 (1938), 3: 267–371 (1939), 3: 481–582 (1940), 5: 339–411 (1940); Kerr, Fl. Siam. 3 (1): 89–100 (1951), 3 (2): 1–35 (1954); Ooststr. & Hoogland, Fl. Males., Ser. I, Spermat. 4: 388–512 (1953), 4: 599 (1954), 5: 558–564 (1958), 6: 936–941 (1972), 7: 823 (1976), 9: 558 (1982), 10: 716 (1989); C.Y.Wu, Convolvulaceae in Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 99–137 (1965); R.C.Fang & S.H.Huang, Fl. Yunnanica 2: 611–686 (1979); R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 1–184 (1979); T.N.Nguyễn in L. Averyanov *et al.*, Materialy po flore i rastitelnosti ostrovogno V'etnama 42–44 (1988); T.N.Nguyễn in L. Averyanov *et al.*, Vasc. Pl. Syn. Vietnamese Fl. 1: 173–186 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 969–1005 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 1–92 (1993); R.C.Fang & Staples, Fl. China 16: 271–325 (1995); T.N.Nguyễn & Đ.H.Dùóng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005); Staples & Brummitt in Heywood *et al.*, Flow. Pl. Fam. World 108–110 (2007); Eich, Solanaceae and Convolvulaceae: secondary metabolites 1–637 (2008); Staples, Fl. Thailand 10: 330–468 (2010); Leti *et al.*, Flore Photogr. Cambodge 166–191 (2013); Staples *et al.*, Thai J. Bot. 6: 79–87 (2014); Staples *et al.*, World Checklist Convolvulaceae <http://apps.kew.org/wcsp> (2015–); Staples & Syahida-Emiza, S., Fl. Penins. Malaysia ser. 2, 5: 55–198, fig. 267–301 (2015).—Type: *Convolvulus* L.
Cuscutaceae Dumort., Anal. Fam. Pl.: 20, 25 (1829), *nom. cons.*
Erycibaceae Endl. ex Meisn., Pl. Vasc. Gen.: tab. diagn. 272, comm. 185 (1840).
Poranaceae J.Agardh, Theoria Syst. Pl.: 364 (1858).

Herbaceous or woody climbers, less often prostrate, ascending or erect. Stems twining to right, lacking tendrils, stipules usually absent (present in *Dichondra*; paired auricles in some *Merremia* resemble stipules; a few *Ipomoea* species have foliose axillary shoots that are stipule-like and are sometimes referred to as pseudo-stipules); sap often milky. Leaves alternate, simple, entire, less often dissected or compound, or reduced to tiny scales or absent (*Cuscuta*).

Inflorescences cymose, organized in racemes, panicles, umbels, or capitula, or flowers solitary, typically axillary, less often terminal; bracts tiny scales to enlarged and wing-like or sepalose. Flowers bisexual, actinomorphic, usually 5-merous, tiny to showy; sepals free, quincuncial, often persistent, sometimes enlarged in fruit; corolla sympetalous, limb nearly

entire to deeply lobed, aestivation contortuplicate or valvate in bud; stamens alternating with corolla lobes, equal or unequal in length, filaments basally adnate to corolla, free and filiform above, often pubescent or glandular around attachment, sometimes with scales (*Cuscuta*, *Lepistemon*) or thickenings (*Merremia*) associated with filaments; anthers secondarily and longitudinally dehiscing, (spirally twisted in *Merremia*, *Operculina*); pollen smooth or finely spiny, apertures variously shaped and arranged; nectary ring-like, cupular, or absent; ovary superior, mostly 2-carpellate (rarely 3–5-carpellate), 1- or 2-locular (rarely 3- or 4-locular); ovules basal, erect; style(s) 1 or 2, terminal (gynobasic in *Dichondra*) or very short or absent; stigmas 1, 2 (or 3), entire or variously lobed, or more-or-less fused and biglobular.

Fruit a capsule, berry, or utricle; dehiscing longitudinally by valves, circumscissile around the middle, irregularly shattering, or indehiscent. Seeds 4 (or fewer by abortion), 6, or 1, trigonous to ovoid or globose, glabrous or pubescent, with a prominent basal hilum (Fig. 1).

Worldwide with 59 genera and c. 1,900 species, the majority found in tropical and warm temperate regions. Twenty-two genera, 108 species, and 10 infraspecific taxa are treated in full in this account for Cambodia, Laos and Vietnam; 13 cultivated taxa are briefly mentioned, included in the keys, but given no further treatment. These numbers are sure to increase as collecting density improves. A few collections, too poor for description, probably represent additional undescribed species. In the comments after the taxonomic descriptions that follow, CLV has been used as an abbreviation for the area or region encompassing Cambodia, Laos, and Vietnam.

Ecology

Little has been reported about the ecology of tropical Southeast Asian Convolvulaceae and this is an area ripe for observation and discovery. In general they are heliophytes—sun-loving plants of open places, forest gaps and edges, and the forest canopy; rather few species grow preferentially in shade. While the majority are climbers, either woody lianas or herbaceous twiners, there are also prostrate mat-forming herbs, diffuse, non-twining herbs, and erect shrubs or, elsewhere, even small trees. The flowers are often showy, diurnal, attractive to bees, butterflies or birds and some are known nectar sources for these animals; a smaller number of species has nocturnal flowers adapted for moth (or bat) pollination. *Erycibe* species have been observed with Orthoptera (tree crickets, grasshoppers) on the inflorescence, seemingly visiting the flowers. A number of Asian Convolvulaceae (*Argyreia*, *Erycibe*, *Merremia*) have extra-floral nectaries on the leaf blade, petiole, calyx, or other plant organs; ants associated with these climbers bite viciously when the plants are disturbed.

In Southeast Asia the fleshy fruits of *Erycibe* are eaten by diverse forest-dwelling mammals that effectively disperse the seeds (McConkey & Galetti 1999). *Argyreia* species have similarly fleshy fruits but to date no observations are recorded about what eats/disperses them. Other genera with dry capsular fruits have seeds dispersed by flotation in water, rain wash, or are carried in soil, or possibly (where long hairs are present on the seeds) by attachment

to animals. Beetles of the genus *Spermophagus* have been observed emerging from Asian Convolvulaceae fruits/seeds at maturity; their ecological role is unstudied.

Some of the most aggressive invaders and weeds also propagate vegetatively: a few centimetres of stem, or a small piece of root is enough to start a new plant. It is not generally recognized that many perennial Convolvulaceae have enlarged underground storage organs (roots, tubers, caudexes) and these are often rich in secondary compounds.

Morphology

Traditionally, pollen surface characters (Fig. 1.), pistil morphology, and fruit type and mode of dehiscence have been important taxonomically. Whether pollen grains have prominent spines (spinulose pollen) or not (smooth pollen) has long been a fundamental character that divides the family into two groups; this pollen character is used in the key to genera. When the flower is in bud, a wedge-shaped band of the five petals is exposed to the exterior while the rest of the corolla is folded into the middle of the flower. These five bands are clearly seen in the opened flower and are generally known as the *midpetaline bands* (or *interplicae*, meaning between the pleats). They usually differ markedly from the other areas of the corolla in colour, texture or indumentum, and they may include clearly visible veins. These midpetaline band characters may be taxonomically informative.

Leaf sizes are always under-reported, because fully developed cauline leaves are almost never collected and the leaves nearest the flowers/ inflorescence, which are typically the ones collected, are reduced in size. If a live plant is compared with the descriptions here, which are based on dried herbarium specimens, then leaves several times larger than reported are very likely to be found. Likewise, corollas shrink significantly on drying, and fresh material may well have flower parts as much as 50% larger than reported here, based on herbarium specimens. These points should be borne in mind when using the keys and checking descriptions. The nature, distribution, and abundance of trichomes on the vegetative and reproductive parts are often diagnostic of certain genera and many species of Convolvulaceae. For example, the presence of stellate indumentum—trichomes with 3 or more arms—is diagnostic of the genera *Erycibe* and *Jacquemontia*. However, the vocabulary describing trichome types is confusing and many botanists use the terms without precision. In reading the keys and descriptions here, users will find it helpful to refer to a standard glossary such as Lawrence (1951 and reprints), particularly figs 308–310, are very helpful because these figures provide a concise visual comparison of various indumentum types.

In the descriptions that follow, “axial parts” is a collective phrase that includes the stems, petioles, peduncles, secondary and lower-level inflorescence axes (that is, the branches in the inflorescence), and pedicels; it stands in contrast to “laminar parts” which include the leaves, bracts, bracteoles, calycles, and sepals/calyces.

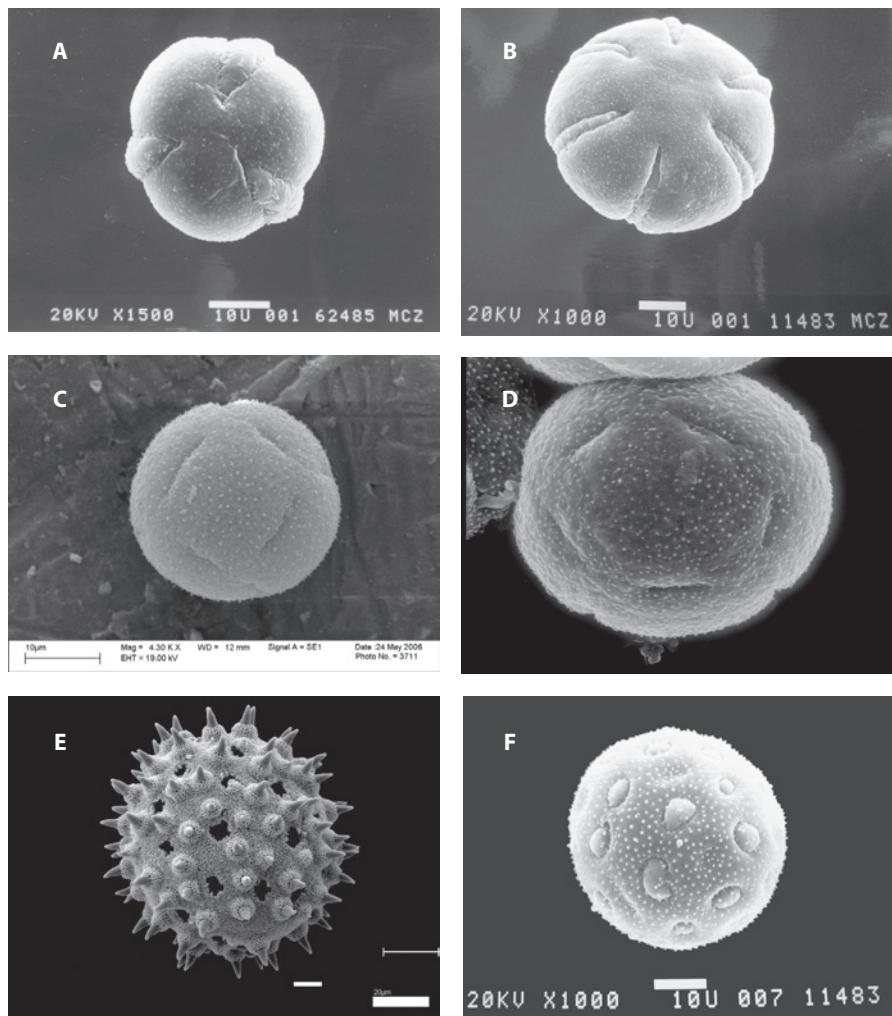


Fig. 1. Comparative pollen plate. A, 3-colporate, non-spinose grain [*Bonamia*, *Cuscuta*, *Erycibe*, *Evolvulus*, some *Merremia*, *Neuropeltis*, *Operculina*, *Tridynamia*] (photo G. Staples); B, 6-colporate, non-spinose grain [only *Merremia umbellata*] (photo G. Staples); C, rugate or zonocolpate, non-spinose grain (4 polar \times 4 equatorial \times 4 polar colpi) [*Aniseia*, *Evolvulus*, *Hewittia*, *Jacquemontia* and some *Merremia*] (photo Maria Teresa Buril, Universidade Federal Rurale de Pernambuco, Brazil); D, rugate or zonocolpate, non-spinose grain (5 polar \times 5 equatorial \times 5 polar colpi) [*Aniseia*, *Evolvulus*, *Hewittia*, *Jacquemontia* and some *Merremia*] (photo Paweena Traiperm, Mahidol University, Thailand); E, pantoporate, spinose grain [*Argyreia*, *Ipomoea*, *Lepistemon*, *Rivea*, *Stictocardia*] (photo Paweena Traiperm, Mahidol University, Thailand); F, pantoporate, non-spinose grain [only *Xenostegia*] (photo G. Staples).

Usage

Both the sweet potato (*Ipomoea batatas* (L.) Lam.) and *cay rau muông* (*Ipomoea aquatica* Forssk.) are important food plants in the CLV area. They are commonly available in markets and are widely grown in villages. Sweet potato is also an agricultural crop of global importance. Other species, often collected from the wild, are consumed within the region.

The Convolvulaceae contributes numerous ornamental species (Ng 2006; Staples & Herbst 2005). Most notable are the morning glories with large, showy flowers that range in colour from the deep purple-blue of *Ipomoea indica* to the soft, pale pink flowers of the shrub morning glory, *I. carnea* subsp. *fistulosa*, to the fragrant, night-flowering white moonflower, *I. alba*. The cypress vine, *I. quamoclit* has feathery, fern-like leaves and blood red or white flowers. Several other species, such as the railway creeper, *I. cairica*, and *I. mauritiana* are used as vegetable screens from their ability to cover chainlink fences with their twining stems, pretty segmented or lobed leaves, and pale purplish flowers often produced in profusion. Other genera also produce attractive flowers, such as *Jacquemontia pentanthos* which has sky-blue flowers 2–3 cm across, or blue daze, *Evolvulus glomeratus* Nees & Martius subsp. *grandiflorus* (Parodi) Ooststr., a free-flowering mounding herb with showy blue flowers 1.4–1.8 cm wide which, being a low plant, makes a useful bedding plant and ground cover.

Still others are grown for their foliage, such as the colourful leaved cultivars of the sweet potato sold in the nursery trade under names such as 'Blackie', 'Lemon-Lime', and 'Tricolor'; these make attractive ground covers. The vigorous elephant's ear vine, *Argyreia nervosa* (Burm. f.) Bojer, has big heart-shaped leaves, white silky-hairy underneath, and clusters of large purple flowers enclosed in whitish bracts. The bridal bouquet, *Porana volubilis* Burm. f., is grown for its small white fragrant flowers that can be used to adorn the hair.

Many of these ornamentals have been grown in the CLV area for as long as two hundred years so it is not surprising that those that readily form seed, such as *I. carnea* subsp. *fistulosa*, *I. alba* and *I. quamoclit*, have spread and become naturalized elements of the flora. Others, such as *I. batatas* and *A. nervosa*, while they will persist where planted, have not become naturalized so far as known.

Rather few species have well-known traditional uses in medicine, one exception being *Operculina turpethum*, but many wild species have minor, local uses in Cambodia, Laos and Vietnam and these have been noted in the species accounts. Worldwide all Convolvulaceae studied to date (about half the genera and a mere 15% of the known species) are rich in secondary compounds, some of which were used in the past for medicinal purposes (Eich 2008). The exploration of these unique secondary compounds continues and their potential applications for medicine, commerce, and agriculture are as yet virtually untapped.

Finally, there are some aggressive and noxious weeds among the Convolvulaceae. In other tropical places, these weeds interfere with agriculture, either as crop parasites (*Cuscuta* spp.) on vegetables, forage crops (alfalfa, for example), or even fruit trees, or as seed contaminants

(such as some *Ipomoea* spp.) in commercial crops (rice, soy bean, maize, etc.) destined for export. When plant quarantine inspectors find seed contaminants of listed noxious weeds this can lead to rejection of entire shipments of commercial grain crops, causing substantial financial losses.

Note about vernacular names

Vernacular names derive from two primary sources: labels on herbarium specimens and published literature. The format followed here groups vernacular names by country and cites the source for each name, either the voucher specimen label where it was recorded (e.g., *Collector number*) or the publication (Author year). No attempt has been made to standardize or edit vernacular names transcribed from specimen labels: instead these raw data are reported here just as the collector recorded them, faithfully including any diacritical marks, accents, or tonal indications the collector wrote down. If the collector indicated an ethnic group, dialect, or language – such as Annamite, Jörai, or Pear, for example – this has also been reported as part of the vernacular name.

The Vietnamese vernacular name *bim bim* is used generally to refer to various kinds of Convolvulaceae, including *Argyreia*, *Ipomoea*, *Merremia*, and species belonging to other genera.

Taxonomy

The descriptions are arranged in alphabetical order by genus, species, and infraspecific taxon names. Phenology has been visually summarized at the start of each species or infraspecific taxon with a chronologue; the colored bands indicate the months in which flowering and fruiting specimens have been collected.



The family classification adopted here is traditional in that the sweeping changes suggested by molecular studies (Stefanović *et al.* 2002, 2003) have been selectively implemented. Thus, several genera with spinulose pollen grains are recognized rather than a much broadened *Ipomoea*. *Porana*, on the other hand, has been split into segregates, because there is adequate morphological evidence that is well supported by molecular data. *Argyreia* is problematic because Southeast Asia is one of the centres of species richness for this genus and there is no comprehensive taxonomic revision available.

After the Convolvulaceae account for the FCLV was submitted, a new classification was published for tribe *Merremieae* and especially for the genus *Merremia* s.l. (Simões & Staples 2017). The following species in the FCLV account of *Merremia* have name changes as a result:

Merremia aegyptia (L.) Urban = *Distimake aegyptius* (L.) A.R.Simões & Staples

Merremia bambusetorum Kerr = *Camonea bambusetorum* (Kerr) A.R.Simões & Staples

Merremia bimbim (Gagnep.) Ooststr. = *Decalobanthus bimbim* (Gagnep.) A.R.Simões & Staples
Merremia boisiana (Gagnep.) Ooststr. = *Decalobanthus boisianus* (Gagnep.) A.R.Simões & Staples
Merremia boisiana var. *fulvopilosa* (Gagnep.) Ooststr. = *Decalobanthus boisianus* var. *fulvopilosus* (Gagnep.) A.R.Simões & Staples
Merremia eberhardtii (Gagnep.) T.N.Nguyễn = *Decalobanthus eberhardtii* (Gagnep.) A.R.Simões & Staples
Merremia kingii (Prain) Kerr = *Camonea kingii* (Prain) A.R.Simões & Staples
Merremia mammosa (Lour.) Hallier f. = *Decalobanthus mammosus* (Lour.) A.R.Simões & Staples
Merremia quinata (R.Br.) Ooststr. = *Distimake quinatus* (R.Br.) A.R.Simões & Staples
Merremia quinquefolia (L.) Hallier f. = *Distimake quinquefolius* (L.) A.R.Simões & Staples
Merremia tuberosa (L.) Rendle = *Distimake tuberosus* (L.) A.R.Simões & Staples
Merremia umbellata (L.) Hallier f. = *Camonea umbellata* (L.) A.R.Simões & Staples
Merremia umbellata (L.) Hallier f. subsp. *orientalis* (Hallier f.) Ooststr. = *Camonea pilosa* (Houttuyn) A.R.Simões & Staples

Morphological diagnoses for the newly elevated and expanded genera *Camonea* Raf., *Decalobanthus* Ooststr., and *Distimake* Raf., as well as a key for identification of all genera formerly classified in tribe *Merremieae*, are provided in Simões & Staples 2017. A follow-up study is ongoing for the Asian taxa taken out of tribe *Merremieae* (Simões & Pisuttimarn, pers. comm. 2018) and when this is completed further taxonomic changes are anticipated. For successful identification of Convolvulaceae, both flowering and fruiting parts are necessary: identification of sterile material is rarely possible below genus level. Examination of pollen grains (spinulose or smooth) is necessary to separate some genera (Fig. 1). The following key to genera requires dissecting flowers to see the stigmas, pollen, and staminal characters. Collectors are advised to take time in the field to collect adequate, fertile material if they hope to have success later in making an identification! Opening and pressing some flowers is very useful for later observation of stigma shapes, anthers, pollen, and other internal structures needed to work the keys to genera. While digital photographs of live plants can be a useful adjunct, a well-prepared voucher specimen is still the best means to identify Convolvulaceae.

Key to the genera

1. Plants parasitic, with haustoria, leafless; flowers in clusters or short racemes; corolla inside with 5 fimbriate scales opposite sepals **5. Cuscuta**
- . Plants not parasitic, with green leaves; flowers and corolla not as above (scales present in *Lepistemon* but flowers in ± umbellate cymes).
 2. Pollen pantoporate and surface finely spiny **3**
 - . Pollen grains with various aperture types, but never finely spiny **7**
 3. Fruits dehiscing by 4(or more) valves, sometimes tardily so **4**
 - . Fruits indehiscent, or at length eroding or irregularly breaking open **5**

4. Corolla urceolate; filaments dilated basally into a concave scale, the 5 scales arched over ovary.....
..... **13. *Lepistemon***
- . Corolla campanulate, funnelform, or salverform; filaments basally pubescent or glandular, not forming scales **11. *Ipomoea***
5. Calyx greatly enlarged, completely enclosing fruit; leaves underneath (and often sepals and corolla lobes outside) with minute blackish dots; fruit wall at length eroding between septa, lantern-like.....
..... **20. *Stictocardia***
- . Calyx enlarged, either reflexed from fruit or not fully enclosing it; leaves (and sepals and corolla lobes) without blackish dots; fruit an indehiscent berry or woody and circumscissile **6**
6. Climbers or trailers; fruit a fleshy, pulpy, or mealy berry; accrescent sepals in fruit often coloured inside **2. *Argyreia***
- . Erect plants; fruit woody, brown, circumscissile; accrescent sepals in fruit brownish, not coloured **19. *Rivea***
7. Ovary deeply 2-lobed; styles 2, gynobasic **6. *Dichondra***
- . Ovary not deeply 2-lobed; style(s), if present, terminal (not gynobasic).
8. Style absent; stigma 1, ± conical, 5–10-ridged; corolla deeply 5-lobed, each lobe bifid apically
..... **8. *Erycibe***
- . Style(s) present, sometimes very short; neither stigma nor corolla as above **9**
9. Outer 2 or 3, or all 5, sepals much enlarged in fruit and falling off with fruit as one dispersal unit; fruit indehiscent; seed 1 **10**
- . Sepals enlarged in fruit or not, remaining attached to pedicels when fruits dehisce; fruits opening by valves or breaking irregularly; seeds usually 4 (or fewer by abortion; seed 1 per capsule in *Neuropeltis*) **14**
10. Herbaceous twiners; corolla glabrous outside or lobes with a minute apical tuft of trichomes; stigmas ellipsoid (longer than wide) **7. *Dinetus***
- . Woody climbers; corolla pubescent outside on midpetaline bands; stigmas globose or reniform (isodiametric) **11**
11. Leaf venation pinnate; flowering sepals covering $\frac{1}{2}$ or more of corolla tube; all 5 sepals ± equally enlarged in fruit **17. *Porana***
- . Leaf venation pedate; flowering sepals covering $\frac{1}{4}$ or less of corolla tube; outer 2 or 3 sepals greatly enlarged in fruit, inner ones much less so **12**
12. Flowers mostly less than 8 mm, white or pale yellowish; bracteoles minute, scale-like; fruiting sepals with a single midvein and reticulate secondary veins **13**
- . Flowers 10–35(–50) mm, white, blue, or violet, in racemes or few branched panicles; bracteoles sepal-like, forming a calycle immediately below calyx; fruiting sepals with 7, 9, or 11 parallel, longitudinal veins **21. *Tridynamia***

- 13.** Corolla funnelform, white; fruiting sepals ovate, apices acute **18. *Poranopsis***
 —. Corolla rotate, yellowish; fruiting sepals orbicular to broadly elliptic, apices emarginate
 **4. *Cordisepalum***
- 14.** Styles 2, free or united part way from the base upward **15**
 —. Style 1, entire or with 2 minute branches concealed by stigmas **17**
- 15.** Plants erect or creeping, never twining; stems herbaceous; styles 2, free; stigmas 4, threadlike
 **9. *Evolvulus***
 —. Plants climbing; stems woody; styles 2, free or partly fused; stigmas 2, capitate or digitately lobed **16**
- 16.** Styles fused about halfway from base upward; stigmas capitate; corolla subentire; bracteoles inconspicuous or deciduous in fruit; seeds 4 or fewer per capsule **3. *Bonamia***
 —. Styles free to base; stigmas deeply digitately lobed; corolla deeply 5-parted; one bracteole greatly enlarged in fruit, wing-like, papery; seed 1 per capsule **15. *Neuropeltis***
- 17.** Stigmas 2, globose; calyces enlarged in fruit, sometimes enclosing it **18**
 —. Stigmas 2, ± elongate, usually ± flattened, or subglobose; calyces not enlarged in fruit or outer 3 sepals slightly enlarged, inner sepals less so **20**
- 18.** Leaves oblong to elliptic, base cuneate; outer 2 sepals cordate and decurrent onto pedicel; aquatic herb **1. *Aniseia***
 —. Leaves variously shaped, usually broader, base often cordate, or rounded; outer 2 sepals not decurrent onto pedicel; terrestrial herbs or lianas **19**
- 19.** Fruit a 4-valved capsule or shattering irregularly **14. *Merremia***
 —. Fruit with a thickened circumscissile lid that separates from ± brittle and tardily shattering endocarp **16. *Operculina***
- 20.** Leaves basally hastate, ± clasping stem, auricles dentate; inner 3 sepals longer than outer 2, tips tapering into slender points **22. *Xenostegia***
 —. Leaves basally rounded or cordate, petiolate (not clasping stem), auricles never dentate; inner sepals shorter than outer, tips not slender-pointed **21**
- 21.** Corolla pale yellow or whitish, centre red-purple; capsules pilose; stigmas ovate-oblong, flattened **10. *Hewittia***
 —. Corolla pinkish, pale purple, white, or sky blue, centre often paler; capsules glabrous; stigmas decurved, sausage-shaped **12. *Jacquemontia***



A genus of 3 species distributed in the American tropics; one species is now naturalized worldwide in tropical wet habitats, including CLV. The taxonomic concept of *Aniseia* followed here excludes several Asian species with spinulose pollen that are correctly placed in *Ipomoea*.

1. *Aniseia* Choisy

Mém. Soc. Phys. Genève 6: 481 [Conv. Orient. 99] (1834); Ooststr., Blumea 3: 279 (1939); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 3 (1993); D.F.Austin, Syst. Bot. 23: 411–420 (1999); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 157 (2005); Staples, Fl. Thailand 10: 335 (2010).

Ipomoea subg. *Aniseia* (Choisy) C.B. Clarke in J.D. Hooker, Fl. Brit. India 4: 200 (1883).

Ipomoea section *Aniseia* Gagnep. & Courchet, Fl. Indo-Chine 4: 231 (1915). – Type species: *Aniseia uniflora* (Burm. f.) Choisy [= *A. martinicensis*].

Prostrate or twining herbs. Leaves petiolate, linear, oblong, lanceolate, or elliptic, often mucronulate.

Inflorescences axillary, pedunculate, 1- to few-flowered cymes. Sepals 5, herbaceous, acute or acuminate, unequal, outer 3 larger, often decurrent on pedicel, accrescent in fruit; corollas broadly tubular to funnelform, with 5 midpetaline bands, pubescent outside, limb 5-toothed or entire; stamens included, filaments basally adnate to corolla tube, free and filiform above; pollen non-spinulose, rugate (polycolpate); pistil included, disc small or none, ovary glabrous, 2-locular, 4-ovulate, style 1, filiform, stigmas 2, thick, globular or oblong.

Fruits dehiscent capsules, 2-locular, 4-valved. Seeds 4 or fewer, trigonous or globose, black.

1. *Aniseia martinicensis* (Jacq.) Choisy

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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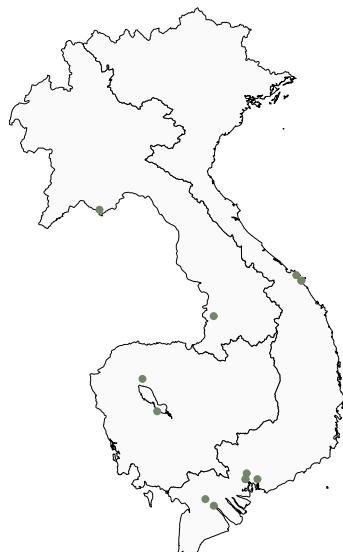
Aniseia martinicensis (Jacq.) Choisy, Mém. Soc. Phys. Genève 8: 66 [Conv. Rar. 144] (1838); Ooststr., Blumea 3: 279 (1939), Fl. Males., Ser. I, Spermat. 4: 435 (1953); Kerr, Fl. Siam. 3 (1): 99 (1951); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 173 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 978 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 4 (1993); D.F.Austin, Syst. Bot. 23: 415 (1999); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 158 (2005); Staples & Jacquemoud, Candollea 60: 449 (2005); Staples, Fl. Thailand 10: 335 (2010); Staples *et al.*, Thai J. Bot. 6: 80 (2014). – *Convolvulus martinicensis* Jacq., Sel. Stirp. Amer. 26, t. 17 (1763). – Type: Martinique, “circa vicum Roberti”, N.J. Jacquin s.n. (holo, presumably W, not located).

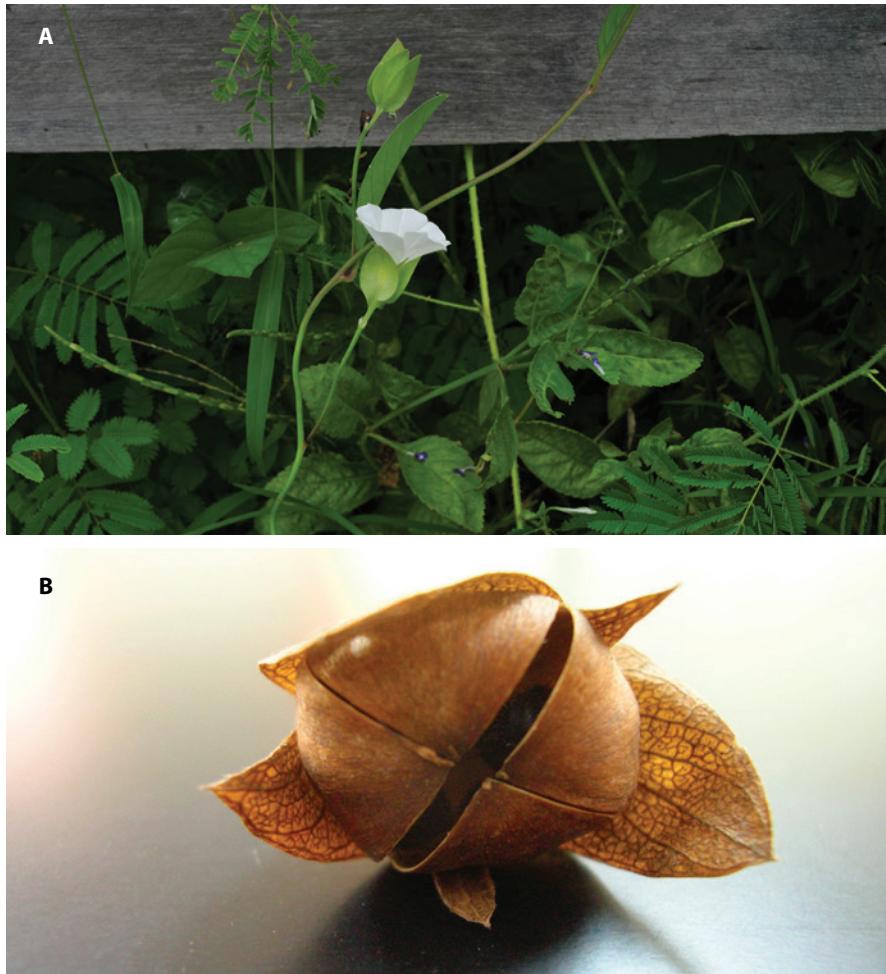
Convolvulus uniflorus Burm. f., Fl. Indica 47 (1768). – *Ipomoea uniflora* (Burm. f.) Roem. & Schult., Syst. Veg. 4: 247 (1819); Gagnep. & Courchet, Fl. Indo-Chine 4: 244 (1915). – *Aniseia uniflora* (Burm. f.) Choisy, Mém. Soc. Phys. Genève 6: 483 [Conv. Orient. 101] 1834. – Type: Java, Pryon s.n. (lecto G-PREL!, designated by Staples & Jacquemoud (2005)).

Stems twining or prostrate, rooting between nodes, 0.5–3.0 m long. Leaves oblong, elliptic, or linear, 3.5–7.0(–11.0) × 0.75–3.0(–5.0) cm, base attenuate, apex obtuse, truncate or emarginate, mucronulate, both sides glabrous or sparsely pilose; petioles 0.5–2.0 cm.

Inflorescences 1–3-flowered; peduncles 2–5 cm long (to 9 cm in fruit), densely pilose; bracts narrowly lanceolate to subulate, 1–3 mm long, acute; pedicels c. 5–7 mm long, appressed pilose. Flowers diurnal, odourless, erect to ascending; sepals unequal, outer 2 ovate, c. 2–20 mm long, base rounded, subcordate or acute, decurrent, apex acute, mucronulate, third sepal lanceolate, falcate, shortly decurrent, inner 2 sepals 10–13 mm long, base not decurrent; corolla funneliform, 2–3 cm long, white, limb shallowly 5-lobed, midpetaline bands brownish hirsute outside, mucronate; stamens included, subequal, white, filament bases pubescent at attachment point, glabrous above; pistil included, white, stigmas globose.

Capsules ovoid, 12–15 × 9–12 mm, valves oblong, acute, glabrous outside, shining silvery inside; outer 2





1.1. *Aniseia martinicensis* (Jacq.) Choisy. A, habit, flower; B, fruit (credit: A, Syahida Emiza S., FRIM; vouchers: A, Malaysia: Syahida et al. FRI-84437 (KEP); B, not collected).

fruiting sepals enlarged, 2.0–2.5 cm long, scarious, reticulate-venose. Seeds 5–6 mm long, sides velvety, angles long-hairy.

Distribution. Native in tropical America and now nearly pantropical as a weed in wet areas. In Asia known to be in Cambodia, Laos, Vietnam, India, Sri Lanka, Bangladesh, China, Myanmar, Thailand, Malaysia, Singapore, Indonesia, the Philippines, Papua New Guinea, Australia, and eastward to the Pacific Islands.

Ecology. At borders of freshwater bodies (not tolerant of brackish or salty waters): rice paddies, ditches, marshes, lake and pond shores, wet areas generally, in full sun or partial



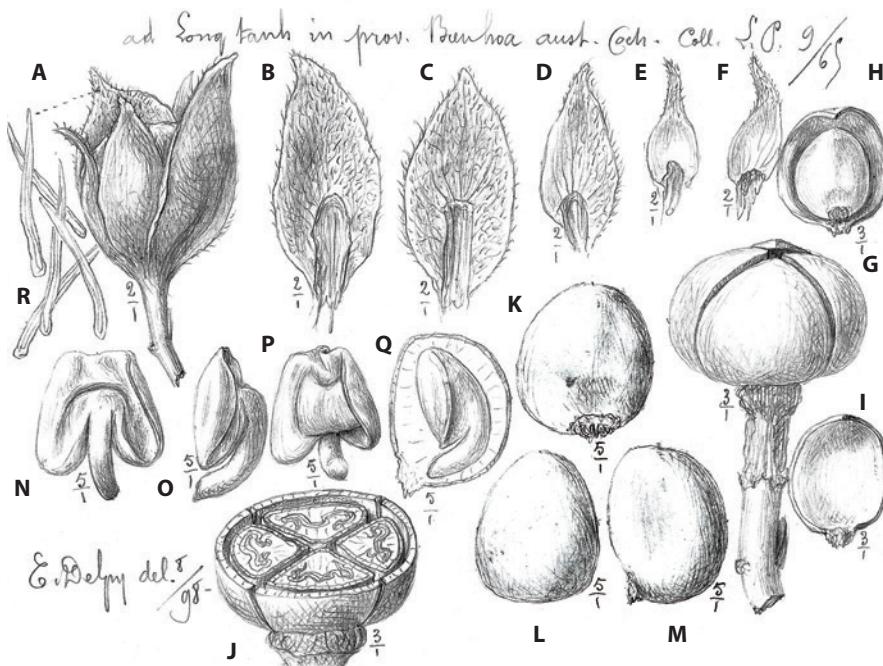
1.2. *Aniseia martinicensis* (Jacq.) Choisy. A, flowering branch; B, fruiting branch (From Ooststroom & Hoogland 1953).

shade; elevation: sea level to c. 140 m. It is hypothesized that the seeds are distributed as a contaminant in rice and this is how *A. martinicensis* has become globally distributed.

Vernacular name

Cambodia. ândat trâkuot (*Martin* 188).

H. S.P. 16°



1.3. *Aniseia martinicensis* (Jacq.) Choisy. A, capsule enclosed in accrescent calyx; B–F, fruiting sepals, detached, adaxial surfaces, outermost (B) to innermost (F); G, capsule with sepals removed showing 4 valves; H, single valve with seed *in situ*; I, valve, adaxial (inner) surface; J, cross-section through capsule showing seeds and embryos; K, seed in adaxial view; L, seed in abaxial view; M, seed in lateral view; N–Q, embryos, various views; R, simple, unbranched trichomes from outer sepal apex. Drawn by E. Delys, August 1898. Voucher: L. Pierre s.n., in September 1865 (P04070963).

Material studied

Cambodia. Pursat: Kompong Luong, 22 Jan. 1966, Martin 188 (P). Siem Riep: bord des chemins, 1 Dec. 1997, Hul et al. 547 (P).

Laos. Champassak: Paksé, 23 Nov. 1938, Poilane 28541 (P). Vientiane: env. de Vientiane, 1 Apr. 1948, Vidal 678B (P).

Vietnam. *s. loc.*: "Cochinchine", 1875, Godefroy s.n. (P). Binh Duong: *s. loc.*, 22 May 1967, Vu Van Cuong 34 (P). Can Tho: bord de la route de Can tho à Long Xuyen, Km 38, 3 Nov. 1967, Vu Van Cuong 691 (P); bord de route, près d'un canal, 27 Feb. 1970, Vu Van Cuong 1709 (P). Da Nang: environ de "Tourane", 20 Feb. 1939, Poilane 18941 (P); May–July 1927, Clemens & Clemens 4087 (P). Dong Nai: Long Thanh, "prov. Bienhoa", Sep. 1865, Pierre s.n. (P). Ha Tinh: Huong Tho, 18 May 1967, Vu Van Cuong 432 (P). Hô Chi Minh Ville: "Saigon", 8 Oct. 1911, Lecomte & Finet 1846 (P); rizières, 1862–1866, Thorel 269 (E, K, P). Thua Thien-Hue: Lang Co, Eberhardt 2539 (P).



Approximately 135 species: distributed mainly in tropical Asia and Malesia, with four species in Madagascar; at a minimum 20 species occur in CLV area, one of which is only known from cultivation: *Argyreia nervosa* (Burm. f.) Bojer [cited by P.H. Hô, Cây cỏ Việt Nam 2 (2): 1002 (1993)], native to India, called *bim bim* môé in Vietnamese (Hiệp 914), is widespread in cultivation as an ornamental climber. It is included in the key but given no further treatment.

Bim bim is a Vietnamese vernacular name used for some *Argyreia* species (Gagnepain & Courchet 1915).

2. *Argyreia* Lour.

Fl. Cochinch. 1: 95, 134 (1790); C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 184 (1883); Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Sci. 63 (2): 89 (1894); Gagnep. & Courchet, Fl. Indo-Chine 4: 272 (1915); Ooststr., Blumea 5: 339–411 (1940); Ooststr. & Hoogland, Fl. Males., Ser. I, Spermat. 4: 494–512 (1953), 5: 563 (1958), 6: 941 (1972); R.C.Fang & Staples, Fl. China 16: 313–321 (1995); Traiperm, Taxonomic study in *Argyreia* Lour. in Thailand. MSc. dissertation, 143 pp. (2002); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 158–161 (2005); Staples & Traiperm, Thai Forest Bull., Bot. 36: 86–108 (2008); Fl. Thailand 10: 337–371 (2010); Staples et al., Thai J. Bot. 6: 80–81 (2014); Staples & Traiperm, Taxon 66: 445–477 (2017).—Type: *Argyreia obtusifolia* Lour.

Letsomia Roxb., Fl. Ind. 2: 75 (1824); C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 191 (1883).—Type: *Letsomia cuneata* (Willd.) Roxb.

Moorcroftia Choisy, Mém. Soc. Phys. Genève 6: 431 [Conv. Orient. 49] 1834. — *Letsomia* subg. *Moorcroftia* (Choisy) C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 195–196 (1883).—Type: *Moorcroftia pinangiana* Choisy.

Cryptanthela Gagnep., Notul. Syst. (Paris) 14: 24. 1950; Ooststr., Blumea 12: 39 (1963).—Type: *Cryptanthela sericea* Gagnep.

Lianas, herbaceous climbers, or wiry trailers from a woody caudex; stems woody and perennial or herbaceous and annual from perennial rootstock; sap often milky. Leaves petiolate, entire, base cuneate, rounded or cordate.

Inflorescences axillary, rarely terminal, cymose, or forming loose or compact capitula, few- to many-flowered; bracts persistent or early deciduous, small or large. Flowers diurnal, showy; sepals herbaceous or ± leathery, pubescent outside, glabrous inside, persistent in fruit, often enlarged, often turning reddish inside; corolla purple, red, pink, or white, campanulate, funnelform, or tubular, limb nearly entire to deeply 5-parted, with 5 distinct, mostly pubescent midpetaline bands; stamens included or exserted, filaments inserted near base of corolla, dilated and triangular at insertion point and usually pubescent or glandular (rarely glabrous), filiform and glabrous above; pollen globose, pantoporate, finely spiny; pistil included or exserted, disc ring-like or cupular, entire or shallowly 5-lobed; ovary 2- or 4-locular, 4-ovuled, pubescent or glabrous, style 1, filiform; stigmas 2, globose.

Fruits berries; exocarp brittle or soft to leathery, red, purplish, orange, or black; endocarp fleshy, pulpy, or mealy. Seeds 4 or fewer, trigonous-rounded, glabrous, or seed 1, conforming to shape of fruit.

This account of CLV *Argyreia* must be considered both preliminary and conservative due to the low collecting density in the CLV region. A number of herbarium collections at hand, too

Key to the species

1. Limb of corolla distinctly 5-lobed or 5-parted to or below the middle; stamens and pistil exserted **2**
 —. Limb of corolla entire, ruffled, or 5-pointed; stamens and pistil included **5**

2. Inflorescences capitate, bracts covering inflorescence; corolla pinkish to white, 1–1.5 cm long.....
 **15. *A. osyrensis***
 —. Inflorescences open, cymose, bracts present, or deciduous, not covering whole inflorescence; corolla pure white, 2 cm or longer **3**

3. Axial parts (stems, petioles, peduncles, pedicels) and sepals covered in hirsute, golden to orange, bristly trichomes **19. *A. thorellii***
 —. Axial parts and sepals sericeous or tomentose with white or dull yellowish, short, soft trichomes **4**

4. Leaves glabrous above, shining silvery sericeous underneath; corolla c. 3 cm long; sepals ovate-oblong, 9–10 mm long **14. *A. obtusifolia***
 —. Leaves strigose above, yellowish tomentose underneath; corolla c. 2 cm long; sepals broadly ovate to circular, c. 5 mm long **5. *A. fulvocymosa***

5. Inflorescence bracts large, outer ones covering inflorescence, often persistent at fruiting **6**
 —. Inflorescence bracts smaller, outer ones not covering inflorescence, deciduous or persistent **10**

6. Leaves mostly lanceolate, elliptic to oblong 1.5–5.5(–9.5) cm wide; corolla pure white **7**
 —. Leaves mostly ovate to circular, rarely lanceolate, (4.0–)5.5–25.0 cm wide; corolla pinkish, purplish **8**

7. Sepals acute-attenuate apically, outer ones sparsely pilose or glabrate abaxially **2. *A. breviscapa***
 —. Sepals obtuse or rounded apically, outer ones yellowish hispid abaxially **10. *A. mekongensis***

8. Stems, axial parts, leaves hispid with yellow-brown bristly trichomes **3. *A. capitiformis***
 —. Stems, axial parts, leaves with short, softer trichomes or glabrescent **9**

9. Inflorescence peduncles 2–5 cm long; leaves abaxially dull yellowish or greyish tomentose; corolla pale purplish on limb, white inside tube **16. *A. pierreana***
 —. Inflorescence peduncles 20 cm or longer; leaves abaxially shining white sericeous-tomentose; corolla pale purplish on limb, darker purple inside tube ***A. nervosa***

10. Largest leaves mostly lanceolate, oblong, elliptic or oblanceolate; inflorescence peduncles usually shorter than or about equal to subtending petioles **11**
 —. Largest leaves mostly ovate, broadly ovate to orbicular; inflorescence peduncles usually longer than subtending petioles **16**

11. Leaves linear, secondary veins indistinct; sepals subequal, strigose outside **17. *A. stenophylla***
 —. Leaves lanceolate, elliptic, oblong, ovate, oblanceolate, to obovate, secondary veins visible, 4–11 either side; sepals unequal, variously pubescent **12**

- 12.** Secondary veins 4 or 5 either side of midvein **6. *A. lanceolata*** **13**
 —. Secondary veins 7–11 either side of midvein
13. Leaves adaxially glabrous **14**
 —. Leaves adaxially sparsely to densely appressed strigose **15**
14. Outer 2 sepals longer than inner 3, apices undulate-wavy; ovary apex minutely sericeous; inflorescence bracts 5–7 mm long, lanceolate-oblong **7. *A. laotica***
 —. Outer 3 sepals longer than inner 2, apices flat, smooth; ovary glabrous; inflorescence bracts 2.0–3.5 mm long, ovate-triangular **12. *A. monglaensis***
15. Leaf undersides greyish tawny pubescent; corolla pale purplish on limb, darker purple inside tube **10. *A. mekongensis***
 —. Leaf underside dully (not shining) appressed sericeous; pale purplish on limb, purple inside tube **11. *A. mollis***
16. Axial parts, leaves, sepals yellowish brown hispid with patent, bristly trichomes **3. *A. capitiformis***
 —. Axial parts, leaves, sepals with various indument but not hispid with patent trichomes **17**
17. Leaves abaxially densely covered in trichomes **18**
 —. Leaves abaxially glabrous or nearly so, to sparsely appressed pubescent **20**
18. Flowers erect-ascending; corolla 1.5–1.7 cm long, densely yellowish pilose on midpetaline bands **1. *A. aff. akoensis***
 —. Flower pendent; corolla 2.5–4.5 cm long, glabrous or finely appressed sericeous on midpetaline bands **19**
19. Inflorescence peduncles 1.5–2.0 cm long; leaf bases cordate; corolla limb purple, white inside tube **4. *A. collinsae***
 —. Inflorescence peduncles 4–14 cm long; leaf bases broadly cuneate, truncate, or rounded; corolla limb pale purplish, darker purple inside tube **13. *A. monosperma***
20. Leaves narrowly ovate to ovate, abaxially glabrous or with few scattered trichomes; secondary veins 4 or 5 either side of midvein **8. *A. longipes***
 —. Leaves broadly ovate to orbicular, abaxially sparsely hispid or strigose; secondary veins 7–11 either side of midvein **21**
21. Leaves abaxially red-purple in life, drying dull reddish; sepals ovate, convex, 6–7 mm long **9. *A. marliopensis***
 —. Leaves abaxially green, drying olivaceous; sepals broadly elliptic to ovate, 9–11 mm long **18. *A. strigillosa***

incomplete for accurate identification, suggest that there are additional species present in the CLV area, but it is not possible to describe them based on materials presently available. Further collecting in the region will certainly generate new distribution records of known species and very likely disclose new taxa.

In Southeast Asia *Argyreia* has radiated into two major groups of ecotypes. The first are woody climbers, typically from forest habitats or secondary regrowth where the vines are found in the light gaps and canopy. CLV species typical of this group include *A. fulvocymosa*, *A. longipes*, *A. mollis*, *A. obtusifolia*, *A. pierreana*, and *A. strigillosa*. The second group of ecotypes occupies the understorey beneath native forests having an open canopy that admits a good deal of light down to ground level, such as dry dipterocarp forest or oak-pine forest. Plants are typically trailers or low twiners with wiry herbaceous stems, often sprouting from tuberous roots or tough, woody underground caudexes adapted to survive drought or burning. This group includes *A. breviscapa*, *A. lanceolata*, *A. laotica*, *A. mekongensis*, *A. stenophylla*, and *A. thorelii*. Other species do not fit either of these groups, and two are among the most widespread *Argyreia* species in CLV, *A. capitiformis* and *A. osyrensis* – both of which thrive in diverse habitats and tolerate human disturbance; their range has evidently increased and they seem more abundant now as a result of human activity.

1. *Argyreia* aff. *akoensis* S.-Z.Yang, P.-H.Chen & Staples



Argyreia akoensis S.-Z.Yang, P.-H.Chen & Staples, *Taiwania* 60 (3): 117 (2015).—Type: Taiwan. Pingtung County: Liangshan, 30 Oct. 2014, P.-H.Chen 499 (holo K; iso A, PPI).

Lianas; stems 2–9 m long, cylindrical, striate, villosulous at first, later glabrescent; trichomes erect, of different lengths, tangled. Leaves broadly ovate to orbicular, 6.5–12.5 × 4.7–11.8 cm, upper side rugate, glabrous, underside densely yellowish grey villous, base rounded or emarginate to subcordate, apex obtuse to rounded, mucronulate, margins entire, drying puckered-undulate (appearing denticulate), ciliate; venation pinnate, secondary veins 8–10 on either side of midvein, looping near margin, veins all prominent on underside; petioles stout, 2.0–8.3 cm long, drying striate, sparsely villous.

Inflorescences axillary, cymose, 1–6-flowered; peduncles 4–10 cm long, distinctly longer than the petioles; pedicels 4–6 mm long, appressed-pilose; bracts deciduous, leaving prominent scars. Flower buds ellipsoid-ovoid, densely yellowish pubescent outside; sepals broadly ovate-suborbicular, strongly convex, 6–8 × 6–7 mm, outside densely villous, inside glabrous, margins incurved, apex obtuse or rounded; corolla probably campanulate, c. 15–17 × 9–11 mm, rose, midpetaline bands pilose outside with yellowish, ascending trichomes, rest of outside glabrous; stamens and pistil not seen.

Fruits cupped by accrescent calyx; sepals all enlarged, bowl-shaped, 9–11 × 9–13 mm, deeply convex, ashy puberulous outside, glabrous and shiny-brown inside. Berries depressed globose to subquadrangular, red (drying black), 9–11 mm diam., glossy, smooth, apex apiculate by persistent style base. Seeds 2 or 4, ovoid-trigonous, 4–5 mm long, blackish, glabrous except for hair tuft around circular hilum.

Distribution. Vietnam, Taiwan.

Ecology. On rocky soils in forest; elevation: sea level to 850 m.

Notes. Three old collections from coastal Phan Rang district, southern Vietnam, are morphologically similar to *A. akoensis*, a species recently described from extreme southern Taiwan. The Vietnamese collections lack the floral details necessary to make a conclusive identification; they are tentatively assigned here, pending further study.

Vernacular name

Vietnam. ra mô ni (*Poilane* 9272).

Material studied

Vietnam. Ninh Thuan: Ca Na, “pro. Phanrang”, 27 Nov. 1923, *Poilane* 8813 (P); l. c., 22 Dec. 1923, *Poilane* 9272 (P); Ba Rau, 22 Feb. 1924, *Poilane* 9744 (P).



2. *Argyreia breviscapa* (Kerr) Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D

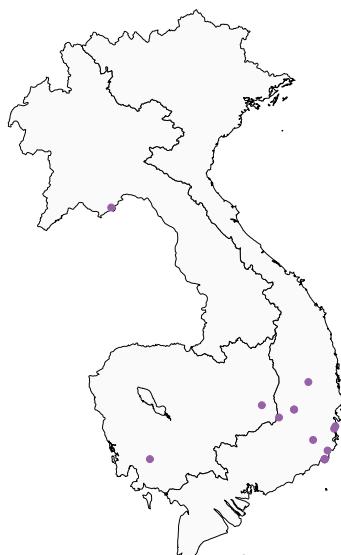
Argyreia breviscapa (Kerr) Ooststr., Blumea 7: 178 (1952); Staples & Traiperm, Thai Forest Bull., Bot. 36: 96 (2008), Fl. Thailand 10: 340 (2010); Leti *et al.*, Flore Photogr. Cambodge 167 (2013); Staples *et al.*, Thai J. Bot. 6: 80 (2014). – *Letsomia breviscapa* Kerr, Bull. Misc. Inform. Kew 1941: 13 (1941), Fl. Siam. 3 (2): 29 (1954). – Type: Thailand, Nakhon Sawan, Huai Wai, Put 4045 (syn BKI, BMI, EI, Kl, PI, TCD!).

Ipomoea bracteosa Gagnep., Notul. Syst. (Paris) 3: 143 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 264 (1915); T.N.Nguyễn in Averyanov *et al.*, Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 996 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 164 (2005). – Type: Vietnam, Ninh Thuân prov., Phanrang à Daban, Lecomte & Finet 1476 (holo Pl, P00288061).

Argyreia calcicola (Kerr) Ooststr., Blumea 7: 178 (1952). – *Letsomia calcicola* Kerr, Bull. Misc. Inform. Kew 1941: 14 (1941), Fl. Siam. 3 (2): 29 (1954). – Type: Thailand, Kanchanaburi, Kao Tawng, Kerr 19658 (syn BKI, BMI, PI, TCD!).

Herbaceous twiners or trailers; stems 1–6 m long, terete, brown appressed tomentose. Leaves lanceolate, oblong, elliptic to broadly elliptic, 4.5–12.0(–16.0) × 1.5–5.5(–9.5) cm, chartaceous, base cuneate, rounded, or emarginate, apex acute, obtuse, rounded, or emarginate; upper side scabrid, trichomes with swollen bases, underside softly tomentose; secondary veins 6–14 either side of midvein; petiole slender, 0.8–3.0 cm.

Inflorescences axillary, capitate, very bracteose; peduncles 0–1.8 cm, brownish pubescent; outer bracts broadly ovate, elliptic-ovate, to orbicular, 2–6 × 3.0–4.5 cm, pinkish, apex attenuate or acute, inner bracts smaller, greenish, bracts tomentose outside, persistent; pedicels 5–8 mm. Flowers pendent, sepals unequal, oblong-lanceolate, 8–14 mm, outer 2 broader, apex acute-acuminate, sparsely pilose in middle to glabrous, inner smaller; corolla tubular-funnelform, 3.5–5.0 cm long, white (see notes), limb undulate-lobed, reflexed, glabrous or sparsely pubescent outside on midpetaline bands; stamens included, filaments 14–15 mm, glabrous or sparsely pilose above insertion, anthers c. 5.5 mm; pistil included, disc undulate, ovary 2-locular, 1.5–2.5 mm, glabrous, style 20–22 mm.





2.1. *Argyreia breviscapa* (Kerr) Ooststr. A, habit; B) calyx; C, fruit; D, flower (credits: A, C, Mathieu Leti; voucher: Cambodia, C. Long et al. CL-376; B, D, Kittisack Phoutthavong, Pha Tad Ke Botanic Garden; voucher: Laos, K. Phoutthavong et al. 424).

Berries ovoid to subglobose, 10–12 mm diam., blackish, enveloped by reddish bracts and sepals. Seeds usually 2, c. 6.0–6.5 mm, black.

Distribution. Cambodia, Laos, Vietnam and Thailand.

Ecology. Open sunny places and clearings in dry dipterocarp forest, tropical dry pine forest, dry deciduous forest, often on hillsides, on rocky clays, gravel, and basalt soils; elevation: 350–800 m.

Usage. The tubers are edible (*Condominas* 44).

Notes. The earliest epithet for the species is that of Gagnepain but it is preoccupied in *Argyreia* by *A. bracteosa* (C.B.Clarke) Raizada.

Some specimen labels indicate that the flower is pink to purple but this probably refers to the bracts and calyx which are often suffused red or purplish; so far as I have seen, the corolla is always pure white.

Vernacular names

Vietnam. buum t̄jung jjat (*Condominas* 44), boh troai (Jörai, Dournes s.n.).

Material studied

Cambodia. Kompong Speu: nearby main gate of Kiriom National Park, 17 Nov. 2007, Nguyen Van Du & Rattana CB-VN 35 (K). Mondulkiri: s. loc., 31 Oct. 2006, Long et al. CL-376 (SING).

Laos. Vientiane: Darn Xay Khao, 20 July 2013, Pouthavong et al. 424 (HNL); Km 20–22 route de Paksane, 6 June 1949, Vidal 967B (P).

Vietnam. s. loc.: *Condominas* 44 (P). Dac Lac: Hau Bon (Cheo Reo), Jan., Dournes s.n. (P); entre Ban Me Thuot et le Poste du Lac, 18 Oct. 1930, Poilane 18520 (P, SING); sud de Ban Me Thuot, route à Dalat, 18 Oct. 1930, Poilane 18525 (P, SING); région du Dak Mil, au nord de Blao, Schmid 1081 (P). Khanh Hoa: Cauda, Nha Trang, Pham Hoang Ho 5316 (P); massif de Co-Inh, près de Nha Trang, 16 Sep. 1922, Poilane 4545 (P). Lam Dong: Dran, 21 Oct. 1924, Evrard 1492 (P, SING). Ninh Thuan: Ca Na, 10 Nov. 1923, Poilane 8530 (P); l. c., 3 Dec. 1923, Poilane 8996 (P); 21 Oct. 1925, Poilane 12373 (P); cabane forestière à l'ouest de Ca Na, 4 Nov. 1925, Evrard 2469 (P, SING); l. c., 5 Nov. 1925, Evrard 2499 (P, SING).

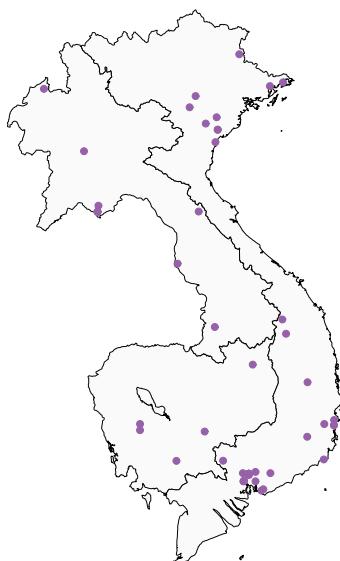
3. *Argyreia capitiformis* (Poir.) Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia capitiformis (Poir.) Ooststr., Fl. Males., Ser. I, Spermat. 6: 941 (1972); R.C.Fang & Staples, Fl. China 16: 317 (1995); R.R.Mill, Fl. Bhutan 7 (2): 843 (1999); Staples & Traiperm, Fl. Thailand 10: 341 (2010); Leti et al., Flore Photogr. Cambodge 168 (2013); Staples et al., Thai J. Bot. 6: 80 (2014). – *Convolvulus capitatus* Vahl, Symb. Bot. 3: 28 (1794), nom. illeg. – *Convolvulus capitiformis* Poir. in Lam., Encycl. Suppl. 3: 469 (1814). – *Ipomoea capitata* Roem. & Schult., Syst. Veg. 4: 238 (1819). – *Argyreia capitata* Choisy, Mém. Soc. Phys. Genève 6: 423 [Conv. Orient. 41] (1834); Gagnep. & Courchet, Fl. Indo-Chine 4: 277 (1915); Ooststr., Blumea 5: 368 (1943); Hoogland, Blumea 7: 184 (1952); Ooststr. & Hoogland, Fl. Males., Ser. I, Spermat. 4: 502 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 174 (1990); P.H.Hồ, Cây có Việt Nam 2 (2): 1000 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 158 (2005). – *Letsomia capitata* Miq., Fl. Ned. Ind. 2: 591 (1856). – *Letsomia capitiformis* (Poir.) Kerr, Fl. Siam. 3 (2): 30 (1954). – Type: “Indies Orientale” without locality, Koenig s.n. (holo Cl!). *Letsomia strigosa* Roxb., Fl. Ind. 2: 80 (1824). – Type: India, West Bengal, cult. Calcutta Bot. Garden, Roxburgh sub Wallich Cat. 1404/1 (syn K-W!, G-DC!). *Letsomia peguensis* C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 193 (1883). – Types: Myanmar, Griffith Cat. 5844 (syn Gl, Kl!); Parish 194, p.p. (syn Kl!); Tavoy, Wallich 1365.2 (syn G-DC!, K-W!); India, Andamans, Helfer s.n. (syn Kl!).

Lianas; stems 2–10 m long, spreading hirsute; trichomes brown or dull yellow, bristly. Leaves ovate to circular, rarely oblong-lanceolate, 8–18 × 4–13 cm, both sides hirsute, base cordate, apex acute or acuminate; secondary veins 13–15 either side of midvein; petiole 3–16 cm.

Inflorescences of 2 forms: capitate, dense, involucrate, or lax, spreading; peduncles stout, 6–30 cm, spreading hirsute; bracts persistent, elliptic to lanceolate, 1.5–2.5 × 1.0 cm, both ends acute, hirsute outside; pedicel short or absent. Flowers erect-spreading; sepals unequal, lanceolate or ovate-oblong to oblong, densely hirsute outside, apex acuminate, 3 outer 15–17 × 5–6 mm, inner smaller; corolla funnelform, 4.5–5.5 cm, hirsute outside, limb pink to reddish purple, rarely whitish, entire to obscurely 5-angled, tube paler inside; stamens



included, c. 17–19 mm, filaments glandular-pilose basally, anthers oblong; pistil included, ovary ovoid, glabrous, 2-locular, style c. 3 cm, jointed at base.

Berries globose, c. 8 mm diam., orange-red, cupped by reddish bracts and sepals. Seeds 4 or fewer, ovoid-trigonous, c. 7 mm.

Distribution. Cambodia, Laos, Vietnam, and NE India, Bhutan, Myanmar, China, Thailand, Malaysia, Indonesia.

Ecology. Dry evergreen forest, secondary regrowth, along trails and roads, margins of cultivated land, thickets, on sandy, clay, and calcareous soils; elevation: 150–900(–1175) m.

Argyreia capitiformis is a species that evidently benefits from human disturbance and seems able to adapt and thrive in many situations near human habitation and activities.

Usage. The minority people in Vietnam collect the leaves, cook them, and feed them to pigs (*Poilane* 2612); the plant is medicinal (*Poilane* 774).

Notes. One of the most abundant species of *Argyreia* in tropical Asia, *A. capitiformis* thrives in disturbed habitats and has benefited from human activity that has opened native forests for agriculture and development. Two distinct phenotypes are known: one has capitate heads with tightly overlapping bracts and an indumentum that is dense and velvety; the other has more open cymose inflorescences and the indumentum is coarser, the trichomes longer and erect-patent.

Vernacular names

Cambodia. voeur kândeung dâyrei (*Cheng et al. CL770*) + (*Cheng & Leti CL876*).

Laos. 'khao 'khon (*Vidal 790*).

Vietnam. dây bìm bìm lóng (Annamite, *Chevalier* 29821), dây bìm bìm (Annamite, *Poilane* 2612), ka ta (*Poilane* 2612), rui tôngia-rôman (rui abanti') (Jörai, *Dournes s.n.*), dây bìm bìm tia (*Poilane* 5186), dây lồng (*Poilane* 774).

Material studied

Cambodia. s. loc.: 1874, *Jullien* s.n. (P). Koh Kong: track between Koh Kong and Tmor Bainng, 14 Nov. 2009, *Simões* et al. 31 (BM); vic. of Tatey Leu (on the track), 16 Nov. 2009, *Simões* et al. 40 (BKF, BM, SING). Kompong Cham: Chup, Takuom Rey, Nov. 1921, *Evrard* 697 (P). Ratanakiri: roadside, 25 Nov. 2007, *Cheng et al. CL770* (P). Takeo: Phnom Tamao, 16 Dec. 2007, *Cheng & Leti CL-876* (P).

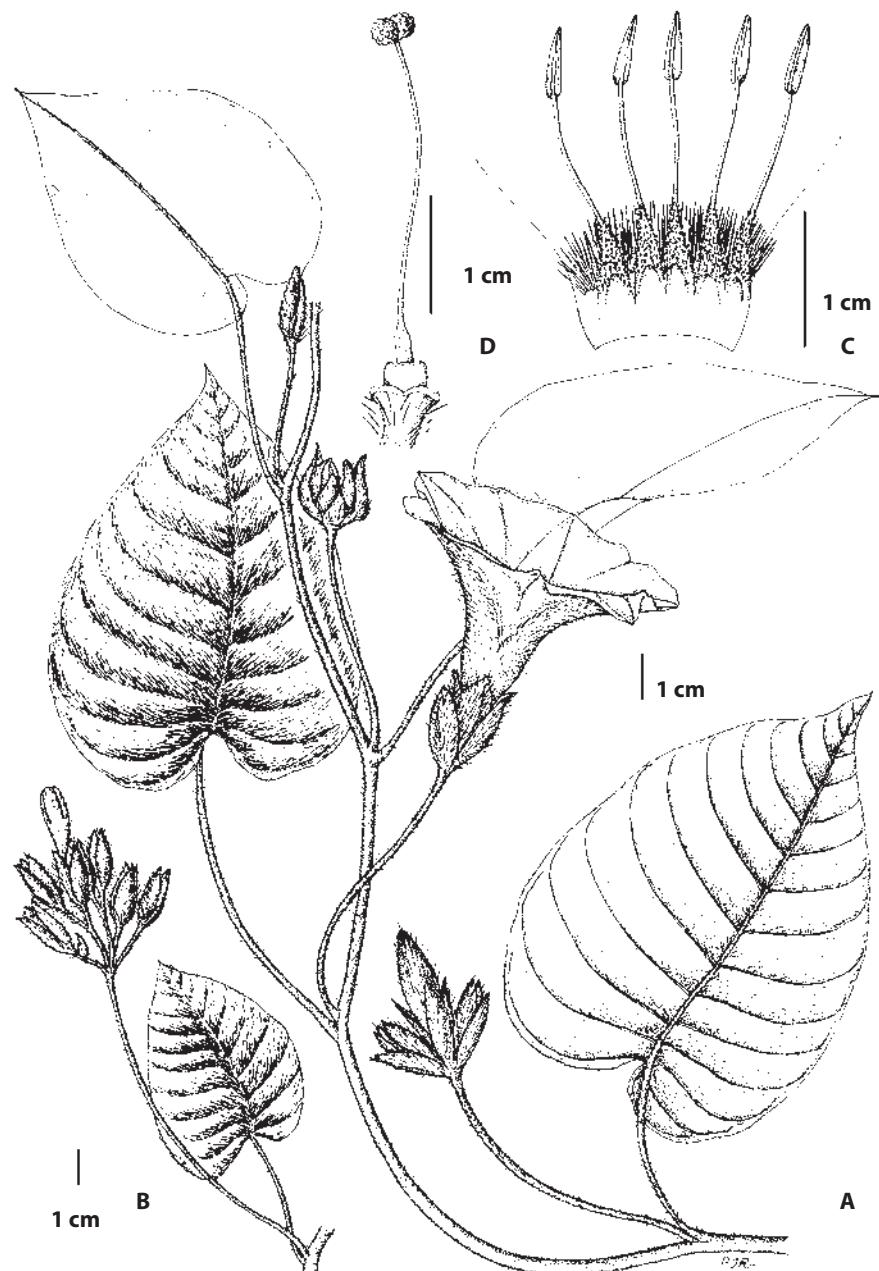
Laos. s. loc.: bords du MéKong, 1875–77, *Harmand* s.n. (P, SING); *Harmand* 18 (P). Champassak: Bassac, 1866–1868, *Thorel* 2338 (P, SING). Khammouane: Kaeng Doer, near Houay Wang Jang, 25 Oct. 2005, *Newman et al. LAO529* (BISH, E). Louang Namtha: Km 40, from Mueang Sing to Mueang Long, roadside, 13 Jan. 2011, *Wongprasert* 111-9 (BKF). Louang Prabang:



2.2. *Argyreia capitiformis* (Poir.) Ooststr. Leaf, flower (credit: Kittisack Phouthavong, Pha Tad Ke Botanic Garden; voucher: Laos, Staples et al. 1518).

along Hwy 13 between Vientiane and Luang Prabang, roadside, 4 Nov. 2012, Staples et al. 1518 (HNL, PTK, SING). Savannakhet: route de Savannakhet à Quang Tri, 5 Jan. 1925, Poilane 11447 (P). Vientiane: Ban Tha Ngon Road, 27 Nov. 1955, Talbot de Malahide 104 (BM, SING); env. de Vientiane, 4 Dec. 1948, Vidal 684B (P); 16 Jan. 1949, Vidal 790B (P); l. c., Don Chan, Dec. 1951, Vidal 1354 (P).

Vietnam. s. loc.: "Cochinchine", anno 1879, Germain 77 (G); Mar. 1874, Godefroy s.n. (P, SING); 19 Nov. 1925, Evrard 126 (P, SING); Evrard 2617 (P). Ba Ria-Vung Tau: Baria, Jan. 1866, Pierre s.n. (G, P, SING). Binh Duong: Thu Dau Mot, Dec. 1865, Pierre s.n. (E). Dac Lac: env. de Ban Me Thuot, Schmid 1079; Hau Bon (Cheo Reo), Dournes s.n. (P). Dong Nai: Bien Hoa, 17 July 1977, Vu Van Cuong 409 (P); l. c., 21 Nov. 1931, Phung v. Dien 204 (P, SING); ad montem Cau ti vai, Dec. 1866, Pierre 2 p.p. (P); l. c., Pierre 6 (P, SING); ad Chiao Chiang, Mar. 1877, Pierre 2 p. p. (P); bord du Dong Nai, Tam Hiep, Bien Hoa, 07 Jan. 1971, Vu Van Cuong 1731 (P); Bien Hoa, poste de Gia Ray, 10 Jan. 1914, Chevalier 29821 (P, SING); ad Long Thanh, Sep. 1865, Pierre 2 p. p. (P); l. c., près de Bien Hoa, Sep. 1865, Pierre s.n. (P, SING). Ha Nam: Kien Khe, 3 Oct. 1884, Bon 2746 (P, SING). Hoa Binh: Cho-bo, 16 Nov. 1887, Balansa 3554 (P); Tu Phap, Dec. 1888, Balansa 3555 (P). Ho Chi Minh Ville: Saigon, Germain 81 (P, SING); l. c., 1862–1866, Thorel 896



2.3. *Argyreia capitiformis* (Poir.) Ootstr. A, habit showing solitary flowers and dense capitate inflorescences; B, flower buds in lax inflorescence; C, opened corolla with stamens; D, pistil. Drawn by P. Inthachub (From Staples 2010).

(P, SING); plaine des Tombeaux, près de "Saigon", 15 Nov. 1864, *Lefèvre* 555 (P). Khanh Hoa: Giang Che, 8 Feb. 1922, *Poilane* 2612 (P); Nha Trang vic., 11–26 Mar. 1911, *Robinson* 1442 (P); entre Nha Trang et Ninh Hoa, *Pham Hoang Ho* 5072 (P); Thai Hu, 13 Jan. 1923, *Poilane* 5186 (P). Kon Tum: District Dak Gley, between Dak Nen and Mang Khen (Dak Che), 19 Nov. 1995, Averyanov et al. VH1838 (AAU, P); Dak To, 20 Nov. 1946, *Poilane* 35547 (P, SING). Lai Chau: Le Pou Nhou, près de Lai Chau, Tho Den, 31 Dec. 1937, *Poilane* 26960 (P, SING). Lam Dong: km 145 route Saigon à Dalat, 25 Jan. 1953, *Schmid* VN1609 (P). Lang Son: Dong Dang, 20 Feb. 1886, *Balansa* 805 (P); Gie Mong, 24 Oct., *Duport* 154 (P); km 113, 22 Oct. 1911, *Lecomte & Finet* 240 (P). Ninh Binh: Cho Ganh, Jan. 1923, *Pételot* 840 (P); *I. c.*, Jan. 1924, *Pételot* 1363 (P); Cuc Phuong National Park, Xao Men Landmark, 30 Nov. 1998, *Soejarto* et al. 10530 (P). Ninh Thuan: Cana, 7 Jan. 1924, *Poilane* 9485 (P). Phu Tho: Phu Ho, *Pételot* 1724 (P). Phu Yen: pagoda de Soc Son, Oct. 1935, *Pételot s.n.* (P). Quang Ninh: Kau Nga Shan vic., Tien-yen, 23 Sep.–7 Oct. 7 1940, *Tsang* 30542 (A, B, C, E, P); Taai Wong Mo Shan vic., Chuk Phai, Ha-coi, 16–22 Oct. 1936, *Tsang* 27040 (A, C, E, P). Son La: Moc Ha, Nov. 1891, *Balansa* 4483 (P); Plu Mi, Nov. 74, *Godefroy s.n.* (P). Tay Ninh: *I. c.*, 8 Nov. 1919, *Poilane* 774 (P). Thanh Hoa: Lat Son, in 3 ascensibus vallis Đông Trung, 10 Feb. 1887, *Bon* 3332 (P, SING).

4. *Argyreia collinsae* (Craib) Na Songkhla & Traiperm

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia collinsae (Craib) Na Songkhla & Traiperm, Thai Forest Bull., Bot. 33: 42 (2005); Staples & Traiperm, Fl. Thailand 10: 343 (2010). – *Rivea collinsae* Craib, Bull. Misc. Inform. Kew 1916. 266 (1916). – *Lettsonia collinsae* (Craib) Kerr, Bull. Misc. Inform. Kew 1941: 15 (1941), Fl. Siam. 3 (2): 31 (1954). – Type: Thailand, Chon Buri, Sriracha, Kerr 2149 (syn K!; K000830763; isosyn BM!, El, E00067043); same locality, *Mrs. Collins* 53 (syn K!; isosyn El, E00067042).

Woody climbers; stems 2–14 m long, innovations herbaceous, whitish pubescent. Leaves cordate to orbicular 5.0–8.5 × 4.0–6.0 cm; base cordate, apex acute, chartaceous, both sides finely appressed puberulent; secondary veins 7–9 either side of midvein, prominent beneath; petioles 2.5–3.5 cm, hirsute.

Inflorescences lax cymes, 3–5-flowered; peduncles 1.5–2.0 cm, appressed pilose; pedicels 5–15 mm, slightly pubescent; bracts elliptic-oblong, 2.0–2.5 × 0.6–0.7 cm, reddish green, margin undulate, apex acute, outside slightly pilose, deciduous. Flowers pendent; sepals subequal, glabrous, apex cucullate in bud, outer 2 sepals ovate, 9–11 mm, apex obtuse, 3 inner sepals cordate, 11–13 mm, apex rounded; corolla campanulate, 2.5–4.5 cm long, waxy, glabrous, limb entire, recurved, purplish, tube gibbous near middle, white inside and out; stamens included, white, filament bases dilated, pubescent; pistil included, disk cupular, subentire, ovary sunken in disk, glabrous, 2-locular.

Berries c. 13 mm diameter, dark red, enclosed by enlarged calyx. Seeds 4 or fewer, 11–12 mm long, dark brown, pubescent.

Distribution. Cambodia, Vietnam, Thailand.

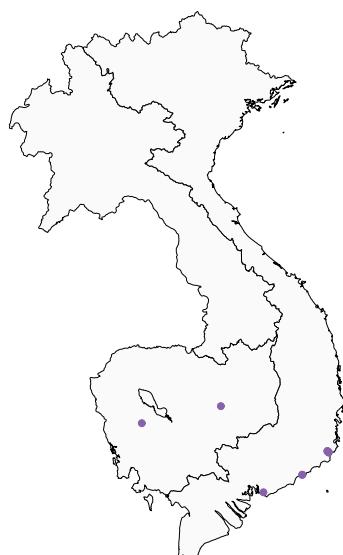
Ecology. In secondary vegetation and scrub, dry deciduous forest, along banks of a dry riverbed, seemingly always on sandy soil; elevation: 700–900 m.

Usage. Fruits are reported to be edible in Cambodia (*Martin* 149).

Vernacular names

Cambodia. bôs can tom ruây (Khmer, *Poilane* 14290), voa kân tet (Khmer, *Martin* 149).

Vietnam. cây đaiū (Annamite, *Chevalier* 39088), cây dây nái (Annamite, *Poilane* 111).





2.4. *Argyreia collinsae* (Craib) Na Songkhla & Traiperm. Habit, flowers (credit: Sawai Mattapha; voucher: Thailand, not collected).

Material studied

Cambodia. Kratie: Svaichek, "prov. de Battambang", 20 Oct. 1927, *Poilane* 14290 (P, SING). Pursat: Kol Totung [Leach], 15 Dec. 1965, *Martin* 149 (P, SING).

Vietnam. *s. loc.*, in montem Deon Ba, Mar. 1866, *Pierre s.n.* (P). Ba Ria-Vung Tau: secus flumen Baria, Dec. 1866, *Pierre s.n.* (P, SING). Binh Thuan: Panthiet, Ambulance, 25 Oct. 1924, *Evrard* 1549 (P); rive droite de la rivière de Phanthiet, 27 Oct. 1924, *Evrard* 1583 (P, SING). Ninh Thuan: environs de Tourcham, 1–2 Oct. 1918, *Chevalier [legit Fleury]* 39088 (P); Tourcham, 24 Nov. 1911, *Lecomte & Finet* 1391 (P); Phanrang, 26 June 1919, *Poilane* 111 (P); Ka Koan, " pro. Phanrang", 16 Dec. 1923, *Poilane* 9164 (P); Ouest gare de Song Mao, 26 Sep. 1940, *Poilane* 30538 (P).

5. *Argyreia fulvocymosa* C.Y.Wu

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia fulvocymosa C.Y.Wu, Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 135 (1965); R.C.Fang & Staples, Fl. China 16: 320 (1995); Staples & Traiperm, Thai Forest Bull., Bot. 36: 102 (2008), Fl. Thailand 10: 345 (2010); Staples *et al.*, Thai J. Bot. 6: 80 (2014).— Type: China, Yunnan, Pingbian, Mao Pin Yi 3101 [sphalm 310] (holo KUN!, KUN1218338; iso KUN!, KUN0315070).

Lianas; stems terete, 2–10(–12) m long, base c. 1 cm diam., yellowish tomentose at first, later glabrescent. Leaves broadly ovate-circular to nearly circular, 12.0–16.5 × 10.0–15.0 cm, underside densely yellowish tomentose, upper side minutely strigose or glabrate, base shallowly cordate, apex abruptly acute or rounded; secondary veins 10–14 either side of midvein; petiole 5–9 cm.

Inflorescences axillary, 9–40-flowered; peduncles 2.5–7.0 cm, angular; bracts early deciduous; pedicels 3–8 mm. Flowers erect to horizontal; sepals unequal, broadly ovate-circular, c. 5 × 4 mm, outer sepals larger, yellowish tomentose outside, glabrous within, apex rounded; corolla funneliform, c. 2 cm, pure white, limb 5-parted, midpetaline bands yellowish hirsute outside; stamens slightly exserted, filaments dilated basally and yellowish glandular pilose, anthers white, apically purplish; pistil exserted, disc annular, c. 1 mm long, ovary glabrous.

Berries enclosed by enlarged calyx, depressed globose, 6–8 mm diam., red, apiculate by style base. Seeds 4 or fewer, ovoid-trigonous, 4–5 mm long, black, smooth.

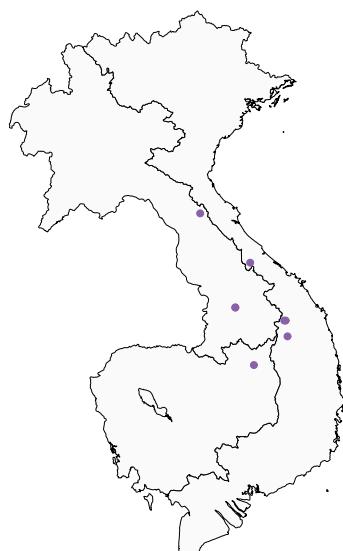
Distribution. Cambodia, Laos, Vietnam and SW China, Thailand.

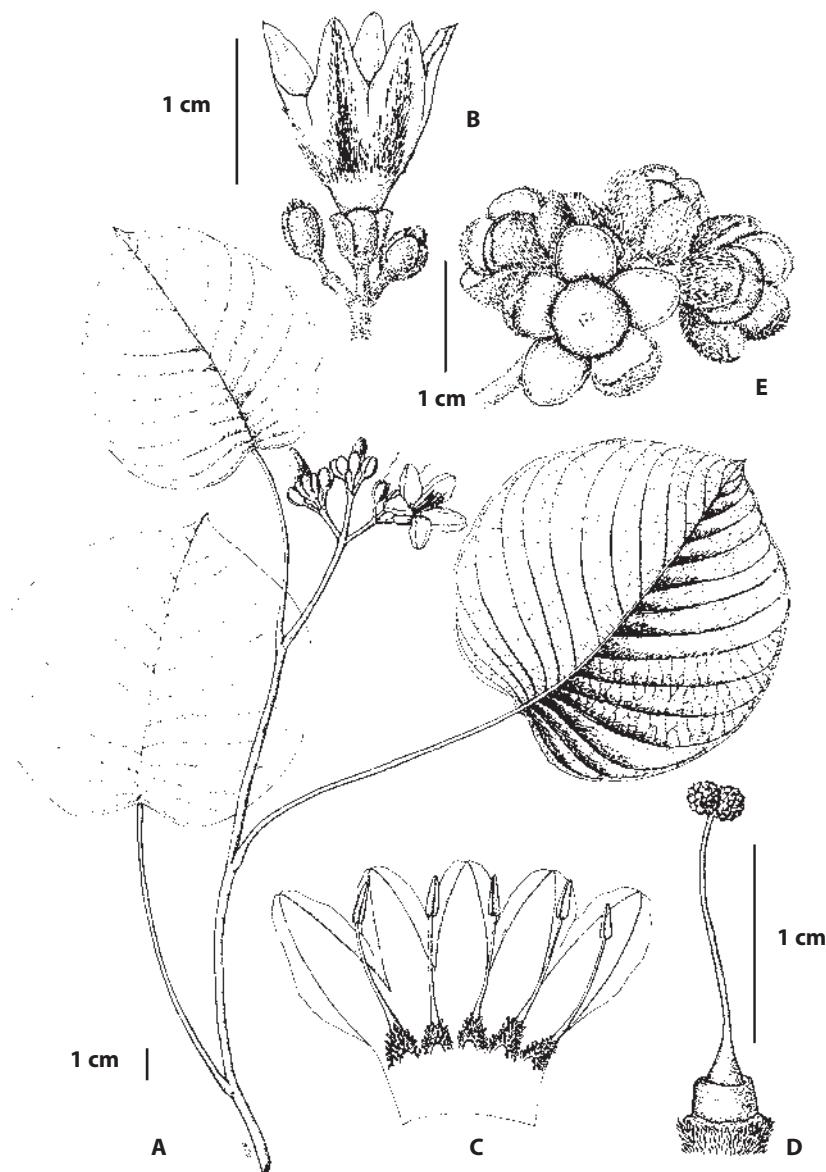
Ecology. Clearings and sunny places in primary evergreen forest, disturbed margins of evergreen forest, secondary regrowth of dry forest with primary forest elements and bamboos, in thickets on red soil and basalt soils; elevation: 550–1450 m.

Material studied

Cambodia. Ratanakiri: lac Yok Laom, 24 Nov. 2007, Cheng *et al.* CL-753 (P).

Laos. Khammouane: along path to Ban Silia, field edges, 24 Oct. 2005, Newman *et al.* LAO478 (BISH, E). Saravane: entre Dasia et Tateng, 10 Sep. 1928, Poilane 15535 (P); entre Tateng et Paksong, plateau de Bolovens, 14 Sep. 1928, Poilane 15556 (P).





2.5. *Argyreia fulvocymosa* C.Y.Wu. A, habit; B, flower; C, opened corolla with stamens; D, pistil; E, fruits.
Drawn by P. Inthachub (From Staples 2010).

Vietnam. Dong Nai: km 52 de la Route Coloniale 20, "prov. de Bien Hoa", 29 Oct. 1932, *Poilane* 21297 (P, SING). Kon Tum: about 6–8 km to N of Dak Gley town, 29 Nov. 1995, Averyanov et al. VH-2108 (AAU, P); on W slope of Ngoc Linh mountain system near Long Nam village, 3 Apr. 1995, Averyanov et al. VH-1103 (P); entre Dak Tô et Dak Ha, 1 Oct. 1930, *Poilane* 18377 (P). Quang Tri: Col d'Ailao, 23 Oct. 1935, *Poilane* 24932 (P).

6. *Argyreia lanceolata* Choisy

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Argyreia lanceolata Choisy, Mém. Soc. Phys. Genève 6: 421 [Conv. Orient. 39] (1834); Gagnep. & Courchet, Fl. Indo-Chine 4: 276 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 174 (1990); P.H. Hồ, Cây cỏ Việt Nam 2 (2): 1000 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 159 (2005); Staples & Traiperm, Fl. Thailand 10: 350 (2010); Staples *et al.*, Thai J. Bot. 6: 81 (2014).— *Lettsomia lanceolata* (Choisy) Kerr, Fl. Siam. 3 (2): 33. 1954.— Type: Myanmar, Martaban, Wallich Cat. 1395/1 (syn not found); Tavoy, 2 Oct 1827, [legit Gomez 349] Wallich Cat. 1395/2 (syn G-DC!, K-W!).

Slender trailers or low twiners from woody tap root, all parts whitish or silvery pubescent; stems herbaceous, wiry, 0.5–4.0 m long. Leaves lanceolate or elliptic-oblong, 6–17 × 2–7 cm, chartaceous, upper side glabrous, underside appressed silvery pubescent, base tapering cuneate or obtuse, apex obtuse, mucronate; secondary veins 4 or 5 on either side of midvein; petiole slender, 0.5–2.0 cm long.

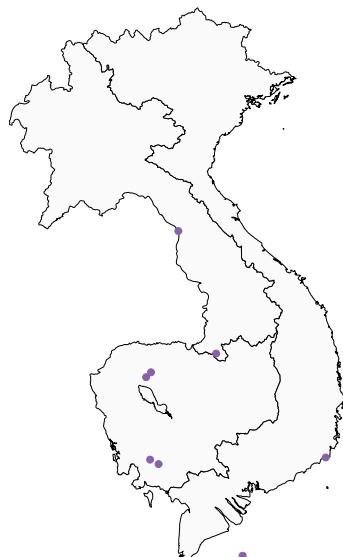
Inflorescences axillary cymes, 1–3(–9)-flowered; peduncles 0.2–0.8 mm long; pedicels slender, 6–10 mm long; bracts lanceolate-acuminate, up to 1.2 cm long, densely sericeous, caducous. Flowers erect; sepals unequal, oblong or lanceolate, apex acuminate, outside shaggy sericeous, inside glabrous, 3 outer sepals 12–19 × 4–5 mm, 2 inner sepals broader; corolla flaring funnelform, 5.0–6.3 cm long, limb entire to 5-pointed, red-purple, tube whitish purple, glabrous inside, midpetaline bands and upper tube whitish strigose-sericeous outside; stamens included, unequal, 26–34 mm long, filaments basally dilated and pubescent; pistil included, 36–40 mm long, disc shallowly 5-lobed; ovary glabrous, 2-locular, jointed at style base.

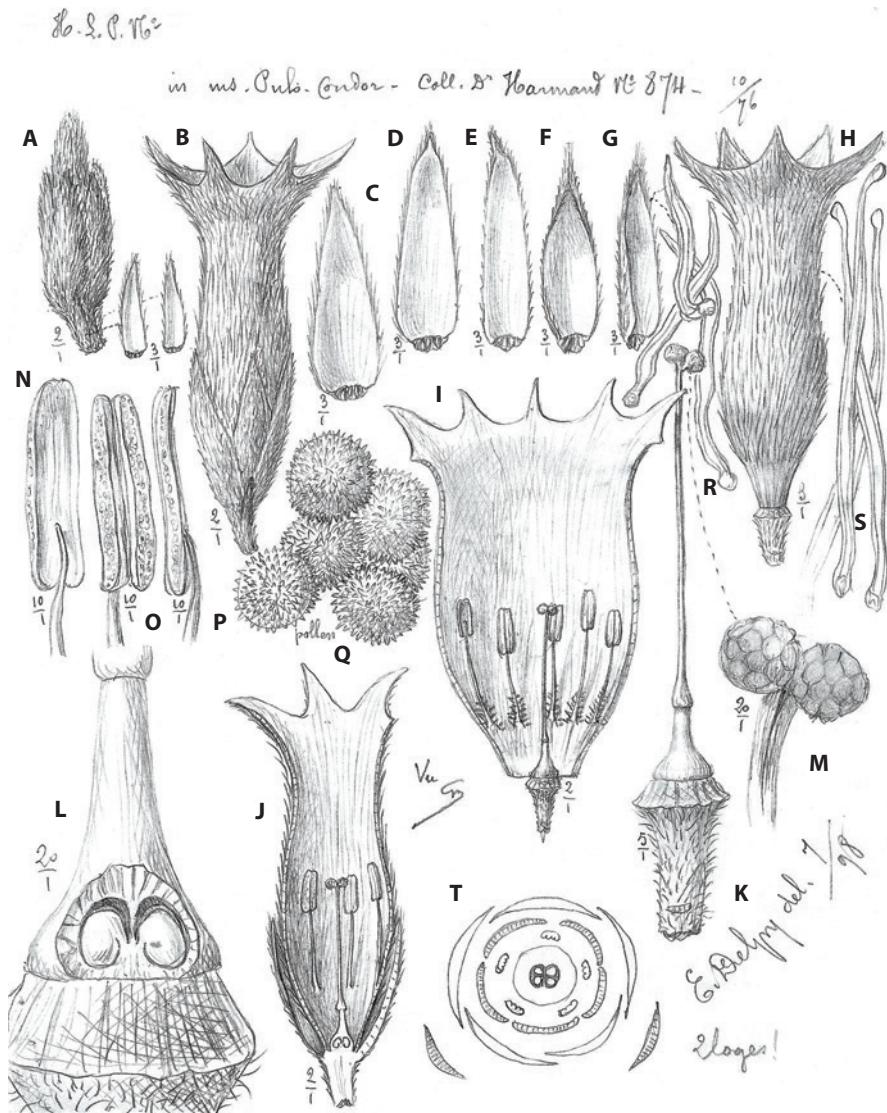
Berries subglobose, c. 7–8 mm diam. Seeds 4 or fewer, 3–4.5 mm long, glabrous.

Distribution. Cambodia, Laos, Vietnam and also India, Myanmar, Thailand.

Ecology. Sunny clearings and understorey in deciduous dipterocarp forest, dry evergreen forest, dipterocarp-pine forest, deciduous dipterocarp-oak scrub forest on rocky, mediocre sandy soil, and deep humus; elevation: 40–150 m.

Notes. One of the most beautiful of the forest understorey species, *A. lanceolata* has large flowers of a





2.6. *Argyreia lanceolata* Choisy. A, flower bud, 2 bracteoles in adaxial view; B, whole flower, lateral view; C-G, sepals, adaxial surfaces, outermost (C) to innermost (G); H, corolla, lateral view, calyx removed; I, corolla, opened, showing position of androecium and gynoecium; J, flower in median longitudinal section; K, pistil and receptacle, floral envelopes removed, note articulation in lower style; L, ovary, enlarged, showing ovules in locules; M, stigmas, enlarged; N, anther, abaxial view; O, anther, adaxial view; P, anther lateral view; Q, pollen grains; R, shorter, wavy trichomes from exterior of sepal; S, longer, straighter trichomes from exterior of corolla; T, floral diagram, ovary is bilocular. Drawn by E. Delpy, July 1898. Voucher: Harmand 874, in October 1876 (P04039381).



A



2.7. *Argyreia lanceolata* Choisy. A, habit; B, flowers (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

striking colour and handsome foliage that is deep green above and silvery beneath. The tough woody tap root and wiry herbaceous stems suggest a plant adapted for seasonal drought or regular episodes of burning during which it dies back to the caudex and then resprouts when more favourable conditions return.

Material studied

Cambodia. Oddor Meanchey: Battambang / Siem Reap border, entre Tou Choum et Samrong, au pied du Massif de Dangrek, 27 Oct. 1927, *Poilane* 14470 (P, SING). Koh Kong: between Koh Kong and Phnom Penh, 21 Nov. 2009, Simões et al. 47 (BKF, BM, K, SING). Kompong Speu: 16 Oct. 2005, *Long & Cheng A* (P). Siem Reap: Phnom Kulen National Park, 26 Nov. 2007, *Nguyen Van Du & Rattana* CB-VN 218 (K, MO).

Laos. Champassak: Expedition du Mekong, Kong, 1866–68, *Thorel* 2308 p.p. (E, P); Penongs, 1866–1868, *Thorel* 2308 p.p. (P). Savannakhet: route de Takhet, 18 Oct. 1938, *Poilane* 28117 (BKF, P, SING).

Vietnam. Ba Ria-Vung Tau: îles de Poulo-Condor, Oct. 1876, *Harmand* 874 (BM, P, SING). Ninh Thuan: Ca Na, "prov. Phanrang", 9 Nov. 1923, *Poilane* 8503 (P).

7. *Argyreia laotica* Gagnep.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Argyreia laotica Gagnep., Notul. Syst. (Paris) 3: 134 (1915), in Lecomte, Fl. Indo-Chine 4: 276 (1915); Kerr, Fl. Siam. 3 (2): 24 (1954); Staples & Traiperm, Thai Forest Bull., Bot. 36: 89–93 (2008), Fl. Thailand 10: 351 (2010); Staples *et al.*, Thai J. Bot. 6: 81 (2014).— Types: Laos, Vien-thian, Thorel 3286 p.p. (syn Pl, P00392013); [Thailand.] ‘Laos’ Kemmarath, Thorel 3286 p.p. (syn Pl, P00392012); without locality, Massie s.n. (syn Pl, P00392015, P00392016, P00392017); Dupuy 117 (syn Pl, P00392014).

Argyreia splendens auctt. non (Hornem.) Sweet: R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 131 (1979); R.C.Fang & Staples, Fl. China 16: 318 (1995), p.p.; Traiperm, Tax. Study *Argyreia* Thailand 75 (2002).

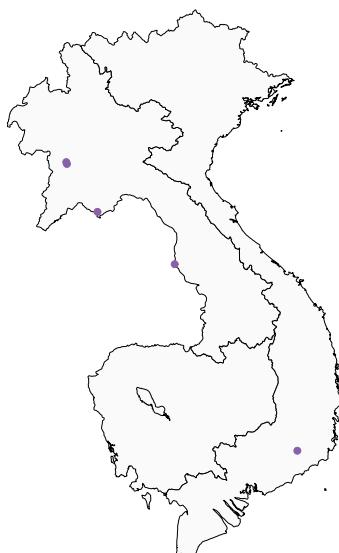
Woody twiners or trailers, stems 2–10 m long; axial parts appressed pilose, later glabrescent. Leaves ovate, lanceolate, or somewhat oblong, 8.0–17.0 × 2.5–7.0 cm, base rounded, cuneate, or emarginate, apex acute or acuminate, upper side glabrous with prominent veins, underside densely silvery to coppery sericeous; secondary veins 7–10 either side of midvein; petiole 1.5–8.0 cm.

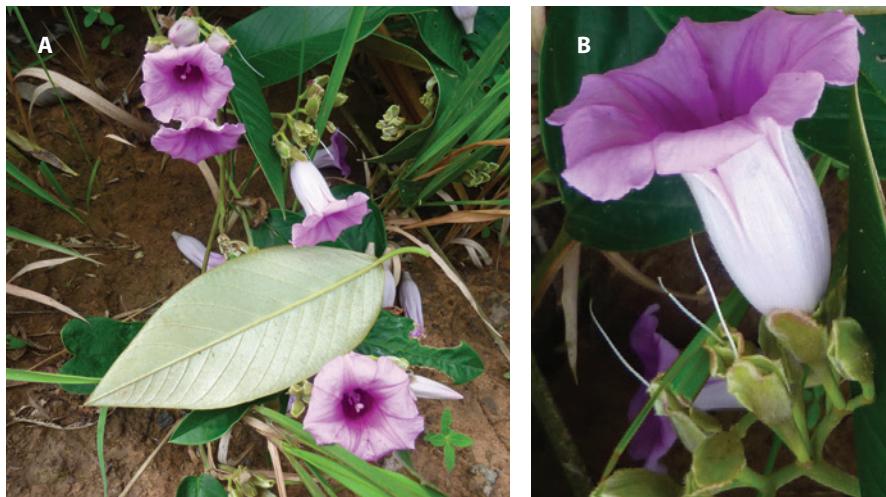
Inflorescences axillary or subterminal, 6–10-flowered, subumbellate; peduncles 0.2–1.0 cm; bracts lanceolate-oblong, 0.5–0.7 cm, sericeous, persistent; pedicels 3–4 mm. Flowers spreading to pendulous; sepals very unequal, outside shaggy-pubescent, inside glabrous, outer 2 ovate-elliptic, 12–15 × 10 mm, apex undulate, inner 3 oblong-elliptic, c. 7 × 3 mm; corolla funnelform, 4.5–5.0 cm long, tube gibbous, limb wavy, pale purple, darker inside tube, outside appressed hirsute, otherwise glabrous; stamens included, unequal, 18.5–24.0 mm, insertion villose, anthers sagittate; pistil included, ovary acute, 4-locular, apex minutely sericeous, style c. 25 mm, jointed near base.

Berries globose, 8–10 mm diam., bright red; fruiting calyces wide-spreading, sepals concave, rose-red inside. Seeds not seen.

Distribution. Laos, Vietnam, Thailand and China.

Ecology. Often in shady places beneath trees or bamboo, in forest or thickets of secondary regrowth, on sandy, basic soil; elevation up to 900 m. There are often ants associated with the inflorescences of *A. laotica*: the





2.8. *Argyreia laotica* Gagnep. A, habit, flowers; B, sepals with undulate apex (credit: G. Staples; voucher: Thailand, not collected).

ants cluster all over the stems, peduncles, petioles and sepals—the slightest disturbance induces them to bite aggressively.

Notes. The name *A. splendens* has been often misapplied to this species; genuine *A. splendens* does not occur in Southeast Asia so far as known.

The trichomes covering the outside of the midpetaline bands and upper corolla tube are of two distinct types: long, stiff, yellowish trichomes curved like a bow and closely appressed to the corolla; and shorter, crimped, erect-patent whitish trichomes that form an under-coat beneath them.

Vernacular names

Laos. ièn¹ don¹ (*Vidal* 4186), kêng thuan (*Vidal* 4167).

Material studied

Laos. Savannakhet: km 20 de la route Savannakhet à Quang Trí, 30 Jan. 1925, *Poilane* 11863 (P). Sayabouri: Ban Na La, 29 Oct. 1965, *Vidal* 4167 (P); l. c., 30 Oct. 1965, *Vidal* 4186 (P).

Vietnam. Lam Dong: km 154 de Saigon, Route Coloniale 20, à quelques km de la limite de la Cochinchine, "prov. du Haut Donai", 12 Jan. 1934, *Poilane* 23382 (P, SING); pied du Braïan, près de Djiring, 22 Jan. 1935, *Poilane* 23985 (P, SING).

8. *Argyreia longipes* (Gagnep.) Traiperm & Staples

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia longipes (Gagnep.) Traiperm & Staples, Adansonia, sér. 3, 35: 361 (2013). – *Erycibe longipes* Gagnep., Notul. Syst. (Paris) 3: 140 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 309 (1915). – Type: Cambodia, “mts de Knang-Krépeuh”, May 1870, Pierre 857 (lecto Pl. P00608668, designated by Traiperm & Staples (2013); isolecto Al!, HUH00054390, BM!, BM000847726, El!, E00273903, GH!, HUH00054389, K!, K000830751, Pl!, P04524263, P00608666, P00608667, P00608669, SING!).

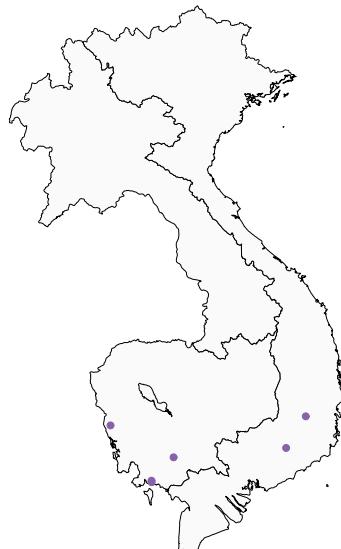
Woody climbers; stems 2–10 m or more, drying striate, brownish, glabrate; indumentum of simple, appressed trichomes. Leaves ovate to narrowly ovate, 5.0–11.0 × 3.0–5.5 cm, base rounded or ± truncate, apex acuminate, chartaceous, glabrous on both sides or nearly so, underside dotted with tiny glands; secondary veins 4 or 5 either side of midvein, indistinct above, prominent beneath; petiole 1–3 cm long, sparsely appressed pubescent.

Inflorescences subumbelliform; peduncles slender, 2.5–10.0 cm long, appressed pubescent; bracts tiny scales, early deciduous; pedicels c. 1 cm long. Flowers erect-spreading; buds narrowly ellipsoid, apex sericeous, glabrous below middle; sepals unequal, outer 2 ovate, smaller, thick, convex, 3.5–4.5 × 3.0–4.0 mm, inner broadly ovate, 5–6 mm long and wide, sparsely appressed pubescent to glabrous, apex obtuse-rounded; corolla funneliform, 3.0–3.5 cm long, basal tube cylindrical, flaring gradually above, limb shallowly lobed-ruf-fled, whitish or pale pink, darker pink inside tube, midpetaline bands appressed sericeous; stamens included, subequal, filaments 2.2–2.3 cm, basally triangular, pubescent above insertion, filamentous and glabrous above that, anthers sagittate, 0.4 cm long; pistil included, disc annular, c. 1.5 mm long; ovary broadly elliptic, 2 mm long, glabrous, 2-locular, ovules 2 per cell, style filiform, 2.5 cm, glabrous, stigmas capitate, biglobose.

Berries ellipsoid to ovoid, 1.2–2.0 × 0.7–1.2 cm, purple, glabrous; fruiting calyx cupping base of fruit. Seed 1, ellipsoid, 0.8–1.2 × c. 0.7 cm, drying black, glabrous.

Distribution. Cambodia, Vietnam, and very likely in SE Thailand as well.

Ecology. A montane plant collected in dwarf evergreen forest, evergreen gallery forest along a seasonally dry stream, and short forest on sandy soil, also on rocky clay soil of good to poor fertility; elevation 1,000–1,200 m.



Usage. Label data on *Monyrak* 32 report that the whole plant is used medicinally, without providing any details.

Vernacular names

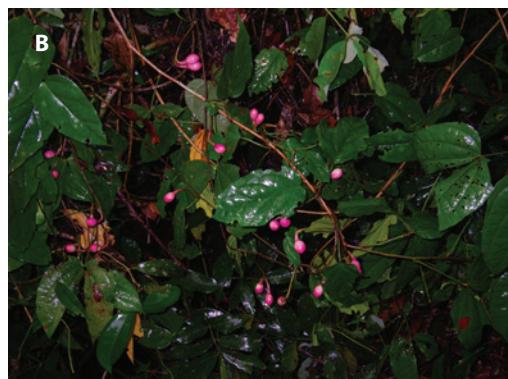
Cambodia. voir cham (*Monyrak* 32).

Vietnam. che (*Poilane* 22093).

Material studied

Cambodia. Kampot: Bokor National Park, along the road to Popokvil, the road to the tea farm, 6 May 1999, *Monyrak* 32 (A, K); along track to Popokvil waterfall, 9 Mar. 2001, *Middleton & Monyrak* 647 (A, P); montagne de l'Éléphant (Damrei Mountains), sur nouvelle route entre le Bokor et la Cascade, 5 Dec. 1933, *Poilane* 23143 (BKF, P). Pursat: Phnom Samkos Wildlife Sanctuary, ca. 5 km S-SW of Phnom Krachau peak, 18 Jan. 2011, *Thomas et al.* 4 (E, P, SING).

Vietnam. Dac Lac: Chu Yang Sin National Park, 12 km S from Krong Kmar village, 5 Apr. 2012, *Nuraliev* 482 (MW). Lam Dong: Mt. Sapoum, sud de la station agricole de Blao, "prov. du haut Donai", 23 Feb. 1933, *Poilane* 22093 (P, SING).



2.9. *Argyreia longipes* (Gagnep.) Traiperm & Staples. A, flower; B, fruit; C, fruit close-up (credits: A, Philip Thomas, RBG Edinburgh, B, C, Maxim Nuraliev; vouchers: A, Cambodia, *P. Thomas et al.* 4 (E); B, C, Vietnam, *Nuraliev* 482 (MW)).

9. *Argyreia marlipoensis* C.Y.Wu & S.H.Huang

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Argyreia marlipoensis C.Y.Wu & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 164 (1979); R.C.Fang & Staples, Fl. China 16: 316 (1995).—Type: China, Yunnan, Mar-li-po, Bar-bu, C.A. Wu 9945 (holo KUN!, on 2 sheets, KUN1218347, KUN1218348).

Lianas; stems to 12 m long, dark brown, terete, densely verruculose, sparsely lenticellate and appressed hispid. Leaves broadly ovate to circular, 10.0–14.0 × 9.5–12.0 cm, upper side glabrescent, minutely pustulate, underside red-purple, sparsely yellowish appressed hispid, base rounded, truncate, or subcordate, apex abruptly caudate-acuminate; secondary veins 7 or 8 either side of midvein; petiole 7–9 cm, golden appressed hispid.

Inflorescences axillary, cymose, 3–10-flowered; peduncles longer than subtending petioles, 5.5–15 cm long, golden appressed hispid; bracts falciform, 18–22 mm long, outer sides yellowish appressed hispid, deciduous, bracteoles similar, smaller. Flowers erect-spreading; sepals ovate, 6–7 mm long, villous outside; corolla funnelliform, pink-purplish, softly whitish pilose outside, limb undulate-ruffled; stamens and pistil included, not seen.

Fruiting calyx accrescent, sepals ovate, subequal, c. 13 × 9 mm, leathery, sparsely yellowish villous outside, apex acute. Berries ovoid, c. 1.5 cm long. Seed 1, flattened ovoid, c. 1 cm long, pale dull yellow, smooth, glabrous.

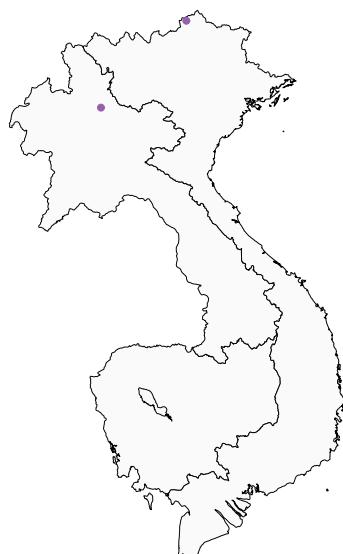
Distribution. Laos, Vietnam, China (Yunnan).

Ecology. In thick secondary regrowth or selectively logged forests on limestone mountain slopes; elevation 500–900 m.

Notes. A single collection from Vietnam (mixed with *Merremia vitifolia* (Burm. f.) Hallier f.) and one recent collection from Laos can be confidently matched with the type gathering of *A. marlipoensis*, an enigmatic Chinese species known only from Malipo Xian, Yunnan province.

Material studied

Laos. Louang Prabang: along the Nam Ou River, opposite Banvattanatam village, 2 Oct. 2014, Puglisi et al. LAOS-144 (E, FOF, SING).





2.10. *Argyreia marlipoensis* C.Y. Wu & S.H. Huang. Habit, flowers (credit: Michele Rodda; voucher: Laos, Puglisi et al. LAOS-144 (E)).

Vietnam. Ha Giang: Quan Ba district, Bat Dai Son protected area, 9 July 2002, *Van der Werff* et al. 17166 (SING).

10. *Argyreia mekongensis* Gagnep. & Courchet

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia mekongensis Gagnep. & Courchet, Notul. Syst. (Paris) 3: 134 (1915), & in Lecomte, Fl. Indo-Chine 4: 282 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 174 (1990); P.H. Hô, Cây cỏ Việt Nam 2 (2): 1001 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 159 (2005); Staples & Traiperm, Fl. Thailand 10: 354 (2010); Leti *et al.*, Flore Photogr. Cambodge 169 (2013); Staples *et al.*, Thai J. Bot. 6: 81 (2014). – *Lettsonia mekongensis* (Gagnep. & Courchet) Kerr, Fl. Siam. 3 (2): 34 (1954). – Type: Cambodia, Stung-Treng, Thorel 2150 (syn P, n.v., BM!, BM000927943, El, E00273907, Kl). Vietnam, [Đông Nai] Baochianh, *in* prov. Bien hoa, Sep. 1865, Pierre 10 (syn P, n.v., Kl); ad Gia lau me, prov. Bien hoa, Pierre 2 (syn P, n.v.).

Lianas; stems 1–4(–10) m long, appressed pubescent. Leaves elliptic to broadly oblong, 7–12 × 3–4 cm, tapering slightly toward both ends, base obtuse, apex acute, upper side sparsely strigose, underside densely greyish tawny pubescent; secondary veins 8–12 either side of midvein; petiole 0.8–1.0 cm, pubescent.

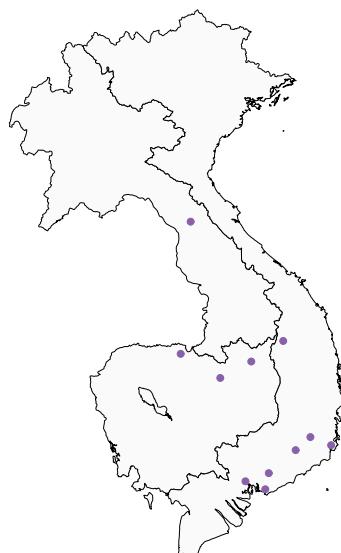
Inflorescences axillary, 5–7-flowered, bracteose; peduncles 0.5–1.0 cm; bracts lanceolate or ovate-cuspidate, c. 2.0 × 0.8 cm, long acuminate, abaxially yellowish hispid, deciduous, bracteoles similar; pedicels c. 10 mm. Flowers spreading to pendent; sepals unequal, 10–12 × 8–9 mm, outer 3 broadly elliptic, obtuse, inner obovate to spatulate, rounded, abaxially yellowish hispid, inner ones subglabrous; corolla campanulate, 5 cm and longer, white, limb 5-pointed, sparsely pilose outside; stamens included, filaments dilated and concave at insertion, papilllose below, anthers oblong, c. 4 mm; pistil included, disc obscurely lobed, ovary c. 2.5 mm long, 2-locular, glabrous, jointed to style base.

Fruiting calyces accrescent, sepals convex, yellowish hispid outside, brownish inside. Berries depressed globose, 7–9 mm diam., red. Seeds 4 or fewer, broadly trigonous, black.

Distribution. Cambodia, Laos, Vietnam and Thailand.

Ecology. Open deciduous forest, disturbed evergreen forest, and secondary regrowth, over clays or rocky, nutrient-poor, acidic soils; elevation: 50–1000(–1500) m.

Notes. The syntypes at P were missing in 2005 and subsequent searches on several occasions failed to locate





2.11. *Argyreia mekongensis* Gagn. & Courchet. A, habit, fruits; B, seeds (credit: Maxim Nuraliev; voucher: Vietnam, A.N. Kuznetsov et al. 1238 (MW)).

them; fortunately there are duplicates (syntypes) of two of the type collections in other herbaria and these were studied for preparation of this flora account.

Vernacular names

Vietnam. re a nganh (*Poilane* 9661), re blao (*Poilane* 21149), pat so (*Poilane* 5162).

Material studied

Cambodia. Preah Vihear: entre Cheom Khsan et Chheb, 3 Dec. 1927, *Poilane* 14196 (P). Ratanakiri: route de Veurn Say, 29 Nov. 2007, *Cheng* et al. CL-842 (P, SING).

Laos. Champasak: Khong distr., Phapheng Falls area, 17 Sept. 1998, *Maxwell* 98-1015 (FOF). Khammouane: forests surrounding Nakai NBCA Area Office, 7 Nov. 2005, *Newman* et al. LAO-979 (E, FOF, P).

Vietnam. Ba Ria-Vung Tau: Baria, Aug. 1867, *Pierre* s.n. (P). Dac Lac: M'Drack, 12 Nov. 1922, *Poilane* 5162 (P). Dong Nai: ad Gia lau me, "prov. Bien Hoa", Sep. 1865, *Pierre* s.n. (E, G, K, probably syntypes for *A. mekongensis*). Gia Lai: Dak Doa, 28 Aug. 1930, *Poilane* 18145 (P, SING). Ho Chi Minh Ville: ad Cay cong, secus flumen Saigon, Apr. 1866, *Pierre* s.n. (BM, E, K). Kon Tum: Chu Mom Ray National Park, 33 km WNW from Kon Tum city, 1 Apr. 2015, *Kuznetsov* et al. 1238 (MW). Lam Dong: km 122 de la Route Col. 12, "prov. Haut Donai", 7 Oct. 1932, *Poilane* 21149 (P); nord de Dalat, 12 Sep. 1940, *Poilane* 30355 (P); Yan Kar, près de Djiring, 3 Sep. 1924, *Evrard* 1244 (P). Ninh Thuan: Ba Rau, "prov. Phanrang", 20 Feb. 1924, *Poilane* 9661 (E, L, P).

11. *Argyreia mollis* (Burm. f.) Choisy

	J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia mollis (Burm. f.) Choisy, Mém. Soc. Phys. Genève 6: 421 [Conv. Orient. 39] (1834); Ooststr., Blumea 5: 357 (1943); Hoogland, Blumea 7: 180 (1952); Ooststr. & Hoogland, Fl. Males., Ser. I, Spermat. 4: 496 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 174 (1990); P.H. Hồ, Cáycô Việtnam 2 (2): 1001 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 159 (2005); Staples & Traiperm, Thai Forest Bull., Bot. 36: 86–108 (2008); Fl. Thailand 10: 355 (2010); Staples *et al.*, Thai J. Bot. 6: 81 (2014). – *Convolvulus mollis* Burm. f., Fl. Indica 44, t. 17 (1768).— Type: Java, Kleinhof s.n. (lecto G-PRELI, designated by Staples & Jacquemoud, Candollea 60: 449 (2005)).

Rivea ?obtecta Choisy, Mém. Soc. Phys. Genève 6: 410 [Conv. Orient. 28] (1834).— *Argyreia obtecta* (Choisy) C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 186 (1883); Gagnep. & Courchet, Fl. Indo-Chine 4: 275 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 174 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 160 (2005); Staples & Traiperm, Thai Forest Bull., Bot. 36: 89–93 (2008), Fl. Thailand 10: 357 (2010); Leti *et al.*, Flore Photogr. Cambodge 170 (2013).— Type: Myanmar, Tavoy, Wallich Cat. 1416/2 (syn G-DC!); Myanmar, Amherst, Wallich Cat. 1416/1 (syn G-DC!).

Argyreia obtusifolia auctt. non Lour.: Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74 (2): 320 (1905); Craib, Bull. Misc. Inform. Kew, 1911: 423 (1911).

Argyreia obtecta var. *acutifolia* Gagnep. in Lecomte, Fl. Indo-Chine 4: 276 (1915).— Types: Laos, Bassac, Thorel 2376 (syn Pl. E!, E00616984, SING!, SING0127711); Cochinchine, without locality, Pierre s.n. (syn, not located); Thailand, “Siam, Xieng-mai”, Kerr s.n. (syn, not located).

Lianas; stems 4–10(–15) m long, base 30 cm diam., innovations densely appressed-pilose. Leaves oblanceolate-obovate, or elliptic, to oblong, 4–15 × 2–7 cm, base tapering cuneate or rounded, apex broadly obtuse or acute, shortly acuminate, upper side appressed stri-gose and smooth (veins not raised), underside sericeous, dull, not shining; secondary veins 7–9 either side of midvein; petioles 7–30 mm.

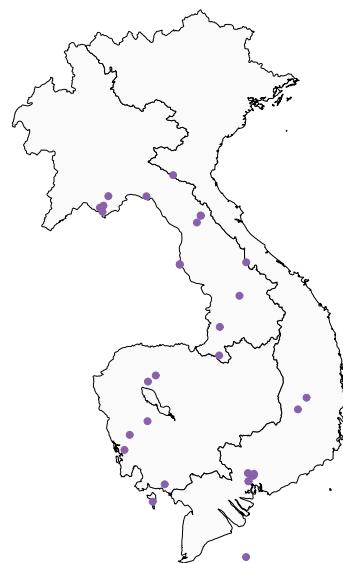
Inflorescences cymose, several-flowered; peduncles 15–20 mm long, pubescent; bracts obovate, tomentose, caducous; pedicels 5–12 mm long, angular. Flowers spreading to horizontal; sepals subequal, 3 outer broadly ovate, 6–10 mm long, obtuse or subacute, densely pubescent outside, inner 2 elliptic to ovate-elliptic, slightly longer, obtuse to submarginate, margins glabrous, dark; corolla campanulate, 3.5–5.5 cm long, pale purple or pinkish, darker inside tube, limb shallowly 5-angled, recurved, midpetaline bands appressed hirsute outside, otherwise glabrous; stamens included, 2.0–3.5 cm long, filament bases

pilose, anthers 3.0–4.5 mm; pistil included, nectary cupular, ovary glabrous, 4-locular, style 3–4 cm long, stigma biglobose.

Berries subglobose, 8–10 mm diam., red, attached to accrescent, reflexed calyx, sepals pale pinkish inside. Seeds 4 or fewer, c. 4–5 mm long, black.

Distribution. Cambodia, Laos, Vietnam as well as southern China, Myanmar, Thailand, peninsular Malaysia, Indonesia (Sumatra, Java).

Ecology. Clearings in forest, thickets, secondary regrowth, recently logged mixed pine forest, margins of evergreen wet forest, riverbanks, on diverse soil types including yellow sands and swampy grey silt; from 175–950 m elevation.



Notes. For a long time the name *A. mollis* was used indiscriminately in herbaria and in the botanical literature for an extraordinary array of morphotypes surely representing several species. Ooststroom and Hoogland (1953) adopted a broad species concept of *A. mollis* (Burm. f.) Choisy that included continental Southeast Asian plants named as *A. obtecta*. I did not accept this in the *Flora of Thailand* account and resurrected *A. obtecta* as a distinct species. Later, having studied the type specimen of *C. mollis* in the Burman herbarium, I realized that Hoogland and Ooststroom were probably correct in synonymizing *A. obtecta* with *A. mollis*. Leaving aside the confusing misapplications of this name to Southeast Asian and Chinese plants, the CLV specimens seen all conform reasonably closely with the Javanese type specimen of *bona fide A. mollis*. The complex of species centred on *A. mollis* greatly needs a modern revision with molecular tools applied.

The characters useful for recognizing *A. mollis* in the broadened concept followed here are: upper sides of leaves strigose, often densely so; laminas elliptic to oblanceolate-obovate; veins not evident on upper side (in dry state), the surface smooth beneath the indumentum; undersides of leaves sericeous to strigose, dull coloured and not shining silvery; sepals broadly ovate to ovate-elliptic; inner sepals with glabrous margins, these are reddish in life and dry blackish.

Vernacular names

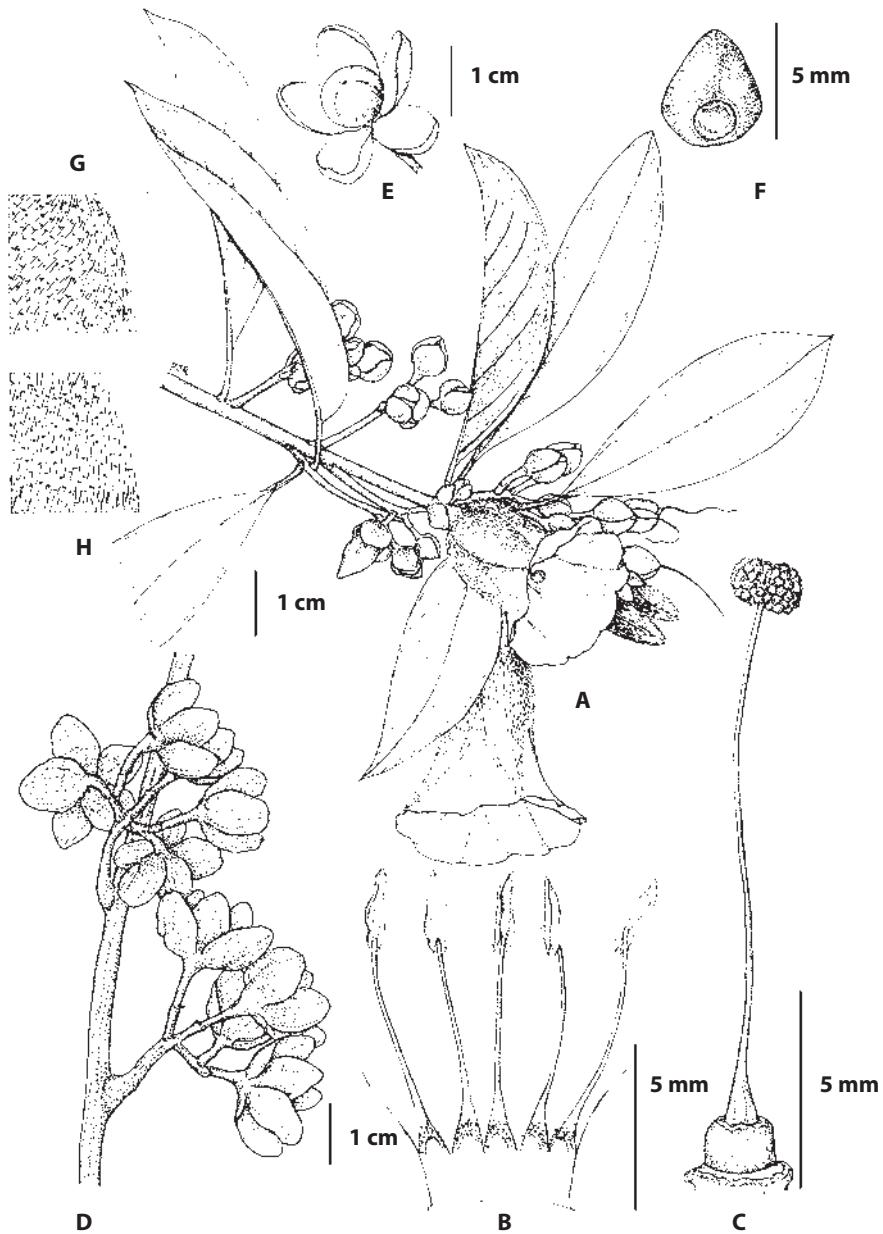
Cambodia. voa khliey (Martin 1249), voa chomnông oh (Martin 1124), voeur trâchéak tonsay (Hul & Lim 516), weār trâchiec ânsay (Hahn 28), voeur maha měk (Guinet 113).

Laos. ba sat khua (Vidal 1946).

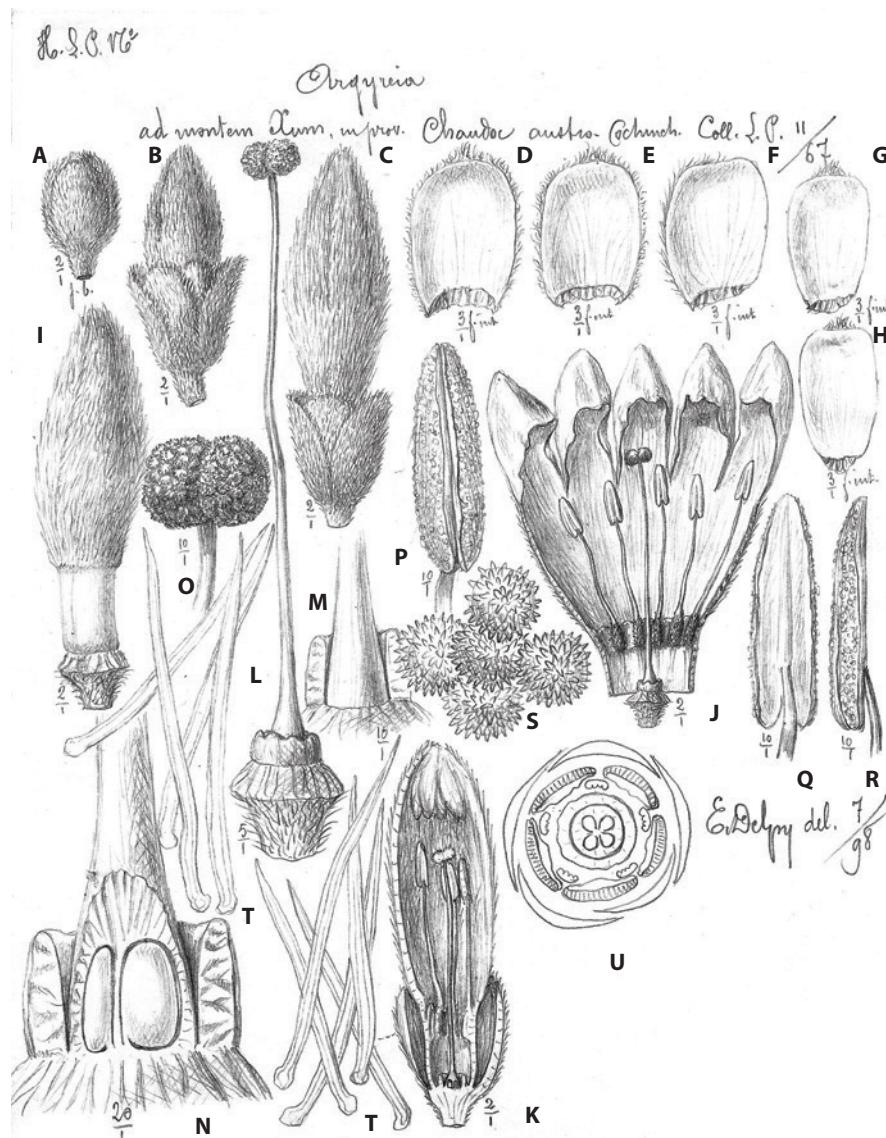
Vietnam. báctau (Pierre s.n., 11/1867).



2.12. *Argyreia mollis* (Burm. f.) Choisy. A, habit; B, corolla opened (credits: A, Preecha Karaket, BKF; B, G. Staples; vouchers: Thailand, not collected).



2.13. *Argyreia mollis* (Burm. f.) Choisy. A, habit; B, opened corolla with stamens; C, pistil; D–E, fruits; F, seed; G, upper leaf surface; H, lower leaf surface. Drawn by P. Inthachub (From Staples 2010, as *A. obtecta*).



2.14. *Argyreia mollis* (Burm. f.) Choisy. A, young flower bud, corolla only; B, immature flower bud, entire; C, mature flower bud; D–H, sepals, adaxial surfaces, outermost (D) to innermost (H); I, mature flower bud, calyx removed; J, mature flower bud, opened, showing androecium and gynoecium; K, mature flower bud in median longitudinal section; L, pistil and receptacle, floral envelopes removed; M, ovary with encircling nectary disc, partly cut away; N, ovary and nectary, longitudinal section showing 2 ovules; O, stigmas, enlarged; P, anther adaxial view; Q, anther abaxial view; R, anther, lateral view; S, pollen grains; T, simple trichomes; U, floral diagram. Drawn by E. Delpy, July 1898. Voucher: L. Pierre s.n., in November 1867 (P03560806).

Material studied

Cambodia. Kampot: Trach Kol, 27 Oct., *Hahn* 28 (P). Koh Kong: bord de route, de Phnom Penh à Koh Kong, environ 30 km de Koh Kong, 13 Nov. 2009, *Cheng* et al. CL1136 (P, SING); *I. c.*, 12 Nov. 2009, *Simões* et al. 29 (BKF, BM, K, SING); track between Tmor Bainng and Tatey Leu, 16 Nov. 2009, *Simões* et al. 38 (BM, SING); vers Andong Teuk, 4 Dec. 1968, *Martin* 1124 (P, SING); *Guinet* 113 (P). Siem Reap: région des Temples d'Angkor, 30 Nov. 1997, *Hul & Lim* 516 (P, RUPP); Mont Kulen, 13 Dec. 1968, *Martin* 1249 (P).

Laos. Bolikhamsai: Borikhane, Phou Kadan, env. Keng Sa Dok, 9 Nov. 1965, *Vidal* 4385 (P). Champassak: montagnes de Khong, Jan. 1876, *Harmand* 171 (P). Khammouane: Nakay district, Ban Sop On, 6 Oct. 2006, *Nanthavong* et al. BT645 (E, P); hills NW of Ban Mak Pheuang on N side of Nam Theun, 29 Oct 2005, *Newman* et al. LAO719 (E, P); hills N and W of Ban Mak Pheung on N side of Nam Theun, 1 Nov. 2005, *Newman* et al. LAO771 (BISH, E, HNL, P). Saravane: 5 Sep. 1928, *Poilane* 15477 (P, SING). Savannakhet: km 20 de la route de Savannakhet à Quang tri, 21 Jan. 1925, *Poilane* 11746 (P); 17 Oct. 1938, *Poilane* 28088 (P, SING). Vientiane: Ban Keun Road, 9 miles, 28 Aug. 1955, *Talbot de Malahide* 80 (SING); env. de That Luang, 1 Nov. 1949, *Vidal* 1105 (P); km 13 route de Tha Ngon, 8 Oct. 1952, *Vidal* 1946 (P); Forest Reserve of Na Sai Thong Royal Project, Muang Naxaythong, 2 Sep. 1995, *Iwatsuki* et al. 95-1538 (A); Phou Khao Khouay, 29 Oct. 1971, *Vidal* 5723 (P).

Vietnam. An Giang: ad montem Xam in "prov. Chaudoc", Nov. 1867, *Pierre* s.n. (E, G, P, SING). Ba Ria-Vung Tau: îles de Poulo-Condor, Moulaf, 1875–1877, *Harmand* 904 (P); Binh Duong: env. de Thuy Dau Mot, Jan. 1865, *Lefèvre* 285 (G). Dac Lac: forêt de Ban Me Thuot, Nov. 1967, *V. Van Cuong* 1052 (P); Trap K'Sor Reserve, 3 Apr. 2008, *Hiep* et al. HAL-11394 (SING). Dong Nai: Bien Hoa, 21 Nov. 1931, *Phung v. Diên* 213 (P, SING); route de Saigon à Bien Hoa, 22 Nov. 1864, *Lefèvre* 302 (P); Bien Hoa, 1862–1866, *Thorel* 906 (E, P, SING). Ho Chi Minh Ville: "Saigon", *Pierre* 1477 (P); Dec. 1865, *Pierre* s.n. (E, P, SING). Kien Giang: Phu quoc, 1875, *Godefroy* s.n. (P). Quang Tri: Lao Bao, 27 Dec. 1924, *Poilane* 11350 (P).

12. *Argyreia monglaensis* C.Y.Wu & S.H.Huang

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Argyreia monglaensis C.Y.Wu & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 164 (1979); R.C.Fang & Staples, Fl. China 16: 318 (1995); Staples et al., Thai J. Bot. 6: 81 (2014).— Type: China, Yunnan, Mengla Hsien, C.H. Yang 10835 (holo HITBC!).

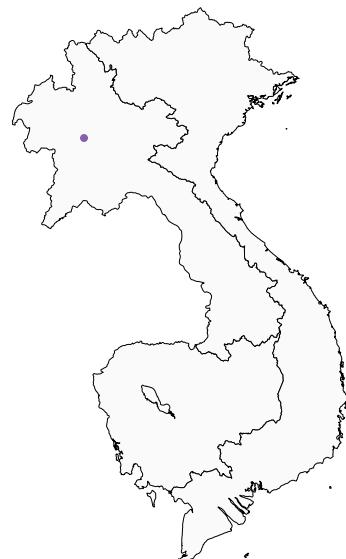
Lianas; stems 0.5–4.0 m long, twining or prostrate, terete, older stems greyish, axial parts yellowish tomentose, young parts densely so. Leaves narrowly oblong or narrowly oblong-lanceolate, 6.5–12.5 × 2.0–3.0 cm, upper side glabrous, underside densely yellowish sericeous-tomentose, base broadly cuneate or rounded, apex acute or acuminate; secondary veins 9–11 either side of midvein; petiole 1–2 cm.

Inflorescences crowded, 7–9-flowered cymes; peduncles 1–3 cm, angular; bracts ovate or ovate-triangular, 2.0–3.5 × 2.0–2.5 mm, outer sides densely yellowish tomentose. Flowers spreading to horizontal; sepals elliptic or ovate-oblong, unequal, tomentose, outer 3 c. 13.0 × 6.5 mm, inner 2 c. 9.5 × 3.5 mm; corolla tubular-funnelform, 3.8–5.0 cm, purple, midpetaline bands sparsely yellowish villous, limb 2.5–3.0 cm wide, entire or undulate-lobed; stamens included, much shorter than corolla, filaments unequal, 1.7–2.2 cm, glandular pubescent basally, anthers sagittate, 4.5–5.0 mm; pistil included, disc ring-like, c. 1 mm long, ovary conical, glabrous, style c. 3.1 cm, jointed at base; stigma 2-lobed.

Berry unknown.

Distribution. Laos, Thailand, China (S Yunnan).

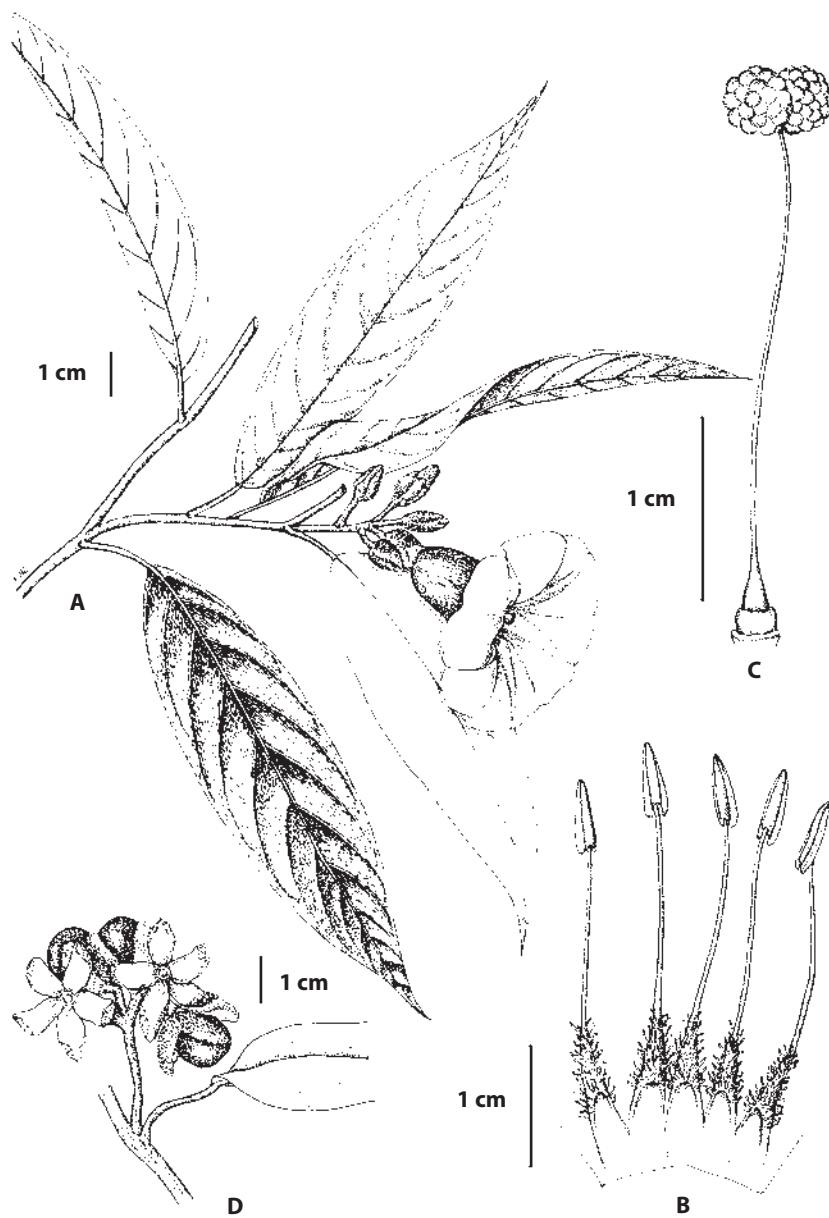
Ecology. Along path in disturbed forest/agricultural area; elevation 300 m.



Material studied

Laos. Louang Prabang: near Pha Tad Ke Botanic Garden, 2 Nov. 2012, Staples et al. 1497 (A, BKF, HNL, KKU, P, PTK, SING).

2.15. *Argyreia monglaensis* C.Y. Wu & S.H. Huang. Inflorescence (credit: G. Staples; voucher: Thailand, Staples et al. 1370 (QBG)).



2.16. *Argyreia monglaensis* (Choisy) C.B. Clarke. A, habit; B, opened corolla with stamens; C, pistil; D, fruits.
Drawn by P. Inthachub (From Staples 2010, as *A. mollis*).

13. *Argyreia monosperma* C.Y.Wu

	J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia monosperma C.Y.Wu, Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 127 (1965); R.C.Fang & Staples, Fl. China 16: 317 (1995).— Type: China. Yunnan, Pingbian, H.T. Tsai 61295 (holo KUN!, KUN1218349; iso AI!, KUN!, KUN0315093).

Argyreia sikkimensis auctt. non (C.B. Clarke) Ooststr.: Staples & Traiperm, Fl. Thailand 10: 365 (2010).

Lianas; stems 5–15 m long, angular, innovations densely appressed silvery sericeous, older stems glabrescent. Leaves broadly ovate-elliptic to circular, 6.0–17.0 × 3.5–16.0 cm, upper side glabrous, underside silvery or greyish sericeous, base broadly cuneate, truncate or rounded, rarely obtuse, apex acute; secondary veins 8–12 either side of midvein; petiole 2.5–9.5 cm.

Inflorescences axillary, few-flowered; peduncles 4–14 cm; bracts attenuate-lanceolate, 20–33 × 5–8 mm, falcate, abaxial side sericeous, persistent; pedicels 4–13 mm, angular. Flowers pendent; sepals broadly ovate to elliptic, ± equal, 7–11 × 5–9 mm, densely sericeous abaxially, glabrous adaxially, apex acute; corolla purple or pinkish, urceolate-campanulate, 2.5–3.5 cm, apex appressed sericeous outside, otherwise glabrous, limb shallowly lobed; stamens and pistil included, filaments glandular pubescent basally, anthers oblong; disc cupular, 0.5–1.5 mm high, ovary glabrous, stigma capitate, 2-lobed.

Fruiting calyces accrescent, cupping base of fruit, sepals up to 1.8 × 1.0 cm. Berries reddish purple, broadly ellipsoidal, 1.5–1.7 cm. Seed 1, reddish purple, ellipsoid, c. 12 × 9 mm, shiny.

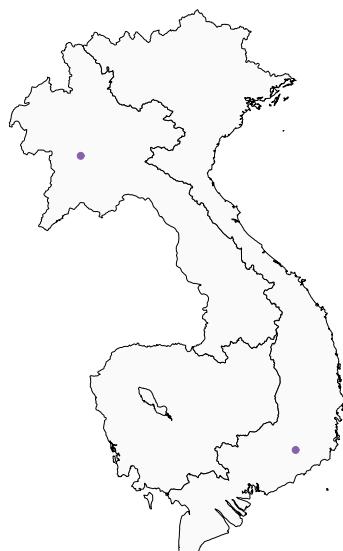
Distribution. Laos, Vietnam, China, Myanmar, Thailand.

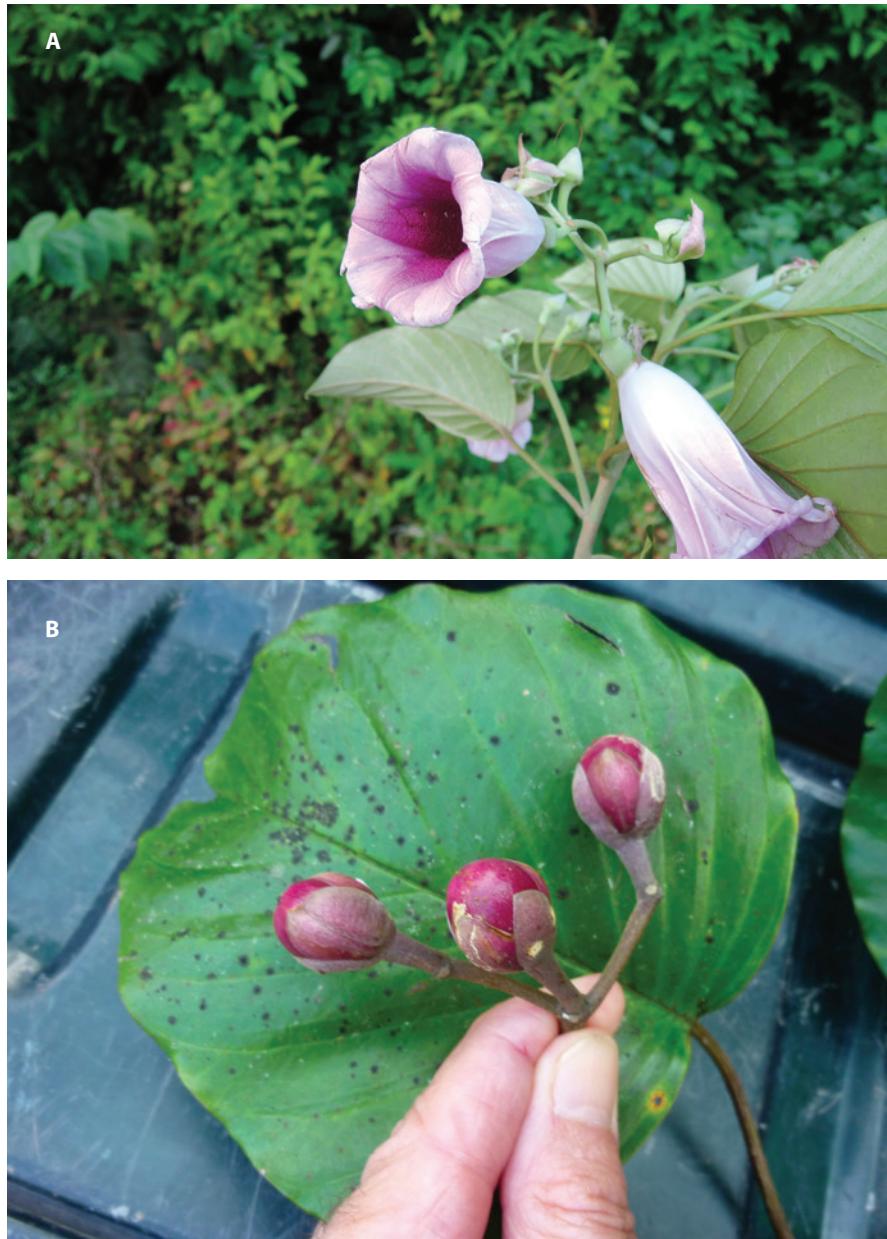
Ecology. In open thickets on fertile clay or limestone soils; 200–1435 m.

Material studied

Laos. Louang Prabang: Nan district, Na Meuang village, 7 Sep. 2014, Phoutthavong et al. 637 (PTK).

Vietnam. Lam Dong: km 89 de la Route Col. no. 20, “prov. de Haut Donai”, délégation de Djirinh, 20 Oct. 1931, Poilane 19816 (P, SING).





2.17. *Argyreia monosperma* C.Y. Wu. A, flower; B, fruits (credits: A, Kittisack Phouthavong, Pha Tad Ke Botanic Garden; voucher: Laos, Phouthavong et al. 637 (PTK); B, G. Staples; voucher: Thailand, Staples et al. 1385 (QBG)).

14. *Argyreia obtusifolia* Lour.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Argyreia obtusifolia Lour., Fl. Cochinch.: 135 (1790); Gagnep. & Courchet, Fl. Indo-Chine 4: 283 (1915); C.E.Chang, Fl. Taiwan 4: 348 (1978); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 1002 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 160 (2005).— Type: Vietnam, without locality or date, Loureiro "5" (syn BM!, BM000885051, BM000885052).

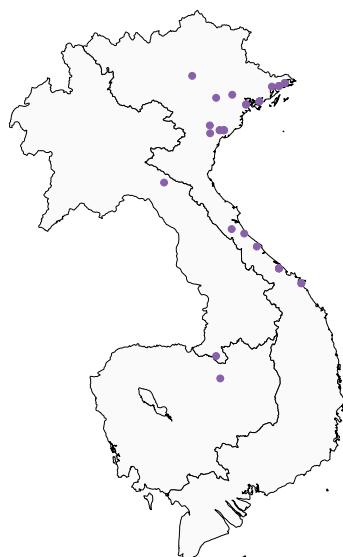
Argyreia acuta Lour., Fl. Cochinch.: 135 (1790); Gagnep. & Courchet, Fl. Indo-Chine 4: 279 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 173 (1990); P.H. Hồ, Cây cỏ Việt Nam 2 (2): 999 (1993); R.C.Fang & Staples, Fl. China 16: 317 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 158 (2005); Leti *et al.*, Flore Photogr. Cambodge 166 (2013); Staples *et al.*, Thai J. Bot. 6: 80 (2014).— Type: China, without locality or date, Loureiro s.n. (holo Pl. P00150768).

Argyreia festiva Wall., Pl. Asiat. Rar. 1: 68 (1830). — *Lettsomia festiva* (Wall.) Benth. & J.D.Hooker, Gen. Pl. 2: 870 (1876).— Type: India, West Bengal, cult. Calcutta Botanic Garden, 1827, Wallich Cat. 1329 (syn G-DC!, K-W!).

Lianas; stems (1–)5–30 m long, twining, terete; axial parts silvery sericeous when young, later yellowish or glabrescent. Leaves elliptic or ovate, 5.0–13.5 × 3–11 cm, upper side glabrous, underside silvery sericeous, base rounded, slightly cordate, or truncate; secondary veins 9 or fewer either side of midvein; petiole 1.5–6.0 cm.

Inflorescences axillary, cymose; peduncles 3.5–8.0 cm, angular or compressed; bracts elliptic or obovate, 8–12 × 4–8 mm, silvery sericeous underneath, apex obtuse, deciduous; pedicels c. 5 mm. Flowers horizontal to pendent; sepals ovate-oblong, unequal, outer sepals 9–10 × 6–7 mm, inner sepals 6–7 × 4–5 mm, silvery sericeous outside, apex obtuse, crinkled or recurved; corolla white, subsilverform, c. 3 cm long, limb 5-parted to middle, lobes oblong, acuminate, silvery sericeous outside; stamens shortly exserted, filaments c. 1.5 cm, anthers oblong, c. 4 mm; pistil exserted, ovary glabrous, 2-loculed, 4-ovuled, style c. 2 cm long, stigma capitate, 2-lobed.

Fruiting calyces partly enclosing berries; sepals boat-shaped, red inside, apex recurved or undulate. Berries red, globose, c. 8 mm diam. Seeds 2–4, ovoid-trigonous, c. 5 mm long, brown.





2.18. *Argyreia obtusifolia* Lour. Flower (credit: Günter Gerlach, Botanischer Garten München; voucher: cultivated in Munich Botanic Garden).

Distribution. Cambodia, Laos, Vietnam, China; introduced to India and Australia.

Ecology. Primary forest and secondary regrowth, bamboo thickets, streamsides, roadsides and paths, on various soils including dry clay, eroded crystalline limestone, and nutrient-poor lateritic sand; elevation sea level to 300 m.

Notes. Loureiro published two names in the *Flora Cochinchinensis* that later proved to refer to the same species. For many years the name *Argyreia acuta* has been in widespread use for that species; the name *A. obtusifolia* having been informally set aside. However, according to the *International Code of Nomenclature*, Art. 11.5, the first author to choose between these two competing names establishes priority of one name over the other and this choice must be followed. Chang (1978: 348) took up the name *A. obtusifolia* Lour. in the *Flora of Taiwan*, first edition, and listed *A. acuta* in synonymy. Thus I am regretfully setting aside the familiar and well established name *A. acuta* and taking up *A. obtusifolia* in its place to bring the nomenclature into agreement with the *ICN*.

Vernacular names

Vietnam. la bac thau (Gagnepain & Courchet 1915), dây thao bac (Bon 4516), mỏ bac (Bon 116), dây bạc lá (Annamite, Poilane 27917), dây bạc thau (Annamite, Poilane 27850), cay buong bach (Eberhardt 2335).

Material studied

Cambodia. Stung Treng: de Strung Streng à Khong, 1866–1868, Thorel 2249 p.p. (BM, P).

Laos. Champassak: Khon, rivages, Aug. 1866–1868, Thorel 2249 p.p. (E, P, SING).

Vietnam. Da Nang: Tourane, 23 Feb. 1908, d'Alleizette 510 (P); Tourane vic., dunes near sea, July 1927, Clemens & Clemens 3807 (BK, BM, G, P). Dong Nai: "province de Bien Hoa", Nui Chua Chan, 2 Feb. 1919, Chevalier 39960 (P, SING). Hai Duong: Sept Pagodas, Aug. 1906, Mouret 199 (P). Hai Phong: Feb. 1908, d'Alleizette 131 (P); l. c., 1885–1889, Balansa 819 (P). Ha Noi: 1886, Balansa 3526 (P); Vo Xa, in monte "Vo Ca", 18 Oct. 1889, Bon 4236 (E, P); 5 Nov. 1890, Bon 4516 (P). Lam Dong: Gia Bac, Oct 1924, Duport 153 (P). Nghe An: Pu Mat Nature Reserve, 2 Nov. 2001, Wang 5284 (HITBC). Ninh Binh: Cho Ganh, Sep. 1923, Pételet 1456 (P, SING); Cuc Phuong National Park, 17 Aug. 2001, Cuong NMC1446 (L, MO, P); village de Giap Ho, près de Cho Ganh, Dec. 1922, Pételet 810 (P); Phuc Nhac, 13 Nov. 1880, Bon 116 (P); 19 Aug. 1881, Bon 591 (P); 9 Nov. 1881, Bon 1009 (P). Phu Tho: bords de la rivière de Yen Lang, Sep. 1887, Balansa 3525 (P). Quang Binh: Son Trach municipality, 3 Feb. 2005, Averyanov et al. HAL 6372 (P). Quang Ninh: Ha Long Bay, on the slope in Hon-gag, 22 Feb. 1965, Sino-Vietnam Exped. 2561 (KUN); Kau Nga Shan vic., Tien Yen, 23 Sep.–7 Oct. 1940, Tsang 30501 (B, C, E, G, P, SING, UPS); Uong Bi [Ouonbi], 19 Nov. 1885, Balansa 821 (P); Sai Wong Mo Shan (Sai Vong Mo Leung), Lomg Nong village, Dam Ha, 18 July–9 Sep. 1940, Tsang 30356 (B, BKF, C, E, G, P, S, SING); Taai Wong Mo Shan, Tong Fa market, Ha-coi, 11–23 Sep. 1939, Tsang 29502 (B); l. c., Tsang 29509 (C, E, P, SING, UPS); Tan Keuin, près de Quang Yen, Aug. 1885, Balansa 822 (P). Quang Tri: km 50 de la Route Coloniale 9, 27 Sep. 1938, Poilane 27917 (P, SING); Sa Lung, 27 Dec. 1940, Poilane 31235 (P, SING). Thanh Hoa: Ngoai Thon, in montib. Van Son, 6 Sep. 1881, Bon 619 (P). Thua Thien-Hue: iter Mékong–Hué, Apr. 1877, Harmand s.n. (P, SING); gare de Cau Hai, un peu au sud de Hue, 14 Sep. 1938, Poilane 27850 (P, SING); Hue env., Eberhardt 2099 (BM, P); Hue, roadside, 29 Sep. 1921, McClure 7414 (BM); Eberhardt 2335 (P, SING). Tuyen Quang: Oct. 1885, Brousmiche s.n. (P).



2.19. *Argyreia osyreensis* (Roth) Choisy. A, habit, flower; B, fruit (credits: A, Kittisack Phouthavong, Pha Tad Ke Botanic Garden; voucher: Laos, Staples et al. 1511 (HNL); B, Paweena Traiperm, Mahidol University; voucher: Thailand, Traiperm s.n.).

15. *Argyreia osyrensis* (Roth ex Roem. & Schult.) Choisy



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Argyreia osyrensis (Roth ex Roem. & Schult.) Choisy in DC., Prodr. 9: 334 (1845); Ooststr., Blumea 7: 177 (1952); Ooststr. & Hoogland, Fl. Males., Ser. I, Spermat. 4: 508 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 1002 (1993); R.C.Fang & Staples, Fl. China 16: 320 (1995); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 160 (2005); Staples & Traiperm, Fl. Thailand 10: 359 (2010); Leti et al., Flore Photogr. Cambodge 172 (2013); Staples et al., Thai J. Bot. 6: 81 (2014). – *Ipomoea osyrensis* Roth ex Roem. & Schult., Syst. Veg. 4: 239 (1819). – *Letsomia aggregata* Roxb. var. *osyrensis* (Roth ex Roem. & Schult.) C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 192 (1883); Kerr, Fl. Siam. 3 (2): 28 (1954). – *Argyreia aggregata* var. *osyrensis* (Roth ex Roem. & Schult.) Gagnep. & Courchet, Fl. Indo-Chine 4: 280 (1915). – Type: India. “in Osyre, India orientalis” B. Heyne s.n. sub Wallich Cat. 1362.2 (syn G-DC!, K!, K000830707, K-W!).
Letsomia aggregata Roxb., Fl. Ind. 2: 76 (1824); Kerr, Fl. Siam. 3 (2): 28 (1954). – *Argyreia aggregata* (Roxb.) Choisy, Mém. Soc. Phys. Genève 6: 427 [Conv. Orient. 45] (1834). – Type: India. presumably cultivated in Calcutta Bot. Garden (not located).
Argyreia brachypoda (Kerr) Ooststr., Blumea 7: 178 (1952). – *Letsomia brachypoda* Kerr, Bull. Misc. Inform. Kew 1941: 13 (1941); Fl. Siam. 3 (2): 29 (1954). – Type: Thailand, Korat, Hui Taleng, Put 2190 (syn BK!, BK16731, BM!, K!, Pl!, P00391878, TCD!).
Argyreia osyrensis var. *cinerea* Hand.-Mazz., Oesterr. Bot. Z. 87: 124 (1938); R.C.Fang & Staples, Fl. China 16: 320 (1995). – Type: China, Yunnan, ‘Yüenkiang’ 21 Nov. 1934, collector unknown (holo W).

Lianas or scandent shrubs; stems (1–)3–10(–15) m long, base 15 cm diam.; axial parts densely whitish grey or yellowish tomentose. Leaves ovate, broadly ovate, to suborbicular, 3–15 × 3–11 cm, underside densely whitish grey tomentose, woolly or villous, upper side darker, strigose-villous or glabrescent, base (sub)cordate, apex shortly acuminate to rounded; secondary veins 5–11 either side of midvein; petiole 1–5 cm.

Inflorescences capitate, involucrate; peduncles 1.5–6.0 cm; bracts ± persistent, broadly obovate, spatulate or circular, 0.8–1.2 cm, outside tomentose, apex obtuse or truncate. Flowers sessile or nearly so, erect to spreading; sepals unequal, tomentose outside; outer 2 sepals obovate, spatulate, or oblong, 9–10 mm, apex obtuse; inner sepals oblong, 5.5–9.0 mm, tomentose outside, glabrous inside, apex obtuse; corolla pale pinkish or white, tubular-campanulate, c. 1.0–1.5 cm, limb deeply 5-parted, lobes narrowly ovate, 0.4–0.8 cm long, recurved, emarginate, midpetaline bands pubescent; stamens exserted, filaments 2.0–2.5 mm long, white or pink, pubescent basally, anthers 2–4 mm, pale purplish; pistil exserted, ovary glabrous, 2-locular, style 2–3 mm long, stigma biglobose, white.

Fruiting calyces accrescent, partly enclosing fruit, sepals convex, red inside. Berries globose, 6–8 mm diam., red. Seeds 4 or fewer, (sub)globose, 4–5 mm diam., greyish, sparsely pubescent.

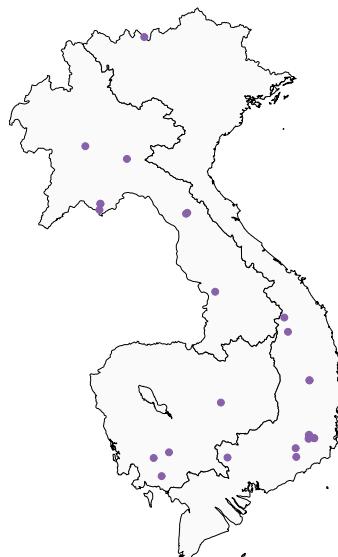
Distribution. Cambodia, Laos, Vietnam as well as Sri Lanka, India, Myanmar, China (Hainan), Thailand, Indonesia.

Ecology. Often in dry forest habitats such as dipterocarp forest, pine forest, mixed evergreen and deciduous forest, secondary regrowth with bamboos, and scrub, on sandy, silty, and rich red basaltic soils; elevation: 100–1500 m.

Vernacular names

Cambodia. vo cup (*Poilane* 14312), momeang sbat (*Martin* 105), voeur cup (*Long & Cheng* CL-67).

Vietnam. hré bal (Jörail, *Dournes* s.n.), rui köbu (Jörail, *Dournes* s.n.).

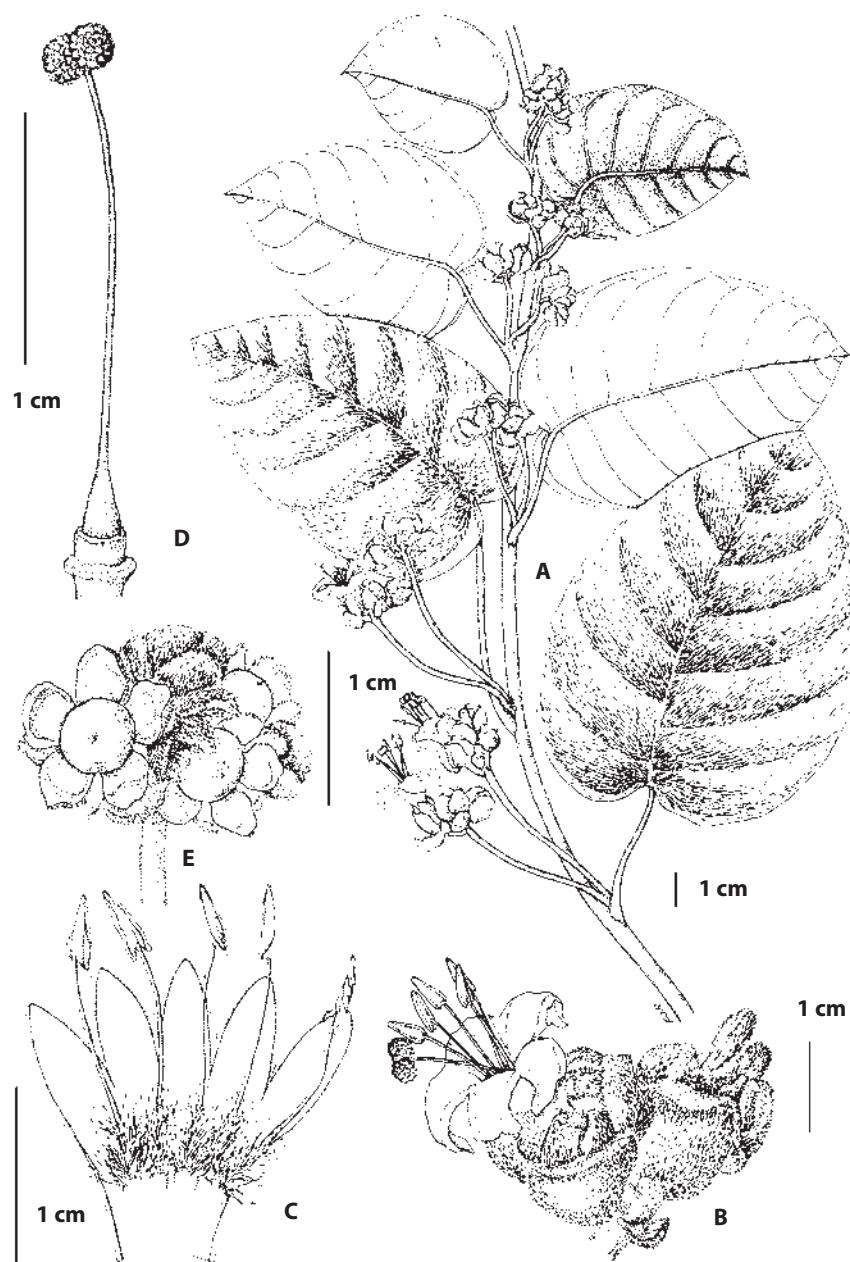


Material studied

Cambodia. Bantay Meanchey: entre Svaichek et Thmor Pouk, "prov. Battambang", 22 Oct. 1927, *Poilane* 14312 (BKF, P, SING). Kampot: km 123 route de Kompot, 20 Dec. 1965, *Martin* 105 (P, SING); km 110, route de Kampot, 20 Dec. 1965, *Vidal* 4755 (P, SING). Kompong Speu: Kirirom, Natl. Park, nearby main gate, 16 Nov. 2007, *Nguyen Van Du & Rattana* CB-VN 03 (K); 17 Oct. 2005, *Long & S.K. Cheng* CL067 (P).

Laos. Champassak: Xe don, "Chedom", 1866–1868, *Thorel* 2449 (P, SING). Khammouane: along road from Nakai NBCA Office to Lak Sau, 19 Feb. 2005, *Newman* et al. LAO312 (E); Tham Mot Ngam, downstream from bridge at Ban Thalong on Nam Theun, 6 Nov. 2005, *Newman* et al. LAO926 (E, P). Louang Prabang: along Hwy 13 between Luang Prabang and Vientiane, Kms 341–342, 4 Nov. 2012, *Staples* et al. 1511 (HNL, KKU, PTK, SING). Saravane: Phou thane, *Spire* 544 (P, SING). Vientiane: Km 20, route de Tha Ngon, 8 Oct. 1952, *Vidal* 1939 (P, SING); *Tixier* s.n. (P). Xieng Khouang: Tran Ninh, 27 May 1919, *Miéville* s.n. (P).

Vietnam. Dac Lac: Hau Bon (Cheo Reo), Nov. 1967, *Dournes* s.n. (P). Dong Nai: Langanh, "prov. de haut Donai", 20 Sep. 1940, *Poilane* 30408 (P, SING). Kon Tum: ca. 3–4 km to W of Dak Gley town, 26 Nov. 1995, *Averyanov* et al. 1991 (AAU, P); entre Dak To et Kontum, 6 Oct. 1930, *Poilane* 18493 (P, SING). Lam Dong: Dalat, Ban Doi waterfall, 31 Dec. 1997, *Phengklai* et al. 10755 (BKF); Dran (Lang Bian), 14 Oct. 1924, *Evrard* 1408 (P, SING); Durc Trong distr., Xa Hiеп An (Elephant Mountain), 31 Aug. 2001, *Gardner* et al. 69 (E); Fimnon, région de Dalat, Oct. 1929, *Lichy* 12 (P, SING); Massif du Lang Bian, Djiring et env., 21–22 Feb. 1914, *Chevalier* 30986 (P, SING); Massif du Tang Bian, de Xomgom à Dran, 27–28 Sep. 1918, *Chevalier* 38525 (P); Sre Quang Forest, Di Linh, Da Lat, 28 Dec. 1997, *Wongprasert* et al. 9712-50 (BKF). Lao Cai: entre Ba Xat et Trinh Thuong, 6 Jan. 1931, *Poilane* 18768 (P, SING). Tay Ninh: 7 Nov. 1919, *Poilane* 755 (P, SING).



2.20. *Argyreia osyrensis* (Roth) Choisy. A, habit; B, flowers; C, opened corolla with stamens; D, pistil; E, fruits.
Drawn by P. Inthachub (From Staples 2010).

16. *Argyreia pierreana* Bois

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Argyreia pierreana Bois, Rev. Hort. 78: 560 (1906); Gagnep. & Courchet, Fl. Indo-Chine 4: 278 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990); P.H. Hô, Cây cỏ Việt Nam 2 (2): 1003 (1993); R.C.Fang & Staples, Fl. China 16: 317 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 160 (2005); Staples *et al.*, Thai J. Bot. 6: 81 (2014). – Type: Vietnam, Haut Tonkin, col du Deo Benh, *Bois* 323 (holo Pl!, P00584836).

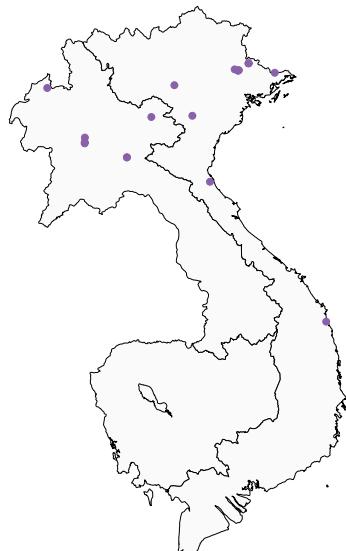
Argyreia liliiflora C.Y.Wu, Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 123 (1965). – Type: China, Yunnan, Fuming, *H.T. Tsai* 58-8759 (holo KUN! on 2 sheets, KUN1218344).

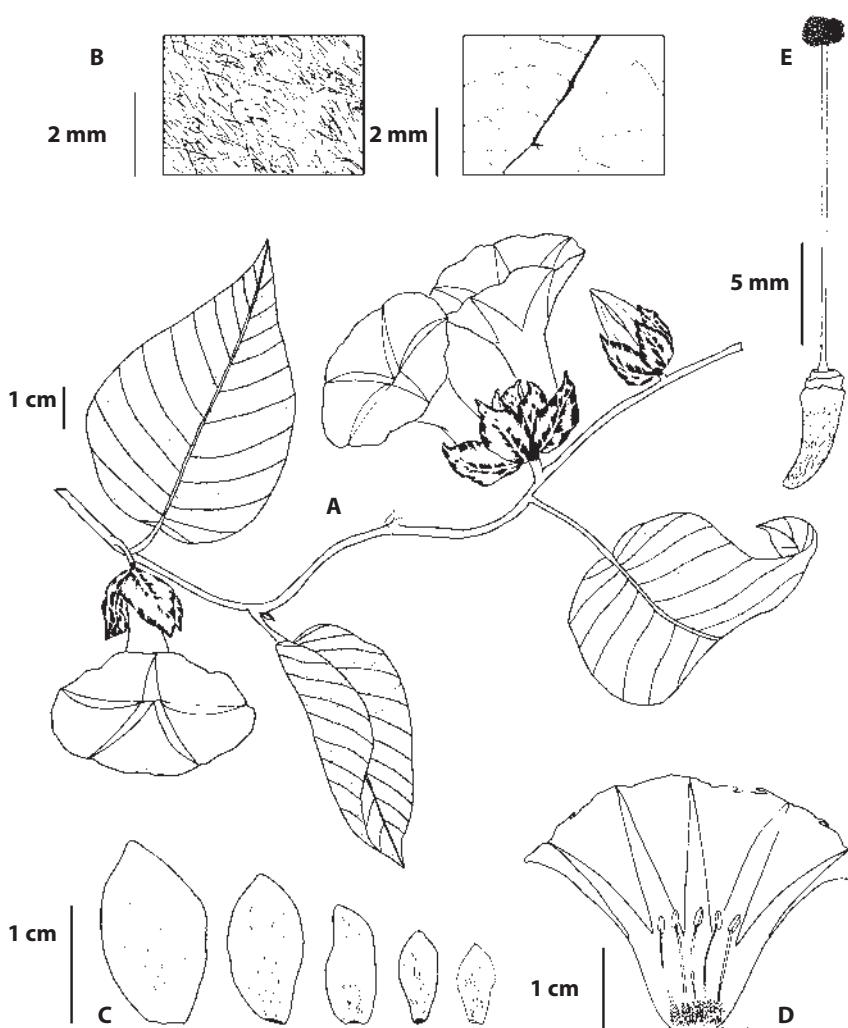
Letsomia seguinii H.Lév., Repert. Spec. Nov. Regni Veg. 9: 452 (1911). – Type: China, Guizhou, env. de Huang Ko Chau, Séguin [sub Bodinier number] 2438 (lecto El!, E00284523, designated by Launert, Notes RBG Edinburgh 37: 144 (1979); isolecto Pl!, P03879133, P03879134, SING!, SING0127740).

Argyreia seguinii Vaniot ex H. Lév., invalid (*nom. pro syn.*); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 160 (2005).

Lianas; stems terete, 4–20(–25) m long, young parts villous, mature stems puberulous or glabrous. Leaves ovate to circular, 10.0–22.0 × 5.5–21.0 cm, upper side glabrous, underside densely dull yellowish or whitish tomentose, base cuneate, rounded, or shallowly cordate, apex ± acute; secondary veins 10–15 either side of midvein; petiole 5–17 cm, pale dull yellow tomentose.

Inflorescences capitate, involucrate, compound cymose, 5–6 cm wide; peduncles 2–5 cm, densely dull yellow villous; outer bracts broadly ovate to transverse elliptic, 2.0–3.5(–6.0) × 2.0–3.0(–5.5) cm, apex obtuse or rounded, inner bracts smaller, obtuse or acute, outer sides ± pubescent, inner sides glabrous; pedicels c. 7 mm. Flowers horizontal to pendent, pushing out from crowded inflorescence; sepals unequal, rose-purplish, ovate to oblong, apex obtuse; outer 3 sepals 15–17 × 8 mm; inner sepals smaller; corolla funnelform, 5–7 cm, limb ruffled, 3–4 cm diam., pale purplish-pink, whitish villous outside, tube white inside; stamens included, white, filaments verruculose at base, anthers oblong to sagittate; pistil included, white, ovary glabrous, style jointed basally, to 3.5 cm long, stigma biglobose.





2.21. *Argyreia pierreana* Bois. A, habit, flowering stem; B, leaf indumentum, abaxial (left), adaxial (right); C, sepals, abaxial view, outermost (left) to innermost (right); D, corolla, opened to show stamens; E, pistil. Drawn by Ludivine Longou. Vouchers: A, C, Spire 1471 (P03879163); B, Spire 1471 and photos of living plants; D, Spire 1471 & Balansa 4482 (P03879170); E, Balansa 4482 & Eberhardt 3350 (P03879159).

Fruiting bracts usually persistent (sometimes deciduous), accrescent, reddish; sepals accrescent, densely crowded, bright reddish. Berries globose, 8–10 mm diam., red. Seeds 4 or fewer, whitish, 4–5 mm, scurfy, glabrate.

Distribution. Laos, Vietnam, Thailand, S China.



2.22. *Argyreia pierreana* Bois. A, leaf, flowers; B, fruits (credits: A, Kittisack Phouthavong, Pha Tad Ke Botanic Garden, Laos; B, Paweena Traiperm, Mahidol University; vouchers: A, Laos, Staples et al. 1499 (HNL); B, Laos, Staples et al. 1508 (HNL)).

Ecology. Primary evergreen forest, lowland broad-leaved forest, thickets with bamboos, on various soils including wet black loam, highly eroded crystalline limestone, and good sandy soil; 50–600(–1100) m.

Vernacular names

Laos. chúa bót (Tay, Poilane 1911).

Material studied

Laos. Houa Phan: Muong Pun, "prov. de Sam Neua", près de Nam Anh, 18 Sep. 1920, *Poilane* 1911 (P, SING). Louang Namtha: "Annam" Muongseng, 28 Aug. 1929, *Poilane* 16768 (P, SING). Louang Prabang: along Hwy. 13 between Luang Prabang and Vientiane, ca. Kms 356–357, 4 Nov. 2012, Staples et al. 1507 (HNL, SING); *l. c.*, Kms 347–348, same date, Staples et al. 1508 (HNL, SING); Phu Souang mountain, on limestone hill near Kokngiew village, 3 Nov. 2012, Staples et al. 1499 (HNL, SING); *Poilane* 20295 (P). Xieng Khouang: 26 Dec. 1917, Chevalier [Miéville legit] 37118 (P); Tran Ninh, km 225, route de Vinh à Xieng Khouang, 30 Aug. 1929, *Poilane* 16776 (P, SING); Spire 1471 (P).

Vietnam. s. loc.: 1890–1891, *Balansa* 4482 (P, SING). Bac Giang: entre Deo Couan et Pho Cam, 13 Jan. 1886, *Balansa* 820 (P). Lang Son: Huu Len, Jan. 1926, Pételet 3235 (P); env. de Lang Son, 10 Dec. 1902, *Bois* 106 (P); de Lang Son à Nuoc Binh, 21 Oct. 1911, Lecomte & Finet 319 (P); col de Deoben, 22 Oct. 1911, Lecomte & Finet 204 (P); Van Linh, Eberhardt 3350 (P, SING); 7–8 km SW of You Pen, 15 Jan. 1965, *Sino-Vietnam Exped.* 1362 (KUN). Nghe An: "Annam", Muong Xen ('Muong seng'), "pro. Vinh", 28 Aug. 1929, *Poilane* 16768 (P, SING); *l. c.*, 2 Feb. 1932, *Poilane* 19989 (P). Phu Yen: Vo Nguyen Giap forest, 5 Oct. 2008, Du et al. HNK-2494 (K). Quang Ninh: entre Dang Mo et Van Linh, 11 Sep. 1939, Pételet 2155 (P). Thanh Hoa: Co Lung munic., Phia village, 21 Sep. 2003, Averyanov et al. HAL-3196 (MO).

17. *Argyreia stenophylla* (Kerr) Staples & Traiperm



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2.23. *Argyreia stenophylla* (Kerr) Staples & Traiperm. Habit, flower (credit: Wittaya Pongamornkul, Queen Sirikit Botanic Garden; voucher: Thailand, *Pongamornkul* 2844 (QBG).

Argyreia stenophylla (Kerr) Staples & Traiperm, Thai Forest Bull., Bot. 33: 42 (2008). – *Letsomia stenophylla* Kerr, Bull. Misc. Inform. Kew 1941: 16 (1941). – Type: Thailand. Chiang Mai: ‘Mî Têng’ [Mae Taeng], 30 Oct. 1922, Kerr 6490 (syn BKI, BM!, K!, K000097487).

Argyreia lineariloba C.Y.Wu, Yunnan Trop. Subtrop. Flor. Res. Rep. 1: 134. pl. 38, fig. 1. (1965). – Type: China, Yunnan, Cho Mo Hsien, Chu Hsiung, M.K. Li 0007 (holo KUN!, KUN1218201; iso KUN!, KUN1218346).

Argyreia popahensis auctt. non (Collett & Hemsl.) Staples: Staples & Traiperm, Fl. Thailand 10: 363 (2010).

Prostrate herbs from fusiform lignotubers; stems wiry, 2.5–6.0 m long, strigose. Leaves linear-oblong, 4.5–7.7 × 0.35–0.9 cm, base rounded, apex obtuse, mucronulate, upper side sparsely strigose, underside strigose; secondary veins indistinct; petiole 0.3–0.7 cm, strigose.

Flowers solitary (or paired), axillary, erect to horizontal; peduncles c. 0.3 cm; bracts 2, linear, c. 0.5–0.7 × 0.2 cm; pedicels 4–5 mm, thickened in fruit; sepals subequal, ovate, c. 8–11 × 3–5 mm, apex obtuse or acute, outside densely strigose, accrescent in fruit; corolla narrowly tubular-funnelform, c. 4–5 cm long, midpetaline bands and upper tube yellowish hispid outside, limb obscurely lobed, purple, tube inside white; stamens unequal, included, filaments 5–8 mm, stiffly pubescent above insertion, anthers c. 5 mm; pistil included, disc narrowly cupular, sinuate, ovary 2 mm long, 2-locular, glabrous, attenuate into style base.

Berries (immature) globose, c. 7 mm diam. Seed 1 (always?), ovoid, c. 5 mm, glabrous, minutely reticulate.

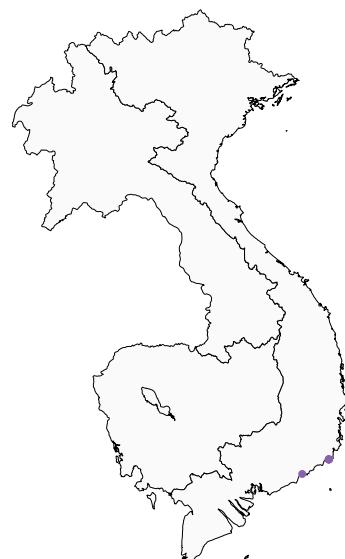
Distribution. Vietnam, Myanmar, China, Thailand.

Ecology. Rocky, windswept sites near the sea or on hilltops, always reported on poor, rocky soils; altitude: 0–300 (–700) m.

Notes. The Vietnamese collections match exactly those from the Thai-Myanmar region, far to the west. Based on the few collections known this is a widely distributed species with discrete, widely disjunct populations.

Material studied

Vietnam. Binh Thuan: Phan Thiet, route de Phu Hai, 2 Nov. 1924, Evrard 1660 (P). Ninh Thuan: côte nord, 1200 m ouest de Ca Na, 2 Nov. 1925, Evrard 2389 (P); Ca Na, “province Phanrang” 8 Mar. 1923, Poilane 5698 (P); l. c., 8 Nov. 1923, Poilane 8424 (P); 24 Nov. 1923, Poilane 8729 (P); 29 Nov. 1923, Poilane 8873 (P); 24 Oct. 1925, Poilane 12456 (P).



18. *Argyreia strigillosa* C.Y.Wu

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Argyreia strigillosa C.Y.Wu, Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 133 (1965); R.C.Fang & Staples, Fl. China 16: 315 (1995); Staples *et al.*, Thai J. Bot. 6: 81 (2014). – Type: China, Yunnan, Long Chuan Hsien, C.K. Wen 580552 (holo KUN!, KUN1218350).

Lianas; axial parts ± strigose, young ones densely so; stems pale or dark brown, ± terete. Leaves nearly circular, c. 12 × 11 cm or larger, both sides sparsely strigose, bases shallowly cordate, apexes obtuse to acute; secondary veins 8–11 either side of midvein; petioles c. 6 cm.

Inflorescences axillary, few- to several-flowered cymes; peduncle 5–11 cm or more; bracts oblong-elliptic, c. 1 cm, early deciduous; pedicels 8–10 mm. Flowers erect; sepals broadly elliptic to ovate, ± equal, 9–11 × 5–6 mm, abaxial sides densely golden woolly, adaxial sides glabrous and black-brown (in dry specimens), apex obtuse to acute; corolla funnelform, 2.8–4.0 cm, purple-red, midpetaline bands sparsely whitish pilose-strigose; limb shallowly lobed; stamens included, filaments c. 1.4 cm, basally glandular pubescent, anthers oblong, c. 3 mm; pistil included, disc annular, c. 1 mm long, ovary glabrous, style c. 1.4 cm.

Berries globose, 7–10 mm diam., ripening blackish, apex with persistent style base. Seeds not seen.

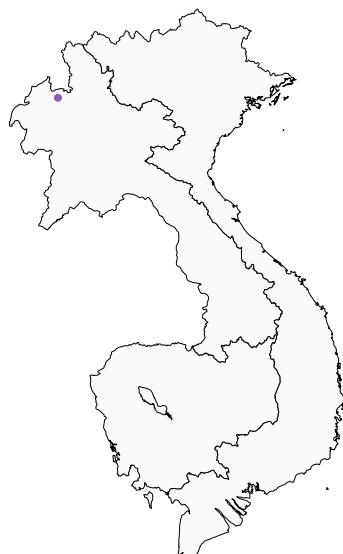
Distribution. Laos and China (S Yunnan).

Ecology. Streamside and roadside thickets; 460 m.

Notes. Once collected in northern Laos, near the Chinese border. *Argyreia strigillosa* is a poorly known species.

Material studied

Laos. Louang Namtha: beside farmland, dry area, 17 Jan. 2002, Li 486 (HITBC).



19. *Argyreia thorelii* Gagnep.



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Argyreia thorelii Gagnep., Notul. Syst. (Paris) 3: 135 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 279 (1915); Staples & Traiperm, Fl. Thailand 10: 367 (2010); Staples *et al.*, Thai J. Bot. 6: 81 (2014). – Type: Laos, Bassac, Thorel 2370 (holo PI, P00392008; iso PI, P00392009, P00392010).

Cryptanthela sericea Gagnep., Notul. Syst (Paris). 14: 24 (1950), *syn. nov.*; *Argyreia poilanei* Ooststr., Blumea 12: 39–40 (1963), *syn. nov.*; P.H.Hô, Cây cỏ Việt Nam 2 (2): 1003 (1993); Staples *et al.*, Thai J. Bot. 6: 81 (2014). – Types: Laos, Saravane, Samia, *Poilane* 15500 (*syn* PI, P00392006); entre Loï et Muong-nong, *Poilane* 15441 (*syn* PI, P00392007).

Woody climbers from underground tubers, axial parts hirsute with spreading golden trichomes; stems to 4 m. Leaves oblong-elliptic, 1–14 × 2–5 cm, adaxial side sparsely scabrid with yellow trichomes, abaxial glabrescent, slightly glaucous, bases rounded, apexes rounded or emarginate, mucronulate; secondary veins 7–9 either side of midvein; petioles 0.7–1.0 cm.

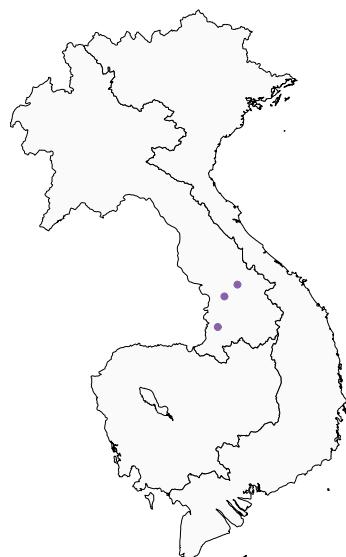
Inflorescences axillary, cymose, 3–5-flowered, copiously red-gold hirsute; peduncles 1.0–1.5 cm, sinuous; bracts oblong-linear, 0.8–1.2 cm, persistent; pedicels c. 5 mm. Flowers spreading to pendent; sepals unequal, lanceolate to linear, outer 18–20 × 4–5 mm, inner 12–15 × c. 3 mm, hirsute, apex tapering acuminate; corolla salverform, white, glabrous outside, tube cylindrical, 2–3 cm long, limb 5-parted to middle, lobes linear-oblong, 1.6–2.0 cm long, 4–5 mm wide, acute; stamens exserted, equal, 38–40 mm long, filament bases dilated, papillose, anthers sagittate; pistil exserted, equal to stamens, disc annular, ovary conical, glabrous, tapering into style, jointed above base.

Fruiting calyces slightly accrescent, reflexing from fruit at maturity. Berries broadly ovoid, c. 1.0 × 0.8 cm, blackish. Seeds 4 or fewer, dark brown.

Distribution. Laos, Thailand.

Ecology. Under mixed deciduous forest, on sandstone substrate. Elevation: 180–650 m.

Notes. Vegetatively and in fruit this species is similar to *A. leucantha*, but the corollas immediately separate the two: campanulate, waxy, with a ruffled limb (*A. leucantha*); salverform and deeply 5-parted, the lobes linear, delicately membranous (*A. thorelii*).

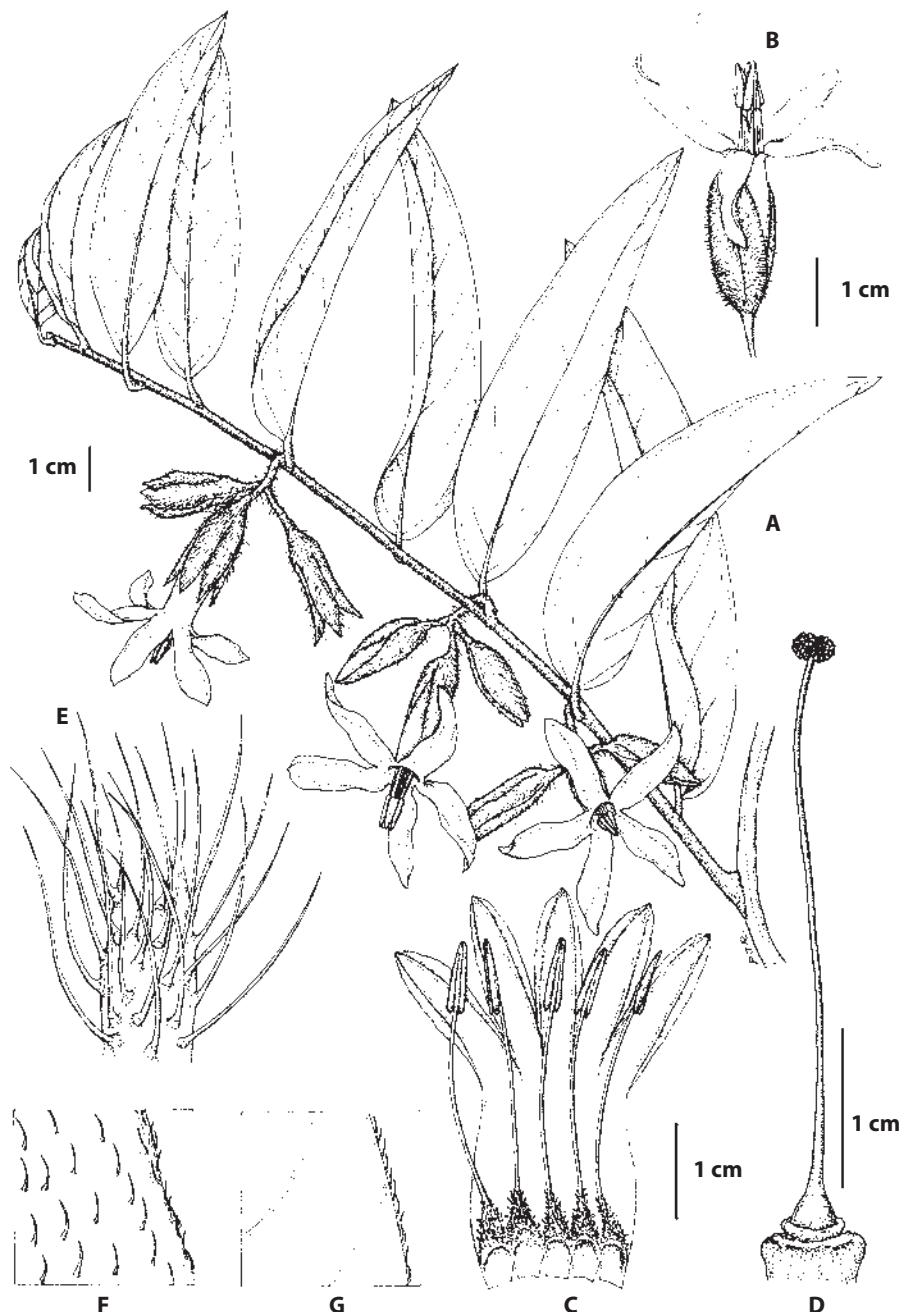




2.24. *Argyreia thorelii* Gagnep. A, habit; B, flower; C, fruit (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Material studied

Known only from the type specimens.



2.25. *Argyreia thorelli* Gagnep. A, habit; B, flower; C, opened corolla with stamens; D, pistil; E, hairs; F, lower leaf surface; G, upper leaf surface. Drawn by P. Inthachub (From Staples 2010).



Sixty-three species: distributed throughout the tropics; one species in CLV.

3. *Bonamia* Thouars, nom. cons.

Hist. Vég. Isl. France 1: 33 (1804); Gagnep. & Courchet, Fl. Indo-Chine 4: 289 (1915); Ooststr., Blumea 3: 75 (1939), Fl. Males., Ser. I, Spermat. 4: 398 (1953); Myint & D.B.Ward, Phytologia 17 (3): 121–239 (1968); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 7 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 161 (2005).—Type: *Bonamia alternifolia* J.St.-Hil.

Breweria R.Br., Prodr.: 487 (1810).—Type: *Breweria linearis* R.Br.

Herbaceous or woody twiners or erect undershrubs; trichomes always simple. Leaves petiolate, entire, herbaceous or subcoriaceous.

Inflorescences cymose, paniculate or flowers solitary; bracts present. Flower sepals equal or subequal, coriaceous or herbaceous, usually not accrescent in fruit; corolla campanulate or funnelform, often blue or white, limb entire or weakly 5-lobed; stamens included, filaments basally adnate to corolla, pubescent or glabrous, filiform and glabrous above; pollen 3-colporate or rugate, non-spinulose; pistil included, disc small or none, ovary 2-locular, 4-ovuled, style 1 basally with 2 free arms distally, or styles 2, free to base, stigmas 2, globose or peltate.

Fruits dehiscent capsules, 2-, 4-, or 8-valved, chartaceous to subwoody. Seeds 4 or fewer, glabrous to pilose.

1. *Bonamia semidigyna* (Roxb.) Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

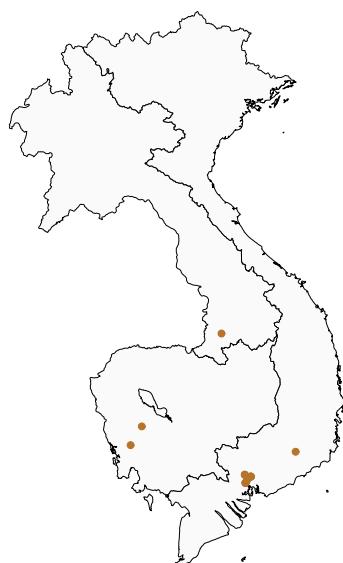
Bonamia semidigyna (Roxb.) Hallier f., Bot. Jahrb. Syst. 16: 528 (1893); Gagnep. & Courchet, Fl. Indo-Chine 4: 289 (1915); Kerr, Fl. Siam. 3 (1): 90 (1951); Oostst., Blumea 3: 76 (1938); Fl. Males., Ser. I, Spermat. 4: 398 (1953); Myint & D.B.Ward, Phytologia 17: 163 (1968); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 971 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 8 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 161 (2005); Staples, Fl. Thailand 10: 375 (2010); Leti *et al.*, Flore Photogr. Cambodge 173 (2013). – *Convolvulus semidigynus* Roxb., Fl. Ind. 2: 47 (1824). – *Breweria semidigyna* (Roxb.) Kuntze, Rev. Gen. 440 (1891). – *Breweria roxburghii* Choisy, Mém. Soc. Phys. Genève 6: 493 [Conv. Orient. 111] (1834), nom. illeg. – Type: India, cult. Calcutta Bot. Garden, Roxburgh s.n. (syn BM!, BM001014556).

Woody climbers, stems 3–15 m; all parts densely tomentose; trichomes reddish brown. Leaves ovate, 6.5–15.0 × 4.0–10.0 cm, base cordate to truncate, apex shortly acuminate to cuspidate, mucronate, upper side sparsely tomentose to glabrescent, underside densely pubescent; secondary veins 5 or 6 either side of midvein; petiole 1.8–6.0 cm long.

Inflorescences axillary, 2–7-flowered, umbelliform cymes; peduncles 4–14 cm; pedicels 4–15 mm; lower bracts foliose, to 2 cm long. Sepals subequal, 8–14 mm long, short-to-mentose, ± acuminate, outer 2 ovate to ovate-oblong, upper margins wavy or reflexed, inner 3 broadly ovate, shorter, margins scarious; corolla campanulate-funnel-form, 2.5–4.5 cm, white, midpetaline bands pubescent outside, otherwise glabrous; stamens included, filaments sparsely pilose basally, anthers oblong, nodding, basally sagittate, apex down-turned; pistil included, ovary pubescent, style bifid, arms unequal.

Capsule ovoid to subglobose, c. 12 mm, apex pubescent, apiculate, 4-valved, valves splitting again several times longitudinally but remaining joined apically. Seeds broadly ovoid-trigonous, 5–6 mm long, blackish, glabrous.

Distribution. Cambodia, Laos, Vietnam, and widespread from Madagascar, India, Sri Lanka, Bangladesh, Myanmar, Thailand, Malaysia to Indonesia and the Philippines.





3.1. *Bonamia semidigyna* (Roxb.) Hallier f. A, habit; B, fruit (credit: Bruno David; voucher: Cambodia, S.K. Cheng et al. CL-1162 (P)).

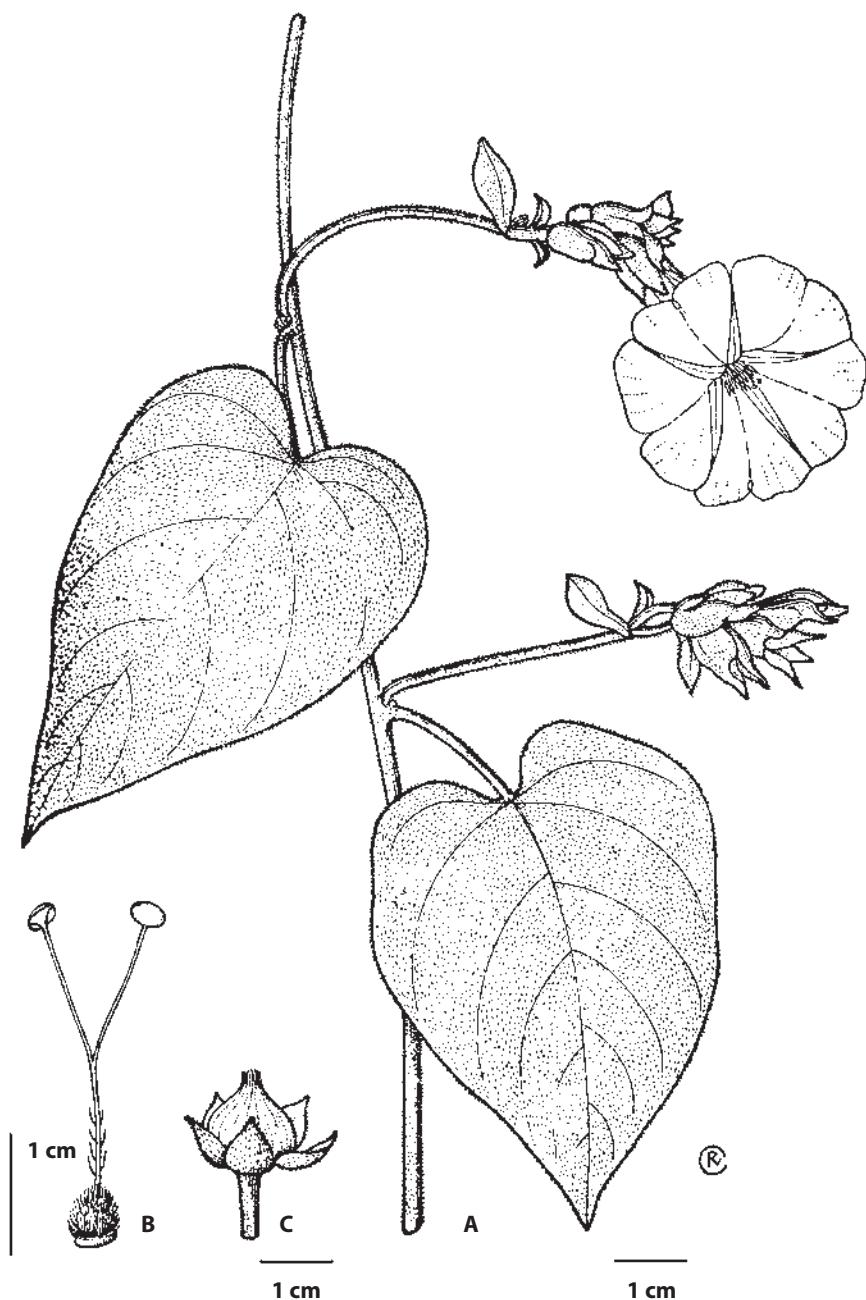
Ecology. Often near the sea in coastal provinces, in swampy or marshy areas, riverbanks, or in clearings and along margins in forest, on clay soil; elevation: sea level–200 m.

Material studied

Cambodia. Koh Kong: proche village de Poum Vial Puoch, 15 Nov. 2009, S.K. Cheng et al. CL-1162 (SING); *I. c.*, Simões et al. 33 (BKF, BM, K, L, SING).

Laos. Champassak: Xedon (Chedom), 1866–1868, Thorel 2420 (P).

Vietnam. s. loc.: "Cochinchine", *d'Alleizette s.n.* (L); *Talmy s.n.* (P). Binh Duong: in vicinibus Thu Dau Mot, Jan. 1872, *Pierre 1052* (P); *I. c.*, 26 Jan. 1865, *Lefèvre 186* (P); Jan. 1867, *Pierre s.n.* (BM, E, P); 1862–1866, *Thorel 612 p.p.* (P). Dong Nai: Km 73 de la Route Col. no. 20, "prov. Bien Hoa", 18 Oct. 1931, *Poilane 19766* (P); ad Bien Hoa, Dec. 1865, *Pierre 9* (E, P); *I. c.*, 1862–1866, *Thorel 612 p.p.* (P); bord Riv. Dong Nai, à hauteur de Tam Hiep, Bien Hoa, 18 Jan. 1971, *Vu Van Cuong 1711* (P). Ho Chi Minh Ville: Mai thon Gia Dinh, 8 July 1967, *Vu Van Cuong 442* (P); "Saigon", 2 Jan. 1901, *Debeaux 222* (P); *I. c.*, Nov. 1874, *Godefroy s.n.* (P); *Germain 80* (P). Lam Dong: km 88,500 de la Route Col. #20, "prov. de Haut Donai", délégation de Djirinh, 20 Oct. 1931, *Poilane 19811* (P).



3.2. *Bonamia semidigyna* (Roxb.) Hallier f. A, flowering branch; B, pistil; C, capsule (From Ooststroom & Hoogland 1953).



Cordisepalum phalanthropetalum, habit (credit: Thamarat Phutthai, Mahidol University; voucher: Thailand, not collected).

Two species in NE India, southern China, Laos, Cambodia?, Vietnam, and Thailand;
one species occurs in CLV.

4. *Cordisepalum* Verdc.

Kew Bull. 26: 138 (1971); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 161 (2005); Staples, Blumea 51: 422 (2006); Fl.Thailand 10: 377 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014).—Type: *Cordisepalum thorelii* (Gagnep.) Verdc.

Lianas, tawny or reddish velutinous. Leaves petiolate; blade ovate-cordate, entire, chartaceous; venation pedate at base, alternate above, veins prominent abaxially.

Inflorescences axillary, racemose, paniculate, or thyrsiform; bracts foliaceous; bracteoles 3, scale-like, forming a calycle just below calyx. Flowers small, numerous; sepals clasping corolla base, accrescent in fruit; corolla rotate, tube short, limb 5-lobed or -parted, lobes reflexed; stamens equal, slightly exserted, lower filaments adnate to corolla tube, free and filiform above; anthers broadly ellipsoid; pollen 3-colporate, nonspinose; pistil included; disc absent; ovary 1-locular, 4-(or 5)-ovuled, glabrous, style simple or absent; stigma biglobose.

Fruiting calyx accrescent, tightly enclosing fruit; outer 3 sepals greatly enlarged, subcircular or broadly ovate, base cordate, inner 2 sepals slightly enlarged, all thinly chartaceous, veins reticulate, dark. Fruits papery utricles, borne on a stalk, velutinous. Seed 1, ellipsoid, glabrous.

1. *Cordisepalum thorelii* (Gagnep.) Verdc.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Cordisepalum thorelii (Gagnep.) Verdc., Kew Bull. 26: 138 (1971); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 972 (1993) sphaerm. 'Cardisepalum thorelii' sensu T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 161 (2005); Staples, Blumea 51: 426 (2006); Fl. Thailand 10: 378 (2010); Staples et al., Thai J. Bot. 6: 82 (2014). – *Cardiochlamys thorelii* Gagnep., Notul. Syst. (Paris) 3: 136 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 297. fig. 33 (1915); Kerr, Fl. Siam. 3 (1): 94 (1951); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990). – Type: Laos, Bassac, *Thorel* 2625 (holo Pl., P00608648; iso Pl., P00608649).

Lianas; brownish to reddish pubescent. Leaves broadly ovate to attenuate-ovate, 8.0–11.5 × 4.3–7.6 cm, base shallowly cordate, apex attenuate-acuminate to subcaudate, both sides densely pubescent; secondary veins 2 basal pairs and 1 or 2 above middle; petiole 1.7–4.3 cm long, velutinous.

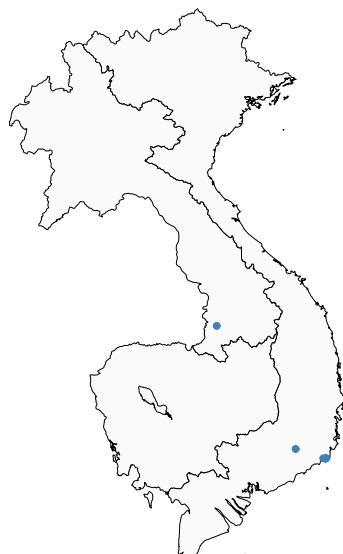
Inflorescences lax, racemose; lower bracts petiolate, broadly ovate, 2.1–3.1 cm long; upper bracts smaller, sessile; pedicels 3–5 mm. Flowers fragrant; sepals naviculate and ovate to elliptic-oblong, c. 2 × <1 mm, acute, outsides velutinous; corolla pale yellowish; tube 1–2 mm long, glabrous inside and out; limb 7–11 mm diam., lobes ovate, acute to acuminate, both sides densely velutinous; stamens < 2 mm long, filaments glabrous; pistil c. 2 mm long, ovary ovoid, ovules 4, style short, terete.

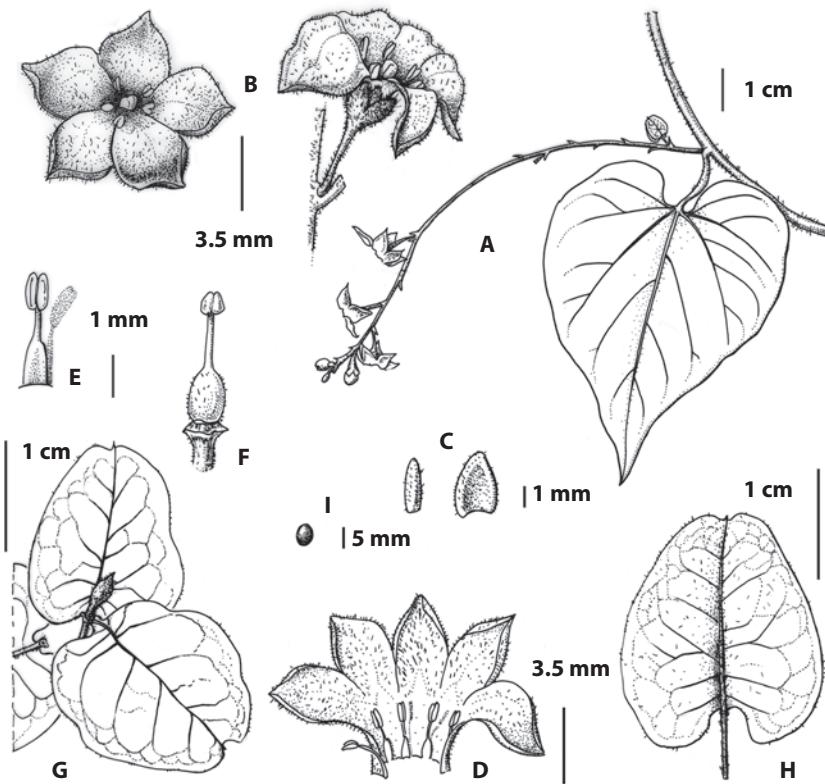
Fruiting calyx clasping fruit, chartaceous, reticulate, sparsely pilose; sepals very unequal, outer 3 ovate-cordate to suborbicular, 21–33 × 19–28 mm, inner 2 sepals falcate, 5–7 mm long. Utricles ellipsoid-fusiform, apiculate, 6.0–7.0 × 3.0–4.5 mm, chartaceous, brownish, velutinous, basal stalk columnar, c. 2 mm long. Seed ellipsoid, 4 mm long, red-brown.

Distribution. Laos, Vietnam, Thailand; probably also in Cambodia.

Ecology. Evergreen forests, mixed/disturbed and open hardwood forests, often in clearings or along the margins; seemingly always on limestone; elevation: 200–900 m.

Notes. In dried material at fruiting stage the third sepal is folded back on itself along the midrib; this may be an





4.1. *Cordisepalum thorelii* (Gagnep.) Verdc. A, habit; B, flowers; C, sepals, outer (right), inner (left); D, corolla, opened, showing stamens; E, stamen, enlarged; F, pistil; G, fruit, with accrescent sepals; H, one fruiting sepal showing venation; I, seed. A, B, G–I, Drawn by anonymous artist, vouchers: Chevalier 30976; Poilane 8768; Thorel 2625; C–F adapted from Gagnepain & Courchet (1915).

artefact of pressing but it is remarkably consistent if so. More likely is that in life the fruiting sepals form a 3-sided papery bladder enclosing the utricle, like Gagnepain's figure in *Flore générale de l'Indochine* (loc. cit.).

Vernacular name

Vietnam. re cãi (*Poilane* 9121).

Material Studied

Vietnam. Lam Dong: massif du Lang Bian, entre Da Nhim et Djiring, 19–20 Feb. 1914, Chevalier 30976 (A, P). Ninh Thuan: signal de 1200 m de l'ouest de Ca Na, 2 Nov. 1925, Everard 2374 (A, P); Ca Na, "prov. Phanrang", 1 Apr. 1923, *Poilane* 5947 (A, BISH, P); l. c., 10 Nov. 1923, *Poilane* 8521 (P); 26 Nov. 1923, *Poilane* 8768 (P); 12 Dec. 1923, *Poilane* 9121 (P); 24 Oct. 1925, *Poilane* 12420 (P).



Approximately 200 species: distributed mainly in North and South America, with a few in Asia and Europe; five species are confirmed in CLV. Yuncker (1932) was the last to revise *Cuscuta* globally and his species concepts are followed here.

5. *Cuscuta* L.

Sp. Pl. 1: 124 (1753); Gagnep. & Courchet, Fl. Indo-Chine 4: 310 (1915); Yuncker, Mem. Torrey Bot. Club 18 (2): 113–331 (1932); Ooststr., Blumea 3: 62 (1938); Fl. Males., Ser. I, Spermat. 4: 391 (1953); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 11 (1993); R.C.Fang et al., Fl. China 16: 322 (1995); Staples, Fl. Thailand 10: 378 (2010); Staples et al., Thai J. Bot. 6: 82 (2014); Digital Atlas of *Cuscuta* http://www.wlu.ca/page.php?grp_id=2147&p=8968 – Type: *Cuscuta europaea* L.

Parasitic herbs; stems twining, filiform, often yellow or reddish, glabrous, with sucker-like haustoria that attach to the host. Leaves reduced to minute scales or absent.

Inflorescences mostly in globular, spicate, racemose, or cymose clusters; pedicels short or absent; bracts minute or absent. Flowers 4- or 5-parted; calyx deeply lobed, sepals basally fused or entirely free; corolla urceolate, tubular, globose or campanulate, white, pinkish, or cream-coloured; infrastaminal scales inside at base of tube, alternating with corolla lobes, scales fimbriate or crenulate, membranous; stamens as many as corolla lobes, inserted on corolla above scales; pollen non-spiny; ovary 2-locular, 4-ovuled, styles 1 or 2, stigmas 2, capitate-globose or elongate, sometimes united (stigma then apparently 1).

Fruits dry or sometimes fleshy capsules, ovoid or globose, circumscissile or opening irregularly. Seeds 1–4, glabrous; embryo acotyledonous, filiform spiral-curved.

Notes

Several collections were sterile and impossible to identify. In addition to the usual floral characters in Convolvulaceae, the scales at the base of the stamens are a critical taxonomic character that must be observed in *Cuscuta*; sterile material is therefore impossible to identify.

It is likely that additional species will be found in the flora area in time because several species of *Cuscuta* are now weed pests of agricultural crops. Their seeds are distributed as contaminants in agricultural commodities in international commerce, and through seed lots sold to farmers. Once established, the plants can be spread vegetatively by farm machinery and road building equipment.

Cuscuta is frequently confused with *Cassytha* (Lauraceae); the latter has brownish trichomes on the stems, especially the young parts; trimerous flowers; an inferior ovary, most clearly visible in fruit, which is a leathery berry capped by persistent tepals. In using the following key, fresh material works best for observing characters that are obscured in pressing (e.g., keels on corolla lobes, staminal scales, etc.). If identifying dried material, it is best to rehydrate some flowers so that all characters can be observed.

Key to the species

1. Style 1 and elongate or very short to absent; stigmas longer than wide; inflorescences racemose or spicate, with an elongate central axis 2
- Styles 2, distinct; stigmas globose or capitate, isodiametric; inflorescences compact cymose clusters or glomerules 3
2. Style longer than stamens; stigmas 2-lobed, lobes elongate or rectangular 4. *C. japonica*
- Style very short or absent; stigmas ligulate, lobes elongate, partly or wholly joined together 5. *C. reflexa*
3. Capsules entirely enclosed within withered corollas, dehiscence circumscissile; corolla lobes keeled on back 3. *C. chinensis*
- Capsule bases encircled by withered corollas, dehiscence irregular; corolla lobes flat on back 4
4. Corolla lobes obtuse; calyx lobes not overlapping; corolla scales short, deeply bifid, with few fimbriae 1. *C. australis*
- Corolla lobes acute, often inflexed; calyx lobes slightly overlapping at the base; corolla scales ovate, not bifid, abundantly fimbriate 2. *C. campestris*

1. *Cuscuta australis* R.Br.



Cuscuta australis R.Br., Prodr.: 491 (1810); Yunck., Mem. Torrey Bot. Club 18 (2): 124 (1932); Ooststr., Blumea 3: 66 (1938), Fl. Males., Ser. I, Spermat. 4: 392 (1953); P.H.Hô, Cáycô Việtnam 2 (2): 1004 (1993); R.C.Fang *et al.*, Fl. China 16: 322 (1995). – *Cuscuta obtusiflora* var. *australis* (R.Br.) Engelm., Trans. Acad. Sci. St. Louis 1: 492 (1859). – Type: Australia, *R. Brown s.n.* (syn BM, BM000016306).

Stems thin, filiform, yellow-orange to reddish.

Inflorescences compact clusters. Flowers 2.0–2.5 mm long; calyx about as long as corolla tube, lobes ovate to orbicular, bases not overlapping, apically obtuse; corolla white, greenish white or creamy white, lobes slightly shorter than or as long as the tube, broadly ovate or narrower, flat, apically obtuse or subobtuse, erect or spreading; stamens slightly shorter than the corolla lobes, filaments as long as or longer than the anthers; corolla scales short, deeply bifid with few, long fimbriae; styles 2, shorter than the depressed-globose ovary.

Capsules depressed-globose or obpyriform, 3–4 mm diam., protruding from withered corolla, not circumsissile, apex with large interstyilar opening. Seeds 4 or fewer, ovoid, c. 1.5 mm long, brownish.

Distribution. Vietnam; widespread through Asia and south to Australia.

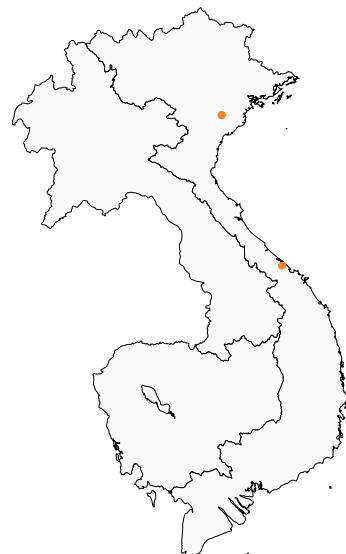
Ecology. Parasitic on various herbaceous host plants, including soya bean (*Glycine* sp.) in farm fields and meadows; elevation not recorded.

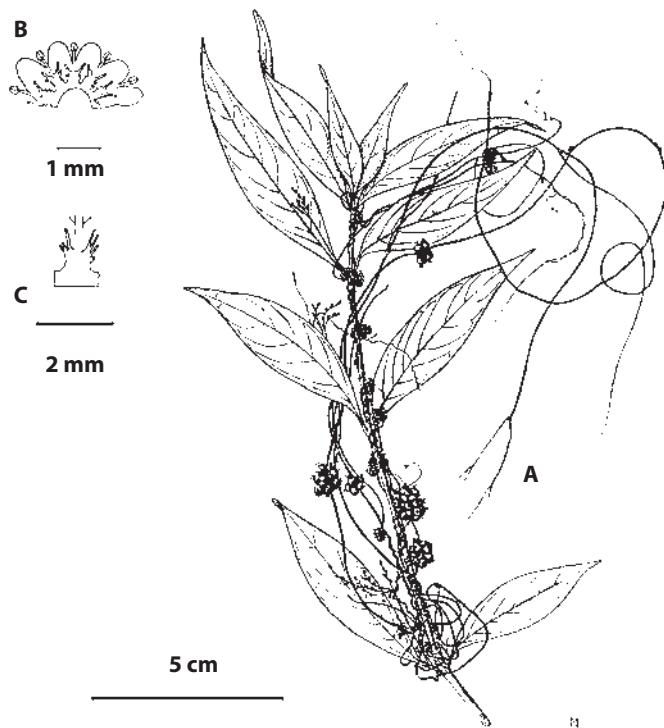
Vernacular name

Vietnam. tó hông (*Bon* 2127, 2796).

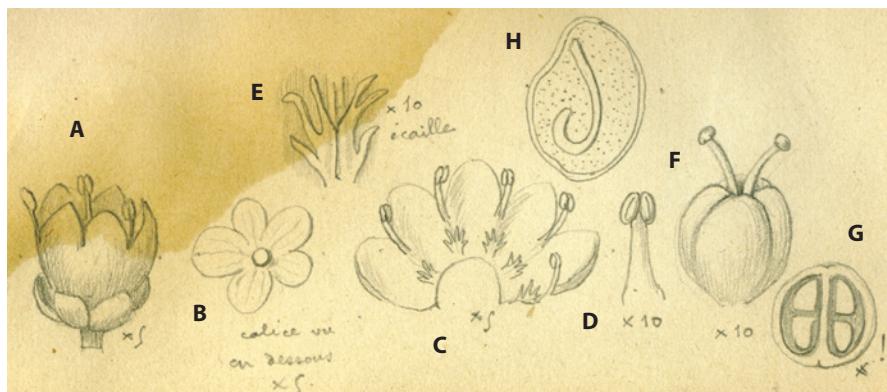
Material studied

Vietnam. Ha Giang: in agris Kien Khe, 12 May 1883, *Bon* 2127 (P); *l. c.*, 29 Oct. 1884, *Bon* 2796 (P). Thua Thien-Hue: Hue, 1 Apr. 1939, *Poilane* 29609 (P).





5.1. *Cuscuta australis* R.Br. A, habit; B, opened corolla, from inside; C, staminal scale (From Ooststroom & Hoogland 1953).



5.2. *Cuscuta australis* R.Br. A, whole flower, lateral view; B, calyx, external (abaxial) view; C, corolla, opened, showing androecium and infrastaminal scales; D, stamen; E, infrastaminal scale; F, pistil; G, ovary in cross-section; H, seed in longitudinal section, showing embryo. Drawn by unknown artist, possibly by the collector. Voucher: H.F.Bon 2127 (P03539609).

2. *Cuscuta campestris* Yunck.



J F M A M J J A S O N D



J F M A M J J A S O N D

Cuscuta campestris Yunck., Mem. Torrey Bot. Club 18 (2): 138 (1932); R.C.Fang et al., Fl. China 16: 323 (1995); Staples, Fl. Thailand 10: 379 (2010).—Type: U.S.A., Texas, Lindheimer 126 (holo MO).

Stems pale yellowish to dull orange, 0.5–0.8 mm diam., smooth.

Inflorescences lateral, usually compact globular clusters, 4–18-flowered, subsessile, axis greenish; pedicels c. 1 mm. Flowers with cupular calyx, enclosing corolla tube, c. 1.5 mm, lobes 5, oval or circular, sometimes wider than long, pale greenish white, bases overlapping when young; corolla shortly campanulate, c. 2.5 mm, white, 4- or 5-lobed, lobes broadly triangular, flat, apices acute, often inflexed; stamens c. as long as corolla lobes, filaments white, anthers ovoid, shorter than filaments, pale yellow to orange, staminal scales distinct, ovate, white, c. as long as corolla tube, fimbriate; pistil ovary globose, greenish, styles 2, stigmas globose, green to somewhat orange.

Capsules depressed globose, c. 2 × c. 3 mm, brown, encircled by withered corolla at base, dehiscing irregularly. Seeds usually 3 or 4 (rarely fewer), ovoid, dull yellow.

Distribution. Vietnam, Myanmar, China, Thailand; also widespread across Africa, Europe, Australia, North and South America, Pacific Islands.

Ecology. Parasitizes diverse host plants in disturbed areas, agricultural fields, roadsides, and hedge plants near human habitations: sea level to 475 m.

Cuscuta campestris is one of the weedy dodders of global importance. It attacks many agricultural and ornamental plants and should be controlled or eradicated before it gets established.

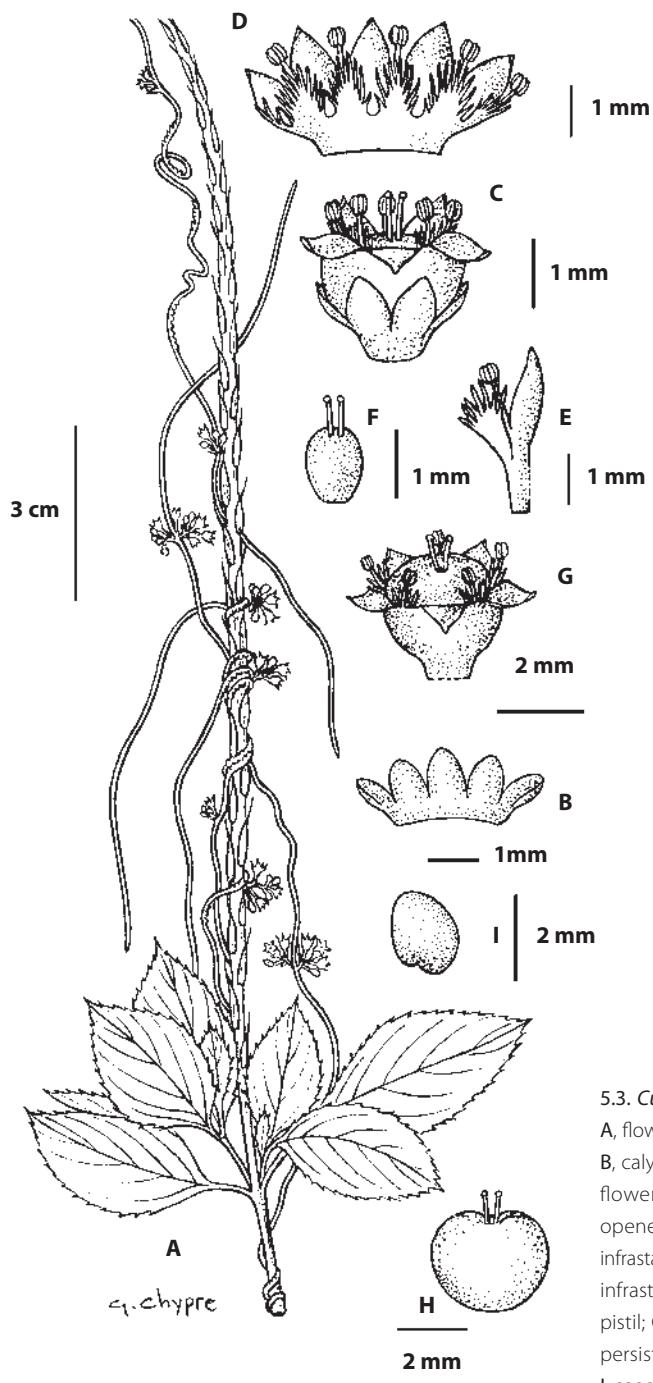
Vernacular name

Vietnam. yatahomau (Annamite, Squires 404).

Material studied

Vietnam. Da Nang: Tourane vic., 21 Aug. 1927, Clemens & Clemens 4390 (A, P). Thua Thien-Hue: near Hue, 5 May 1927, Squires 404 (E, GH, P).





5.3. *Cuscuta campestris* Yunck.

A, flowering stem, on host plant; B, calyx, opened, adaxial side; C, flower, lateral view; D, corolla opened, showing stamens and infrastaminal scales; E, stamen and infrastaminal scale, from side; F, pistil; G, fruit, partly enclosed in persistent floral whorls; H, fruit; I, seed, lateral view (From Heine 1984).



5.4. *Cuscuta campestris* Yunck. A, habit; B, flowers (credit: Lua Hock Keong, National Parks Board, Singapore; voucher: Singapore, Lua H.K. LKH 11-19(SING)).

3. *Cuscuta chinensis* Lam.



J

F

M

A

M

J

J

A

S

O

N

D



J

F

M

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M

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A

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N

D

Cuscuta chinensis Lam., Encycl. 2: 229 (1786); Yunck., Mem. Torrey Bot. Club 18 (2): 209 (1932); Kerr, Fl. Siam. 3 (1): 89 (1951); P.H. Hô, Cây cỏ Việt Nam 2 (2): 1005 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 13 (1993); R.C. Fang *et al.*, Fl. China 16: 323 (1995); Staples, Fl. Thailand 10: 381 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014).—Type: France, cult. in Jardin des Plantes, Lamarck s.n. (holo P-LA).
Cuscuta hygrophilae auctt. non Pearson: Gagnep. & Courchet, Fl. Indo-Chine 4: 311 (1915).

Stems yellow, thin, c. 1 mm diam.; scales at nodes lanceolate-oblong, 1.5–2.0 mm long.

Inflorescences lateral, compact cymose glomerules, few- to many-flowered, nearly sessile; bracts and bractlets scale-like; pedicel c. 1 mm. Flower calyxes cupular, sepals triangular, c. 1.5 mm, apices obtuse, partly thickened; corolla white, urceolate, c. 3 mm, lobes persistent triangular-ovate, keeled, apices acute or obtuse, reflexed; stamens inserted at throat; staminal scales oblong, reaching stamens, long fimbriate; pistil (see Notes), ovary nearly globose, styles 2, equal or unequal in length, stigmas globose.

Capsules enclosed by withered corolla, globose, c. 3 mm diam., circumscissile. Seeds 2–4, pale brown, ovoid, c. 1 mm, scabrous.

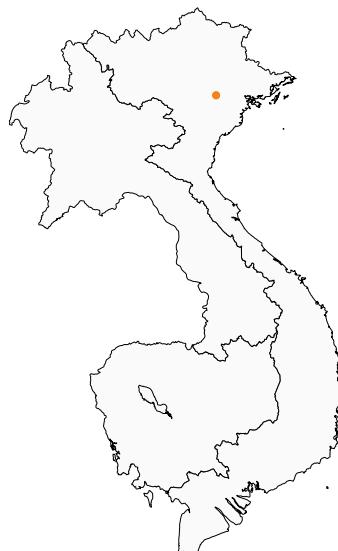
Distribution. Vietnam, ranging from Afghanistan, Kazakhstan, Mongolia, Russia, China, Thailand, Japan, Korea, Sri Lanka, Indonesia, to Australia and Africa.

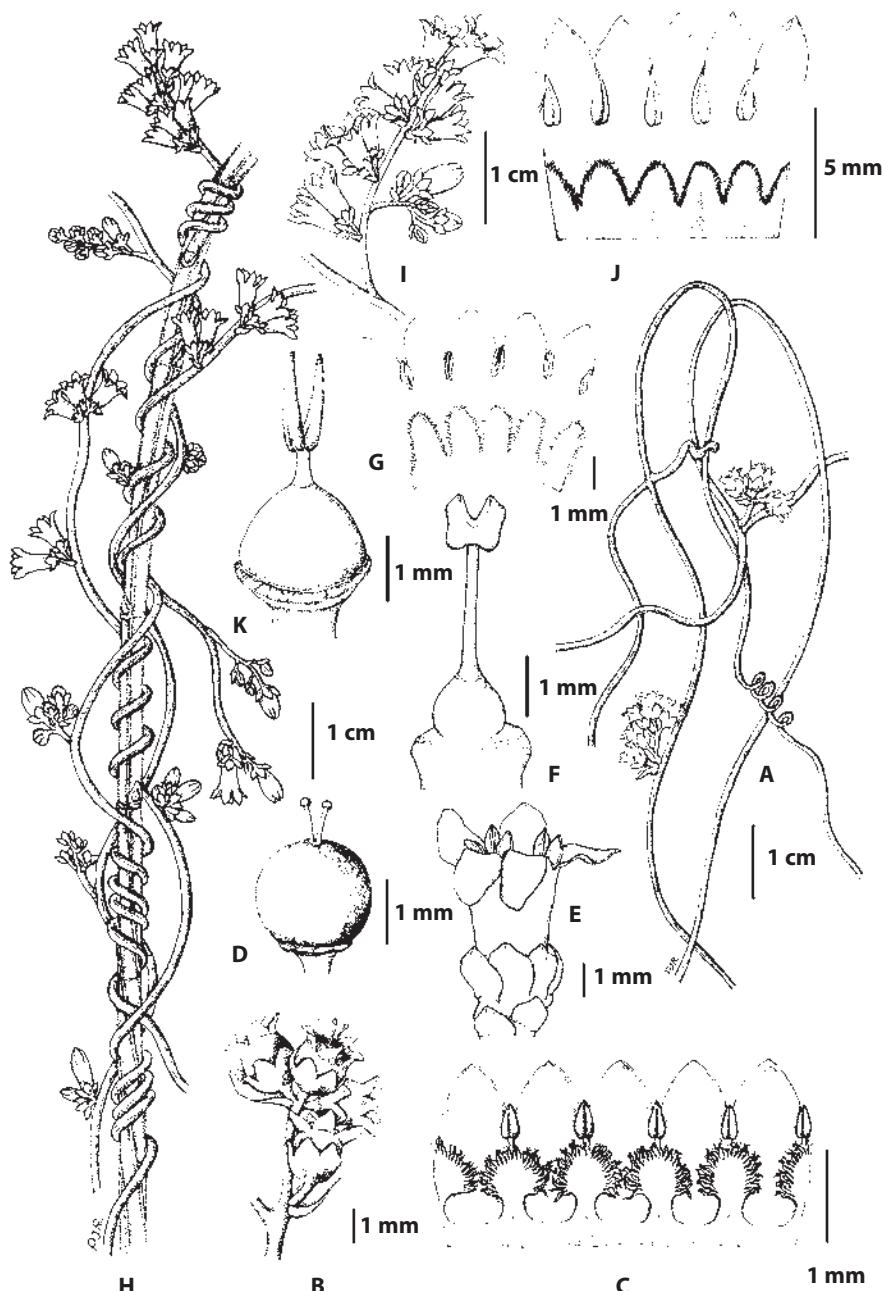
Ecology. A parasite of diverse dicot hosts. One collector noted that the plants flower rarely.

Notes. There are just two specimens referred to *C. chinensis* and both have abnormal flowers with multiple, complete pistils contained inside a single corolla. Such carpelody has not been reported in the literature, as far as I have found.

Vernacular name
tô hông (Gagnepain & Courchet 1915).

Material studied
Vietnam. s. loc.: "Cochinchine", Loureiro s.n. (BM). Ha Noi : Hanoi vic., 7 June 1887, Balansa 3556 (P); l. c., 1909, d'Alleizette s.n. (P).





5.5. A–D, *Cuscuta chinensis* Lam. A, habit; B, flowers; C, opened flowers with stamens; D, fruit; E–G, *Cuscuta japonica* Choisy. E, flower; F, pistil; G, opened flower with stamens; H–K, *Cuscuta reflexa* Roxb. H, habit; I, flowers; J, opened flower with stamens; K, fruit. Drawn by P. Inthachub (From Staples 2010).

4. *Cuscuta japonica* Choisy

	J	F	M	A	M	J	J	A	S	O	N	D
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Cuscuta japonica Choisy in Zoll., Syst. Verz. 130, 184 (1854); Gagnep. & Courchet, Fl. Indo-Chine 4: 312 (1915); Yunck., Mem. Torrey Bot. Club 18 (2): 252 (1932); P.H.Hô, Cây cỏ Việt Nam 2 (2): 1005 (1993); R.C.Fang et al., Fl. China 16: 323 (1995); Staples & Traiperm, Thai Forest Bull., Bot. 36: 105 (2008); Staples, Fl. Thailand 10: 381 (2010).—Type: Japan, without locality, Zollinger 355 (syn A!).

Stems yellow or often with purplish spots, 1–2 mm diam., many branched.

Inflorescences spicate, c. 3 cm long, axes yellowish; bracts scale-like, broadly ovate, c. 2 mm. Flowers nearly sessile; calyx cupular, c. 2 mm long, whitish, deeply divided, sepals ovate to circular, equal or unequal, purplish tuberculate abaxially, apex acute; corolla greenish white, campanulate to tubular, 3–7 mm, shallowly 5-lobed, lobes erect or reflexed, ovate-triangular, much shorter than tube, apex obtuse; stamens inserted at throat, anthers protruding from corolla, ovate-circular, yellow-orange, filaments very short or absent; staminal scales oblong, fimbriate, reaching middle of tube; ovary globose, smooth, style 1, ≥ ovary length, stigma elongate.

Capsules ovoid, c. 5 mm, circumscissile near base. Seeds 1–4, brown, 2.0–2.5 mm, smooth.

Distribution. Laos, Vietnam and Russia, Japan, China, Thailand.

Ecology. Parasitic on a variety of monocot and dicot hosts, locally common in villages; elevation: sea level to 100 m.

Vernacular name
cay tà hông (Gagnepain & Courchet 1915).

Material studied
Laos. Champassak: Huay Maesang, from Pakse to Khonphapong Fall, 27 Jan. 2009, Wongprasert 091-15 (BKF).

Vietnam. Lai Chau: ca. 3 km from Paso village on road between Lai Chau and Sa Pa, 15 Oct. 2000, Harder et al. 5942 (A, MO). Lang Son: Thanh Moi, Feb. 1938, Pételet 6279 (A, GH). Lao Cai: Ba Xat, 11 Jan. 1921, Poilane 18860 (P).



5. *Cuscuta reflexa* Roxb.



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J F M A M J J A S O N D

Cuscuta reflexa Roxb., Pl. Corom. 2: 3. t. 104 (1798); Yunck., Mem. Torrey Bot. Club 18 (2): 259 (1932); Ooststr., Blumea 3: 70 (1938); Fl. Males., Ser. I, Spermat. 4: 393 (1953); Kerr, Fl. Siam. 3 (1): 89 (1951); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 13 (1993); R.C.Fang *et al.*, Fl. China 16: 324 (1995); Staples, Fl. Thailand 10: 381 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014).—Type: India, without locality, *Roxburgh* s.n. (not located).

Parasitic twiners, all axial parts dotted or tubercled red-brown; stems stout, 2–3 mm diam., whitish to pale tan.

Inflorescences lateral, racemose or paniculate, 1.5–3.0 cm long, axes greenish; bracts scale-like; pedicel 2–4 mm. Flowers fragrant; calyx cupular, sepals 5, broadly ovate, equal, 2.0–2.5 mm, greenish, sparsely tuberculate outside, apex rounded; corolla tubular, 5–9 mm, white or creamy, lobes 1/2 or 1/3 as long as tube, triangular-ovate, erect, spreading, or reflexed; stamens inserted at sinus between lobes, filaments very short or none, anthers elliptic-ovate, yellow to orange; staminal scales oblong, reaching mid-tube, white, densely fimbriate; ovary ovoid-conical, style 1, very short or absent, stigmas 2, ligulate, longer than style, erect or spreading.

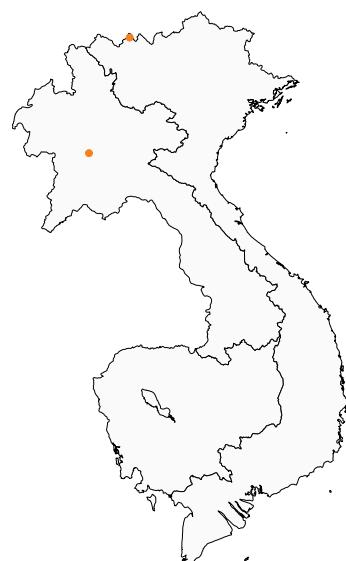
Capsules conical-globose, subquadrate when mature, 5–10 mm diam., circumscissile, pale yellowish dotted brown. Seeds 4 or fewer, oblong, c. 4 mm, dark brown.

Distribution. Laos, Vietnam and widespread from Afghanistan, Pakistan, Nepal, Sikkim, India, Sri Lanka, Myanmar, China, Thailand, and Indonesia.

Ecology. In a variety of disturbed habitats, also agricultural fields, parasitizing diverse, mostly woody, host plants including *Ageratina* and *Rubus*; elevation: 1200–1600 m.

Material studied

Laos. Louang Prabang: along Hwy 13 between Vientiane and Luang Prabang, Kms 312–313, 4 Nov. 2012, *Staples et al.* 1516 (HNL, SING, WLU).



5.6. *Cuscuta reflexa* Roxb. Flowers (credit: Paweena Traiperm, Mahidol University; voucher: Laos, *Staples et al.* 1516 (HNL)).

Vietnam. Lai Chau: Yao san, nord de Phong Tho, 10 Dec. 1937, *Poilane* 26815 (P).



Fifteen species: most in North and South America, with two species in New Zealand, one in Australia, and one widespread; one species here reported from Vietnam.

6. *Dichondra* J.R.Forst. & G.Forst.

Char. Gen. Pl. 39, t. 20 (1776); Ooststr., Blumea 3: 72 (1938); Fl. Males., Ser. I, Spermat. 4: 394 (1953); Tharp & M.C.Johnst., Brittonia 13: 346–360 (1961); Lawalrée, Acta Bot. Nederlandica 19: 717–721 (1970); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); R.C.Fang & Staples, Fl. China 16: 275 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 161 (2005); Staples, Fl. Thailand 10: 382 (2010).—Type: *Dichondra repens* J.R.Forst. & G.Forst.

Herbs; stems creeping or sprawling, rooting from nodes. Leaves simple, blade reniform to circular, margins entire; petioles present; stipules present, minute scales.

Flowers solitary or paired, axillary, pedicellate, hidden among leaves; bracts minute; sepals joined basally, ± equal, becoming enlarged in fruit; corolla campanulate, more or less equal to calyx, lobed to middle or below; stamens included; pollen not spiny; ovary deeply 2-lobed, each lobe with 2 ovules; styles 2, gynobasic, free, filiform; stigmas capitate.

Fruits indehiscent utricles or irregularly dehiscent, 2-valved capsules, apically rounded, truncate, emarginate, or deeply 2-lobed. Seed(s) 1 or 2 per lobe, nearly globose, smooth.

Notes

Older botanical literature from around the world applied the name *D. repens* almost universally to a widespread, often weedy species. Tharp and Johnston and Lawalrée (*op. cit.*) identified specimens from Asia that were called *D. repens* as *D. micrantha* Urban. According to their taxonomic concepts, genuine *D. repens* J.R.Forst. & G.Forst. is confined to Australia and New Zealand and the widespread naturalized (and cultivated) species is actually the American *D. micrantha*. Recent floras continue this unfortunate dichotomy in what they call the widespread, weedy species of *Dichondra* that has now become almost pantropical.

1. *Dichondra micrantha* Urb.



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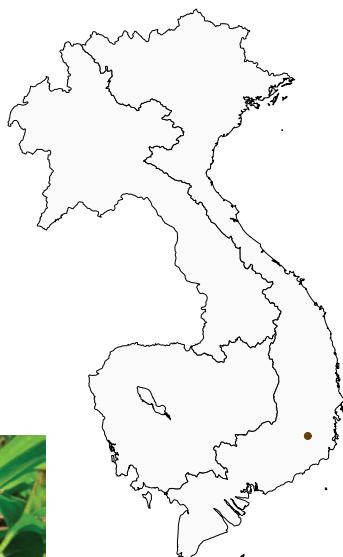
J F M A M J J A S O N D

Dichondra micrantha Urb., Symb. Ant. 9: 243 (1924); Tharp & M.C.Johnst., Brittonia 13: 350 (1961); Lawalrée, Acta Bot. Neerlandica 19: 717–721 (1970); R.C.Fang & Staples, Fl. China 16: 275 (1995); Staples & S.Z.Yang, Fl. Taiwan ed. 2, 4: 349 (1998); D.F.Austin, Econ. Bot. 52: 88–106 (1998); Staples & Traiperm, Thai Forest Bull., Bot. 36: 105 (2008); Staples, Fl. Thailand 10: 382 (2010).— Type: Cuba, Oriente Prov., Taco Bay, pr. Baracoa, 11 Dec. 1914, Ekman 3851a (holo S; iso US).

Dichondra repens auctt. non J.R. & G.Forst.: Gagnep. & Courchet, Fl. Indo-Chine 4: 310 (1915); Ooststr., Blumea 3: 73 (1938); Fl. Males., Ser. I, Spermat. 4: 395 (1953); R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 8 (1979); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 970 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 161 (2005).

Mat-forming herbs; stems prostrate, branching, rooting at nodes, sparsely pubescent. Leaves crisp-fleshy; blades reniform to nearly circular, 0.8–1.5(–2.5) cm diam., glabrous above, sparsely pubescent below; petiole 2.0–3.5 cm long.

Flowers 1 (or more) per node; pedicels erect, recurved at apex, shorter than petioles; calyx broadly campanulate, lobes obovate-oblong to spatulate, 1.5–2.0 mm, enlarging to 2.5 mm in fruit, margins or whole sepal densely pubescent; corolla yellow, c. 2 mm long,



6.7. *Dichondra micrantha* Urban habit (credit: G. Staples; voucher: China, not collected).

5-lobed to middle, glabrous; stamens equal; ovary pilose, styles unequal.

Utricles downward-pointing, subglobose, 2.0–2.6 mm, membranous, sparsely pubescent. Seeds yellow to brown, glabrous.

Distribution. Naturalized in Vietnam, India, Bhutan, Myanmar, Thailand, China, Japan, the Philippines; native to subtropical North America and the West Indies. Once collected in Vietnam and once in northern Thailand; surely more plentiful and widespread in Southeast Asia than these vouchers suggest.

Ecology. Typically in shady, damp places, often found in plant nurseries, grassy lawns around homes, cracks in pavements, on all types of soil; elevation sea level to 675 m. *Dichondra micrantha* is now widespread in the tropics, generally as an introduced lawn substitute that becomes naturalized as a weed.

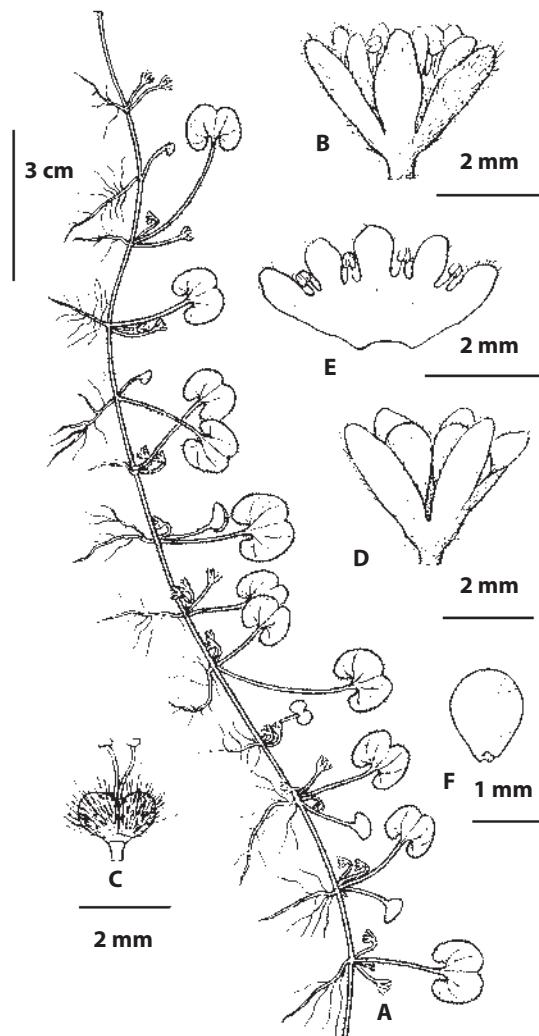
Vernacular name

Vietnam. cây hai hat (*Nguyen* 947).

6.1. *Dichondra micrantha* Urb. A, flowering stem; B, flower, lateral view; C, pistil; D, fruits, enclosed in calyx; E, corolla, opened; F, seed (From Bosser & Heine 2000, as *D. repens*).

Material studied

Vietnam. Lam Dong: Dalat, 4 Mar. 1985, *Nguyen Thi Nhan* 947 (HN).





Eight species: widely distributed in Asia; two species occur in CLV. The distinguishing features of *Dinetus* species are primarily in the fruits and fruiting calyx so the key on page 105 is written for fruiting material only.

7. *Dinetus* Buch.-Ham. ex Sweet

Brit. Fl. Gard. 2: t. 127 (1825); Staples, Novon 3: 198–201 (1993); R.C.Fang & Staples, Fl. China 16: 283 (1995); Staples, Blumea 51: 428 (2006); Fl. Thailand 10: 384 (2010); Staples et al., Thai J. Bot. 6: 82 (2014).—Type: *Dinetus racemosus* (Roxb.) Sweet. *Porana* auctt. non Burm. f.: Gagnep. & Courchet, Fl. Indo-Chine 4: 294 (1915), p.p.; Ooststr., Blumea 3: 85 (1938), p.p.; Fl. Males., Ser. I, Spermat. 4: 402 (1953), p.p.; Kerr, Fl. Siam. 3 (1): 91 (1951), p.p.; R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 24 (1979), p.p.; T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 186 (1990), p.p.

Herbaceous twiners. Leaves petiolate, simple, cordate, herbaceous; venation pedate basally, alternate above, veins prominent on underside, often winged.

Inflorescences solitary or paired, axillary, racemes or panicles; bracts foliose, bracteoles usually minute scales, basal to calyx; pedicel filiform. Flowers often fragrant; sepals free or shortly fused basally, accrescent in fruit, veins longitudinal, usually 7 or 9 (5–11) from base; corolla funnelform or subsalverform, entire to 5-parted, glabrous except for apical hair tuft on back of lobes; stamens included, filaments glabrous or basally pilose, anthers linear to sagittate; pollen 3-colporate, not spiny; pistil included, disc ring-like, 5-lobed, or absent, ovary 1-locular, 2-ovuled, style often jointed above base; stigma ellipsoid, entire or slightly 2-lobed.

Fruiting calyx clasping fruit base or reflexed; sepals equally enlarged or outer 3 sepals larger than inner. Fruit a papery, indehiscent utricle. Seed 1, often longitudinally keeled, smooth, glabrous.

Ecology

These plants often grow up rapidly after forest disturbance, such as a fire or slash and burn clearing. Then, during the shortest days of the year (December, January), the vines bloom simultaneously, blanketing the shrubs, trees and bamboos with masses of tiny white, fragrant flowers, followed soon after by the winged fruits that disperse into other opened, cleared areas. The dead fruiting vines hang on their support for a long time and the enlarged sepals weather to a pale greyish or tan. The seeds of *Dinetus* are parasitized by beetles of the genus *Spermophagus*.

Key to the species

- | | |
|--|-------------------------------|
| 1. Fruit ellipsoid, apex acute or apiculate | 1. <i>D. racemosus</i> |
| 1. Fruit broadly ovoid to rhomboid, apex truncate or depressed | 2. <i>D. truncatus</i> |

1. *Dinetus racemosus* (Roxb.) Sweet

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Dinetus racemosus (Roxb.) Sweet, Brit. Fl. Gard. 2: pl. 127 (1825); R.C.Fang & Staples, Fl. China 16: 284 (1995); Staples, Blumea 51: 443 (2006); Fl. Thailand 10: 384 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014). – *Porana racemosa* Roxb., Fl. Indica 2: 41 (1824); Gagnep. & Courchet, Fl. Indo-Chine 4: 294 (1915); Ooststr., Blumea 3: 91 (1938), Fl. Males., Ser. I, Spermat. 4: 403 (1953); Kerr, Fl. Siam. 3 (1): 92 (1951); R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 34 (1979); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 186 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 973 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 180 (2005). – Type: India. cultivated in Calcutta Botanic Garden, Roxburgh s.n. sub Wallich Cat. 1326E.1 (lecto K-W!, designated by Staples, Novon 3: 199–200 (1993)).

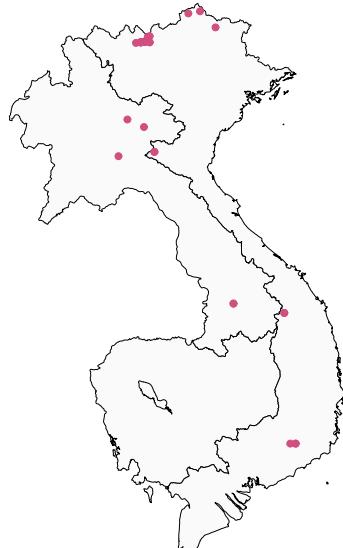
Annual herbs; stems twining, 2–5(–10) m high; indumentum yellowish to silvery; stem glabrate. Leaves deeply cordate, 6.0–16.7 × 3.3–9.4 cm, upper side strigose, underside puberulous to tomentellous; petiole 2.9–7.7 cm. Stems, foliage, and bracts turning red-purple before dying.

Inflorescence paniculate, 13–45 cm; lower bracts cordate, persistent, prominently veined in fruit; bracteoles 2, minute scales; pedicel 4–7 mm, glabrous. Sepals lanceolate-linear, equal, 1–2 mm, outside glabrous to silvery or golden pubescent, in fruit enlarged calyx reflexed, tan to purplish, sepals spatulate to oblanceolate, flat or slightly concave, equal, 9.0–14.0(–18.0) × 2.5–4.0(–5.0) mm, outside puberulent or glabrous, apex rounded-obtuse, apiculate; corolla funnelform, 8–11 mm, white, yellow in tube, limb 8–12 mm diam., 5-parted; stamens unequal, 1.5–2.5 mm, filaments glabrous basally, ovary ovoid, stigma ellipsoid to clavate, apex emarginate.

Utricle narrowly ellipsoid-obovoid, 5–7 × 3–4 mm, tan, sometimes streaked purple, glabrous, apex acute or apiculate. Seed ellipsoid-oblong, 3.0–5.0 × 2.5–3.0 mm, reddish to dark brown.

Distribution. Laos, Vietnam, and from Pakistan, Nepal, Bhutan, India, Myanmar, China, Thailand, to Indonesia and the Philippines.

Ecology. In open areas in disturbed forest, thickets, along roads or watercourses in closed evergreen wet forest, semi-evergreen forest, lower montane forest and



hill evergreen forest; on diverse soil types including rocky clays, humus-rich forest soil, rich red soil, sandstone, and often on limestone; elevation: (700–)1100–1500 m.

Usage. The young leaves are eaten with chilis (Laos, *Poilane* 2080), the fruits are eaten fresh or dried (Laos, *Poilane* 2375).

Vernacular names

Laos. khua tak tenk (*Poilane* 2375).

Vietnam. bim núi (*Khao & Trung* 2505).

Material studied

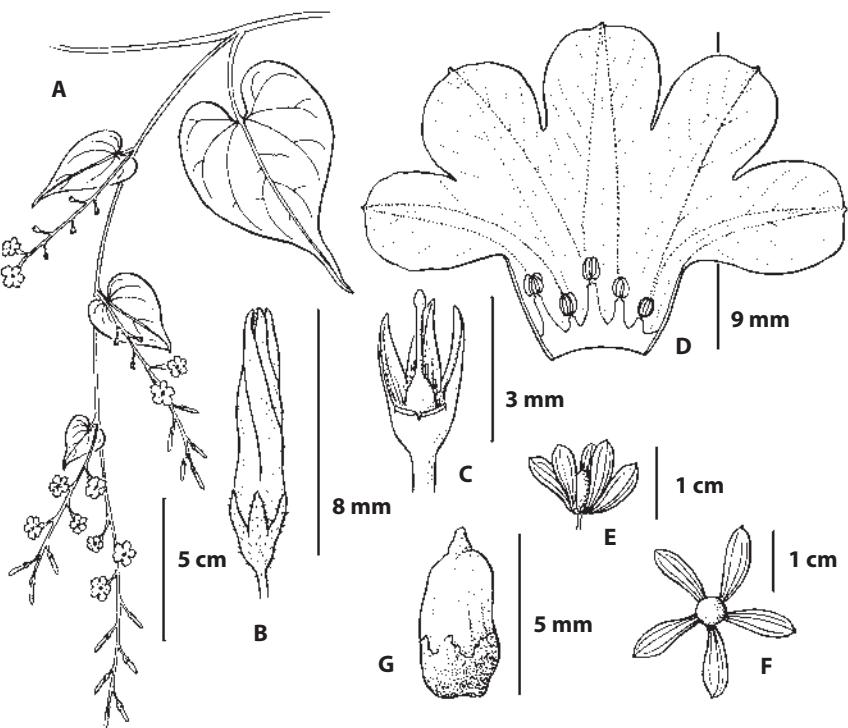
Laos. Champassak: Paksong vic., 11 Nov. 1928, *Poilane* 28379 (A, P). Houa Phan: roadside vegetation, 24 Oct. 2002, *Homsombath & Newman* 1438 (E, P); Muang Houamuang, Sam Neua, 14 Oct. 1920, *Poilane* 2080 (A, P). Saravane: entre Ta Teng et Paksong, plateau des Bolovens, Km 68.500 de la route de Saravane à Paksong, 28 Oct. 1928, *Poilane* 16180 (A, P). Xieng Khouang: Tran Ninh, 21 Nov. 1920, *Chevalier* (legit *Poilane*) 2375 (A, BISH, E, HNL, L, P).

Vietnam. s. loc.: 7 Oct. 1891, *Balansa* 4434 (P). Cao Bang: Yen Lac munic., vic. of Yen Lac village, about 44 km N-NW from Cao Bang town, 18 Nov. 1998, *Averyanov* et al. CBL 419 (AAU, HN). Ha Giang: Meo Vac distr., vic. Meo Vac town, 48.2 km from Ha Giang city, 7 Oct. 1999, *Hiep* et al. NTH 3381 (K); W of Ngan Chai village about 0.5 km, 26 Nov. 2004., *Wu* et al. WP-711 (MO). Hoa Binh: canton du Lui Duc, Dec. 1926, *Pételet* 4024 (P); Qin Duc canton, 4 Dec. 1926, *Colani* 4024 (UC). Kon Tum: c. 6–8 km N of Dak Gley town, 29 Nov. 1995, *Averyanov* et al.

VH 2118 (HN); Dac Gle, Dac choong, 16 Mar. 1978, *Ban* 474 (HN); pied du massif du Ngok Pau, 18 Dec. 1946, *Poilane* 35962 (A, P). Lai Chau: Binh Lu, 24 Oct. 1976, *Khoi & Do* 166 (HN). Lam Dong: Dalat, Suiovang, 28 Dec. 1982, L.X.-V.N. 001009 (HN); Djiring, 1 Dec. 1911, *Lecomte & Finet* 1612 (P); l. c., 1 Oct. 1911, collector unknown s.n. (P). Lao Cai: près de Cha Pa, 27 Apr. 1909, *d'Alleizette* s.n. (L); Chapa, *Hautefeuille* 128 (P); *Hautefeuille* 134 (P); près de Lao Cai,



7.1. *Dinetus racemosus* (Roxb.) Sweet. A, habit; B, flowers; C, fruit (credits: A, B, G. Staples, C, Piyakaset Suksathan; vouchers: A, B, not voucherized; C, Thailand, Staples et al. 1376 (QBG))



7.2. *Dinetus racemosus* (Roxb.) Sweet. A, Flowering stem habit; B, flower bud; C, flowering calyx (2 sepals removed) and gynoecium; D, corolla opened to show stamen attachment; E, utricle with \pm clasping calyx; F, utricle with spreading clayx; G, utricle eroded at base to expose seed. Drawn by Anna Stone (From Staples 2006).

Dec. 1937, Pételot 6237 (A, NY, US); Chapa, col de Lo Qui Ho, Sep. 1927, Pételot 3168 (A, HNU, UC); route de Lao Cai à Lai Chau, 7 Dec. 1994, Tirvengadum et al. 3065 (AAU, P); 6 Dec. 1964, Sino-Viet Exped. 5 (IBSC, KUN, PE); Sa Pa district, Hoang Lien Son, 3 Nov. 1963, Bui Duc Binh s.n. (HNU); l. c., 16 Nov. 1978, Bui Duc Binh s.n. (HNU); l. c., 25 Oct. 1976, Dao et al. 191 (HN); l. c., 29 Nov. 1978, Bui Duc Binh 101 (HNU); Hoang Lien Son, cau Mong Sen, 6 Dec. 1964, Khao & Trung s.n. (HN); l. c., 6 Dec. 1983, Khao & Trung 2505 (HN); l. c., Ô qui ho, 23 Nov. 1976, Khoi & Do 96 (HN); près gite Ngai Tio, avant col des Nuages, 30 Nov. 1937, Poilane 26636 (A, P); Pa Kha, 22 Dec. 1929, Poilane 17225 (P); Sa Pa, au pied de la colline de Ham Rong, 6 Dec. 1994, Tirvengadum et al. 3055 (P); l. c., Tirvengadum et al. 3056 (P). Nghe An: Muong Xen, 21 Oct. 1911, Lecomte & Finet 455 (P); 4 Dec. 1913, Chevalier 29311 (P); l. c., Chevalier 29329 (P).

2. *Dinetus truncatus* (Kurz) Staples



J F M A M J J A S O N D



J F M A M J J A S O N D

Dinetus truncatus (Kurz) Staples, Novon 3: 200 (1993); R.C.Fang & Staples, Fl. China 16: 284 (1995); Staples, Blumea 51: 449 (2006); Fl. Thailand 10: 384 (2010). – *Porana truncata* Kurz, J. Bot. 11: 136 (1873). – Type: Myanmar. Pegu, 'Karennee hills'. F. Mason 17 (lecto K!, designated by Staples (1993); isolecto HBG!).

Annual herbs; indumentum yellowish; stems sparsely sericeous, glabrate. Leaves broadly ovate-cordate, 8.3–9.5 × 5.6–6.9 cm, upper side glabrous or sparsely strigose, underside sparsely stellate; veins sericeous with simple trichomes; petiole 3.8–6.4 cm. Stems, foliage and bracts turning red-purple before dying.

Inflorescence racemose or paniculate; bracts ovate-cordate, amplexicaul, persistent in fruit; bracteoles scales; pedicels filiform, puberulent, deflexed in fruit. Sepals lanceolate, clasping tube base, equal, 1.5–2.5 mm long, outer side sericeous; corolla narrowly funnelform, white, 7–11 mm long, tube flaring gradually, limb 5-parted, 9–11 mm diam., glabrous outside; stamens included, filament bases glabrous; pistil included.

Fruiting calyx wide-spreading; sepals narrowly elliptic to oblong, equal, 17–21 × 4–5 mm, purplish tan to brownish, glabrous or sparsely pubescent, apex obtuse to rounded, mucronulate. Utricle pendent, inflated, broadly obovoid to rhomboid, 5-angled, 4–6(–8) × 4–6.5(–8) mm, pale brown, angles often darker, apex truncate or depressed-concave. Seed broadly ellipsoid to subglobose, 3–5 × 3–4 mm, yellowish to dark red-brown, smooth to coarsely wrinkled.

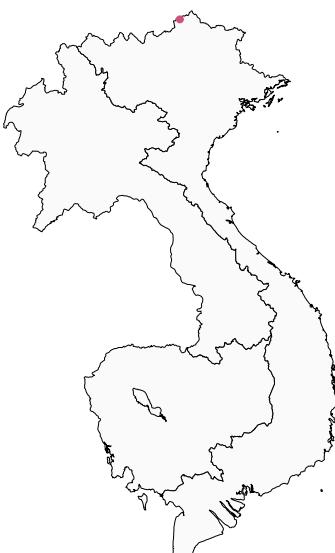
Distribution. Vietnam, Myanmar, China, Thailand.

Ecology. Open areas in secondary regrowth following slash and burn agriculture; elevation: 1000 m.

Notes. Once collected in Vietnam but probably more common than the single voucher suggests. The difficulty in separating flowering material of *D. truncatus* from *D. racemosus* ensures that some specimens are wrongly identified.

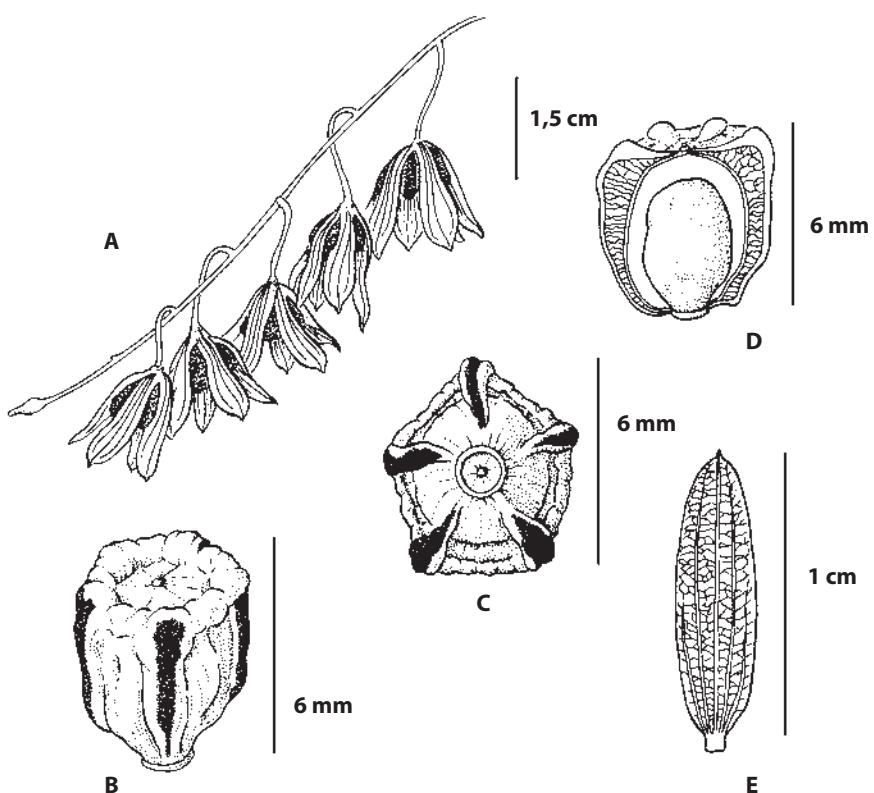
Material studied

Vietnam. Ha Giang: Bat Dai Son Provincial Protected Area, 11 Feb. 2001, Harder et al. 6114 (SING).





7.3. *Dinetus truncatus* (Kurz) Staples. A, habit, bracts, young fruits; B, mature fruit (credits: A, Maxim Nuraliev, B, Piyakaset Suksathan; vouchers: A, Vietnam, not collected; B, Thailand, Staples & Suksathan 1361 (QBG)).



7.4. *Dinetus truncatus* (Kurz) Staples. A, fruiting stem habit; B, utricle in side view; C, utricle base; D, utricle opened to show spongy layer; E, fruiting sepal. Drawn by Anna Stone (From Staples 2006).



Seventy-one species: mainly in tropical Asia and Malesia with outlying species in Australia, Japan, Taiwan; 10 species occur in CLV.

The following account must be considered conservative in that it makes no taxonomic changes and is based solely on herbarium material, supplemented by label data and information from the literature. Colours mentioned in the key refer to dried herbarium material except for the ripe fruits, which are based on label data recorded by collectors.

8. *Erycibe* Roxb.

Pl. Coromandel 2: 31, t. 159 (1798); Gagnep. & Courchet, Fl. Indo-Chine 4: 304 (1915); Hoogland, Blumea 7: 342–361 (1953); Hoogland in Ooststr., Fl. Males., Ser. I, Spermat. 4: 404 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); R.C.Fang & Staples, Fl. China 16: 277 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 161 (2005); Staples, Fl. Thailand 10: 387 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014).—Type: *Erycibe paniculata* Roxb.

Woody climbers, scandent shrubs, or erect treelets; stems lenticellate or striate-angulate lengthwise (rarely both on same twig), twigs glabrous or tomentose, trichomes 2-armed or stellate. Leaves petiolate, entire, coriaceous or chartaceous.

Inflorescences terminal or axillary, racemose, paniculate or glomerulate; bracts early deciduous, usually minute. Flowers small, often fragrant; sepals free, persistent, nearly equal, leathery, outsides usually pubescent; corolla white or yellow, rotate, tube short, glabrous outside, limb deeply 5-lobed, each lobe again 2-lobulate apically, midpetaline areas densely appressed pubescent outside, secondary lobules rather thin, glabrous, margins entire, rolled, or incised-dentate; stamens included or tips exserted, filaments triangular or secondarily concave, anthers cordate basally, apex obtuse or tapering acuminate by sterile acumen, sometimes truncate to retuse at both ends; pollen 3-colporate, not spiny; ovary globose, ellipsoid, or cylindrical, 1 (or 2)-locular, 4-ovuled, stigma nearly sessile, conical, with 5 spiralling ridges.

Fruit leathery or fleshy berries, red, yellow, orange, or black. Seed 1; embryo pleated and folded.

Notes

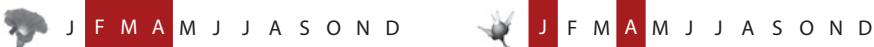
Hoogland (1953) revised the nomenclature of the entire genus, including all taxa described up to that time. Unfortunately, he did not prepare descriptions of the continental Asian species of *Erycibe*, though he annotated much of the available material. Thus, it has been necessary to develop taxonomic concepts based on study of the specimens Hoogland annotated and comparing them with more recent gatherings. Rather few *Erycibe* species have been described since Hoogland's review, and only one is from the CLV area.

The flowers of *Erycibe* are often sweetly fragrant and the plants, high in the forest canopy, may be detected when in bloom by their scent. The berries have a soft, juicy, edible pulp surrounding the seed; mammals (and probably birds) eat the fruits and play a role in seed dispersal. The berries change colour as they ripen from green through yellowish to either dark (purple, blackish) or an orange-red colouration. Fruit colours mentioned in the key following refer to fully ripe fruits; do not be misled!

Key to the species

1. Stems and abaxial leaf surfaces densely reddish pubescent **5. *E. hainanensis***
—. Stems glabrous or pubescent; abaxial leaf surfaces glabrous or sparsely pubescent **2**
2. Inflorescences axillary, dense glomerules with no visible axis **1. *E. cochinchinensis***
—. Inflorescences terminal or axillary, racemose or paniculate, always with a visible central axis **3**
3. Leaves abaxially sparsely pubescent **9. *E. subspicata***
—. Leaves abaxially glabrous **4**
4. Woody stems and leaf-bearing twigs with raised, whitish lenticels **5**
—. Woody stems and leafy twigs striate-angulate, lacking lenticels **7**
5. Secondary veins usually 8 (7–10) either side of midvein; corolla lobules erose at apex
..... **8. *E. schmidii***
—. Secondary veins 4–6 either side of midvein; corolla lobules smooth, undulate **6**
6. Leaves 5–6 cm long; inflorescences 1–2 cm long, 3–10-flowered **2. *E. crassiuscula***
—. Leaves 6.9–9.0 cm long; inflorescences 4–15 cm long, many-flowered **6. *E. obtusifolia***
7. Inflorescences terminal, thyrsoid **10. *E. tixerii***
—. Inflorescences axillary, racemose or paniculate **8**
8. Leaves chartaceous, drying reddish; anthers apically truncate or retuse; fruits ripening orange
..... **4. *E. griffithii***
—. Leaves coriaceous, drying yellowish grey; anthers apically acute or acuminate; fruits ripening black
or purple **9**
9. Secondary veins 5–7 either side of midvein; petioles 13–30 mm long; inflorescences up to 11 cm
long; corollas c. 13 mm long **3. *E. elliptilimba***
—. Secondary veins 8 or 9 per side; petioles 6–10 mm long; inflorescences 1.5–2.0 cm long; corollas
c. 7 mm long **7. *E. oligantha***

1. *Erycibe cochinchinensis* Gagnep.



Erycibe cochinchinensis Gagnep., Notul. Syst. (Paris) 3: 138 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 308 (1915); Kerr, Fl. Siam. 3 (1): 94 (1951); Hoogland, Blumea 7: 345 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 975 (1993); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 161 (2005); Staples, Fl. Thailand 10: 390 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014).- Type: Laos, Attapeu, Harmand 1298 (lecto Pl, P00260105, designated by Hoogland (1953); isolecto A, BO, Pl, P00260106, P00260107).

Woody climbers; stems terete, greyish, 3–10(–25) m long, base 0.15–0.3 m diam.; twigs glabrous. Leaves oblong-elliptic to oblong-oblanceolate, 9–19 × 3–7 cm, coriaceous, drying reddish, base acute, apex obtuse or acuminate; secondary veins 7 or 8, curved near margins, slightly raised on undersides; petiole 10–15 mm long, glabrous.

Inflorescences dense, axillary glomerules to 2 cm long; pedicels 3 mm long. Flowers fragrant; sepals orbicular, equal, c. 3 mm diam., reddish pubescent outside; corolla pale yellow, c. 9 mm long, lobes deeply bilobed, lobules entire, in-rolled; stamen filaments shorter than anther, anthers ovoid-acuminate, 1.7 mm long, scales 5, inserted between filaments at base of corolla tube; ovary subglobose, 2-locular, stigma 5-ridged.

Berries ellipsoid, 20 × 10–12 mm, ripening yellow-orange.

Distribution. Cambodia, Laos, Vietnam and Thailand.

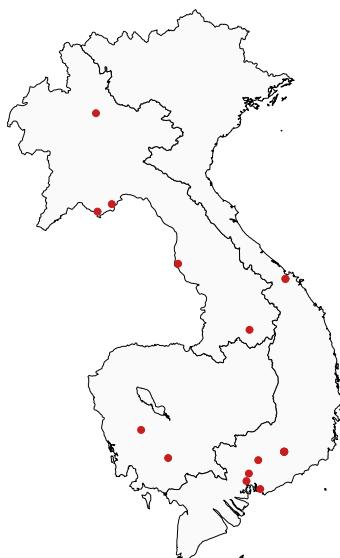
Ecology. Primary and secondary evergreen forest, mixed evergreen forest, sometimes in disturbed thickets and regrowth, on rich, sandy soil or granitic-schistaceous soil; elevation: c. 200–800(–1200) m.

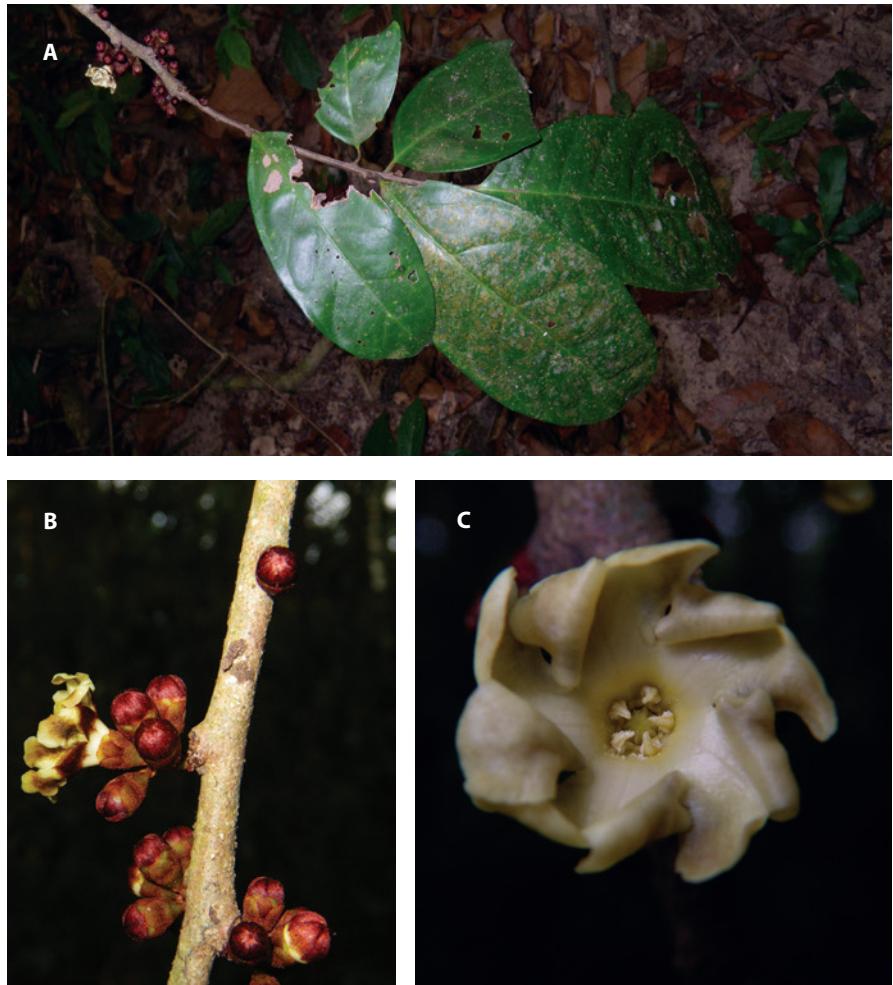
Usage. The berries are reported to be edible (*Poilane* 15166).

Vernacular names

Cambodia. kô cho đất (*Poilane* 15166).

Vietnam. huoan yunh (*Poilane* 22248).





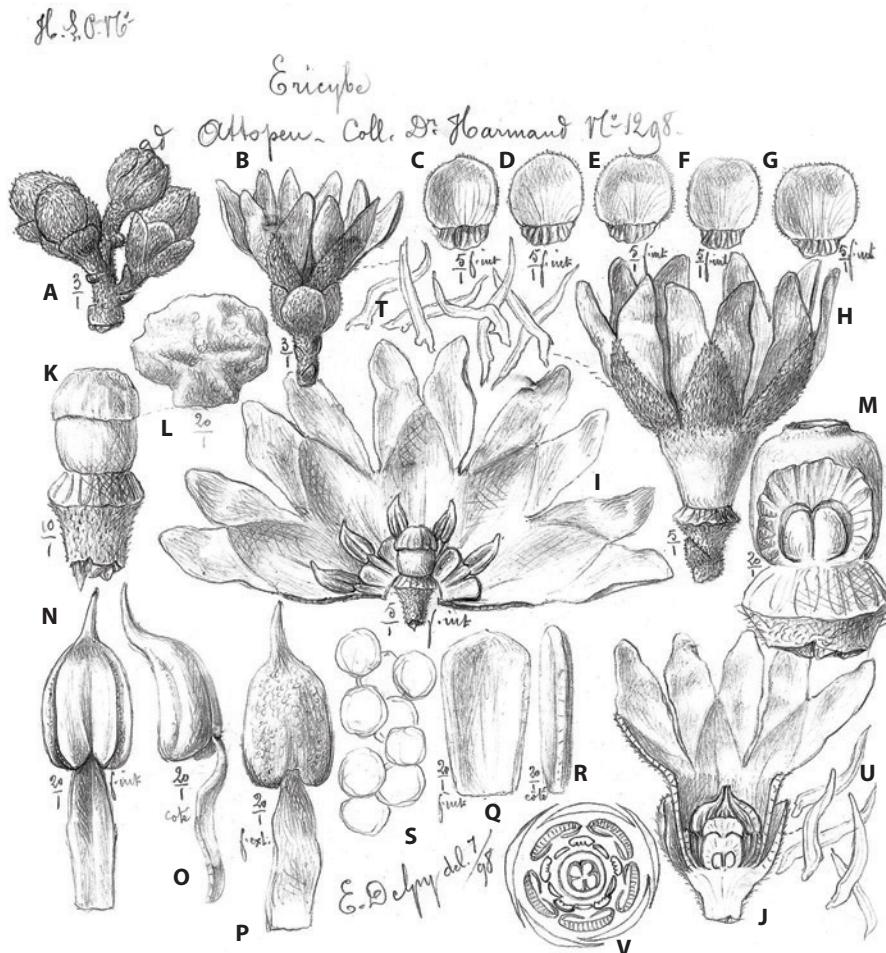
8.1. *Erycibe cochinchinensis* Gagnep. A, habit; B, flower, buds; C, inset: stamens, pistil, and infrastaminal scales (credit: Maxim Nuraliev; voucher: Vietnam, A.N. Kuznetsov et al. 403 (MW)).

Material studied

Cambodia. Kompong Speu: Phnom Thom EISSO ("Phnom Tho ma so"), près du village Ko virk, 2 May 1927, Poilane 15166 (P). Pursat: entre Kam Nom et Trassây, 30 Apr. 1928, Poilane 15044 (P).

Laos. Savannakhet: Km 20 de la route No 10, 20 Feb. 1925, Poilane 12037 (P); près de Savannakhet, 5 Mar. 1925, Poilane 12081 (E, P). Vientiane: "Wiengchan", Pak Ngum, 23 Mar. 1932, Kerr 20693 (L, P); l. c., 26 Mar. 1932, Kerr 20744 (K, L).

Vietnam. Ba Ria-Vung Tau: montibus Dinh, près de Baria, 20 Mar. 1918, Chevalier 36787 (P). Dong Nai: Kon Man, in "prov. Bien Hoa", Mar. 1877, Pierre s.n. (L); Ma Da National Park, 5 Mar.



8.2. *Erycibe cochininchinensis* Gagnep. A, glomerule of flower buds; B, flower, lateral view; C–G, sepals, adaxial surfaces, outermost (C) to innermost (G); H, corolla, calyx removed, lateral view; I, corolla opened, showing androecium and gynoecium; J, flower in longitudinal section, note position of anthers above stigma; K, pistil; L, stigma, from above; M, ovary, partly cut away, showing 2 ovules; N, stamen, adaxial view; O, stamen, lateral view; P, stamen abaxial view; Q, infrastaminal scale, adaxial view; R, infrastaminal scale, lateral view; S, pollen grains; T, 2-armed trichomes from midpetaline band on corolla exterior; U, 2-armed trichomes from abaxial surface of sepal; V, floral diagram. Drawn by E. Delpy, July 1898. Voucher: Harmand 1298 (P00260105).

2011, Kuznetsov et al. 403 (MW); ad Ton-man in "prov. Bien Hoa", Mar. 1877, Pierre 15 (P, syntype for *E. cochinchinensis*). Ho Chi Minh Ville: ad Cay Cong Apr. 1866, Pierre s.n. (K, P, syntypes for *E. cochinchinensis*). Lam Dong: Blao, "prov. Haut Donai", 22 Jan. 1933, Poilane 21762 (A, BKF, K, L, P); l. c., 4 Feb. 1933, Poilane 21822 (A, BKF, P); l. c., 4 Apr. 1933, Poilane 22248 (P, SING); l. c., 16 Apr. 1933, Poilane 22339 (K, P); forêt de l'Ecole de Blao, Mar. 1961, Schmid s.n. (P). Thua Thien-Hue: Nui Bach Ma station, 22 Apr. 1939, Poilane 29916 (K, P); l. c., 26 Apr. 1939, Poilane 30013 (P).

2. *Erycibe crassiuscula* Gagnep.

	J	F	M	A	M	J	J	A	S	O	N	D
								J	F	M	A	M

Erycibe crassiuscula Gagnep., Notul. Syst. (Paris) 3: 139 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 306 (1915); Hoogland, Blumea 7: 346 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 975 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 162 (2005).—Type: Vietnam, Thanh Hoa, Cửa Bang, Bon 5569 (lecto Pl, P00260112; isolecto Pl, P00260113, P00260114, designated by Hoogland (1953)).

Lianas; stems 4–10 m long, branches pallid to yellowish, sparsely lenticellate, lenticels whitish, ultimate twigs subangulate, thinly appressed pilose. Leaves ovate or lanceolate-acuminate, 5.0–6.0 × 2.5–3.0 cm, base slightly attenuate, apex obtuse, glabrous, subcoriaceous; secondary veins usually 5 either side of midvein, arching-confluent near margins, impressed on upper surfaces, finer nerves forming a dense reticulum; petiole c. 10 mm long, sparsely pilose.

Inflorescences axillary and terminal, racemose, 1–2 cm long, 3–10-flowered; peduncles 7–20 mm long, appressed reddish pilose; pedicels 4–5 mm long, bracts tiny, deciduous. Flower buds globose, reddish pilose outside; outer 2 sepals orbicular, densely pilose outside, inner sepals obovate, membranaceous, glabrous; corolla c. 8 mm long, outside reddish sericeous, limb 5-lobed, lobes c. 4.5 mm long, apex bifid, the lobules rounded, short, folded inwards; stamens included within tube, filaments 1 mm long, inserted on base of tube, basally dilated, anthers elliptic, 1.5 mm long, apex mucronate, mucro long, deflexed; ovary cylindrical, glabrous, 2-loculed, each locule biovulate, stigma cap-like.

Berries broadly ellipsoid, 8–9 × 6–7 mm, red (drying black), glabrous.

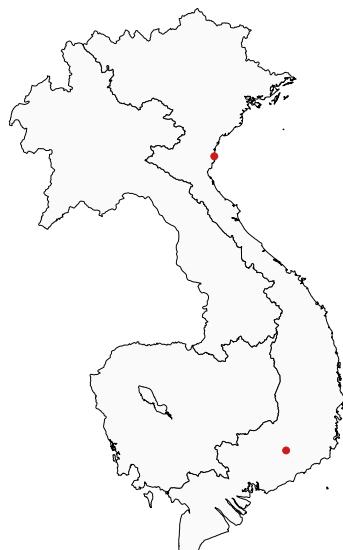
Distribution. Vietnam.

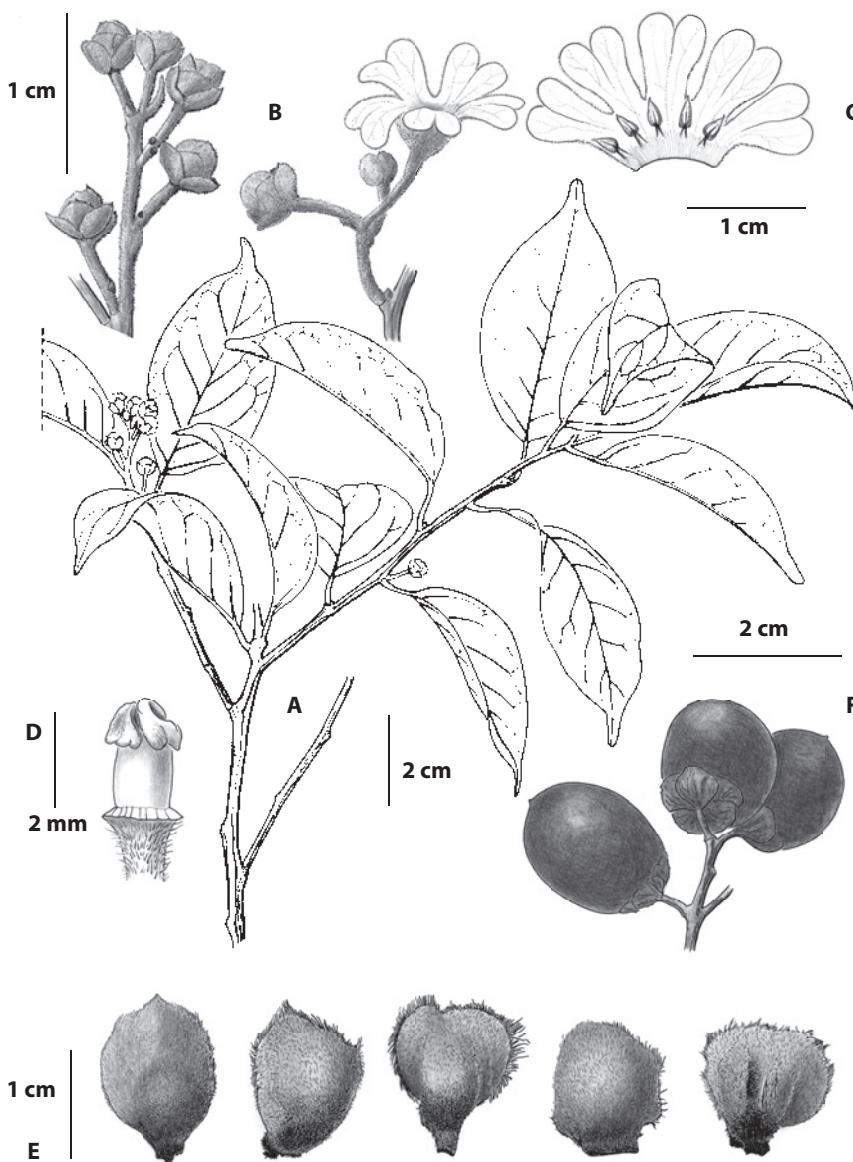
Ecology. Nothing recorded by collectors.

Notes. Gagnepain contrasted his *E. crassiuscula* against *E. henryi* Prain, a Taiwanese species, and pointed out several distinguishing characters that separate the two. Hoogland, in his nomenclatural review of *Erycibe*, tentatively maintained *E. crassiuscula* as a distinct species and pointed out that it may be no more than an aberrant, small-leaved variant of *E. elliptilimba*.

Material studied

Vietnam. Lam Dong: 'Haut Donai', near Blao Agricultural Station, 30 June 1933, Poilane 22783 (P).





Bernard Duhem 9/20/2015

8.3. *Erycibe crassiuscula* Gagnep. A, habit of flowering stem; B, inflorescences, buds (left), open flower (right); C, corolla opened, showing stamens; D, pistil; E, sepals, abaxial view, outermost (left) to innermost (right); F, fruits, showing persistent calyx. Drawn by Bernard Duhem. Vouchers: for A, B, F, Bon 5569 (P00260114); for E, Poilane 22783(P); C, D were adapted from a drawing by L. Courchet attached to Bon 5569.

3. *Erycibe elliptilimba* Merr. & Chun

	J	F	M	A	M	J	J	A	S	O	N	D

Erycibe elliptilimba Merr. & Chun, Sunyatsenia 2: 45 (1934); Hoogland, Blumea 7: 346 (1953); Hoogland in Ooststr., Fl. Males., Ser. I, Spermat. 4: 419 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 975 (1993); R.C.Fang & Staples, Fl. China 16: 279 (1995); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 162 (2005); Staples, Fl. Thailand 10: 391 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014).—Type: China, Hainan, H.Y. Liang 61534 (holo NY; iso B!, E!, K!, P!, P00260116).

Erycibe fecunda Kerr, Bull. Misc. Inform. Kew 1941: 10 (1941); Fl. Siam. 3 (1): 96 (1951).—Type: Thailand, Chaiyaburi, Kerr 8535 (holo K!; iso BK!, E!, K!, LI, TCD!).

Erycibe noei Kerr, Bull. Misc. Inform. Kew 1941: 11 (1941); Fl. Siam. 3 (1): 97 (1951).—Type: Thailand, Nakhon Ratchasima, Noe 210 (holo K!; iso BK!, E!, TCD!).

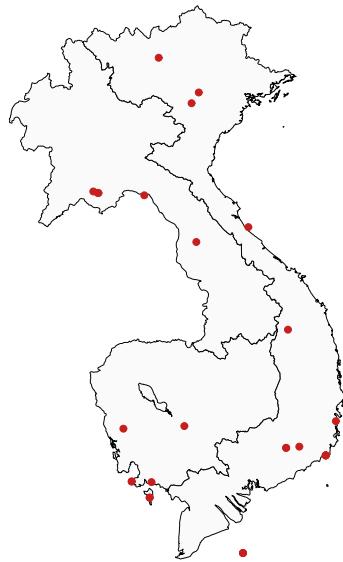
Erycibe poilanei Gagnep., Notul. Syst. (Paris) 14: 28 (1950).—Type: Cambodia, Kampot, Poilane 416 (holo P!, P00260138; iso P!, P00260139, P00260140).

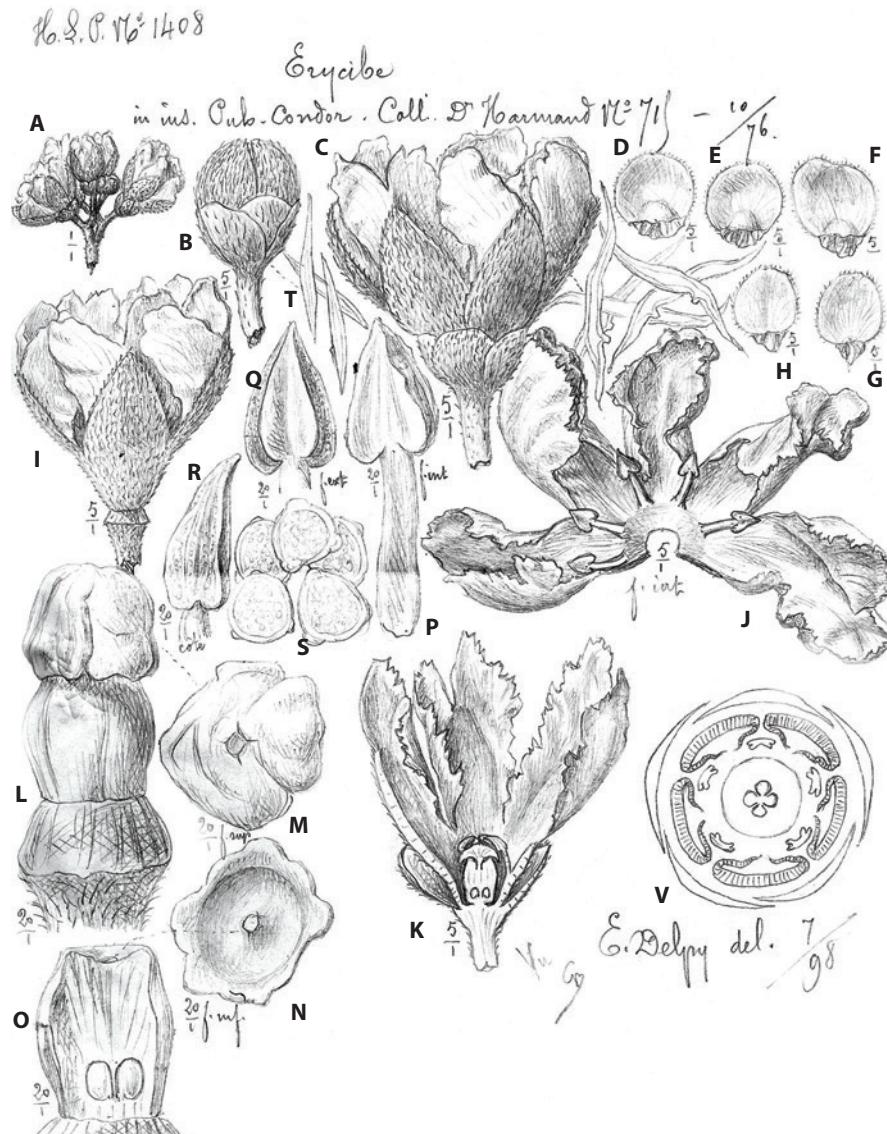
Erycibe rabilii Kerr, Bull. Misc. Inform. Kew 1941: 12 (1941); Fl. Siam. 3 (1): 97 (1951).—Type: Thailand, Nakhon Si Thammarat, Rabil 225 (holo K!, K000830544; iso B!, B_10_0272274, BK!, BK257825, K!, K000830545).

Erycibe paniculata auctt. non Roxb.: Gagnep. & Courchet, Fl. Indo-Chine 4: 305 (1915).

Lianas; stems 6–15(–20) m long, bases 16–30 cm diam.; twigs angulate-striate. Leaves broadly elliptic to oval-oblong, 9.0–15.0 × 4.5–7.5 cm, thickly coriaceous, glabrous, base obtuse, apex abruptly short acuminate; midvein slightly raised on undersides, secondary veins 5–7 either side of midvein, indistinct; petiole 13–30 mm.

Inflorescences 1–3 per node, axillary, racemose-paniculate, 1.5–11.0 cm long, rust-coloured pubescent with 2-armed trichomes, later glabrescent; pedicels 2–4 mm. Sepals suborbicular, 3–4 mm, densely pubescent outside, glabrate in fruit; corolla white (or yellow), c. 1.3 cm; lobules obovate to cuneate, 3.5–5.0 mm, margins slightly emarginate; stamens included, anthers lanceolate, apex acute-acuminate; ovary 1.3–1.6 mm, glabrous, stigma conical, 5-ridged.





8.4. *Erycibe elliptilimba* Merr. & Chun A, glomerule of flower buds; B, flower bud, lateral view; C, whole flower, lateral view; D-H, sepals, adaxial surfaces, outermost (D) to innermost (H); I, corolla, calyx removed, lateral view; J, corolla, opened, showing androecium; K, flower in longitudinal section; L, pistil, lateral view; M, stigma, seen from above; N, stigma, seen from below; O, ovary in longitudinal section, showing 2 ovules; P, stamen adaxial view; Q, stamen, abaxial view; R, stamen, lateral view; S, pollen grains; T, 2-armed trichomes from abaxial surface of sepal; U, 2-armed trichomes from abaxial surface of midpetaline band on exterior of corolla; V, floral diagram. Drawn by E. Delpy, July 1898. Voucher: Harmand 715 (P00260152, but note that this drawing is pinned on a different sheet: L. Pierre 1408, P00260125).

Berries ellipsoidal, c. 2 cm, smooth, black, with a paler apical scar.

Distribution. Cambodia, Laos, Vietnam, SE China and Thailand.

Ecology. Primary evergreen forest, secondary regrowth, thickets, edge of marsh, on diverse soils including clay, rocky, sandstone, and black humus; elevation: 500–1200(–1800) m.

Usage. Used as medicine for nausea and colds (*Vidal 4396*).

Vernacular names

Laos. 'nao duan 'ha (*Vidal 4396, 4429*), nao chian ha (*Vidal 2619*).

Vietnam. rêu a tinh (*Poilane 9000*), diă xa n (m n) (*Fleury 37856*), gu-an yunh (*Poilane 22396*), h r re ta m ng dan (*Poilane 9260*), cai dau l o (*Poilane 9001*), brus (*Poilane 23743*).

Material studied

Cambodia. Kampot: ca. 10 km E of Bokor, 20 Feb. 1974, *Abbe et al. 9654A* (K, SING). Koh Kong: Cheko, near Sihanoukville, 19 Jan. 1965, *Kira et al. 326* (BKF); Cheko, *collector unknown 825* (BKF); Veal Veng district, Yury Sakor logging concession, 20 May 1999, *Bansok 83* (A, K).

Laos. Attopeu: bassin d'Attopeu, ad flumen Sedom, Jan. 1877, *Harmand 34* (P). Bolikhamsay: Borikhane, env. Keng Sa Dok, 9 Feb. 1965, *Vidal 4396* (L, P). Champassak: Bassac, 1866–1868, *Thorel 2681 p.p.* (P). Vientiane: env. de Ban Keun, 12 Nov. 1965, *Vidal 4429* (P); env. de Vientiane, Ban Sak, 1952–53, *Vidal 2165* (P); Pak Kha Nhoung, pr s de Bankeun, Jan. 1954, *Vidal 2619* (P).

Vietnam. An Giang: "ad montem Diai, in prov. Chaudoc", Dec. 1867, *Pierre 1408* (A, E, K, P). Ba Ria-Vung Tau: Poulo Condor, *Germain 66* (P); *I. c.*, 1875–1877, *Harmand 715* (K, P); Sep. 1876, *Harmand 745* (P). Ha Tay: Mont Bavi, 2 Jun. 1918, *Fleury 37856* (P). Hoa Binh: massif de Nui Bien, pr s de Chobo, 6 Sep. 1926, *Poilane 13177* (P). Khanh Hoa: SE du massif de la M re et l'enfant, pr s de Nha Trang, 24 May 1923, *Poilane 6678* (P). Kien Giang: Cay shan, Da Bac, île de Phu Quoc, 29 Sep. 75, *Godefroy 871* (P); *I. c.*, Jan. 1874, *Pierre 1408* (A, K, P). Kon Tum: entre Giang Lo et Dak To, 7 Sep. 1930, *Poilane 18276* (BKF, P). Lam Dong: station agricole de Blao, "prov. du Haut Donai", 26 Apr. 1933, *Poilane 22396* (K, P); *I. c.*, 1 Jan. 1935, *Poilane 23743* (P); Bra n, pr s de Djiring, "prov. Haut Donai", Feb. 1935, *Poilane 24618* (P). Lao Cai: Khanh Yen Ha munic., S of Na Nheo village, 25 Mar. 2002, *Averyanov et al. HAL-2728* (SING). Ninh Thuan: Ca Na, "pro. Phanrang", 29 Nov. 1923, *Poilane 8896* (P); *I. c.*, 3 Dec. 1923, *Poilane 9000* (BKF, K, P); *Poilane 9001* (A, BKF, L, P); 22 Dec. 1923, *Poilane 9260* (P). Quang Binh: Phong Nha - Ke Bang National Park, near Ho Chi Minh road, 25 Mar. 2007, *Nguyen et al. HNK-2125* (K).

4. *Erycibe griffithii* C.B.Clarke



J F M A M J J A S O N D



J F M A M J J A S O N D

Erycibe griffithii C.B.Clarke, Fl. Brit. India 4: 182 (1883); Kerr, Fl. Siam. 3 (1): 96 (1951); Hoogland, Blumea 7: 349 (1953); Hoogland in Ooststr., Fl. Males., Ser. I, Spermat. 4: 411 (1953); P.H.Hô, Cây cỏ Việt Nam 2 (2): 976 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 162 (2005); Staples, Fl. Thailand 10: 392 (2010).—Type: Myanmar, Mergui, *Griffith s.n.* [Kew distr. 5880] (lecto K, designated by Hoogland (1953: 349)).

Erycibe cupreum Gagnep., Notul. Syst. (Paris) 14: 27 (1950).—Type: Vietnam, Núi Bach Ma, Poilane 29904 (lecto PI, P00260170, designated by Hoogland (1953); isolecto BISHI, BISH1001134).

Scandent shrubs or treelets; stems 8–10(–30) m long, bases 15–45 cm diam.; twigs striate-ridged. Leaves elliptic to oval-elliptic, 7.0–14.0 × 2.5–8.0 cm, chartaceous, glabrous, drying reddish on undersides, base acute to obtuse or rounded, apex acuminate, secondary veins 5–8 either side of midvein, prominent above, indistinct beneath; petiole 7–14 mm.

Inflorescences axillary, sometimes 2 or 3 together, to 3.5 cm long, usually 3–10-flowered; pedicels (2–)3–6(–7) mm. Sepals outer 2 broadly ovate or triangular-ovate, 2–3 × 2–3 mm, inner ones transverse-oval, 2.0–2.8 × 2.7–4.0 mm, densely stellate-hirsute outside; corolla white, c. 7 mm, tube 1.5–2.5 mm; midpetaline bands densely stellate-hirsute outside, lobules entire or slightly crenulate; anthers sessile on corolla tube, 0.4–0.5 mm long, truncate or retuse at both ends; ovary 1.5–2.0 × 1.0–1.5 mm, glabrous; stigma conical, c. 10-ridged.

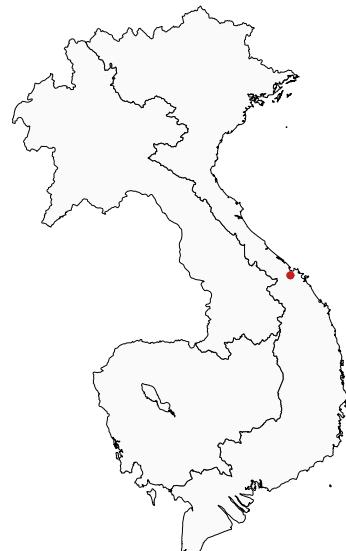
Berries ellipsoid, 26–40 × 20–23 mm, scurfy outside, ripening orange, apex tapering-obtuse.

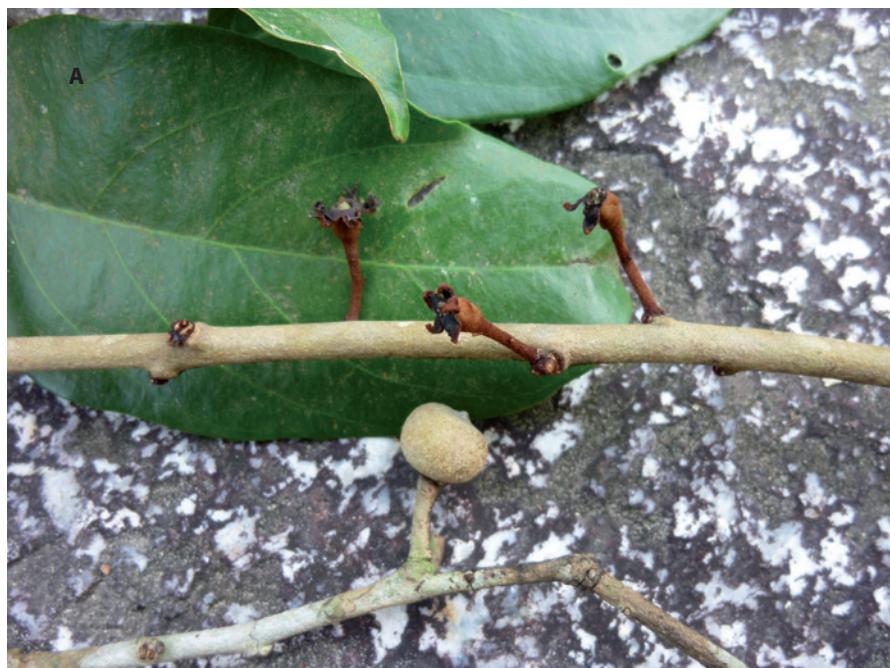
Distribution. Vietnam, Myanmar, Malaysia, Thailand.

Ecology. In primary forest on granitic-schistaceous soil; elevation: 500–1200 m.

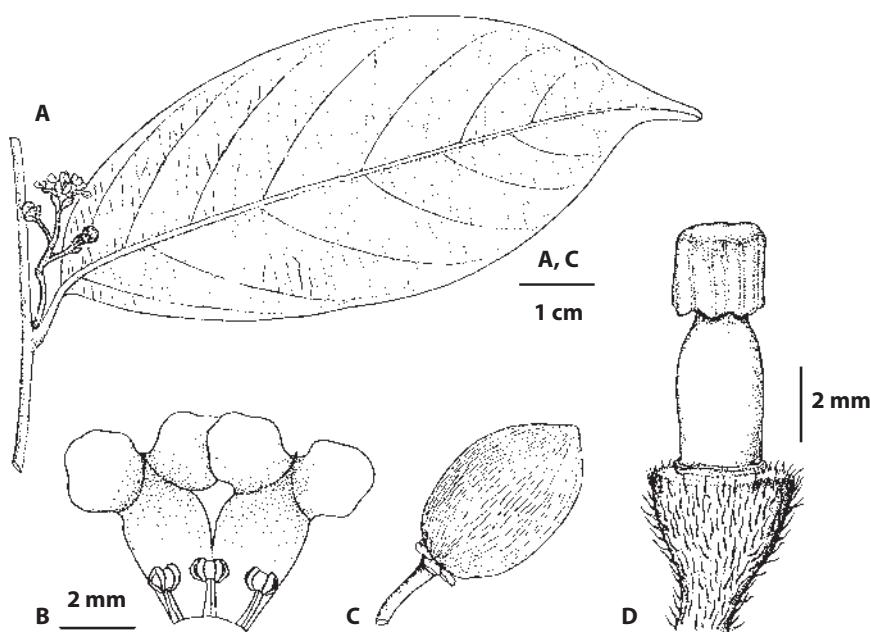
Material studied

Vietnam. Thua Thien-Hue: Nui Bach Ma Station, 20 Apr. 1939, Poilane 29846 (K, P, syntype of *E. cupreum*).





8.5. *Erycibe griffithii* C.B. Clarke A, habit, senescent flowers, young fruit; B, senescent flower, side view (credit: G. Staples; voucher: Thailand, Staples & Suddee 1493 (BKF)).



8.6. *Erycibe griffithii* C.B. Clarke A, leaf; B, opened corolla with stamens; C, fruit (Courtesy of Ooststroom & Hoogland 1953); D, pistil. Drawn by P. Inthachub (From Staples 2010).

5. *Erycibe hainanensis* Merr.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Erycibe hainanensis Merr., Philipp. J. Sci. 21: 353 (1922); Hoogland, Blumea 7: 349 (1953); P.H.Hô, Cây cỏ Việt Nam 2 (2): 976 (1993); R.C.Fang & Staples, Fl. China 16: 278 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 162 (2005).— Type: China, Hainan, MacClure C.C.C. 8547 (lecto A, designated by Hoogland (1953); isolecto K!, MO, NY, PI, P00260180).

Erycibe bachmaense Gagnep., Notul. Syst. (Paris) 14: 27 (1950).— Type: Vietnam, Núi Bach Ma, Poilane 29895 (lecto PI, P00260181, designated by Hoogland (1953); isolecto PI, P00260182).

Scandent shrubs, all axial parts densely reddish or brownish tomentose, trichomes simple or 2-armed; stems to 8 m long; branches terete, c. 5 mm diam. Leaves elliptic to oblong-elliptic, 6.5–18.0 × 3.5–8.0 cm, undersides densely reddish pubescent especially along midvein, upper side sparsely pubescent or glabrous, base obtuse to rounded, apex abruptly acuminate to acuminate; secondary veins 5–9 either side of midvein; petiole 5–10 mm long.

Inflorescences axillary or terminal, paniculate, 4–12 cm, densely flowered; pedicels 2–3 mm, robust. Sepals circular-reniform, 3–4 mm, densely reddish tomentose outside, margin ciliate; corolla white or greenish yellow, c. 1.2 cm, lobules broadly obovate, 3.5–4.0 mm, margins fimbriate; filaments c. 2 mm, base dilated, anthers deltoid, c. 1 mm, apex cuspidate; stigma capitate, 5-ridged.

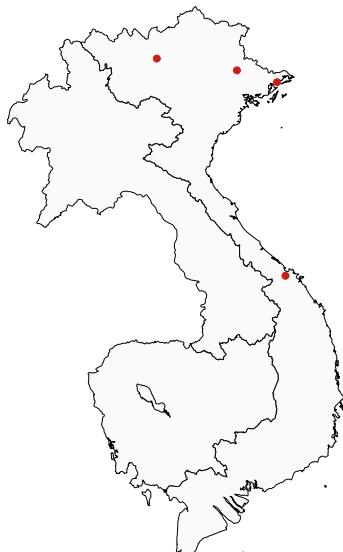
Berries ellipsoid, 2.0–2.8 cm, yellow, apex with paler cap-like scar.

Distribution. Vietnam, China.

Ecology. Forest on granitic-schistaceous soil; elevation 1000–1200 m.

Material studied

Vietnam. Lang Son: Van Linh, 4 Jul. 1941, Pételet 6919 (P). Lao Cai: Khanh Yen Ha munic., S of Na Nheo village, 24 Mar. 2002, Averyanov et al. HAL-2690 (MO, SING). Quang Ninh: Sai Wong Mo Shan (Sai Vong Mo Leung), Lung Wan village, Dam Ha, 18 May–5 July 1940, Tsang 30147 (B, BKF, C, E, K, L, P, SING, UPS).



6. *Erycibe obtusifolia* Benth.



Erycibe obtusifolia Benth., Fl. Hongk. 236 (1861); Hoogland, Blumea 7: 352 (1953); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 976 (1993); R.C.Fang & Staples, Fl. China 16: 279 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 162 (2005).— Type: China, Hong Kong, Makikis 165 (lecto K, K000830565, designated by Hoogland (1953)).

Erycibe boniana Gagnep., Notul. Syst. (Paris) 3: 137 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 309 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990).— Type: Vietnam, Ninh Bình, Bon 4333 (lecto Pl, P00260083, designated by Hoogland (1953); isolecto Pl, P00260084, P00260085, P00260086, P00260275).

Lianas; stems 4–20 m, bases to 5 cm diam., glabrous except for inflorescences; branchlets distinctly striate-angular. Leaves elliptic or obovate, 6.9–9.0 × 2.5–4.0 cm, leathery, base cuneate, apex obtuse, acute, or shortly acuminate; secondary veins 4–6 either side of midvein, slightly raised on underside; petiole 8–12 mm.

Inflorescences terminal or axillary, 4–15 cm long; pedicels 4–6 mm. Sepals circular, c. 3 mm diam., ± dull yellow pubescent outside with 2-armed trichomes, later glabrate; corolla white, 8–10 mm long, lobules broadly elliptic, undulate; stamens unequal, filaments c. as long as anthers, anther apex acuminate; ovary ellipsoidal (drum-shaped), glabrous, stigma conical, spirally ridged.

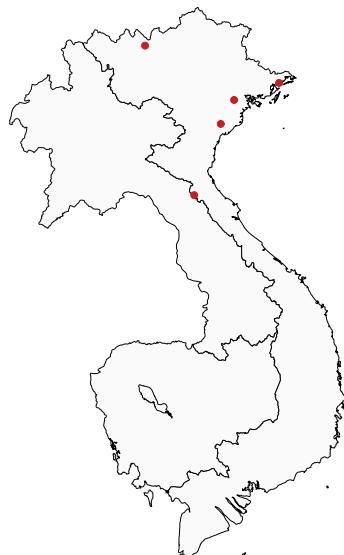
Berries ovoid-ellipsoidal, 1.4–2.0 cm, red to yellow.

Distribution. Vietnam, China.

Ecology. In forests, without details; elevation 1500 m.

Material studied

Vietnam. Ha Noi: Ninh Thai, Ngoc Son, 5 Jan. 1888, Bon 3576 (P). Ha Tinh: Ngam Thiep region, 12 May 1998, Hiep et al. VA-503 (SING). Lao Cai: Chapa, Aug. 1930, Pételet 3815 (P). Quang Ninh: Sai Wong Mo Shan (Sai Vong Mo Leng), Lomg Ngong village, Dam Ha, 18 July–9 Sept. 1940, Tsang 30362 (B, BKF, C, E, L, P, SING).



7. *Erycibe oligantha* Merr. & Chun

	J	F	M	A	M	J	J	A	S	O	N	D

Erycibe oligantha Merr. & Chun, Sunyatseria 5: 175 (1940); Hoogland, Blumea 7: 352 (1953); R.C.Fang & Staples, Fl. China 16: 279 (1995).—Type: China, Hainan, F.C. How 73077 (holo A; iso BISH!, BISH1001139, BM, BO, G, PI, P00260207).

Scandent shrubs, all axial parts nearly glabrous; stems 4–7 m long, branchlets striate, grey. Leaves elliptic or narrowly ovate or obovate, 8–19 × 4–8 cm, thinly coriaceous, underside glabrous, base broadly cuneate, apex rounded or abruptly acuminate; secondary veins 8 or 9 either side of midvein; petiole 6–10 mm, drying dark orange-brown.

Inflorescences axillary, racemose, 1.5–2.0 cm, red-brown sericeous, few-flowered; bracteoles c. 1 mm long; pedicels c. 3 mm. Sepals circular, convex, 2–3 mm diam., appressed pubescent outside, ciliate, glabrescent in fruit; corolla white to pale yellow, c. 7 mm, midpetaline bands appressed rust-coloured pubescent, lobules oblong-ovate, nearly entire; anthers ovoid or oblong-ovoid, c. 1.5 mm, apex acuminate; ovary glabrous; stigma capitate, 5-ridged.

Berries ellipsoid, 2.0–2.5 cm long, glabrous, apex mucronulate.

Distribution. Vietnam, China (Hainan).

Ecology. In secondary forest on clay or limestone soil; elevation 1100 m.

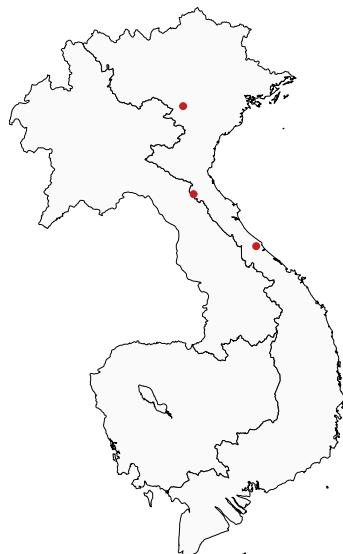
Notes. Three collections from Vietnam are here referred to *E. oligantha*; flowers are lacking so the identification is uncertain, but the leaves and young fruiting sepals agree well with Chinese material of *E. oligantha*.

Vernacular name

Vietnam. dây rat gà (*Poilane 1086*).

Material studied

Vietnam. Ha Tinh: Huong Son distr., Rao An Ngam Thep village, *Hiep et al. VA-5* (K). Hoa Binh: Mai Chau district, Pa Co, 23 Sept. 2005, *Vu et al. HNK-814* (K). Quang Tri: Ben Tham, 8 Mar. 1920, *Poilane 1086* (P).



8. *Erycibe schmidtii* Craib



Erycibe schmidtii Craib, Bot. Tidsskr. 32: 352 (1916); Kerr, Fl. Siam. 3 (1): 98 (1951); Hoogland, Blumea 7: 355 (1953); P.H.Hô, Cây cỏ Việt Nam 2 (2): 977 (1993); R.C.Fang & Staples, Fl. China 16: 279 (1995); T.N.Nguyễn & Đ.H.Dúóng, Checkl. Pl. Sp. Vietnam 3: 162 (2005); Staples, Fl. Thailand 10: 394 (2010).— Type: Thailand, Trat, Koh Chang, Schmidt 686B (iso K!, K000830578).

Erycibe semipilosa Gagnep., Notul. Syst. (Paris) 14: 28 (1950).— Type: Vietnam, Nha-trang, Poilane 6193 (lecto Pl, P00260252, designated by Hoogland (1953); isolecto K!, Pl, P00260251).

Erycibe laevigata auctt. non Choisy: Gagnep. & Courchet, Fl. Indo-Chine 4: 306 (1915).

Scandent shrubs; stems 5–12 m long; branchlets terete, angular, lenticellate, appressed brownish puberulous, glabrescent. Leaves oblong-elliptic or narrowly elliptic, 7.0–12.0 × 2.5–6.0 cm, subcoriaceous, both sides glabrous, base broadly cuneate, apex acuminate, obtuse; secondary veins usually 8 (7–10) either side of midvein, indistinct; petiole 10–35 mm.

Inflorescences terminal [or axillary], racemose [or paniculate], 2–7 cm, peduncles rust-coloured puberulous, glabrescent; pedicels 2–5 mm. Sepals unequal, margins ciliolate, outer 2 (sub) orbicular, 3–4 mm, glabrate, inner 3 elliptic, c. 5 mm, densely velutinous outside; corolla c. 8 mm, white, midpetaline bands densely sericeous, lobules obcordate, margins erose; anthers conical, 2.0–2.5 mm, apex long acuminate; ovary cylindrical, c. 2 mm, stigma peltate, wider than ovary, conical, spirally 5-ridged.

Berries (immature) ellipsoid, c. 10 × 7 mm, apiculate, dark, glabrous.

Distribution. Cambodia, Vietnam and also NE India, Myanmar, S China, Thailand.

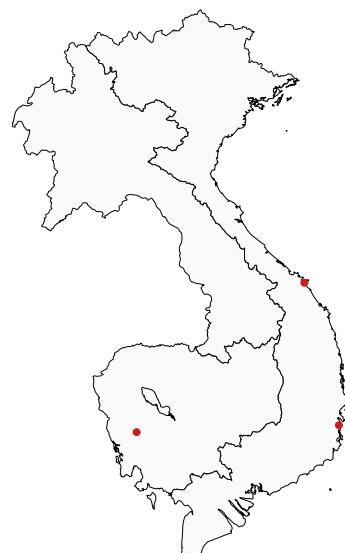
Ecology. In forest on sandy-clayey to rocky soils; elevation: 300–900 m.

Notes. *Erycibe schmidtii* remains enigmatic, despite having been described in several floristic accounts (loc. cit.). The type material at K is too scrappy to form a reasonable species concept. The few leaves and disarticulated inflorescences could not now be matched with most of the protologue, viz. terminal position of a 3 cm. long racemose inflorescence. A few specimens are tentatively assigned here.

Material studied

Cambodia. Kompong Speu: in montibus Aural, in "prov. Samrong tong", 28 Apr. 1870, Pierre 867 (P).

Vietnam. Da Nang: col des nuages, près de Tourane, 18 Sep. 1923, Poilane 8068 (P).



9. *Erycibe subspicata* Wall. ex G.Don

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Erycibe subspicata Wall. ex G.Don, Gen. Hist. 4: 392 (1838); Kerr, Fl. Siam. 3 (1): 98 (1951); Hoogland, Blumea 7: 357 (1953); P.H.Hô, Cây cỏ Việt Nam 2 (2): 977 (1993); R.C.Fang & Staples, Fl. China 16: 278 (1995); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 162 (2005); Staples, Fl. Thailand 10: 395 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014).— Type: Myanmar, Martaban, Wallich Cat. 1332 (holo K-W!; iso B!, G-DC!).

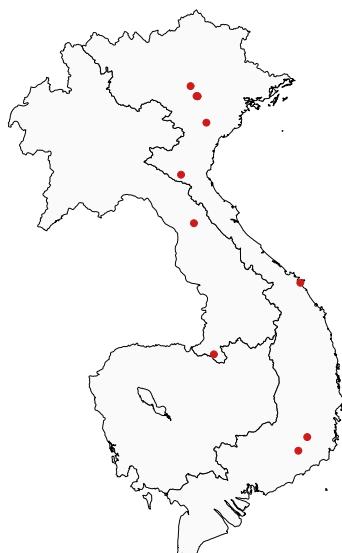
Scandent shrubs; stems 5–15 m long; twigs terete, rust-coloured pubescent, later glabrescent. Leaves oblong, lanceolate-oblong, or elliptic, 7.0–18.0 × 2.5–5.5 cm, coriaceous, shiny, base cuneate or rounded, apex cuspidate, rarely acuminate, upper side glabrous, glossy, underside sparsely pubescent with 2-armed trichomes, or subglabrous; secondary veins 6 or 7 either side of midvein; petiole 6–10 mm, rust-coloured pubescent.

Inflorescences terminal, elongate, paniculate, 7–20 cm, axes densely rust-coloured pubescent; bracts scale-like, < 2 mm long; pedicels c. 4 mm. Flowers fragrant; sepals broadly elliptic to suborbicular, subequal, 3.0–3.5 mm, densely rust-coloured pubescent outside; corolla yellow, cream, or white, 12–14 mm, lobules semicircular, margins erose-dentate; anthers conical, 1.0–1.5 mm; ovary cylindrical, < 1 mm long, stigma broader than ovary, conical, coarsely wrinkled-ridged.

Berries ellipsoid-oblong, 20–23 × 10 mm, black, often apiculate.

Distribution. Cambodia?, Laos, Vietnam and NE India, Myanmar, China (Yunnan), Thailand. Although no collections from Cambodia have been seen, it seems likely the species occurs there.

Ecology. Margins and clearings in forests on rocky soil; elevation: 600–1000 m.



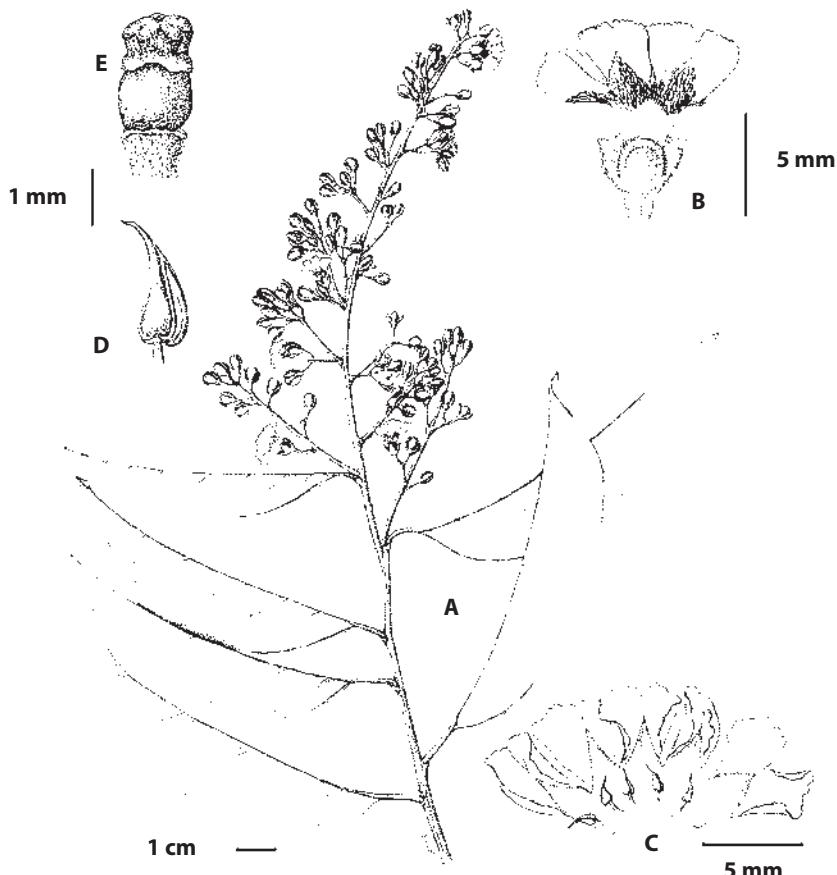
Vernacular name

Vietnam. cras (Poilane 23998).

Material studied

Laos. Champassak: Khong Island, 14 Sep. 1998, Maxwell 98-944 (L). Khammouane: Nakai district, near Ban Done: 9 Oct. 2006, Nanthavong *et al.* BT-728 (E, P).

Vietnam. Da Nang: Lien Chieu, près de Tourane, 17 Aug. 1923, Poilane 7577 (P). Ha Noi: près de Tu Phap, 18 Nov.



8.7. *Erycibe subspicata* Wall. ex G.Don A, habit; B, flower; C, opened corolla with stamens; D, stamen; E, pistil. Drawn by P. Inthachub (From Staples 2010).



8.8. *Erycibe subspicata* Wall. Flowers (credit: Rachun Pooma, BKF; voucher: Thailand, not collected).

1888, *Balansa* 4067 (K, P). Lam Dong: pied au Bräan, près de Djiring, près du village des Sam Rong Tho, 29 Jan. 1935, *Poilane* 23998 (K, L, P); route de Dalat, 21 Oct. 1930, *Poilane* 18557 (P). Nghe An: Gianh river, Khe Lo village, Luc Dia, Con Cuong, 17 Oct. 2008, Du et al. HNK3162 (K). Ninh Binh: Cuc Phuong National Park, slope NE of Bong, 19 Mar. 1999, Soejarto & Cuong 10623 (L). Phu Tho: Phu-Tho, Eberhardt 4488 (P).

10. *Erycibe tixieri* Deroin

	J	F	M	A	M	J	J	A	S	O	N	D
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Erycibe tixieri Deroin, Adansonia 17: 184 (1995).—Type: Vietnam, Lâm Đồng, Dran, Poilane 30193 (holo Pl, P00260281; iso K!, LI, L0056168, Pl, P00260282).

Lianas; stems exceeding 5 m long, young stems pubescent at first, later glabrescent, striate. Leaves oblong to obovate, 4.0–14.0 × 1.4–6.2 cm, chartaceous, both sides glabrescent, concolorous, base cuneate, apex acuminate, acumen 1.0–1.5 cm long; midvein impressed on upper surface, prominent underneath, secondary veins 6–9 either side of midvein, prominulous on both sides; petiole 6–14 mm long, 2–4 mm thick, prominently sulcate adaxially, pubescent at first, later warty.

Inflorescences terminal, thyrsoid, comprising 30–40 flowers grouped in cymules of 1–5 flowers; bracts foliose, pubescent on both sides, margins ciliate, lower ones petiolulate 1–2 mm, blade 10–30 × 5 mm, upper ones becoming sessile and reduced in size. Flowers not opened; sepals orbicular, convex, c. 2.5 × 2.5 mm, outside densely stellate pubescent, margins ciliate; corolla in bud covered apically with stellate trichomes, 1 arm much longer than the rest; stamens (in bud) c. 2 mm long, subsessile, apical appendage triangular-acuminate; ovary ovoid-columnar, c. 1 mm long, glabrous, 1-locular, 4-ovulate, stigma sessile, prominently 5-ridged.

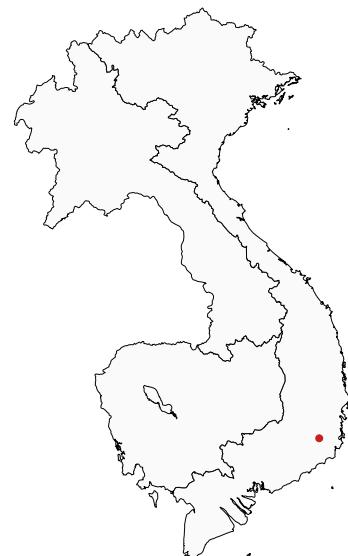
Berries unknown.

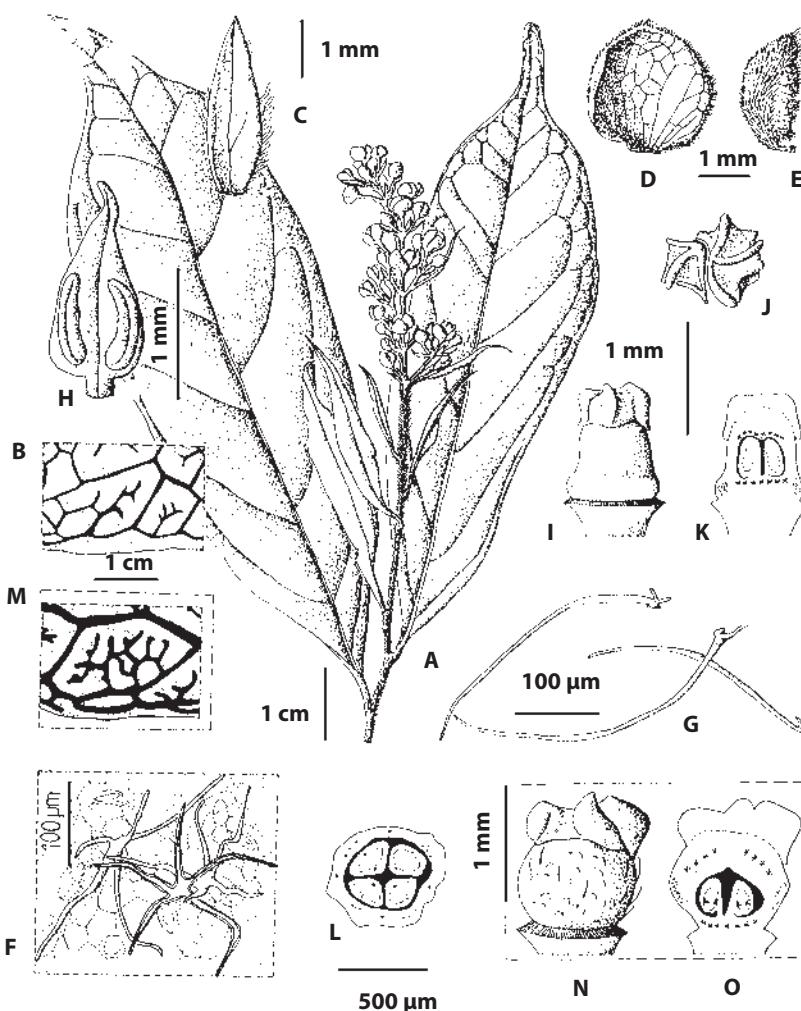
Distribution. Vietnam.

Ecology. Collected once at an elevation of 1000 m on rich, basaltic soil.

Material studied

Known only from the type collection.





8.9. A–L, *Erycibe tixieri* Deroin. A, shoot tip and inflorescence; B, marginal veinlets in leaf; C, bract; D, sepal in adaxial view; E, sepal in side view; F, enlarged surface of abaxial sepal face; G, branched trichomes from abaxial (outer side) corolla; H, stamen; I, pistil; J, stigma, viewed from above; K, pistil in longitudinal section; L, ovary in transverse section, showing 4 ovules; M–O, *Erycibe subspicata* Wall. ex G. Don. M, marginal veinlets in leaf; N, pistil; O, pistil in longitudinal section. Symbols in K, L, O: stippling = nectariferous tissue; stars = calcium oxalate crystals. Drawn by T. Deroin. Vouchers: *E. tixieri*, Poilane 30193 (P); *E. subspicata*, Poilane 23998 (P) (From Deroin & Falaise 1995).



Approximately 100 species: all native in the Americas (southern North America to South America), with two species widely naturalized in the tropical and subtropical regions of the Old World; both of these occur in CLV. Ooststroom (1934) has monographed the genus and his work remains the definitive study.

9. *Evolvulus* L.

Sp. Pl. ed. 2, 391 (1762); Gagnep. & Courchet, Fl. Indo-Chine 4: 302 (1915); Ooststr., Meded. Bot. Mus. Herb. Rijks. Univ. Utrecht. 14: 1–267 (1934), Blumea 3: 74 (1938), Fl. Males., Ser. I, Spermat. 4: 395 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 15 (1993); T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 42 (1988); R.C.Fang & Staples, Fl. China 16: 275 (1995); T.N.Nguyễn & Đ.H.Dùong, Checkl. Pl. Sp. Vietnam 3: 163 (2005); Staples, Fl. Thailand 10: 395 (2010); Staples et al., Thai J. Bot. 6: 82 (2014).—Type: *Evolvulus nummularius* (L.) L.

Herbs, subshrubs, or shrubs; stems never twining. Leaves petiolate or sessile; leaf blade entire.

Inflorescences axillary cymes, solitary, or several in terminal spikes or capitula; peduncles and pedicels usually present (or absent); bracts present, tiny to foliaceous. Flower sepals free, subequal; corolla rotate, funnelform, or salverform, limb entire to 5-lobed, midpetaline bands often pilose outside; stamens included or exserted; pollen globose, rugate, not spiny; pistil included or exserted, disc cupular or absent, ovary 2-locular, 4-ovuled, styles 2, filiform, free or united basally, each style 2-cleft, stigmas 4, filiform, terete or minutely capitate.

Fruits dehiscent capsules, usually 4-valved. Seeds 1–4, smooth or minutely tuberculate, glabrous.

Notes

Evolvulus glomeratus Nees & Martius subsp. *grandiflorus* (Parodi) Ooststr., native to Brazil, is cultivated globally as an ornamental, and is probably found throughout Southeast Asia. A mounding herb with whitish-sericeous leaves, it has sky blue flowers 1.4–1.8 cm diam., clustered at the stem tips. It does not produce capsules in cultivation. It is included in the key but given no further treatment.

Key to the species

1. Stems prostrate, rooting at nodes; leaves in 2 opposite rows (distichous), blades orbicular to broadly oblong, apex rounded to emarginate **2. *E. nummularius***
- . Stems decumbent, ascending to erect; leaves spirally arranged, blades lanceolate, oblong, ovate-oblong, elliptic, linear or spatulate, apex obtuse to acute..... **2**
 2. Flowers clustered near stem tips, 1 per axil of uppermost leaves; peduncles none or very short (flowers appear sessile); corolla 1.4–1.8 cm diam.; fruits not produced ***E. glomeratus* subsp. *grandiflorus***
 - . Flowers spread along entire stem, 1–3 per leaf axil; peduncles present, shorter to longer than subtending leaf; corolla 7–8 mm diam.; fruits numerous, capsules on deflexed pedicels **1. *E. alsinoides***

1. *Evolvulus alsinoides* (L.) L.

	J	F	M	A	M	J	J	A	S	O	N	D
					J	F	M	A	M	J	J	A

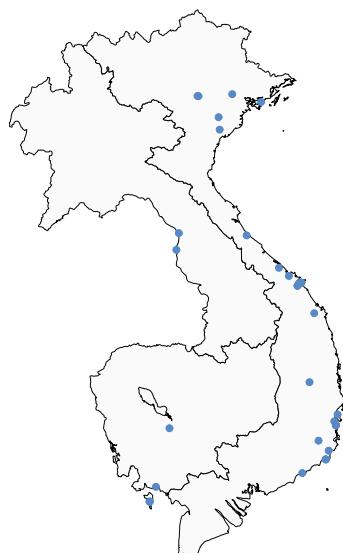
Evolvulus alsinoides (L.) L., Sp. Pl. ed. 2: 392 (1762); Gagnep. & Courchet, Fl. Indo-Chine 4: 303 (1915); Ooststr., Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 14: 26 (1934); Blumea 3: 74 (1938); Fl. Males., Ser. I, Spermat. 4: 395 (1953); Kerr, Fl. Siam. 3 (1): 89 (1951); T.N.Nguyễn in Averyanov *et al.*, Materialy po flore i rastitelnosti ostrovogno V'etnama 42 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 176 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 970 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 16 (1993); R.C.Fang & Staples, Fl. China 16: 276 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 163 (2005); Staples, Fl. Thailand 10: 397 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014). – *Convolvulus alsinoides* L., Sp. Pl. 1: 157 (1753). – Type: Sri Lanka, Herb. Hermann 3: 55, no. 76 (lecto BM, BM000628009, designated by Verdc., Fl. Trop. E. Africa, Convolvul. 18 (1963)).
Evolvulus alsinoides var. *sericeus* (Wall.) Gagnep. & Courchet, Fl. Indo-Chine 4: 304 (1915); Ooststr., Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 14: 37 (1934), *nomen invalidum*.
Evolvulus alsinoides var. *linifolius* auctt. non (L.) Baker: Gagnep. & Courchet, Fl. Indo-Chine 4: 304 (1915).

Perennial herbs; stems prostrate or ascending; trichomes appressed and spreading. Leaves nearly sessile, blades lanceolate, oblong, ovate-oblong, elliptic, linear or spatulate, 7–25 × 5–10 mm; petiole 0–2 mm long.

Inflorescences 1- to few-flowered cymes; peduncles filiform, 25–35 mm; bracts linear-subulate to linear-lanceolate, 1.5–4.0 mm. Sepals lanceolate, 3–4 mm, villous; corolla rotate, 7–10 mm diam., pale to vivid blue or blue-purple, centre white; stamens exserted, filaments basally adnate to corolla tube, filiform above, anthers oblong, white; pistil exserted, ovary glabrous, stigmas 4, filamentous, white.

Capsules globose, tan, glabrous. Seeds 4 or fewer, black, smooth.

Distribution. Cambodia, Laos, Vietnam and widespread throughout the Old World tropics; a pantropical weedy species originally native in tropical America, but widely distributed through human dispersal.

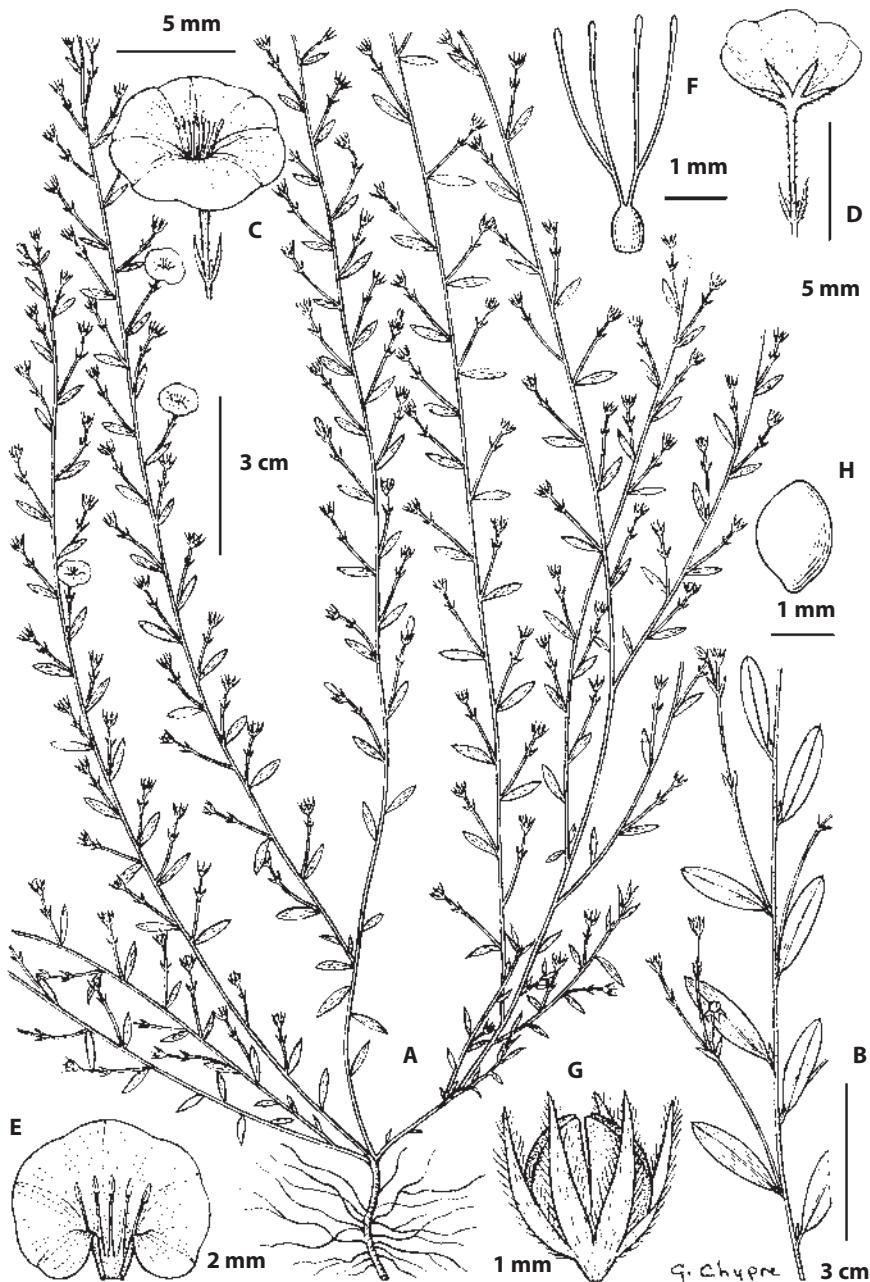




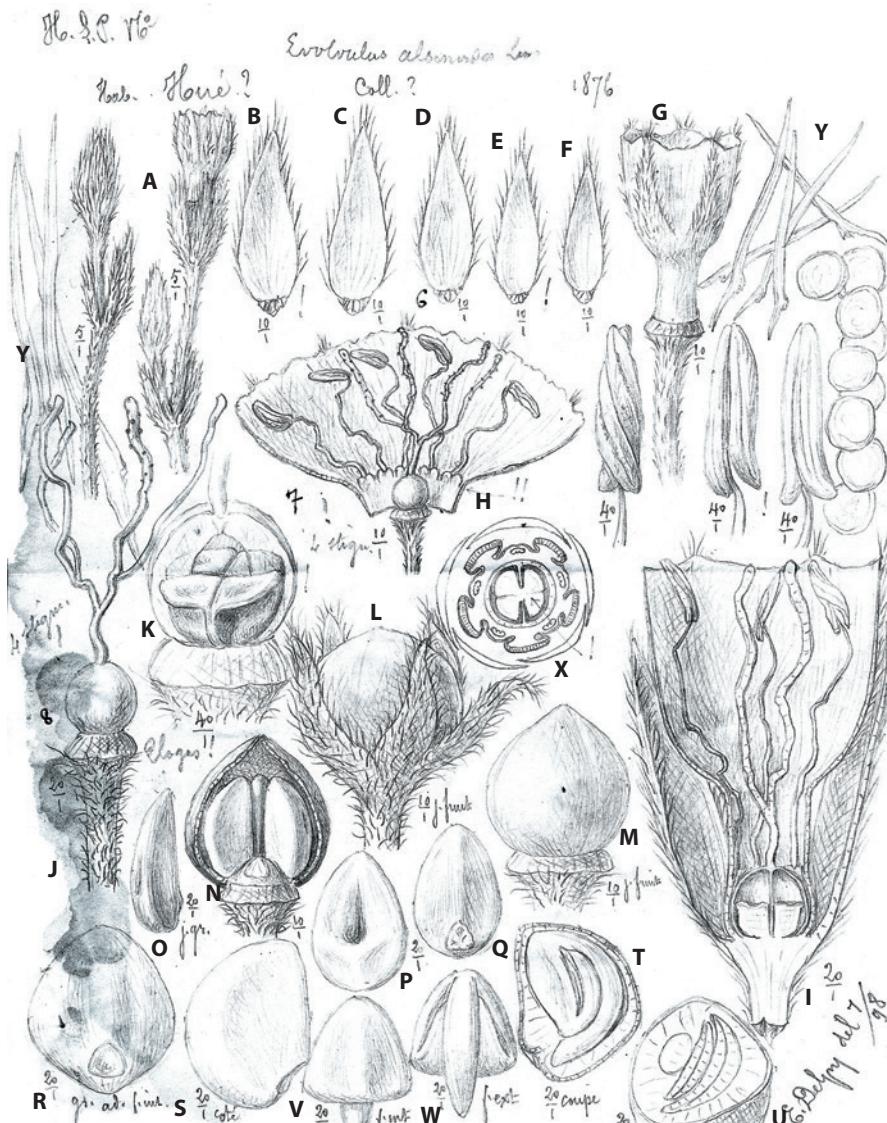
9.1. *Evolvulus alsinoides* (L.) L. A, habit; B, flower; C, fruit (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Ecology. Characteristically found in impoverished habitats with intense insolation: on sandy or rocky, nutrient poor soils, in dry to dessicated habitats, often on sandy sea beaches; elevation from sea level to 300 m.

Notes. *Evolvulus alsinoides* is a highly polymorphic species. In the *Flore générale de l'Indochine*, Gagnepain and Courchet attempted to segregate two varieties among Indochinese specimens. A few years later, in his monograph, Ooststrom (loc. cit. 1934) recognized 15 intergrading varieties world-wide, based mostly on habit, leaf arrangement, and hairiness; he cited specimens from the CLV area under the following: typical variety *alsinoides*;



9.2. *Evolvulus alsinoides* (L.) L. A, flowering plant, habit; B, flowering shoot of a well-developed plant; C, D, flowers; E, corolla opened, showing stamens; F, pistil; G, capsule enclosed in calyx; H, seed. (A, Vieillard 1018; C-H, MacKee 34535) (From Heine 1984).



9.3. *Evolvulus alsinoides* (L.) L. A, inflorescence branches with buds and flower; B–F, sepals, adaxial surfaces, outermost (B) to innermost (F); G, flower, calyx removed, lateral view; H, corolla, opened, showing androecium and gynoecium; I, flower in longitudinal section; J, pistil; K, ovary, partly cut away showing 4 ovules; L, young fruit with calyx; M, capsule, calyx removed; N, capsule, one valve removed; O, immature seed, lateral view; P, immature seed, abaxial view; Q, immature seed, adaxial view; R, mature seed, adaxial view; S, mature seed, lateral view; T, seed in longitudinal section, showing embryo; U, seed in cross-section, showing embryo; V, W, embryo; X, floral diagram; Y, 2-armed trichomes from plant body. Drawn by E. Delypy, July 1898. Voucher: unknown collector s.n. (P03849627).

transitional specimens between var. *alsinoides* and var. *debilis* (Kunth) Ooststr.; var. *decumbens* (R.Br.) Ooststr.; transitional specimens with the morphology of var. *decumbens* and the indumentum resembling var. *javanicus* (Blume) Ooststr.; and numerous Indochinese specimens that he did not assign to any variety. Most significantly, the two varieties accepted by Gagnepain and Courchet were not recognized among Indochinese specimens! Given the extraordinary intergradation in Southeast Asian *E. alsinoides*, I do not recognize any varieties here, but adopt a single polymorphic species concept.

Vernacular names

Vietnam. rõ anh (*Poilane* 20885), rok si-rit (Jörai, *Dournes* s.n.).

Material studied

Cambodia. Kampot: 1870, *Pierre* s.n. (E). Kompong Chhnang, 6 June 1875, *Godefroy* 960 (P). Kompong Speu: ad montem Reang Khong, May 1870, *Pierre* 999 (P).

Laos. s. loc.: *Counillon* s.n. (P); *Massie* s.n. (P). Khammouane: entre la Sé Bang Fai et Takhet, 19 Oct. 1938, *Poilane* 28157 (P); Km 30, Thakhek to Phong Tiou, 12 Apr. 1950, *Vidal* 1213 (P).

Vietnam. s. loc.: "Tonkin", *Duport* s.n. (P); *Lecomte & Finet* s.n. (P); 1883–1891, *Bon* 275 (P); *Bon* 518 (P). Binh Thuan: Phan Thiet, 25 Oct. 1924, *Evrard* 1533 (P). Dac Lac: Hau Bon (Cheo Reo), Aug. 1967, *Dournes* s.n. (P); km 46 route Ban Mi Thuot to Ninh Hoa, *Schmid* s.n. (P). Da Nang: Tourane, Mar.-Apr 1883–1885, *Couderc* s.n. (P); highway near sea between Namo & Tourane, 5–9 Sept. 1927, *Clemens & Clemens* 4489 (P); Jan. 1837, *Gaudichaud* s.n. (P); env. de Tourane, 20 Feb. 1939, *Poilane* 28935 (P); village Thuy-loan, 8 Oct. 1909, *Bauche* 92 (P); l. c., 18 Oct. 1909, *Bauche* 104 (P). Hai Duong: "Tonkin", Sept-Pagodes, Aug. 1908, *Mouret* 231 (P). Ha Nam: Kien Khe, in collibus Dong Ham, 5 Mar. 1883, *Bon* 2082 (P); l. c., 23 Apr. 1883, *Bon* 2082 (P). Ha Noi: vallée de Baa Tai, à la base du Mont Bavi, 15 May 1888, *Balansa* 3533 (P); Tu Phap, au bord des sentiers, June 1887, *Balansa* 3534 (P). Hoa Binh: près de Phuong Lam, 10 Nov. 1887, *Balansa* 3532 (P). Ho Chi Minh Ville: à 10 km du Cap, route de Saigon, 21 Oct. 1920, *Evrard* 122 (P); Thi duc, Mar. 1866, *Pierre* s.n. (P). Khanh Hoa: bord de la route de Ba Ha, "prov. Nhatrang", 29 Apr. 1923, *Poilane* 6111 (P); Dong Bo, "prov. Nha Trang", 9 Mar. 1922, *Poilane* 2739 (P); île de la Tortue, près de Nha Trang, 6 Apr. 1922, *Poilane* 2911 (P); Nha Trang, 21 Nov. 1911, *Lecomte & Finet* 1364 (P); Nha-Trang vic., 11–26 Mar. 1911, *Robinson* 1046 (P); Suoi Dau, "prov. Nha Trang", 5 Jan. 1966, *Vidal* 4871 (P). Kien Giang: Phu quoc, bords de la mer, 17 Oct. 75, *Godefroy* 939 (P); *Godefroy* 940 (P); l. c., Jan. 1874, *Pierre* 31 (P). Ninh Binh: Cho Ganh, Oct. 1922, *Pételot* 741 (P). Ninh Thuan: Ca Na, "prov. Phanrang", 8 Nov. 1923, *Poilane* 8499 (P); l. c., 19 Oct. 1925, *Poilane* 12354 (P); l. c., 19 Aug. 1922, *Poilane* 20885 (P); Krong Pha, 23 June 1921, *Hayata* 990 (P); de Phan Rang à Tour cham, 24 Nov. 1911, *Lecomte & Finet* 1409 (P). Quang Binh: village de Thach Xa Xa, dunes à 4 km de la mer, July 1930, *Pételot* 4153 (P). Quang Ngai: Dong Phu, dunes littorales, June 1934, *Pételot* 5354 (P). Quang Ninh: Baie d'Along, île oun Bichy, 8 Nov. 1911, *Lecomte & Finet* 781 (P). Thua Thien-Hue: Phu Loc district, Bach Ma Natl. Park, 25 Apr. 2003, *Averyanov & N.T. Vinh* HLF-1323 (MO); Quang Tri River, near sea, 30 Oct. 1927, *Squires* 384 (E, P, SING). Tuyen Quan: forêt de Dap Can, Dec. 1885, *Brousmiche* 314 (P).

2. *Evolvulus nummularius* (L.) L.



J F M A M J J A S O N D



J F M A M J J A S O N D

Evolvulus nummularius (L.) L., Sp. Pl. ed. 2, 391 (1762); Ooststr., Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 14: 114 (1934); Fl. Males., Ser. I, Spermat. 5: 558 (1958); P.H.Hô, Cây cỏ Việt Nam 2 (2): 970 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 19 (1993); R.C.Fang & Staples, Fl. China 16: 276 (1995); Staples, Fl. Thailand 10: 399 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014). – *Convolvulus nummularius* L., Sp. Pl. 1: 157 (1753). – *Volvulopsis nummularia* (L.) Roberty, Candollea 14: 28 (1952); Sarma *et al.*, Curr. Sci. 93: 826–831 (2007). – Type: [icon] ‘*Convolvulus minor repens, nummulariae folio, flore coeruleo*’ in Sloane, *A voyage to the islands Madera, Barbados, Nieves, S. Christopher and Jamaica* 1: 157, t. 99, fig. 2 (1707) (lecto, designated by Verdc. in Jarvis *et al.*, Regnum Veg. 127: 16 (1993)).

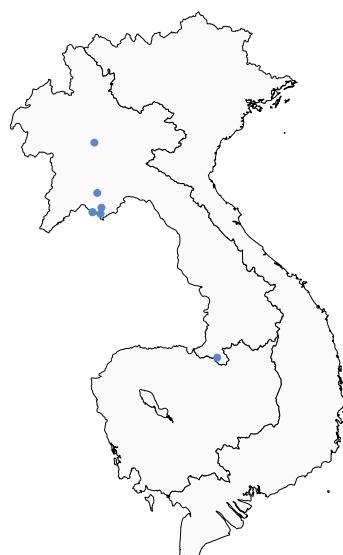
Perennial herbs; stems prostrate, rooting at nodes, 20–40 cm, slender, villous or scabrous. Leaves distichous, appressed to ground; blades suborbicular or broadly oblong, 1.3–1.7 × 1.2–1.4 cm, underside glabrous or appressed pilose, dark punctate, base cordate to rounded, apex rounded or emarginate; secondary veins 2 or 3 either side of midvein; petiole 2–4 mm.

Flowers solitary or paired; peduncles absent or to 2 mm; pedicels 2.5–3.0 mm, densely villous; sepals oblong-ovate to oblong, 3–4 × 2–3 mm, persistent, outer 2 slightly longer, pilose outside, margins ciliate; corolla broadly campanulate or subrotate, c. 6 mm long, white, limb c. 7–8 mm diam., 5-lobed; stamens inserted at middle of corolla tube, filaments c. 1.5 mm, glabrous basally, anthers oblong; ovary globose, style lobes linear, c. 3 mm, stigmas minutely capitate.

Capsules ovoid, 2–3 mm diam. Seeds 2–4, ovoid-trigonous, c. 1.0 × 0.5 mm, brown, minutely tuberculate.

Distribution. Naturalized in Laos as well as India, Myanmar, China, Thailand, Malaysia, also Africa; native in North and South America. Almost certainly present in Cambodia and Vietnam as well, but not yet documented from either.

Ecology. Usually in disturbed habitats along roads or trails, in vacant lots, cracks in pavements, gravel road shoulders, footpaths, on sandy, lateritic, clay, or limestone soils in secondary forest regrowth, pastures, along roadsides; elevation: sea level to 300 m.





9.4. *Evolvulus nummularius* (L.) L. Habit, flower, fruit (credit: G. Staples; voucher: Malaysia, Syahida et al. FRI-66701 (KEP)).

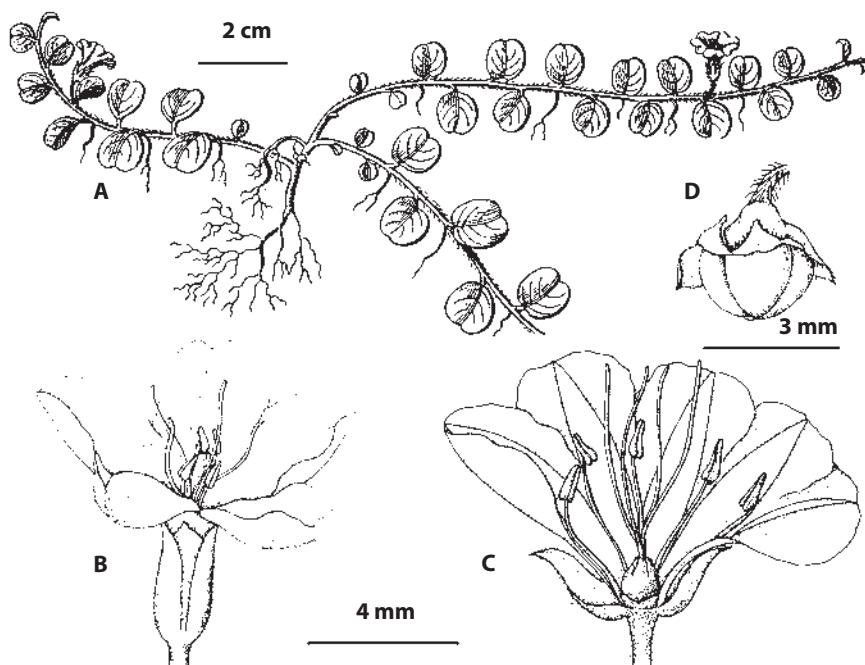
In India, the flowers of *E. nummularius* have been shown to be pollinated by small land snails (Sarma et al. 2007) and this may be the case in CLV as well; it is unknown whether snails pollinate *E. nummularius* in its native range. The fruiting pedicel bends downward after floral anthesis and the fruit develops on, or beneath, the soil surface. Seeds are probably dispersed in soil: caked on shoes, in treads of rubber tyres, or moved with building or agricultural materials. These simple dispersal mechanisms have contributed to the global spread of this little herbaceous creeper.

Vernacular names

Laos. phak hvèn dông, ko:mko:yz, lo:d kho:n (*Luanglath 51*).

Material studied

Laos. Champassak: Phapheng Falls area, mainland E of Mekong River, 18 Sep. 1998, *Maxwell 98-1038* (CMU). Louang Prabang: in Pha Tad Ke Botanic Garden, path near director's office, 5 Nov. 2012, *Staples et al. 1526* (HNL, PTK, SING). Vientiane: Ban Aang Yai, Muang Sang Thong, 4 Sep. 1995, *Iwatsuki et al. IC 95-1578* (A); coin de Lane Xang Av. et Sam Sen Thai Rd., 1 May 1995, *Deroin 188* (P); Dong Dok area, near National University of Laos, 2 May 2005, *Sengsomphou et al. OD-57* (E, P); 5 km au N de Dong Dok, 5 May 1995, *Deroin 192* (P); Khon Phouk village, near Nam Lik River, 23 Aug. 1999, *Maxwell 99-171* (CMU); route de Tha Ngone, 5 Nov. 1988, *Luanglath 51* (P).



9.5. *Evolvulus nummularius* (L.) L. A, habit (courtesy of Ooststroom & Hoogland 1953); B, flower; C, opened corolla with stamen; D, fruit. B-D Drawn by P. Inthachub (From Staples 2010).



Two species: one widespread in tropical regions in Africa, Asia, and naturalized in the West Indies; one endemic to Somalia. The former is present in CLV.

The generic name *Hewittia* proved to be illegitimate and a proposal to conserve it has been recommended by the Committee on Vascular Plants of IAPT (Staples & Noltie 2007; Brummitt 2009).

10. *Hewittia* Wight & Arn., nom. cons.

Madras J. Lit. Sci., ser. 1, 5: 22 (1837); Gagnep. & Courchet, Fl. Indo-Chine 4: 298 (1915); Ooststr., Blumea 3: 286 (1939), Fl. Males., Ser. I, Spermat. 4: 438 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 177 (1990); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 21 (1993); R.C.Fang & Staples, Fl. China 16: 285 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 163 (2005); Staples & Noltie, Taxon 56: 262 (2007); Brummitt, Taxon 58: 285 (2009); Staples, Fl. Thailand 10: 401 (2010); Staples *et al.*, Thai J. Bot. 6: 82 (2014). – Type: *Hewittia bicolor* Wight & Arn.

Twining or prostrate herbs. Leaves petiolate, bases usually cordate, margins entire, angular, or lobed.

Inflorescences axillary, long-pedunculate, 1- to few-flowered cymes; bracts 2 (to many), leaf-like, borne well below calyx, persistent. Flowers erect; sepals 5, apices acute, outer 3 sepals ovate, accrescent with prominent veins in fruit; inner 2 sepals smaller; corolla campanulate or funnelform, limb shallowly 5-lobed; stamens included, filaments dilated basally, adnate to corolla tube, free distally, filiform; pollen non-spinulose, rugate (polycolpate); pistil included, disc ring-like, ovary 1-locular or imperfectly 2-locular apically, 4-ovuled, style 1, filiform, stigmas 2, ovate-oblong, flattened.

Fruit a capsule, globose, 4-valved, pilose, protruding from reflexed calyx. Seeds 4 or fewer, trigonous.

1. *Hewittia malabarica* (L.) Suresh

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Hewittia malabarica (L.) Suresh, Interpret. Van Rheede's Hort. Malab. 88 (1988); R.C.Fang & Staples, Fl. China 16: 285 (1995); Staples, Fl. Thailand 10: 401 (2010); Staples *et al.*, Thai J. Bot. 6 (1): 82 (2014). – *Convolvulus malabaricus* L., Sp. Pl. 1: 155 (1753). – Type: [icon] "Kattu-kelengu" in Rheede, Hort. Malab. 11: 105, t. 51 (1692) (lecto, designated by Suresh in Nicolson *et al.*, Interpret. Van Rheede's Hort. Malab. 88 (1988)).

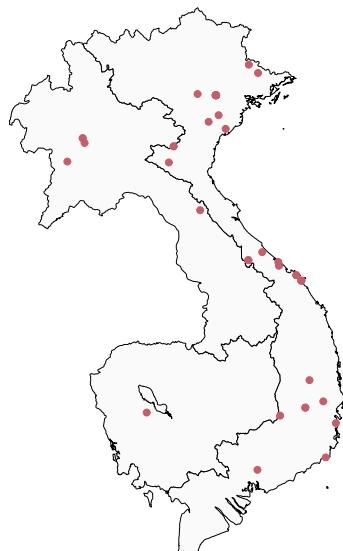
Convolvulus scandens Milne, Descr. Cat. Seeds E. Indies 2 (1773). – *Hewittia scandens* (Milne) Mabb., Taxon 29: 606 (1980); P.H.Hô, Cây cỏ Việt Nam 2 (2): 978 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 21 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 163 (2005). – Type: not indicated.

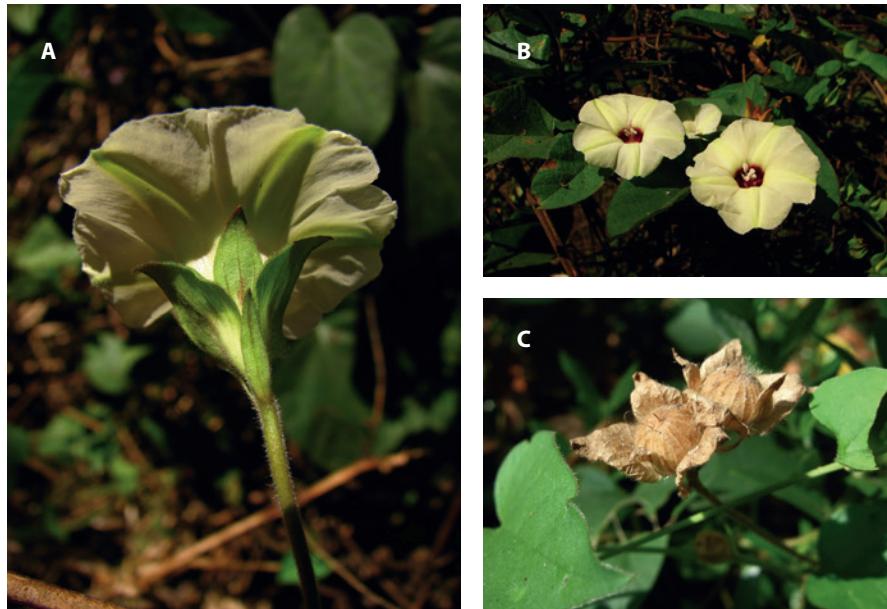
Convolvulus sublobatus L.f., Suppl.: 135 (1781). – *Hewittia sublobata* (L.f.) Kuntze, Rev. Gen. Pl.: 441 (1891); Ooststr., Fl. Males., Ser. I, Spermat. 4: 438 (1953); Kerr, Fl. Siam. 3 (2): 1 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 177 (1990). – *Shutereia sublobata* (L.f.) House, Bull. Torrey Bot. Club 33: 318 (1906); Ooststr., Blumea 3: 287 (1939). – Type: India (specimen not located).

Hewittia bicolor Wight & Arn., Madr. J. Sci. ser. I, 5: 22 (1837); Gagnep. & Courchet, Fl. Indo-Chine 4: 298 (1915). – Type: India, without locality, R. Wight s.n. (iso E).

Perennial herbs; stems twining or prostrate, 1–2 m, occasionally rooting at nodes; rather densely pubescent. Leaves ovate to hastate, 3–10 × 3–8 cm, appressed pilose or subglabrous, upper side minutely and sparsely verrucate, base cordate, hastate, or truncate, apex acuminate to acute, mucronate, margins entire, angled or 3-lobed; petiole 1–6 cm.

Inflorescences cymose, 1- to few-flowered; peduncles 1.5–10.0 cm; bracts oblong-lanceolate, 7–15 mm, persistent; pedicels 2–4 mm. Sepals unequal, pubescent outside, accrescent, outer 3 broadly ovate, 9–15 × 6–9 mm, to 17 mm in fruit; inner 2 oblong-lanceolate, smaller; corolla 2.0–2.5 cm long, pale yellow or whitish, centre red-purple, midpetaline bands pilose outside; stamens c. 9 mm long, filaments basally papillose, anthers ovoid-deltoid; ovary villous.





10.1. *Hewittia malabarica* (L.) Suresh. A, calyx and bracts; B, habit, flowers; C, fruits (credit: A, B, Piyakaset Suksathan; C, Tomoki SANDO; voucher: A, B, Thailand, Staples et al. 1393 (QBG); C, not collected).

Capsules depressed globose or quadrangular, 8–10 mm diam., pilose, tardily dehiscent, the 4 valves splitting into smaller segments. Seeds 4 or fewer, ovoid-trigonous, 4–6 mm, brown to dull black, scurfy, hilum pubescent.

Distribution. Cambodia, Laos, Vietnam as well as India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, New Guinea, the Philippines; also widespread in tropical Africa and the Pacific and introduced to the Caribbean islands.

Ecology. Often a plant of disturbed areas near human habitation: roadsides, plantations, agricultural fields, waste places, as well as in disturbed areas, at the edges or in clearings of evergreen forest, disturbed forest, deciduous forest, and in brushy thickets, on sandy or clay soils; elevation: near sea level–700 m.

Usage. The plant is medicinal (*Vidal 4204*).

Notes. The capsules appear to dehisce tardily, the 4 valves separating except at the apex; each valve again tears longitudinally at several points, but the tears don't reach the apex. The whole fruit at this stage looks like a lattice with the seeds still trapped inside.

Vernacular names

Liseron de Malabar (*d'Alleizette 6*).

Laos. chí cho 'khao (*Vidal* 4204), khua khao (*Vidal* 726B).

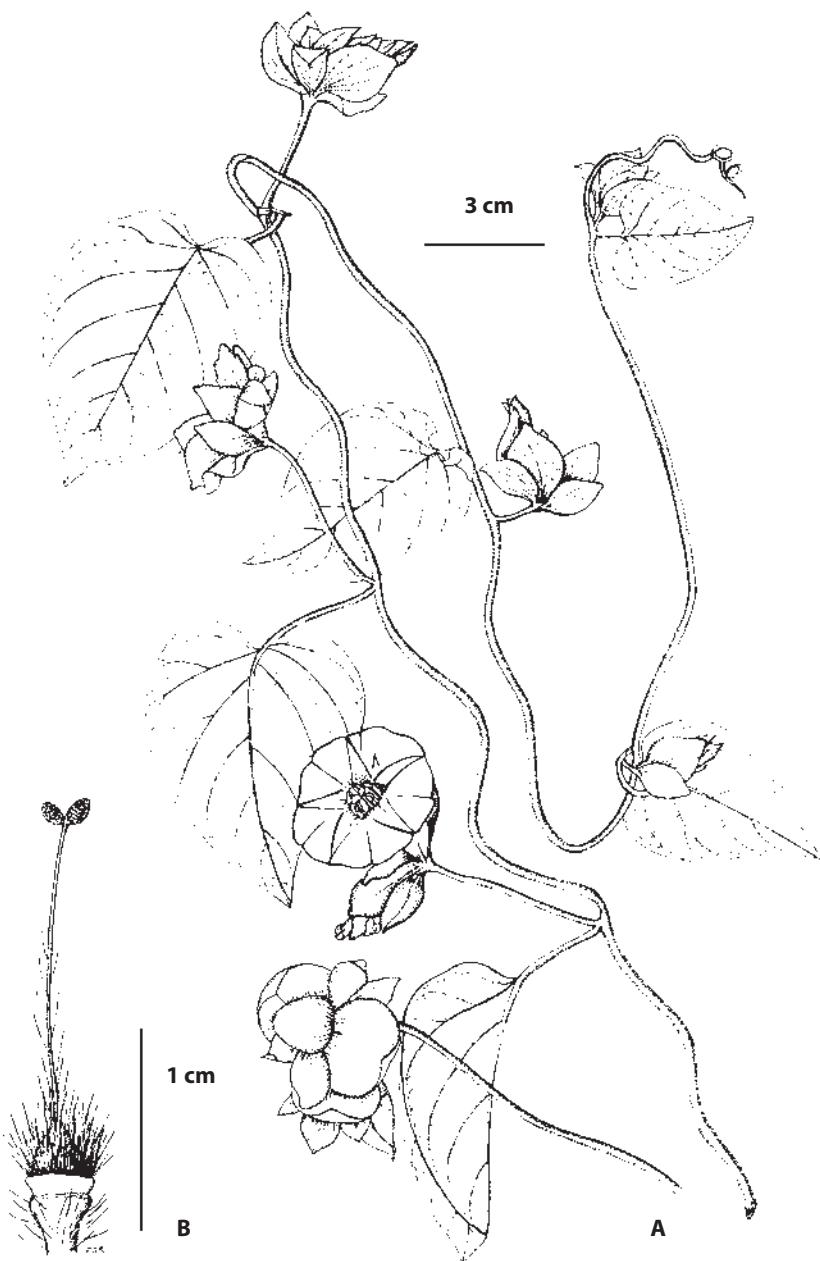
Vietnam. bìm bìm, hoa bìm bìm (*Bon* 2772), rui aban-ti' (Jörai, *Dournes s.n.*), cây dây biển (Annamite, *Poilane* 40012), bim luong sac (*Tran Hinh Ly* 826).

Material studied

Cambodia. Pursat: sous bois, *Couderc s.n.* (P).

Laos. Khammouane: along path to Ban Silia, 24 Oct. 2005, *Newman et al.* LAO492 (E). Louang Prabang: Luang Prabang vic., 2 Mar. 1969, *Pottier* 40 (P); *I. c.*, 28 Jan. 1949, *Vidal* 726 (P); along Hwy 13 between Luang Prabang and Vientiane, about Kms 359–360, near village of Ban Xieng Ngeun, 4 Nov. 2012, *Staples et al.* 1506 (HNL, KKU, P, SING). Sayabouri: 30 Oct. 1965, *Vidal* 4204 (P).

Vietnam. *s. loc.*: "Cochinchine", 1862–1866, *Thorel* 229 (P). Dac Lac: Krong pao, Krong bong, 22 Dec. 1979, *Nguyen Thi Nhan* 687 (HN); Krong Pac district, Thi Tran, 20 Dec. 1979, *Tran Hinh Ly* 826 (HN); Hoa Le, 23 Dec. 1979, *Nguyen Thi Nhan* 691 (HN); Dac lao, Dac Mil, Nam Da, 15 Dec. 1979, *Nguyen Thi Nhan* 649 (HN); Hau Bôn (Cheo Reo), Feb. 1967, *Dournes s.n.* (P). Da Nang: Tourane, Jan. 1837, *Gaudichaud* 140 (P); *I. c.*, 30 July 1927, *Clemens & Clemens* 4003 (P); *I. c.*, 19 Feb. 1939, *Poilane* 28922 (P). Ha Giang: Kien Khe, Dong Bau, 15 Oct. 1884, *Bon* 2772 (P). Ha Nội: Citadelle d'Hanoi, 31 Oct. 1884, *Brousmiche s.n.* (P); Hanoi, Oct. 1908, *d'Alleizette* 6 (P); *I. c.*, Jan. 1909, *d'Alleizette* 479 (P); Oct. 1885, *Balansa* 815 (P); Oct. 1890, *Balansa* 4896 (P); 1886, *Balansa* 3547 (P); de Tu Phap aux roches de Notre-Dame, Dec. 1888, *Balansa* 3546 (P); Ngoc Ha, 2 Dec. 1979, *Aat & Tam FLHN4-80* (HN); *I. c.*, 11 May 1971, *unknown collector FLHN2-0007* (HN). Khanh Hoa: SE de massif de la mère et l'enfant, "prov. Nha Trang", 24 May 1923, *Poilane* 6707 (P). Lang Son: Chi Lang district, Dong Mo, 21 Apr. 1981, *Tran Dinh Nghia T-794* (HN); Nan Quan, près de Lang Son, 10 Dec. 1902, *Bois* 59 (P). Nghe An: Canh Trap, Spire 1097 (P); Tuong Duong district, Tam Dinh, 22 Apr. 2001, *Vu Van Can* 442 (HNU); *I. c.*, 24 Apr. 2001, *Vu Van Can* 1015 (HNU). Ninh Binh: Cuc Phuong National Park, Dan village, 0.5 km to Bong, site no. CP206, 23 June 2000, *Cuong et al.* 841 (A); Dinh Huong, 22 Oct. 1892, *Bon* 5717 (P). Ninh Thuan: Ca Na, 4 Dec. 1923, *Poilane* 9057 (P). Quang Tri: Binh Tri Thien, Huong Hoa, Huong Tan, 15 Aug. 1981, *Do Hong Phuc* 244 (HN); *I. c.*, 18 Aug. 1981, *Do Hong Phuc* 253 (HN); Quang Tri vic., *Pirey* 57 (P). Thanh Hoa: Camp des Tigres, près de Dong Son, 16 Jan. 1886, *Balansa* 814 (P). Thua Thien-Hue: haut cours du Bo giang, *Eberhardt* 2895 (P); Hué vic., near seashore, 10 Feb. 1927, *Squires* 87 (P); Lang Co, *Eberhardt* 1646 (P); *Eberhardt* 2523 (P).



10.2. *Hewittia malabarica* (L.) Suresh. A, habit (courtesy of Ooststroom & Hoogland 1953); B, pistil. Drawn by P. Inthachub (From Staples 2010).



Estimated to comprise more than 600 species, mainly in the tropics with the greatest number found in the Americas (Austin & Huáman, 1996). At least 30 species are found in CLV. These are a mixture of indigenous and naturalized species, the latter mostly garden escapes, largely from tropical America.

11. *Ipomoea* L.

Sp. Pl. 1: 159. 1753; Gagnep. & Courchet, Fl. Indo-Chine 4: 229 (1915); Ooststr., Blumea 3: 481 (1940), Fl. Males., Ser. I, Spermat. 4: 458 (1953); T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 42 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 177 (1990); R.C.Fang & Staples, Fl. China 16: 301 (1995); D.F.Austin & Huáman, Taxon 45: 3 (1996); D.F.Austin & Bianchini, Taxon 47: 833 (1998); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 163 (2005); Staples, Fl. Thailand 10: 403–427 (2010). – Type: *Ipomoea pes-tigridis* L.
Batatas Choisy, Mém. Soc. Phys. Genève 6: 434 [Conv. Orient. 52] (1834). – *Ipomoea* section *Batatas* Gagnep. & Courchet, Fl. Indo-Chine 4: 231 (1915). – Type: *Batatas edulis* (Thunb.) Choisy.
Calonyction Choisy, Mém. Soc. Phys. Genève 6: 441 [Conv. Orient. 59] (1834); Gagnep. & Courchet, Fl. Indo-Chine 4: 285–287 (1915), nom. illeg. – Type: an illegitimate name based on *Bonanox* Raf.
Pharbitis Choisy, Mém. Soc. Phys. Genève 6: 438 [Conv. Orient. 56] (1834); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 179 (2005). – *Ipomoea* section *Pharbitis* Gagnep. & Courchet, Fl. Indo-Chine 4: 231 (1915). – Type: *Pharbitis hispida* Choisy.
Quamoclit Mill., Gard. Dict. Ed. 4, 3. 1754. – *Ipomoea* section *Quamoclit* Gagnep. & Courchet, Fl. Indo-Chine 4: 230 (1915). – Type: *Ipomoea quamoclit* L.
Mina Cerv. in Llave & Lexarza, Nov. Veg. Descr. 1: 3 (1824); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 184 (1990). – Type: *Mina lobata* Cerv.
Dimerodiscus Gagnep., Notul. Syst. (Paris) 14: 25 (1950). – Type: *Dimerodiscus fallax* Gagnep.

Perennial or annual, herbaceous twiners or woody climbers, rarely shrubs; trichomes simple or 2-armed (rarely stellate); stems usually twining, less often prostrate, erect, or floating. Leaves petiolate, simple or compound, blades entire, lobed, or divided.

Inflorescences mostly axillary, cymose, 1 to few to many-flowered, rarely paniculate or capitulate; bracts various. Flowers often showy, diurnal or nocturnal; sepals persistent, ± enlarged in fruit; corolla funnelform, campanulate, or salverform, variously coloured, rarely yellow, limb entire, ruffled, 5-lobed or -parted, midpetaline bands well-defined; stamens usually unequal, included or exserted, filaments basally dilated, pubescent or glandular at insertion, free and filiform above, anthers ovoid or linear, longitudinally dehiscent, not twisted; pollen globbose, pantoporate, finely spiny; pistil included or exserted, nectary annular, ovary 2-, 3-, or 4-locular, 4- or 6-ovuled, style 1, filiform, stigma capitate, usually 2-, rarely 3-globose.

Fruits dehiscent capsules, 4- or 6-valved. Seeds 4, 6 or fewer, trigonous or hemispherical, glabrous or pubescent.

Ecology. *Ipomoea* species in CLV are mostly weedy introduced ones that have escaped cultivation to become naturalized, often in sunny, disturbed areas and they are now the dominant convolvulaceous element near human habitation. Others are coastal, littoral species widespread across the Old World tropics. The lack of endemism in *Ipomoea* stands in marked contrast to *Argyreia* in the Southeast Asian flora. The majority of *Ipomoea* species have ephemeral, brightly coloured, diurnal flowers pollinated by bees or butterflies, but a few species (*I. aculeata*, *I. alba*, *I. violacea* in CLV) have nocturnal flowers showing a suite of floral characters adapted for moth pollination: white or pale greenish or pinkish corolla; salverform or tubular shape; exserted stamens and pistil. Two introduced species (*I. hederifolia*, *I. quamoclit*) are adapted for hummingbird pollination; their vivid red-orange corollas are diurnal. These floral characters are useful for identifying groups of species within *Ipomoea*, though similar pollination syndromes have evolved several times independently and are not necessarily an indication of close relationship.

Usage. *Ipomoea* species are the source of edible foods and crop plants, minor medicinals, and ornamentals (see below). The sweet potato, *Ipomoea batatas*, is grown as a food plant throughout Southeast Asia and may persist for some years where planted; there are now several forms with colourful leaves that are grown as ornamental ground covers and container plants.

The following five species have been reported in the literature to occur in CLV, but I have seen voucher specimens to document only two of them. They are listed here and included in the key to aid in their identification. All are commonly cultivated ornamentals and, except for the first, they are likely to escape and become naturalized wherever they are planted.

Ipomoea horsfalliae Hook. [cited by P.H.Hô, Cây cỏ Việt Nam 2 (2): 994 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 169 (2005)]. No vouchers seen (Fig. 11.1A)

Ipomoea lobata (Cerv.) Thell. [syn. *Mina lobata* Cerv.: cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 184 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 177 (2005)]. No vouchers seen (Fig. 11.1B–C).

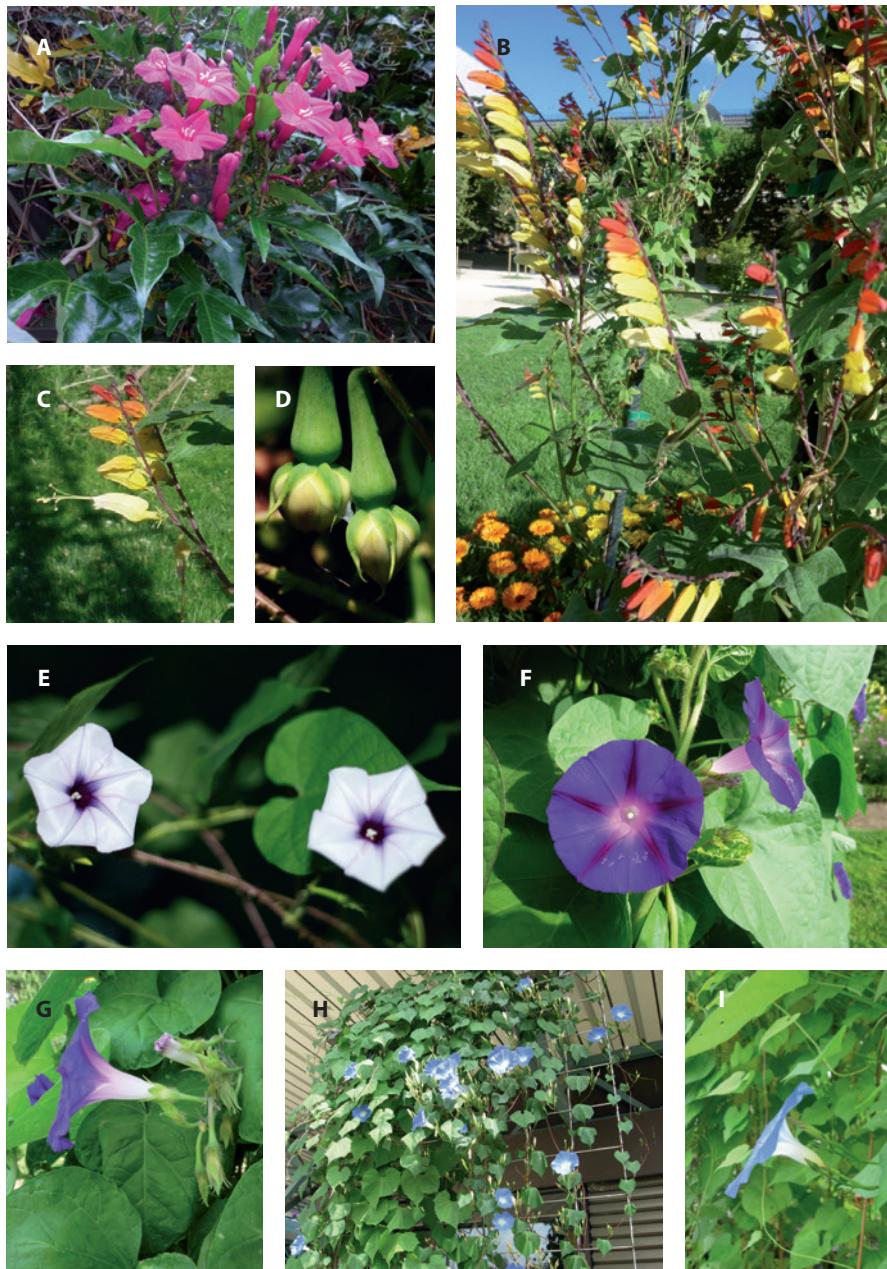
Ipomoea muricata (L.) Jacq. [cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 179 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 992 (1993); syn. *Calonyction muricatum* (L.) G.Don: cited by Gagnep. & Courchet, Fl. Indo-Chine 4: 286 (1915); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 170 (2005)]. No vouchers seen (Fig. 11.1D–E).

Ipomoea purpurea (L.) Roth [syn. *Pharbitis purpurea* (L.) Voigt: cited by T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 179 (2005)] was cultivated in Saigon Botanic Garden and the only voucher specimen, *Hiệp 676* (Pl), records the Vietnamese name *dây bìm bìm bông tiêm* for it (Fig. 11.1F–G).

Ipomoea tricolor Cav. [syn. *Pharbitis rubro-caerulea* Hook.: cited by T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 179 (2005)]. Cultivated in Dalat (Fig. 11.1H–I).

Taxonomy

In the past decade, molecular studies have suggested that all genera with spinulose pollen grains (in this flora, *Argyreia*, *Lepistemon*, *Rivea*, and *Stictocardia*) be subsumed into a greatly expanded *Ipomoea*. This course has not been followed here until taxon sampling is increased and the generic delimitation issues are resolved.



11.1. A, *Ipomoea horsfalliae* Hook. Habit; B–C, *Ipomoea lobata* (Cerv.) Thell., B, habit; C, inset: flower; D–E, *Ipomoea muricata* (L.) Jacq., D, fruits; E, flowers; F–G, *Ipomoea purpurea* (L.) Roth, F, flowers; G, fruits; H–I, *Ipomoea tricolor* Cav., H, habit; I, inset: flower, sepals. (credit: A–C, G. Staples, cultivated, not voucherized; D–E, Yingyong Paisooksantivatana, Thailand, not voucherized; F–I, G. Staples; voucher: cultivated, not collected).

Key to the species

1. Sepals distinctly awned at or below apex, awn straight or curved; corolla salverform with a long and narrow tube, or tubular-urceolate; stamens and stigmas exserted **2**
- . Sepals never awned; corolla funnelform or campanulate, sometimes salverform; stamens and stigmas mostly included (rarely exserted) **6**

2. Corolla 2.2–4.5 cm long, blood red or orange-red (rarely pure white); outer sepals 2–4.5 mm long (excluding awn), inner sepals 3–6 mm long (excluding awn) **3**
- . Corolla larger, white or pale purplish; outer sepals 5–12 mm long (excluding awn), inner sepals 7–15 mm long (excluding awn) **5**

3. Corollas narrowly cylindrical below, suddenly widening into long-urceolate or tubular limb, opening red, fading to yellow then white ***I. lobata***
- . Corollas salverform, remaining one colour **4**

4. Leaves pinnately divided into numerous linear segments; corollas blood red (or pure white) **25. *I. quamoclit***
- . Leaves entire, cordiform or angulate; corollas orange-red **13. *I. hederifolia***

5. Corollas white, 7–12 cm long, tube cylindrical, not flaring above, limb rotate; stamens and stigmas exserted **2. *I. alba***
- . Corollas pale purplish, (3–)5–6 cm long, tube widening above, limb funnelform to rotate; stamens and stigmas included or just reaching corolla mouth ***I. muricata***

6. Corollas 9–12 cm long, white with greenish bands, salverform, tube narrow, cylindrical, limb rotate; sepals obtuse or rounded **7**
- . Corollas 8 cm long or less, often much smaller, campanulate or funnelform (rarely salverform); sepals acute, acuminate, or obtuse **8**

7. Leaves usually 3–7-lobed, rarely entire; sepals subequal or outer 2 slightly longer than inner; filaments inserted near mouth of corolla tube, anthers exserted **1. *I. aculeata* var. *mollissima***
- . Leaves entire, cordiform; outer sepals mostly shorter than inner ones; filaments inserted near base of corolla tube, anthers included **30. *I. violacea***

8. Sepals completely glabrous outside, sometimes muricate or ridged **9**
- . Sepals pubescent outside, or fringed on margins **26**

9. Sepals at least 14 mm long, outer ones with lanceolate to broadly lanceolate base, long and gradually attenuate towards apex **15. *I. indica***
- . Sepals not gradually attenuate toward apex, mostly shorter **10**

- 10.** Leaves palmately lobed to palmately compound **11**
 —. Leaves entire, not palmately cut **15**
- 11.** Stamens exserted; corolla salverform, red or red-purple ***I. horsfalliae***
 —. Stamens included; corolla funnelform or campanulate **12**
- 12.** Pseudostipules (tiny leaves from axillary shoot) present; leaves compound (divided all the way to base) **7. *I. carica***
 —. Pseudostipules absent; leaves parted to middle or more, not all way to base **13**
- 13.** Stems twining; sepals bowl-shaped, apex rounded, inner ones circular
 **17. *I. mauritiana***
 —. Stems prostrate or tips ascending; sepals oblong to elliptic-oblong, mucronulate **14**
- 14.** Corollas pinkish to pale purple; tubers present; leaves thin, membranous, middle lobes acute or subacute **5. *I. batatas***
 —. Corollas white or yellowish, sometimes with dark red at tube base; tubers absent; leaves fleshy, middle lobes obtuse or emarginate **14. *I. imperati***
- 15.** Woody lianas; leaves with 10–15 parallel secondary veins either side of midvein **16**
 —. Herbaceous twiners or prostrate; leaves with fewer secondary veins **17**
- 16.** Corollas 5.5–6.5(–10.0) cm long, broadly funnelform; flowers few, in cymose clusters
 **9. *I. campanulata***
 —. Corollas 3–3.5 cm long, tubular-funnelform; flowers many, in elongate panicles
 **28. *I. sumatrana***
- 17.** Corollas salverform, 3.0–3.5 cm long, pale purplish or white, centre purplish; peduncles stout, thickened apically, flattened **27. *I. sagittifolia***
 —. Corollas funnelform, variously coloured; peduncles neither thickened nor flattened apically **18**
- 18.** Corollas pale yellow or creamy white, dark red inside at tube base **19**
 —. Corollas pinkish, purplish, blue, or pure white **21**
- 19.** Corollas 4.5–6.0(–6.5) cm long **8. *I. cambodiensis***
 —. Corollas 2–4 cm long **20**
- 20.** Corollas 3.5–4.0 cm long; sepals unequal, outer 7–11 mm, inner to 15 mm, margins concolorous; prostrate plants of sea beaches **14. *I. imperati***
 —. Corollas 2.0–2.5 cm long; sepals equal, 3–4 mm long, margins whitish; twiners or creepers of inland sites **19. *I. obscura***

- 21.** Aquatic plants floating on water or creeping on mud; stems fistulose (hollow); leaf base truncate, cordate, hastate, or sagittate; corollas 3–5 cm long, pinkish with purple centre or pure white **3. *I. aquatica*** **22**
- Terrestrial twiners or creepers, not as above
- 22.** Stems twining; corollas sky blue with white tube; sepals green with pale margins, not mucronulate ***I. tricolor***
- Stems prostrate or tips ascending; corollas red-purple, pinkish, white with purplish centre; sepals concolorous, apex mucronulate **23**
- 23.** Leaves herbaceous, attenuate toward acute or obtuse apex; storage tubers present **5. *I. batatas***
- Leaves rather fleshy, apex rounded, emarginate, or bilobed (sometimes abruptly obtuse or acute); tubers absent, roots fibrous or taproot fleshy **24**
- 24.** Stems thin, wiry; leaves usually ovate and cordiform, less often oblong, circular, or reniform, apex abruptly acute or obtuse; corollas almost white to pale purplish, darker in tube **16. *I. littoralis***
- Stems thick, terete or angular; leaves circular or reniform, apex rounded, emarginate, or bilobed; corollas red-purple **25**
- 25.** Sepals warty on back; plants of inland sites **4. *I. asarifolia***
- Sepals smooth on back; plants of sandy sea beaches **20. *I. pes-caprae***
- 26.** Sepals orbicular, 2 outer c. 2 cm diam., base subcordate, greyish tomentose outside **12. *I. harmandii***
- Sepals not as above **27**
- 27.** Peduncles none or 3 (rarely to 15) mm; corollas less than 1.5 cm long **28**
- Peduncles well developed, longer; corollas more than 1.5 cm, often much longer **30**
- 28.** Erect or ascending herbs; leaf base acute, attenuate onto petiole; corollas glabrous, c. 1.25 cm long **24. *I. polymorpha***
- Twining or prostrate herbs; leaf base cordate; corollas pilose outside toward apex of midpetaline bands **29**
- 29.** Ovary and capsules pubescent; pedicels 0–3 mm; outer sepals linear-acuminate from ovate bases; corollas pink or purple, c. 7–9 mm long **11. *I. eriocarpa***
- Ovary and capsules glabrous; pedicels 8–15 mm; outer sepals linear-acuminate from broadly deltoid, auriculate bases; corollas white, 9–13 mm long **6. *I. biflora***
- 30.** Flowers crowded at end of peduncles, enclosed by involucrate bracts **31**
- Flowers variously arranged, not involucrate **32**

- 31.** Leaves palmately divided nearly to base; corollas white; outer sepals lanceolate, acute **21. *I. pes-tigridis***
 —. Leaves entire, cordiform; corollas pink or purplish; outer sepals oblong to spatulate, obtuse **23. *I. pileata***
- 32.** Sepals 4 mm long or less, whitish marginate; corollas pale yellow or cream-white, with dark red in centre of tube **19. *I. obscura***
 —. Sepals 5 mm or longer, without paler margins, corollas variously coloured, not yellowish **33**
- 33.** Outer sepals orbicular, apex broadly rounded **34**
 —. Outer sepals narrower, apex acute or subobtuse **35**
- 34.** Secondary veins 10–15 either side of midvein; corollas glabrous outside; outer sepals 13–14 mm long **9. *I. campanulata***
 —. Secondary veins 7–9 either side of midvein; corollas farinose outside on tube and midpetaline bands; outer sepals 5–6 mm long **10. *I. carnea* subsp. *fistulosa***
- 35.** Corollas sericeous outside **36**
 —. Corollas glabrous outside **37**
- 36.** Aquatic herbaceous twiners; corollas 4–5 cm long; seeds white villous **26. *I. rubens***
 —. Terrestrial subwoody climbers; corolla 2.5 cm long; seeds nearly glabrous **22. *I. pierrei***
- 37.** Sepals long-attenuate or long and linear-acuminate at the apex **38**
 —. Sepals acute or subobtuse, often mucronulate, not long-attenuate towards apex **39**
- 38.** Outer sepals lanceolate at base, abruptly narrowed, with a long and linear acumen, patently hirsute in basal portion; corollas sky blue with white inside tube **18. *I. nil***
 —. Outer sepals lanceolate at base, long and gradually attenuate towards apex, glabrous to appressed pilose never hirsute; corollas deep purple blue with white inside tube, ageing dull red **15. *I. indica***
- 39.** Corollas 1.5–2.0 cm long; flowers crowded together at end of peduncle **29. *I. triloba***
 —. Corollas 3–6 cm long; flowers in lax cymes or solitary **40**
- 40.** Annual twiners; corollas 5–6 cm long, limb darker coloured than white tube; sepals equal in length, acute, patently hirsute on basal part, glabrous apically ***I. purpurea***
 —. Perennial creepers; corollas 3.5–4.0 cm long, limb paler than darker tube; outer sepals shorter than inner, distinctly mucronulate, pilose on backs and margins fimbriate **5. *I. batatas***

1. *Ipomoea aculeata* Blume var. *mollissima* (Zoll.) Hallier f. ex Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea aculeata Blume var. *mollissima* (Zoll.) Hallier f. ex Ooststr., Blumea 3: 574 (1940), Fl. Males., Ser. I, Spermat. 4: 486 (1953); R.C.Fang & Staples, Fl. China 16: 312 (1995); Staples, Fl. Thailand 10: 406 (2010). – *Calonyction mollissimum* Zoll., Syst. Verz. 2: 128, 131 (1854); Kerr, Fl. Siam. 3 (2): 20 (1954). – *Ipomoea mollissimum* (Zoll.) Hallier f. ex Boerl., Handl. Fl. Ned. Ind. 2: 512 (1899). – Types: Java, Besuki, Waringen, Zollinger 671.Z (syn PI, P04066962); prope Bandung, Zollinger 932.Z (syn PI, P04066960, P04066961); prope Litjin, Zollinger 2860 (syn BO, PI, P04066963, P04066964).

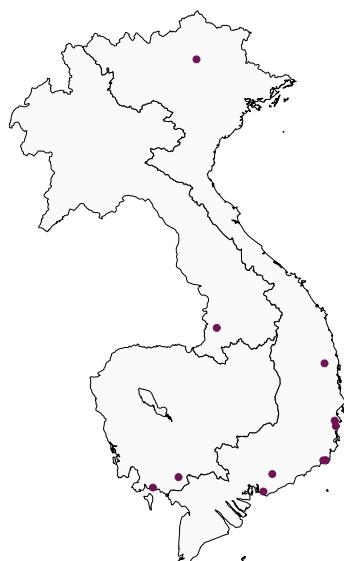
? *Ipomoea yomae* Kurz, Forest Fl. Burma 2: 218 (1877). – Type: Myanmar, Pegu Yomah, Kurz 1096 (holo CAL; iso K!, K000830828).

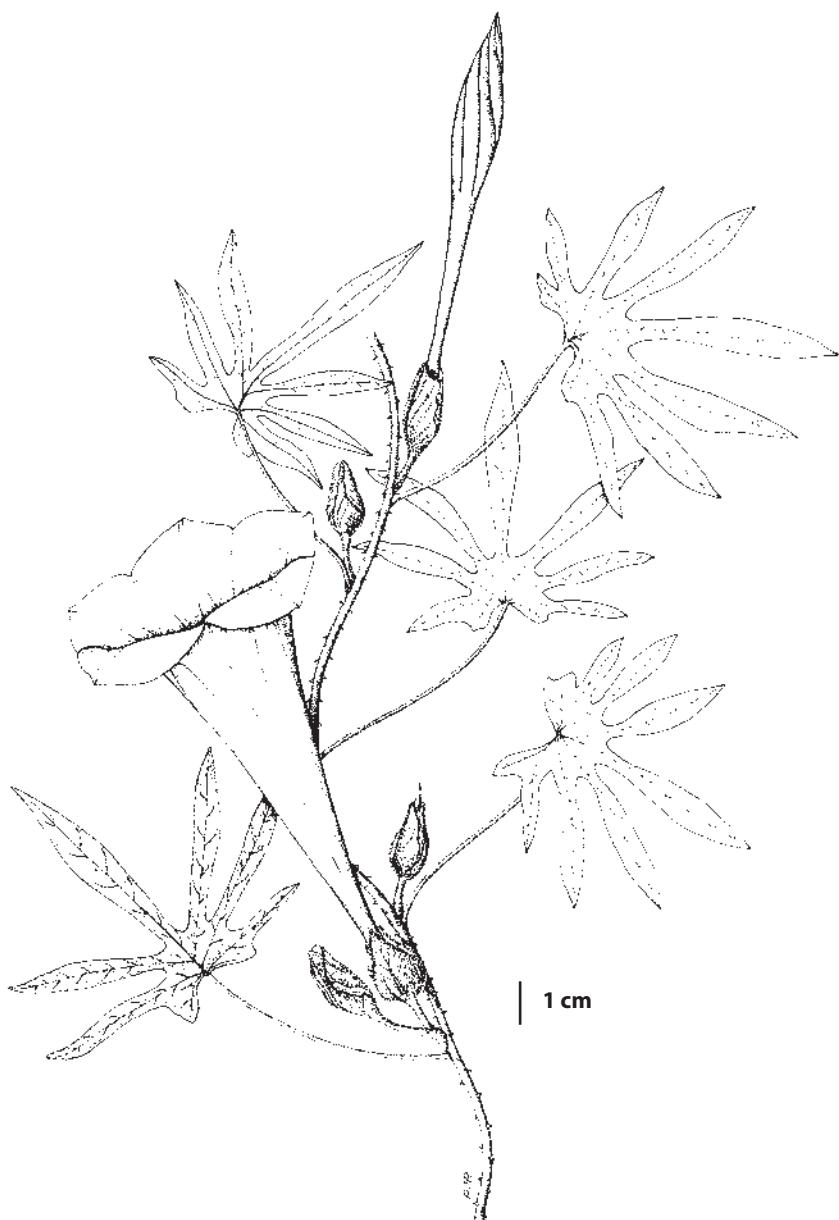
Ipomoea trichosperma auctt. non Blume: T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 43 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 993 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 172 (2005); Staples et al., Thai Forest Bull., Bot. 33: 179 (2005).

Calonyction trichospermum auctt. non (Blume) Choisy: Gagnep. & Courchet, Fl. Indo-Chine 4: 287 (1915).

Perennial climbers, yellowish pubescent, glabrescent; stems 3–7 m long, smooth or fleshy tuberculate. Leaves variable, 5–14 × 3–10 cm, blades cordiform, entire, or irregularly lobate-angulate, or deeply digitately parted into 5–7 linear-oblong lobes, widest near middle, tapering toward ends, both sides softly pubescent [or subglabrous], base cordate, apex acuminate, mucronulate; petiole 2.5–10.0 cm, pilose.

Flowers nocturnal, solitary (or paired), axillary; peduncles stout, 0–0.5 cm; bracts deciduous; pedicels clavate, 0.7–1.6 cm, recurved, thickened in fruit, to 2 cm; sepals subequal, outer 2 larger, broadly elliptic to orbicular, 12–18 mm, thinly coriaceous, apex rounded to emarginate, mucronulate, inner smaller, all enlarged in fruit; corolla salverform, white, midpetaline bands greenish or pale yellowish outside, tube 10–14 cm, limb 8–10 cm diam.; stamens exserted, filaments inserted near middle of tube, pubescent above and below insertion, anthers curved, 4–5 mm; pistil exserted, ovary glabrous, stigma biglobose.





11.2. *Ipomoea aculeata* Blume var. *mollissima* (Zoll.) Hallier f. ex Ooststr. Drawn by P. Inthachub (From Staples 2010).

Capsules ovoid, c. 15 mm, 4-valved, dark brown, apiculate. Seeds 6–8 mm, densely grey-brown woolly.

Distribution. Cambodia, Laos, Vietnam as well as Bangladesh, Myanmar, China (Hainan), Thailand, Indonesia, the Philippines, Australia.

Ecology. Moist clearings in forest, on rocky soil; elevation: up to 200 m.

Usage. the leaves are edible (*Poilane* 8940).

Vernacular names

Vietnam. dam thóm, dam thô (*Poilane* 8940, 8851).

Material studied

Cambodia. Kampot: Bokor National Park, 17 Nov. 2012, Wu et al. WH-4333 (MO). Takeo: in "Chiung Diung Mts., Tran vic.", Feb. 1868, Pierre 6 (P).

Laos. Champassak: Bassac, 1866–1868, Thorel s.n. (P).

Vietnam. Ba Ria-Vung Tau: Oct. 1866, Pierre s.n. (P, SING). Dac Lac: Krong Pak, Hoa Son, 24 Dec. 1979, Trần Dinh Ly 870 (HN). Dong Nai: Gia Ray, 1–3 Feb. 1919, Chevalier 39868 (P). Khanh Hoa: Hoa Cat, près de Nha Trang, 26 Sep. 1922, Poilane 4721 (P, SING); Nha Trang vic., 11–26 Mar. 1911, Robinson BS1318 (K, P); Phu Hu, entre Nha Trang et Ninh Hoa, 15 Jan. 1923, Poilane 5292 (P, SING). Ninh Thuan: Ca Na, "pro: Phanrang", 28 Nov. 1923, Poilane 8851 (P); l. c., 30 Nov. 1923, Poilane 8940 (P); coté Sud, dans le Ray Signal de 1200m, à l'ouest de Ca Na, 2 Nov. 1925, Evrard 2379 (P, SING). Tuyen Quang: Suoi Trinh, Km 26 près du Tram de Suoi Trinh, 13 Nov. 1922, Poilane 5171 (P).

2. *Ipomoea alba* L.



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J F M A M J J A S O N D

Ipomoea alba L., Sp. Pl. 1: 161 (1753); Ooststr., Blumea 3: 547 (1940), Fl. Males., Ser. I, Spermat. 4: 480 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 177 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 992 (1993); R.C.Fang & Staples, Fl. China 16: 309 (1995); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 163 (2005); Staples, Fl. Thailand 10: 406 (2010); Staples et al., Thai J. Bot. 6: 83 (2014). – *Calonyction album* (L.) House, Bull. Torrey Bot. Club 31: 591 (1904); Kerr, Fl. Siam. 3 (2): 19 (1954). – Type: [icon] “*Munda-valli*” in Rheede, Hort. Malab., 11: 103, t. 50, (1692) (lecto, designated by Verdc., Fl. Trop. E. Africa, Convolvul. 130 (1963)).

Convolvulus aculeatus L., Sp. Pl. 1: 155 (1753). – *Calonyction aculeatum* (L.) House, Bull. Torrey Bot. Club 31: 590 (1904). – Type: [icon] “*Convolvulus americanus subrotundis foliis, viticulis spinosis*” in Plukenet, Phytographia: t. 276, f. 3 (1694) (lecto, designated by Gunn, Brittonia 24: 153. (1972)).

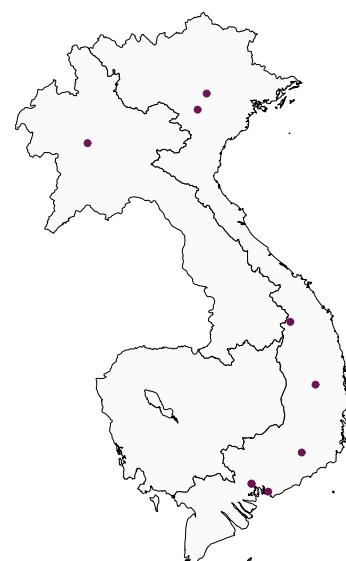
Ipomoea bona-nox L., Sp. Pl. ed. 2, 228 (1762), nom. illeg.– Type: based on *I. alba* L.

Calonyction speciosum Choisy, Mém. Soc. Phys. Genève 6: 441 [Conv. Orient. 59] (1834), nom. superfl.; Gagnep. & Courchet, Fl. Indo-Chine 4: 285 (1915).– Type: based on same type as *I. bona-nox* L.

Perennial herbaceous climbers, usually glabrous; stems to 10 m, terete, smooth or with fleshy prickles. Leaves ovate to subcircular in outline, 10–20 × 5–16 cm, base cordate, apex acuminate, mucronulate, margins entire, angular to 3-lobed; petiole 5–20 cm.

Inflorescences cymose, 1- to several-flowered; peduncles stout, terete, 1–24 cm; bracts early deciduous, small; pedicels 7–15 cm, clavate distally, enlarged in fruit. Flowers nocturnal, fragrant; sepals unequal, elliptic to ovate, glabrous; outer 3 sepals 5–12 mm, apex with a stout, spreading, 4–9 mm awn; inner 2 sepals 7–15 mm, mucronate; corolla salverform, white with greenish bands, tube 7–12 cm, c. 5 mm diam., limb 7–12 cm diam., undulate; stamens exserted, filaments inserted in upper corolla tube, glabrous, anthers sagittate basally; pistil exserted, ovary narrowly conical, glabrous.

Capsules ovoid, 25–30 mm, brown, glabrous, apiculate. Seeds c. 10 × 7–8 mm, white, brown, or black, glabrous.



Distribution. native in tropical America, dispersed from there throughout the tropics as an ornamental; introduced and naturalized in Laos, Vietnam, as well as Nepal, India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, and the Pacific Islands.

Ecology. Along streams or in moist places in secondary forest, scrub jungle, on riverbanks, or on cleared land; elevation: c. 120–750 m.

The vines are rampant where established and can cover large areas under a ‘vegetable blanket’ of foliage.

Usage. In Thailand the mature, unopened flower buds are currently being sold as a vegetable, with purported medicinal and health benefits.

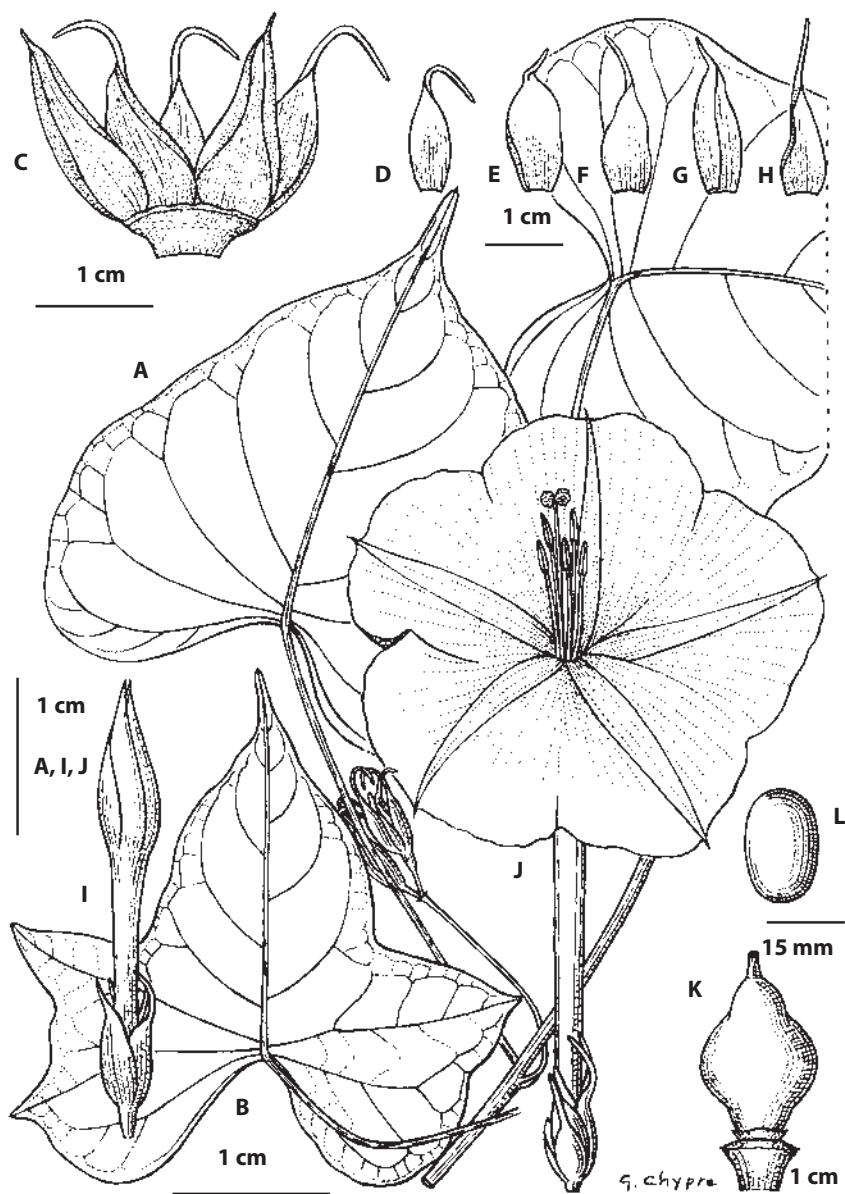
Vernacular name

Vietnam. tin dlei arong kru (Jörail, Dournes s.n.).

Material studied

Laos. Louang Prabang: bank of Mekong River, at landing on Luang Prabang side, across from Pha Tad Ke garden, 5 Nov. 2012, Staples et al. 1519 (HNL, PTK, SING).

Vietnam. Ba Ria-Vung Tau: in montibus Dinh ad Baria, Oct. 1866, Pierre s.n. (P). Dac Lac: Hau Bon (Cheo Reo), Apr. 1965, Dournes s.n. (P). Ha Noi: 7 Dec. 1887, Balansa 3553 (K, P, SING). Hoa Binh: Cho bo (rivière Noire), 12 Nov. 1887, Balansa 3552 (P). Ho Chi Minh Ville: “Saigon”, 13 Oct. 1864, Lefèvre 68 (P); l. c., 10 Nov. 1883, unknown 286 (P). Kon Tum: about 6–8 km N of Dak Gley town, 28 Nov. 1995, Averyanov et al. 2048 (AAU, P). Lam Dong: Djering – Phon Tiel, 30 Nov. 1911, Lecomte & Finet 1597 (P).



11.3. *Ipomoea alba* L. A, branch with entire leaf; B, lobed leaf; C, calyx, opened, showing adaxial side of sepals; D–H, sepals; I, flower bud; J, flower, with exerted stamens and pistil; K, fruit; L, seed (From Heine 1984).

3. *Ipomoea aquatica* Forssk.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea aquatica Forssk., Fl. Aegypt.-Arab. 44 (1775); Gagnep. & Courchet, Fl. Indo-Chine 4: 248 (1915); Ooststr., Blumea 3: 528 (1940), Fl. Males., Ser. I, Spermat. 4: 473 (1953); Kerr, Fl. Siam. 3 (2): 10 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 177 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 989 (1993); R.C.Fang & Staples, Fl. China 16: 307 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 164 (2005); Staples, Fl. Thailand 10: 407 (2010); Leti *et al.*, Flore Photogr. Cambodge 174 (2013); Staples *et al.*, Thai J. Bot. 6: 83 (2014). – Type: Yemen, Zebid, Forsskal s.n. (holo Cl; iso BM).

Herbaceous creepers or low twiners, aquatic or terrestrial, all parts glabrous; stems prostrate or floating, 1–3 m long, hollow, rooting at nodes. Leaves variable: ovate, ovate-lanceolate, oblong, or lanceolate, 3.5–17.0 × 0.9–8.5 cm, base cordate, sagittate or hastate, occasionally truncate, apex acute or acuminate margins entire or undulate; petiole 3–14 cm.

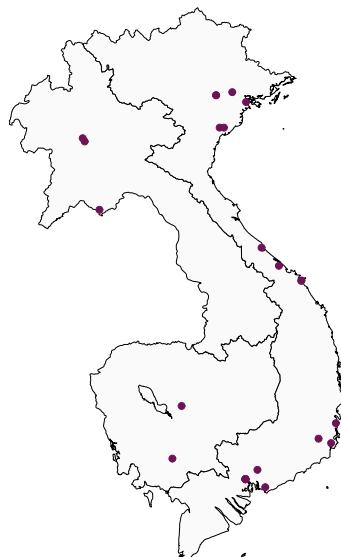
Inflorescences 1–3(–5)-flowered; peduncles 1.5–9.0 cm, base pubescent, bracts squamiform, 1.5–2.0 mm, pedicels 1.5–5.0 cm. Flowers diurnal; sepals nearly equal, glabrous, outer 2 ovate-oblong, 7–8 mm, margin whitish, thin, apex obtuse, mucronulate, inner sepals ovate-elliptic, c. 8 mm; corolla funneliform, 3.5–5.0 cm, pure white or pink-purplish with darker purple centre, glabrous; stamens unequal, included; pistil included, ovary conical, glabrous.

Capsules ovoid to globose, c. 1 cm diam., woody, tardily dehiscent or perhaps indehiscent. Seeds 4 or fewer, densely greyish pubescent.

Distribution. Cambodia, Laos, Vietnam, and also Pakistan, Nepal, India, Sri Lanka, Bangladesh, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, Australia, Pacific Islands, also in South America, Africa.

Ecology. Cultivated and growing wild: floating in still waters or creeping on wet soil, in sunny rice fields, muddy buffalo wallows, swamps; elevation: not recorded.

Usage. The shoot tips and tender young leaves are eaten as a potherb and salad vegetable throughout the region. In many places the plants are cultivated, or they may be collected from canals and ditches where they grow spontaneously. The stems and older foliage are fed to livestock.



Vernacular names

Cambodia. tra kuôn (*Collard* 3).

Vietnam. rau muông, olus muông (*Bon* 84), cây rau muông (*Annamite, Bauche* 127), rap bach (*Poilane* 9841).

Material studied

Cambodia. Kompong Speu: près de Srang, pied du Massif de Phnom Chang Or, 23 Jan. 1928, *Poilane* 14547 (P, SING). Kompong Thom: dans les mares, *Collard* 3 (P).

Laos. Louang Prabang: Luang Prabang vic., *Dupuy* 136 (P, SING); along Hwy 13 between Luang Prabang and Vientiane, ca. Kms 364–366, 4 Nov. 2012, *Staples* et al. 1505 (HNL, PTK, SING). Vientiane: That Luang road, 29 Nov. 1955, *Talbot de Malahide* 112 (SING).

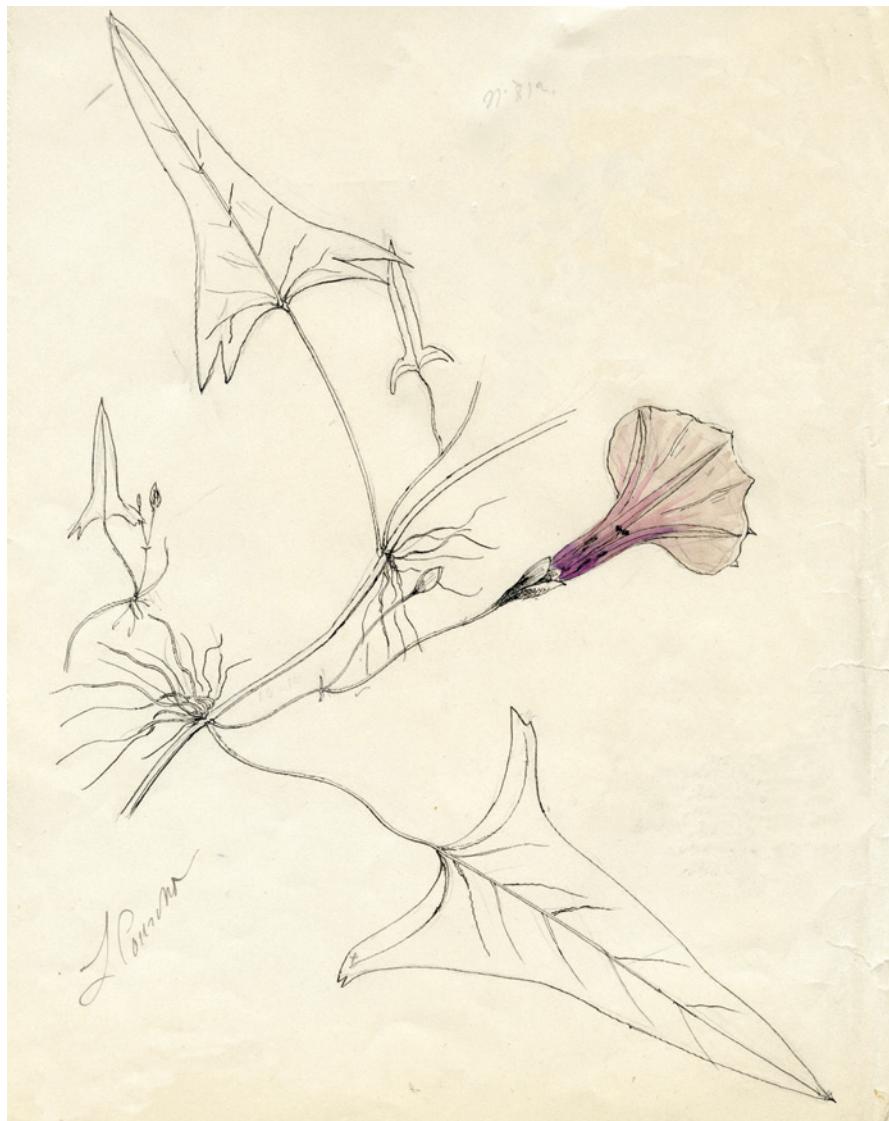
Vietnam. s. loc.: "Cochinchine", Germain 44 (P); "Long Tchéou", 14 Feb. 1911, Simond 299 (P); 20 Nov. 1925, Evrard [legit Daû 121] 2469 (P). Ba Ria-Vung Tau: Baria, cap Baudouin, Apr. 1867, *Talmy s.n.* (P). Da Nang: Tourane vic., wallows near fields, July 1927, *Clemens & Clemens* 3803 (P); route de Hué, 12 Nov. 1911, *Lecomte & Finet* 1097 (P). Hai Duong: Sept Pagodes, July 1906, *Mouret* 191 (P). Hai Phong: 1886, *Balansa* 818 (P). Ha Noi: Oct. 1890, *Balansa* 4895 (P); *l. c.*, 15 Dec. 1918, *Chevalier* 39508 (P). Ho Chi Minh Ville: jardins chinois env. de Saigon, 26 Jan. 1919, *Chevalier & Nguyen Tuong Du* 39755 (P); aux env. de Saigon, 17 Nov. 1864, *Lefèvre* 546 (P); *l. c.*, *Lefèvre* 567 (P); ad flumen Saigon, Dec. 1866, *Pierre s.n.* (E, P); *l. c.*, Sep. 1869, *Pierre s.n.* (P); July 1870, *Pierre* 766 (P). Khanh Hoa: Nha Trang vic., 11–26 Mar. 1911, *Robinson* 1354 (P). Ninh Binh: Kim Son district, Cho Ganh, Oct. 1923, *Pételot* 1049 (P); in stagnis Phuc Nhac, 27 Oct. 1880, *Bon* 84 (P, SING). Ninh Thuan: Ba Rau "pr: Phanrang", 2 Mar. 1924, *Poilane* 9841 (P); Krong Pha, 30 Oct. 1920, *Evrard* 424 (P). Quang Tri: du canton An My, 17 Oct. 1909, *Bauche* 127 (P). Soc Trang: Mangea, rizières, 22 Jan. 1914, *Chevalier* 30266 (P). Thua Thien-Hue: Hue vic., Nov. 1911, *Lecomte & Finet* 1294 (P).



11.4. *Ipomoea aquatica* Forssk. A, habit, purple color form; B, leaves, sepals; C, white color form (credits: A, B, Preecha Karaket, BKF; C, G. Staples; vouchers: A, B, Thailand, not collected; C, cultivated Singapore, not collected).



11.5. *Ipomoea aquatica* Forssk. A, flowering branch; B, part of thick, hollow, floating stem (From Ooststroom & Hoogland 1953).



11.6. *Ipomoea aquatica* Forsk. Habit of flowering stem, showing roots at nodes. Drawn by L. Courchet.
Voucher: Baudois s.n. (P03560392).

4. *Ipomoea asarifolia* (Desr.) Roem. & Schult.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea asarifolia (Desr.) Roem. & Schult., Syst. Veg. 4: 251 (1819); Ooststr., Blumea 3: 539 (1940), Fl. Males., Ser. I, Spermat. 4: 477 (1953); Kerr, Fl. Siam. 3 (2): 10 (1954); P.H.Hô, Cây cỏ Việt Nam 2 (2): 989 (1993); Staples, Fl. Thailand 10: 409 (2010); Staples *et al.*, Thai J. Bot. 6: 83 (2014). – *Convolvulus asarifolius* Desr. in Lam., Encycl. 3: 562 (1789). – Type: Senegal, Roussillon s.n. (holo P-LA).

Ipomoea repens Lam., Tabl. Encycl. 1: 467 (1793). – *Ipomoea beladamboe* Roem. & Schult., Syst. Veg. 4: 233 (1819), nom. superfl.; Gagnep. & Courchet, Fl. Indo-Chine 4: 260 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 177 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 164 (2005). – *Convolvulus beladambu* Spreng., Syst. Veg. 1: 608 (1825). – Type: [icon] “Beladamboe” Rheedea, Hort. Malab. 11: t. 58 (1692) (syn).

Perennial herbs; stems prostrate or tips twining, thick, terete or angular. Leaves circular or kidney-shaped, 3.5–8.0 × 3.5–10.0 cm, base cordate, basal lobes rounded, apex broadly rounded or weakly emarginate, mucronulate; petiole thick, 3–9 cm long, deeply grooved adaxially, smooth or minutely muricate.

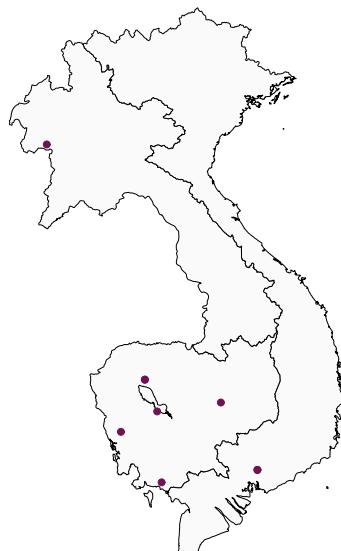
Inflorescences axillary to a leaf, often produced beside a leafy shoot; peduncles angular, 2.0–5.5(–10.0) cm, cymose, 1- to few-flowered, central flower pedicel longer than calyx, 14–24 mm. Flowers diurnal; sepals unequal, elliptic-oblong, obtuse, mucronulate, outer 2 shorter, 3-nerved, rather warty, 5–6 mm long, inner ones 8–9 mm; corolla funnelform, 5–6 cm long, red-purple, glabrous; stamens included, filaments shortly pilose at base; pistil included, ovary glabrous.

Capsules globose, c. 1.5 cm diam., glabrous. Seeds c. 5–7 mm long, glabrous.

Distribution. Almost ubiquitous in the tropics: Cambodia, Laos, Vietnam and India, Thailand, Malesia; Africa, the Americas.

Ecology. Sprawling or trailing on damp ground or in water in roadside ditches, muddy pastures, rice paddies, and sunny fields, on sandy soil; elevation: not recorded.

Usage. Used medicinally in Cambodia to treat eye problems (*Poilane* 14275) and “maux de ventre (douleurs)” (*Martin* 1355).





11.7. *Ipomoea asarifolia* (Desr.) Roem. & Schult. A, flowers; B, fruit (credit: T. Sando; voucher: Thailand, not collected).

Vernacular names

Cambodia. trakuontk (*Poilane* 14275), takuon tec (*Hahn* s.n.), trà kuon taêc (*Martin* 1355), voa kung the (*Müller* 301), trâkuon ték (*Hul* et al. 522).

Material studied

Cambodia. Kampot: Trach Kol, 17 Oct. 1895, *Hahn* 16 (P). Kompong Cham: Minot, 17 July 1931, *Müller* 301 (P). Kratie: Svaikek, 20 Oct. 1927, *Poilane* 14275 (P). Pursat: Anlong Krauch (village ethnique Pear), Massif des Cardamoms, 24 Dec. 1968, *Martin* 1355 (P, SING); Kg. Luong, 29 June 1965, *Martin* 226 (P, SING). Siem Réap: env. des Temples d'Angkor, 30 Nov. 1997, *Hul* et al. 522 (P, RUPP); Angkor, 12 Dec. 1911, *Lecomte & Finet* 1815 (P)

Laos. s. loc.: route de Than Ngeun, 17 Mar. 1956, *Tixier* 17/3/56-01 (P).

Vietnam. s. loc.: "Cochinchine", lieux inondés, 1862–1866, *Thorel* 630 (E, P).

5. *Ipomoea batatas* (L.) Lam.



Ipomoea batatas (L.) Lam., Tabl. Encycl. 1: 465 (1793); Gagnep. & Courchet, Fl. Indo-Chine 4: 240 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 177 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 988 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 164 (2005); Staples, Fl. Thailand 10: 410 (2010); Leti *et al.*, Flore Photogr. Cambodge 175 (2013); Staples *et al.*, Thai J. Bot. 6: 83 (2014). – *Convolvulus batatas* L., Sp. Pl.: 154 (1753). – Type: Herb. Linn. No. 77.5 (lecto Sl, designated by Biju, Taxon 51: 755 (2003 [2002])).

Creeping herbs, with enlarged subterranean tubers, axial parts glabrous or pilose; stems prostrate or ascending, rarely twining, rooting at nodes. Leaves broadly ovate to circular, 4–13 × 3–13 cm, margins entire or palmately 3–5(–7)-lobed, herbaceous, lobes broadly ovate to linear-lanceolate, sparsely pilose or glabrous; petiole 2.5–20.0 cm.

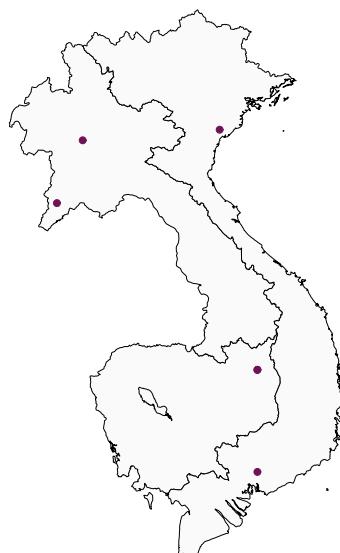
Inflorescences 1- or 3–7-flowered; peduncles 2.0–10.5 cm, stout, angular; bracts early deciduous, lanceolate, 2–4 mm; pedicels 0.2–1.0 cm. Flowers diurnal; sepals oblong or elliptic, more or less unequal, outsides glabrous or pilose, margins ciliate, apex acute, mucronulate, 2 outer 7–10 mm, inner sepals 8–11 mm; corolla campanulate to funneliform, 3.0–4.5 cm, pink, white, pale purple to purple, with darker centre, glabrous; stamens included; pistil included, ovary pubescent or glabrous.

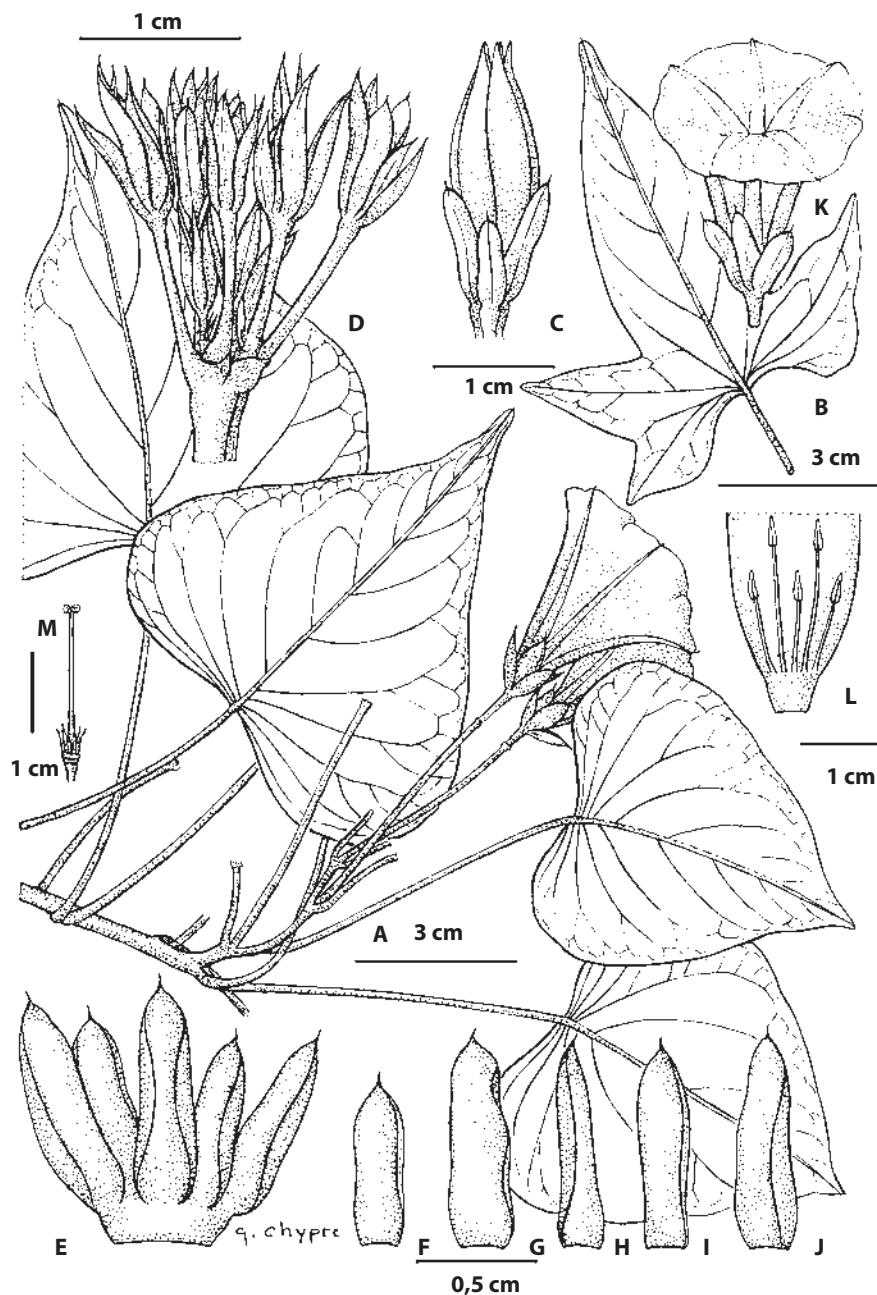
Capsules rarely produced, ovoid or depressed globose, pubescent. Seeds glabrous.

Distribution. A cultigen that arose in tropical America and is now grown world-wide for food and commercial purposes (primarily ethanol production). In Asia it is present in Cambodia, Laos, Vietnam, as well as China, Thailand, Malaysia, Indonesia, the Philippines, Papua New Guinea, and the Pacific Islands.

Ecology. Cultivated and persisting for a few years after cultivation ceases: in gardens, abandoned fields, rubbish dumps, vacant lots, along roadsides and paths, on sandy and red basaltic soils; elevation: up to 200 m.

Usage. The enlarged storage roots are eaten, either baked or boiled, and the tender shoot tips are used raw in salads and vegetable platters. The older stems and foliage are fed to livestock.





11.8. *Ipomoea batatas* (L.) Lamarck. A, flowering stem; B, lobed leaf; C, flower bud; D, inflorescence; E, calyx opened, adaxial view; F–J, sepals, adaxial view; K, flower; L, corolla cut open, showing stamens; M, pistil (From Heine 1984).



11.9. *Ipomoea batatas* (L.) Lam. A, habit, flowers; B, fruits; C, variegated leaf cultivars (credit: G. Staples; voucher: cultivated, not collected).

Vernacular names

Cambodia. buum nyüt (*Matras 118*), buum cin (*Matras 110*).

Vietnam. khoai lang (*Bon 1112*), lang dây (*Bon 1449*).

Material studied

Cambodia. Ratanakiri: Ban Tuk, 1967, *Matras 110* (P); *I. c.*, *Matras 118* (P).

Laos. Louang Prabang: 27 Dec. 1969, *Pottier 549* (P). Sayabouri: Paklai, 1866–1868, *Thorel s.n.* (P).

Vietnam. *s. loc.*: “Cochinchine”, cultivée, Jan. 1868, *Talmy s.n.* (P). Ninh Bình: Cho Ganh, Jan. 1923, *Pételot 1361* (P); Duyên Mô, cult., 14 Dec. 1881, *Bon 1112* (P); Khang Thuong, cult., 2 Mar. 1882, *Bon 1449* (P).

6. *Ipomoea biflora* (L.) Pers.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea biflora (L.) Pers., Syn. Pl. 1: 183 (1805); R.C.Fang & Staples, Fl. China 16: 304 (1995); Staples & Jarvis, Taxon 55: 1020 (2006); Staples, Fl. Thailand 10: 411 (2010); Staples *et al.*, Thai J. Bot. 6: 83 (2014). – *Convolvulus biflorus* L., Sp. Pl. ed. 2, 2: 1668 (1763). – *Aniseia biflora* (L.) Choisy, Mém. Soc. Phys. Genève 6: 483 [Conv. Orient. 101] (1834); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 173 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 157 (2005). – Type: China, Hong Kong, à Kennedy-town, Bodinier 386 (neo El, designated by Staples (2006); isoneo Pl. P00622221).

Convolvulus sinensis Desr. in Lam., Encycl. 3: 557 (1791). – *Ipomoea sinensis* (Desr.) Choisy, Mém. Soc. Phys. Genève 6: 459 [Conv. Orient. 77] (1834); Gagnep. & Courchet, Fl. Indo-Chine 4: 243 (1915); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 997 (1993). – Type: China, Moreau s.n. (holo P-JU6773).

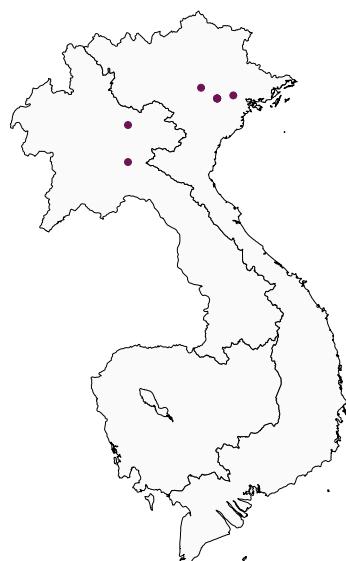
Ipomoea plebeia R.Br., Prodr.: 484 (1810); Ooststr., Blumea 3: 492 (1940); Fl. Males., Ser. I, Spermat. 4: 463 (1953). – Type: Australia, Queensland, Bay of Inlets, Banks & Solander s.n. (holo BM).

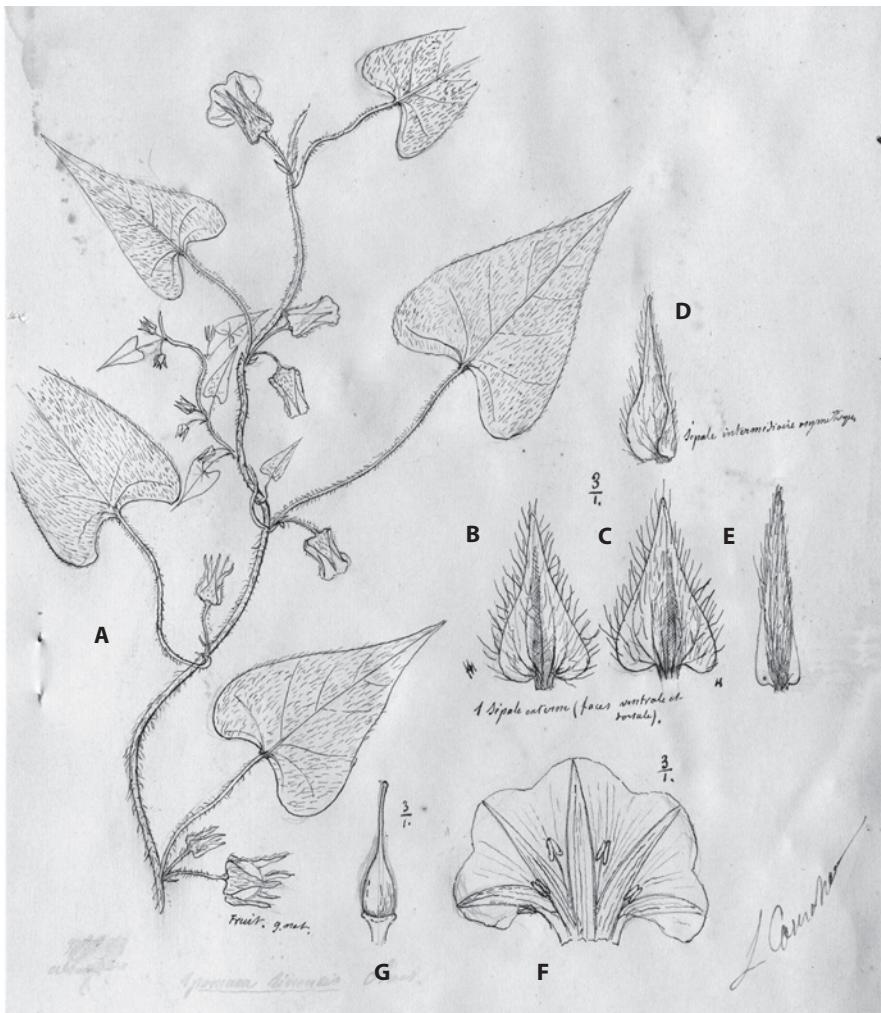
Annual herbaceous twiners, axial parts greyish hirsute; stems 1–2 m. Leaves cordate or deltoid-cordate, 4.0–9.5 × 3.0–7.0 cm, hirsute-villous, base cordate, margins rarely slightly 3-lobed, apex acuminate; secondary veins 6 or 7 either side of midvein; petiole 1.5–8.0 cm.

Inflorescences 1–3-flowered; peduncles (0–)0.3–1.5 cm; outer 3 bracts linear-lanceolate, small; pedicels 0.8–1.5 cm. Flowers diurnal; sepals slightly enlarged in fruit, outer 3 sepals deltoid-lanceolate, 8–10 × 4–5 mm, outsides greyish hirsute-villous, margins ciliate, insides subglabrous, bases auriculate, inner 2 linear-lanceolate, equal or longer than outer sepals; corolla narrowly campanulate, 0.9–1.3 cm, white, limb shallowly lobed, midpetaline bands pubescent; stamens c. 3 mm, anthers ovoid-deltoid, base sagittate; ovary conical, glabrous.

Capsules subglobose, c. 9 mm diam., glabrous. Seeds ovoid-trigonous, c. 4 mm, puberulous to tomentellous, margin sometimes white woolly.

Distribution. Laos, Vietnam, and India, China, Thailand, Indonesia, Australia, Pacific Islands, E Africa. A weedy species that is surely much more abundant than the few herbarium specimens document.



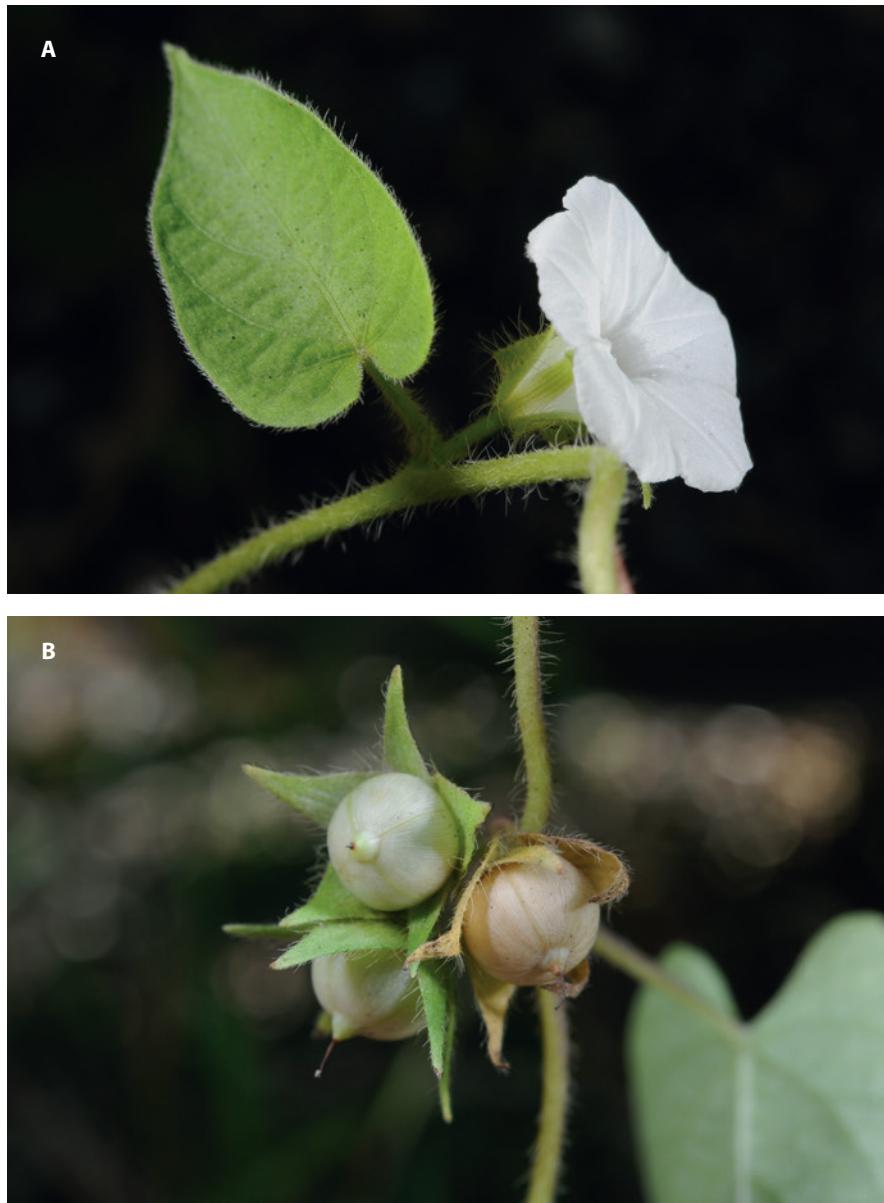


11.10. *Ipomoea biflora* (L.) Pers. A, habit of flowering plant; B, outer sepal, adaxial surface; C, outer sepal, abaxial surface; D, middle (third) sepal, showing asymmetrical base; E, inner sepal, showing symmetrical base; F, corolla, opened, showing androecium; G, pistil. Drawn by L. Courchet. Voucher: O. Debeaux s.n., in January 1914 (P04080462).

Ecology. In disturbed places: field edges, hedges, vacant lots, on all soil types; elevation: up to 990 m.

Material studied

Laos. Houa Phan: bridge over Nam Chong, Ban Phonsong, 24 Oct. 2002, *Homsombath & Newman* 1443 (E, P). Xieng Khouang: env. de Xieng Khouang, Sep.–Dec. 1917, *Chevalier* [Miéville legit] 37246 (P).



11.11. *Ipomoea biflora* (L.) Pers. A, habit, flower; B, fruit (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Vietnam. Cao Bang: Long Tchéou, Oct. 1893, *Simond s.n.* (P). Hai Duong: Sept-Pagodes, Aug. 1906, *Mouret 201* (P). Ha Noi: Citadelle de Hanoi, 1883–1885, *Couderc s.n.* (P, SING); 9 Mar. 1909, *d'Alleizette s.n.* (P); l. c., Jan. 1902, *Debeaux s.n.* (P); env. d'Hanoi, June 1908, *d'Alleizette 189* (P). Phu Tho: Vietry, 31 Oct. 1888, *Balansa 3543* (P).

7. *Ipomoea cairica* (L.) Sweet

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea cairica (L.) Sweet, Hort. Brit.: 287 (1827); Ooststr., Blumea 3: 542 (1940), Fl. Males., Ser. I, Spermat. 4: 478 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 990 (1993); R.C.Fang & Staples, Fl. China 16: 309 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 168 (2005); Staples, Fl. Thailand 10: 411 (2010); Staples *et al.*, Thai J. Bot. 6: 83 (2014). – *Convolvulus cairicus* L., Syst. ed. 10, 922 (1759). – Type: [icon] “*Convolvulus Aegyptius*” in Vesling in Alpino, De Plantis Aegypti 73, 74 (1640) (syn).

Ipomoea palmata Forssk., Fl. Aegypt.-Arab. 43 (1775). – Type: Egypt, Rosetta, Forsskål s.n. (holo C).

Convolvulus tuberculatus Desr. in Lam., Encycl. 3: 545 (1792). – *Ipomoea tuberculata* (Desr.) Roem. & Schult., Syst. Veg. 4: 208 (1819). – Type: France, cult. ‘Jardin du Roi’, collector unknown s.n. (holo P-LA).

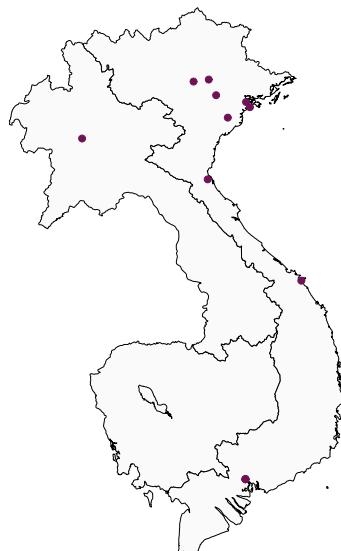
Ipomoea pulchella Roth, Nov. Pl. Sp. 115. 1821; Gagnep. & Courchet, Fl. Indo-Chine 4: 257 (1915). – Type: ‘Indes Orientale’ without locality, B. Heyne s.n. (not located).

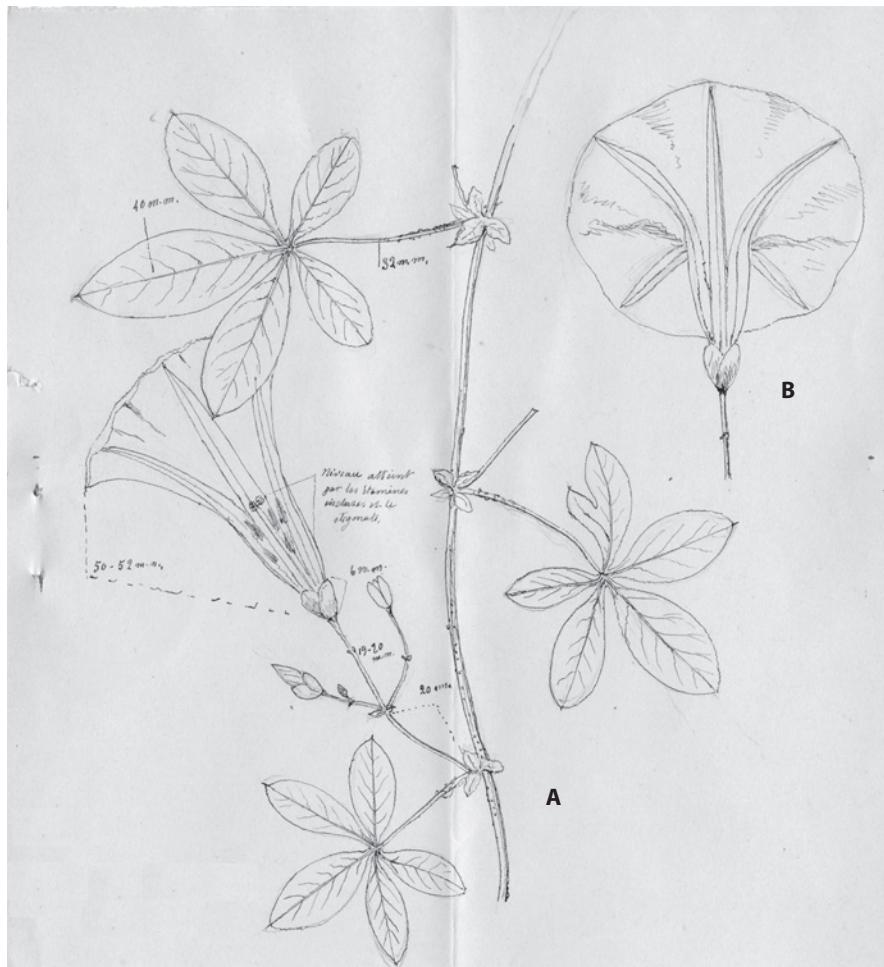
Perennial herbaceous twiners, glabrous, from a tuberous root, axial parts verruculose or smooth; stems 2–5 m. Leaves palmately 5-parted to base, lobes unequal, apex acute or obtuse, mucronulate, middle lobe ovate, ovate-lanceolate or elliptic, 3.0–55.0 × 1.5–2.5 cm, secondary lobes smaller, basal lobes usually 2-lobed or -parted; petiole 2–8 cm, base with leafy pseudostipules (tiny leaves from axillary bud).

Inflorescences 1- or several-flowered; peduncles 2–8 cm; bracts and bracteoles early deciduous, squamiform, small; pedicels 0.5–2.0 cm. Flowers diurnal; sepals unequal, outer 2 sepals 4.0–6.5 mm, inner sepals 5–9 mm, glabrous, outsides more or less verruculose, margins paler, scarious; corolla funnelform, (2.5–)5.0–7.0 cm, pink, purple, or reddish purple, centre darker, rarely white; stamens included, unequal; pistil included, ovary glabrous.

Capsules subglobose, c. 10 mm. Seeds c. 5 mm, black, densely tomentose, margin with longer trichomes..

Distribution. Laos, Vietnam, and Pakistan, India, Myanmar, China, Thailand, Malaysia, the Philippines, Pacific Islands, Africa, and South America.





11.12. *Ipomoea cairica* (L.). A, habit of flowering plant; B, flower in lateral view. Drawn by L. Courchet. Voucher: H. Bon 5665 (P03562228).

Ecology. Cultivated as an ornamental and weedy in vacant lots and on waste ground, along roadsides, and in forest edges, on sandy, mediocre soils; elevation: 0–900 m.

Usage. “Cultivé pour ses tubercules comestibles” (Gagnepain & Courchet 1915: 258).

Notes. A common plant near human habitations throughout the region. The relatively few specimens in herbaria do not accurately reflect the species’ true distribution and abundance. Not a single fruiting specimen was found from the CLV area.

Vernacular names

Ipomoée à feuilles palmées (*d'Alleizette* s.n.).



11.13. *Ipomoea cairica* (L.) Sweet. A, flower, side view showing calyx; B, habit (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Vietnam. dây muôn raò (Annamite, *Poilane* 1438).

Material studied

Laos. Louang Prabang: near Phouthy Market, across from Ban Khoy Secondary School, 5 Nov. 2012, Staples et al. 1522 (HNL, PTK, SING).

Vietnam. s. loc.: 1912, Lecomte & Finet s.n. (SING). Baria-Vung Tau: région de Longson, Oct. 1911, Lecomte & Finet s.n. (P). Da Nang: Tourane, June 1927, Clemens & Clemens 3163 (P); Ville de Tourane, 31 May 1920, Poilane [sub Chevalier #] 1438 (P, SING). Hai Phong: colline de Do Son, Aug. 1912, Lemarié 8 (P); Dec. 1885, Balansa 817 (P). Ha Noi: 1908, d'Alleizette s.n. (P). Ho Chi Minh Ville: Jardin Botanique, 3 Jan. 1920, Hiép 772 (P); l. c., Aug. 1920, Hiép 1041 (P); 18 Mar. 1920, Hiép 1068 (P). Nam Dinh: June 1908, Mouret 192 (P). Nghe An: 4 Sep. 1892, Bon 5665 (P, SING). Phu Tho: Phuto to Phudoan, 28 Oct. 1911, Lecomte & Finet 665 (P, SING). Vinh Phuc: Tamdao, 21 Dec. 1994, Tirvengadum et al. 3321 (AAU, P).

8. *Ipomoea cambodiensis* Gagnep. & Courchet



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Ipomoea cambodiensis Gagnep. & Courchet, Notul. Syst. (Paris) 3: 143 (1915); Fl. Indo-Chine 4: 249 (1915); P.H. Hồ, Cây cỏ Việt Nam 2 (2): 990 (1993); Staples et al., Adansonia 36 (2): 352 (2014); Staples et al., Thai J. Bot. 6: 83 (2014). – Type: Cambodia. Kampot, Geoffray 275 (syn PI, P00288062); Geoffray 275bis (syn PI, P00288063). Laos. Xaignabouli: Paklay, Thorel s.n. (syn PI, P00288064).

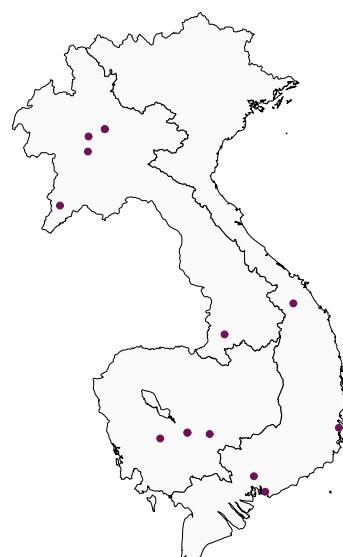
Herbaceous twiners; stems 2–5 m high or more, filiform, drying striate-angulate, glabrescent or sparsely puberulent; innovations coppery red, deep green at maturity. Leaves triangular-ovate, 5–14 × 3.0–7.5(–10.0) cm, both sides sparsely pubescent, base deeply cordate, margins drying undulate-denticulate towards the base, apex acute to acuminate, mucronulate, underside minutely dotted; secondary veins 6–7 either side of midvein; petiole 1.5–9.0(–13.5) cm long, shortly pubescent.

Inflorescences axillary, (1)–3–7(–10)-flowered; peduncles 0.8–1.9 cm; pedicels 1.5–2.5 cm; bracts oblong-acute, 2 mm long, subopposite. Flowers diurnal; buds apically silky pubescent outside; sepals unequal, ovate-obtuse, base subcordate, glabrous, outsides drying verrucose-pitted below middle, smooth above, apex acute to obtuse, mucronulate, outer sepals 4.0–4.5 mm, inner 6–7 mm long; corolla funnel-shaped, 4.5–6.0(–6.8) cm long, tube base narrow, cylindrical, red-purple inside, widening abruptly above, limb obscurely 5-lobed or 5-angled, creamy white or pale yellowish, lobes triangular, very short; stamens inserted near tube base, filaments unequal, 5–15 mm long, base abruptly widened, papillose, anthers oblong, 4 mm long, white; pistil included, slightly longer than stamens, ovary acuminate, glabrous, 2-locular, biovulate, style filiform, stigma biglobose, white.

Fruiting sepals not accrescent, at length reflexed against pedicel, drying brown-black, margins paler. Capsules ovoid-conical, 15–17 mm long, dark brown, 4-valved, glabrous, tardily dehiscent, apex often apiculate by indurated style base. Seeds 4 or fewer, 7–9 mm long, woolly with long, wavy, grey-brown trichomes.

Distribution. Cambodia, Laos, Vietnam, as well as Thailand and Malaysia (Sabah). The disjunction between continental Southeast Asia and NE Borneo is remarkable.

Ecology. In disturbed secondary forest, along roadsides, often near streams or water, on clay or granitic-schistaceous soil; elevation: 300–600 m.





11.14. *Ipomoea cambodiensis* Gagnep. & Courchet habit of flowering plant. Drawn by L. Courchet. Voucher: Geoffray 275 (P00288062).

Vernacular names

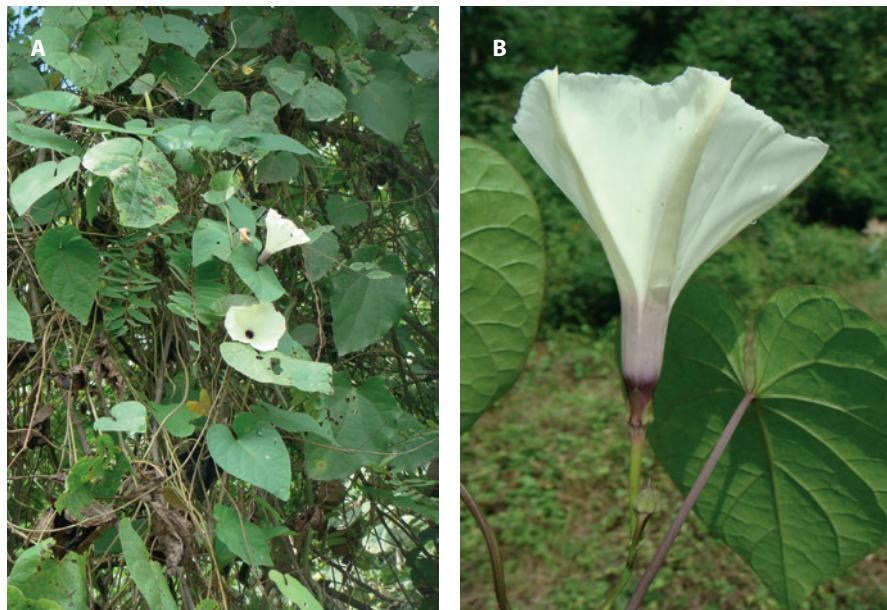
Laos. chi¹ cho² khieng² (*Pedrono* 40).

Material studied

Cambodia. Kampong Cham: Chup, Nov. 1921, *Evrard* 734 (P). Kompong Speu: in montem "Chéreev", Mar. 1870, *Pierre* s.n. (P).

Laos. s. loc.: bas cours de la N. Hou, 21 Mar. 1937, *Poilane* 20464 (P). Champassak: Huay Palai, 19 Feb. 2010, *Wongprasert* 102-42 (BKF). Louang Prabang: PK7, rte. Ban Khittot, 13 Feb. 1969, *Pedrono* 40 (P); Ban Khi Mot, 2 Nov. 1969, *Pedrono* 132 (P); along Hwy 13 between Luang Prabang and Vientiane, about Km marker 331, 4 Nov. 2012, *Staples* et al. 1512 (A, BKF, HNL, KKU, P, PTK, SING).

Vietnam. Ba Ria-Vung Tau: in montibus Dinh ad Baria, Aug. 1866, *Pierre* s.n. (P). Da Nang: Poste 6, "pro: Quang Nam", 18 Mar. 1939, *Poilane* 29393 (P). Dong Nai: Bien hoa, Jan. 1866, *Pierre* s.n. (P). Khanh Hoa: Dhu hu, "pr. Nhatrang", 13 Jan. 1923, *Poilane* 5190 (P).



11.15. *Ipomoea cambodiensis* Gagnep. & Courchet. A, habit; B, flower (credit: Paweena Traiperm, Mahidol University; voucher: Laos, Staples et al. 1512 (SING)).



9. *Ipomoea campanulata* L.



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Ipomoea campanulata L., Sp. Pl. 1: 160 (1753); D.F.Austin *et al.*, Brittonia 30: 195–198 (1978); Van Steenis, Fl. Males., Ser. I, Spermat. 9: 558 (1982); P.H.Hô, Cây cỏ Việt Nam 2 (2): 995 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 168 (2005); Staples, Fl. Thailand 10: 412 (2010); Staples *et al.*, Thai J. Bot. 6: 83 (2014). – Type: [icon] “Adamboe” in Rheede, Hort. Malab. 11: 115, t. 56. (1692) (lecto, designated by Gunn, Brittonia 24: 170, fig. 2 (1972)).

Ipomoea campanulata var. *typica* Prain, invalid; Gagnep. & Courchet, Fl. Indo-Chine 4: 254 (1915).

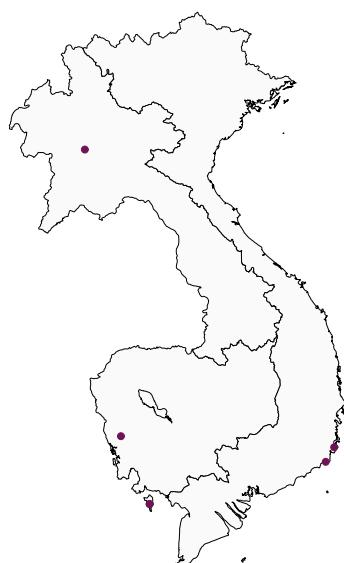
Ipomoea campanulata var. *illustris* C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 211 (1883); Gagnep. & Courchet, Fl. Indo-Chine 4: 253 (1915). – *Ipomoea illustris* (C.B.Clarke) Prain, Bengal Pl. 2: 735 (1903); Kerr, Fl. Siam. 3 (2): 13 (1954); Ooststr., Blumea 3: 566 (1940), Fl. Males., Ser. I, Spermat. 4: 485 (1953). – Type: “Malay Peninsula from Moulmein southwards”, Parish 6 (syn K!, K000830812).

Ipomoea soluta Kerr, Bull. Misc. Inform. Kew 1941: 18 (1941), Fl. Siam. 3 (2): 17 (1954); R.C.Fang & Staples, Fl. China 16: 311 (note) (1995). – Type: India, Bombay, N.A. Dalzell s.n. (holo K!, K000830813).

Ipomoea soluta Kerr var. *alba* C.Y.Wu, Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 122 (1965), *syn. nov.* – Type: China, Yunnan, Y.H. Li 2003 (holo KUN!, KUN1218199).

Woody climbers or subshrubs; stems 7–8 m long or more, grey, verruculose-lenticellate. Leaves ovate-cordate, 16–17(–28) × 13–15(–26) cm, upper sides nearly glabrous, undersides pubescent, base cordate, apex acute to acuminate; secondary veins 10–15 either side of midvein; petiole 6.5–9.0(–15.5) cm, densely puberulous.

Inflorescences several-flowered; peduncles stout, shorter than petiole, densely puberulous; bracts early deciduous; pedicels stout, 0.7–1.3 cm, densely pubescent. Flowers diurnal; sepals slightly unequal, orbicular, leathery, outside farinose or glabrous, apex rounded, outer 2 sepals 13–14 mm; inner sepals 14–15 mm, apex rounded or emarginate, sepals accrescent in fruit; corolla broadly funnelform, 5.5–6.5(–10.0) cm, tube gradually narrowed toward base, red-violet inside, limb paler or white, shallowly 5-lobed, lobes semicircular; stamens included, slightly unequal, filaments



dilated basally, puberulous; pistil included, ovary narrowly conical, glabrous.

Capsules ovoid, c. 15 mm long, 4-valved, brown, glabrous. Seeds c. 8–9 mm, black, long silky-pubescent on margins.

Distribution. Cambodia, Laos, Vietnam, and Sri Lanka, India, Myanmar, China, Thailand, Malaysia, the Philippines, New Guinea.

Ecology. A native species found typically in primary evergreen forest, also in secondary vegetation, roadsides, or in bamboo thickets on rocky or sandy soils; elevation: up to 800 m.

Vernacular names

Cambodia. voa veuk (khmer, *Martin 1351*), sum lângêng (Pear, *Martin 1351*).

Vietnam. re lô up (*Poilane 9270*).



11.16. *Ipomoea campanulata* L. habit, flower
(credit: Kittisack Phouthavong, Pha Tad Ke Botanic Garden, Laos; voucher: Laos, Staples et al. 1510 (HNL)).

Material studied

Cambodia. Kratie: Sambor, Nov. 1875, *Harmand 27* (P, SING). Pursat: Anlong Krauch, piémont du Massif des Cardamomes, 24 Dec. 1968, *Martin 1351* (P, SING).

Laos. Louang Prabang: along Hwy 13 between Luang Prabang and Vientiane, about Kms 346–347, 4 Nov. 2012, *Staples et al. 1510* (HNL, PTK, SING); Muong you, *Spire 729* (P).

Vietnam. Kien Giang: Phu Quoc island, 6 Oct. 1875, *Godefroy 951* (P, SING); *I. c.*, 6 Oct. 1875, *Harmand 951* (P). Ninh Thuan: Ca Na “pro. Phanrang”, 22 Dec. 1923, *Poilane 9270* (P); Ninh Hai district, Nui Chua National Park, at Vung Olim campsite, 10 Jan. 2010, *Soejarto et al. DDS-14550* (P).

10. *Ipomoea carnea* Jacq. subsp. *fistulosa* (Choisy) D.F.Austin

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea carnea Jacq. subsp. *fistulosa* (Choisy) D.F.Austin, Taxon 26: 237 (1977); Van Steenis, Fl. Males., Ser. I, Spermat. 9: 558 (1982); P.H.Hô, Cây cỏ Việt Nam 2 (2): 995 (1993); R.C.Fang & Staples, Fl. China 16: 311 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 168 (2005); Staples, Fl. Thailand 10: 413 (2010). – *Ipomoea fistulosa* Mart. ex Choisy in DC., Prodr. 9: 349 (1845); Van Steenis, Fl. Males., Ser. I, Spermat. 4: 599 (1954). – Type: Brazil, Martius 2398 (lecto MI, designated by D.F.Austin (1977)).

Ipomoea crassicaulis (Benth.) B.L.Rob., Proc. Amer. Acad. Sci. 51: 530 (1916); Ooststr., Blumea 3: 569 (1940), Fl. Males., Ser. I, Spermat. 4: 485 (1953); Kerr, Fl. Siam. 3 (2): 11 (1954); T.N.Nguyễn in Averyanov et al., Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 169 (2005). – Type: Ecuador, Guayaquil, Sinclair s.n. (holo K).

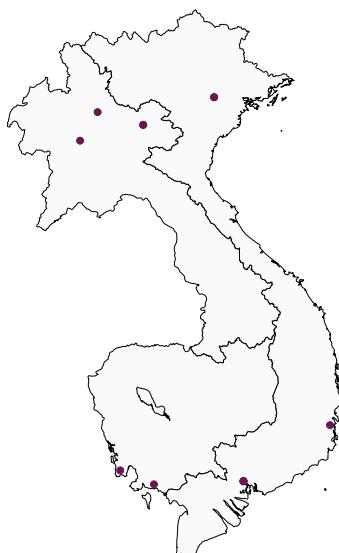
Shrubs; stems erect or spreading, 1–3 m long, becoming sparsely lenticellate with age, axial parts puberulent, later glabrescent. Leaves ovate or ovate-oblong, 6–25 × 4–17 cm, upper sides nearly glabrous or both sides densely puberulous, base cordate or truncate, apex acuminate, mucronulate; midvein with 2 prominent glands underneath at base; secondary veins 7–9 either side of midvein; petiole 2.5–15.0 cm.

Inflorescences few to several-flowered; peduncles stout, 5–10 cm; bracts early deciduous, ovate; pedicels 1.0–1.5 cm. Flowers diurnal; sepals circular, equal or inner sepals longer, 5–6 mm, all sepals broadly rounded, outside farinose-puberulous; corolla funnelform, 7–9 cm, purplish, pink, or whitish, darker in tube, tube and midpetaline bands farinose outside; stamens included, unequal, anthers linear, bases sagittate; pistil included, ovary and style base puberulent.

Capsules ovoid, 15–20 mm, pale brown, apiculate. Seeds c. 1 cm, black, entirely brown sericeous-pubescent.

Distribution. Cambodia, Laos, Vietnam, and Pakistan, Nepal, India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, New Guinea, Pacific Islands; native to South America.

Ecology. Cultivated in gardens as an ornamental and naturalized in weedy fields, roadsides, riverbanks, on hill tops, forest margins; elevation: 0–300 m.



Usage. used medicinally in Laos for treating cerebral fevers (*Pottier 520A*).

Notes. Poisonous. According to label data on a Cambodian specimen, this plant was “Inconnue au Cambodge avant 1903; importée à Kampot en Avril 1903” (*Geoffray 231*). This provides an approximate date of introduction for this tropical American plant into the CLV area.

Although the botanical literature for CLV has often cited *I. carnea*, in fact all specimens examined and living plants seen belong to subsp. *fistulosa* rather than the nominate subsp. *carnea*.

Vernacular names

Laos. bǎng săn khǎo (*Pottier 520A*), ngonǎn dou sēi (*Pottier 262*).

Vietnam. dây bìm bìm (*Chevalier 29803*).

Material studied

Cambodia. Kampot: cult., importé du “Siam” à Kampot, Apr. 1903, *Geoffray 231 & 231bis* (P).

Laos. Bokeo: Ban Houeisay, “prov. Houakhong”, 25 July 1969, *Pottier 262* (P); *I. c.*, *Pottier 287* (P). Louang Prabang: Ban Khoy, 22 Aug. 1969, *Pottier 433* (P); Ban Na Luang, 4 Sep. 1969, *Pottier 520A* (P).

Vietnam. s. loc.: 8 Feb. 1958, *Sigaldi 319* (P). Ha Noi: Hanoi, Mar. 1909, *d'Alleizette s.n.* (P); Université de Hanoï, 29 Oct. 1995, *Allorge 1041* (P). Ho Chi Minh Ville: “Saigon”, Jardin botanique, 7 Jan. 1914, *Chevalier 29803* (P); *I. c.*, 22 Jan. 1919, *Chevalier 39848* (P); *I. c.*, 9 Dec. 1918, *Hiép 97* (P); *I. c.*, 26 Jan. 1919, *Chevalier 39827* (P); “Institut de recherches agronomiques de Saigon,” *Evrard [legit Dông 98] 2748* (P). Khanh Hoa: Ninh Hoa, près de Nha Trang, 3 May 1922, *Poilane 3155* (P, SING).



11.17. *Ipomoea carnea* Jacq. subsp. *fistulosa* (Mart.) Austin. Habit & flowers (credit: Tran Huu Dang; voucher: Vietnam, not collected).



11. *Ipomoea eriocarpa* R.Br.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Ipomoea eriocarpa R.Br., Prodr. 484 (1810); Gagnep. & Courchet, Fl. Indo-Chine 4: 245 (1915); Ooststr., Fl. Males., Ser. I, Spermat. 4: 462 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 985 (1993); R.C.Fang & Staples, Fl. China 16: 303 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 169 (2005); Staples *et al.*, Thai J. Bot. 6: 83 (2014).—Type: Australia, Banks s.n. (holo BM).

Herbaceous twiners or trailers. Stems prostrate or twining, 1–2 m long, slender, retrorsely or patently pilose. Leaves mostly lanceolate to oblong or linear-lanceolate, 2.5–6.0 × 0.5–1.5 cm, base cordate with rounded sinus and basal lobes, long attenuate to acuminate towards apex, with obtuse or acute point, both sides sparsely pilose or more densely so underneath; secondary veins 7 or 8 either side of midvein; petiole 0.75–8.0 cm long, pilose.

Inflorescences axillary, sessile or nearly so, cymosely-branched; peduncles much shorter than petioles or absent; pedicels 0–3 mm long; bracts linear or lanceolate, 3–8 mm long, smaller upwards, pilose. Flowers diurnal, inconspicuous; sepals subequal, linear-acuminate from ovate base, 7–8 mm long, inner ones slightly narrower than outer, pilose outside; corolla tubular to funnelform, barely longer than calyx, 7–9 mm long, pinkish or purple, darker inside tube, midpetaline bands pilose outside; stamens and pistil included, filaments inserted near tube base, pubescent basally, glabrous above; ovary and style base pubescent.

Capsules shorter than enclosing calyx, broadly ovoid to globose, c. 5–6 mm diameter, 2-locular, 4-valved, pubescent, capped by persistent style base. Seeds usually 4, c. 2.5 mm long, glabrous, minutely reticulate.

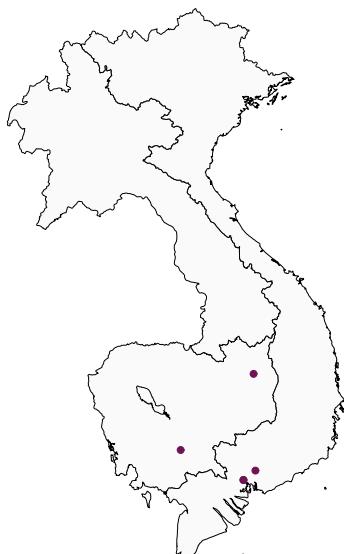
Distribution. Cambodia, Vietnam, and China, Malaysia, throughout Malesia, northern Australia.

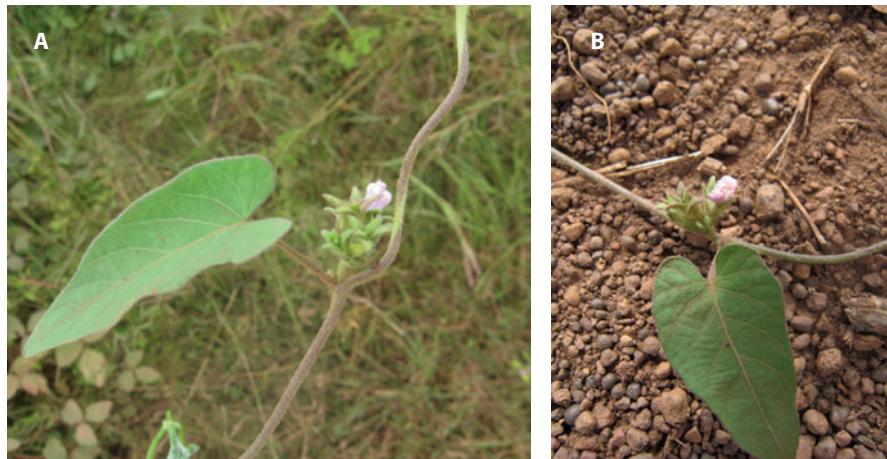
Ecology. Creeping on open ground in sunny places, as a twiner in grasslands, at roadsides; elevation 130 m.

Ipomoea eriocarpa escapes notice because of its diminutive habit, hidden among grasses and low herbs, and the small, unobtrusive flowers.

Material studied

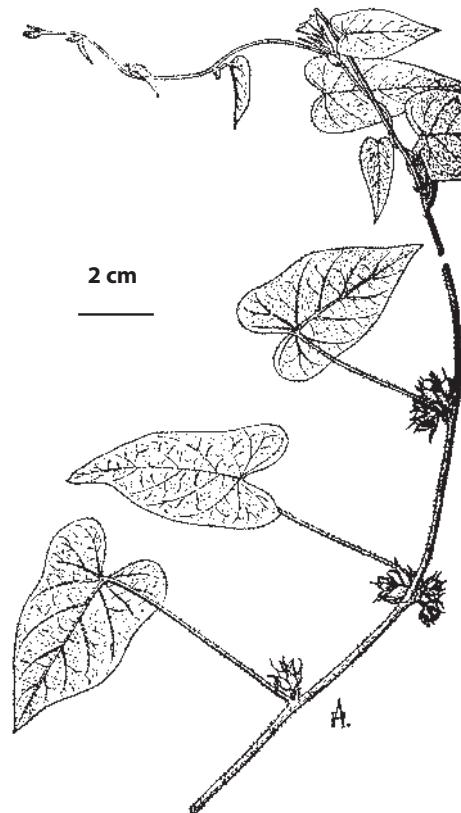
Cambodia. s. loc.: 1874, Jullien s.n. (P). Ratanakiri: route de Lumphat, 26 Nov. 2007, Cheng *et al.* CL798 (P, SING).





11.18. *Ipomoea eriocarpa* R. Br. A, habit; B, inflorescence, flower (credit: Bruno David; voucher: Cambodia, S.K. Cheng et al. CL-798 (P)).

Vietnam. s. loc.: "Cochinchine", 1862–1866, Thorel 1561 (P, SING). Ho Chi Minh Ville: env. de "Saigon", Apr. 1872, Pierre 1034 (E, P); "Saigon", Dec. 1867, Talmy s.n. (P).



11.19. *Ipomoea eriocarpa* R. Br. Branch with flowers and capsules (From Ooststroom & Hoogland 1953).

12. *Ipomoea harmandii* Gagnep.



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Ipomoea harmandii Gagnep., Notul. Syst. (Paris) 3: 145 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 243 (1915). – *Aniseia harmandii* (Gagnep.) P.H.Hô ex T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 173 (1990); P.H.Hô, Cáycô Việtnam 2 (2): 978 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 158 (2005). – Type: Vietnam. Bà Rịa-Vũng Tàu: Poulo Condor, 1875–1877, Harmand 904 (holo Pl, P00288068; iso Pl, P00288069).

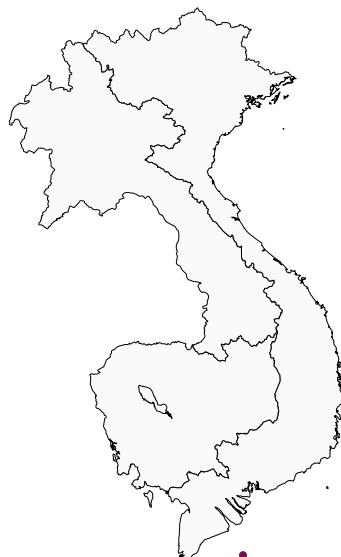
Perennial herbs, twining; branches at first tomentose, subsilvery, later glabrescent. Leaves reniform or suborbicular, c. 11 cm × 10 cm, base deeply cordate, auricles rounded, apex abruptly acuminate (acumen 15 mm long), both sides at first silvery sericeous, later subglabrous, undersides more densely pubescent; secondary veins 6 or 7 either side of midvein, arcuate; petiole 6–10 cm long, whitish tomentose, later glabrous.

Inflorescences axillary, 1–3-flowered, peduncles 0–7 mm long, tomentose; pedicels a little shorter or equal. Flowers not seen; buds c. 2 cm long; calyx (immature) with outer 2 sepals orbicular, c. 2 cm diam., base shallowly cordate, outer side and along inner margins greyish tomentose, inner 3 sepals ovate-acute or suborbicular, 1.0–1.5 cm long, mucronate; corolla (in bud) 13 mm long, glabrous, limb deeply 5-lobed, lobes acute, 6 mm long, margins inflexed; stamens inserted near corolla base, filaments glabrous, anthers oblong; ovary glabrous, acute, locules 2, biovulate, disc prominent, annular, encircling base of ovary, style filiform, stigma capitate, biglobose.

Fruits not seen.

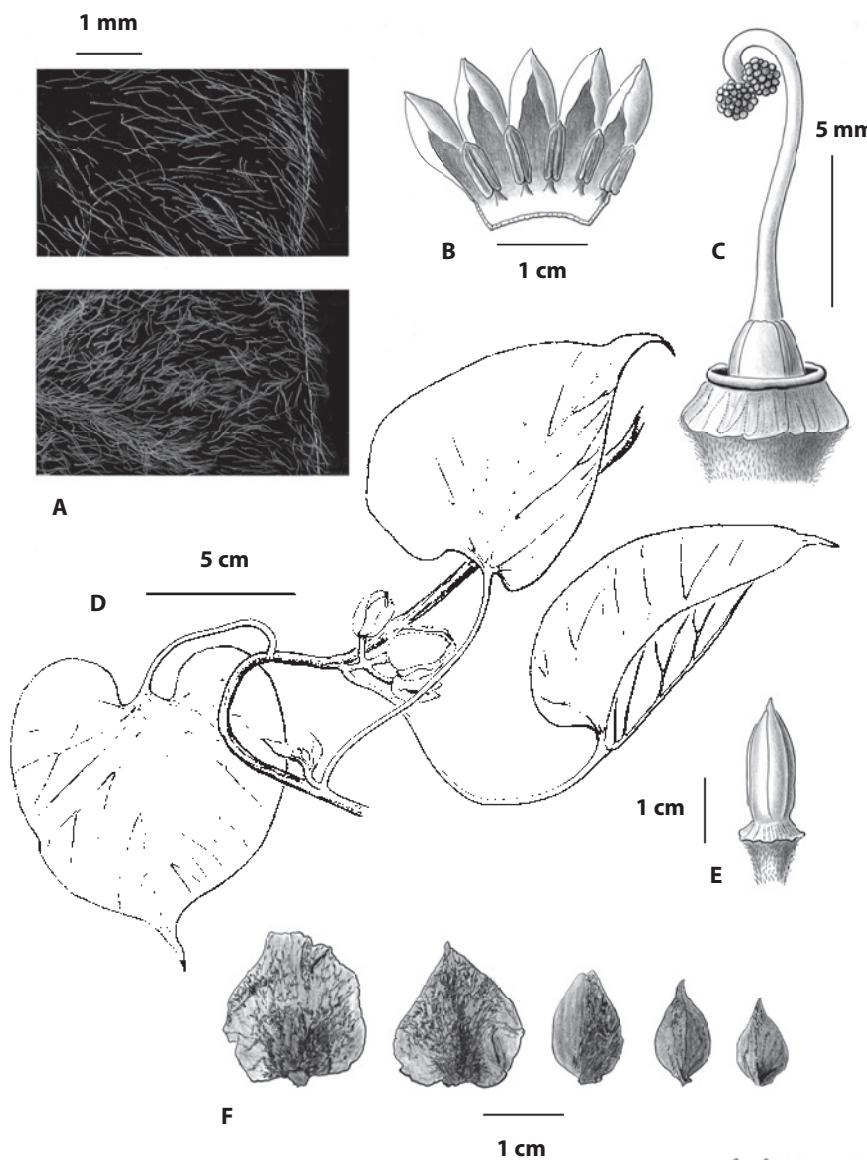
Distribution. Vietnam, known only from Poulo Condor island.

Notes. An enigmatic species known only from the type gathering. Although the epithet has been transferred to *Aniseia*, and Vietnamese botanical literature mostly accepts *A. harmandii*, the pollen grains are clearly spinulose and this rules out placement in *Aniseia*, a genus of 3 species with exclusively smooth, non-spinulose pollen (Austin 1999).

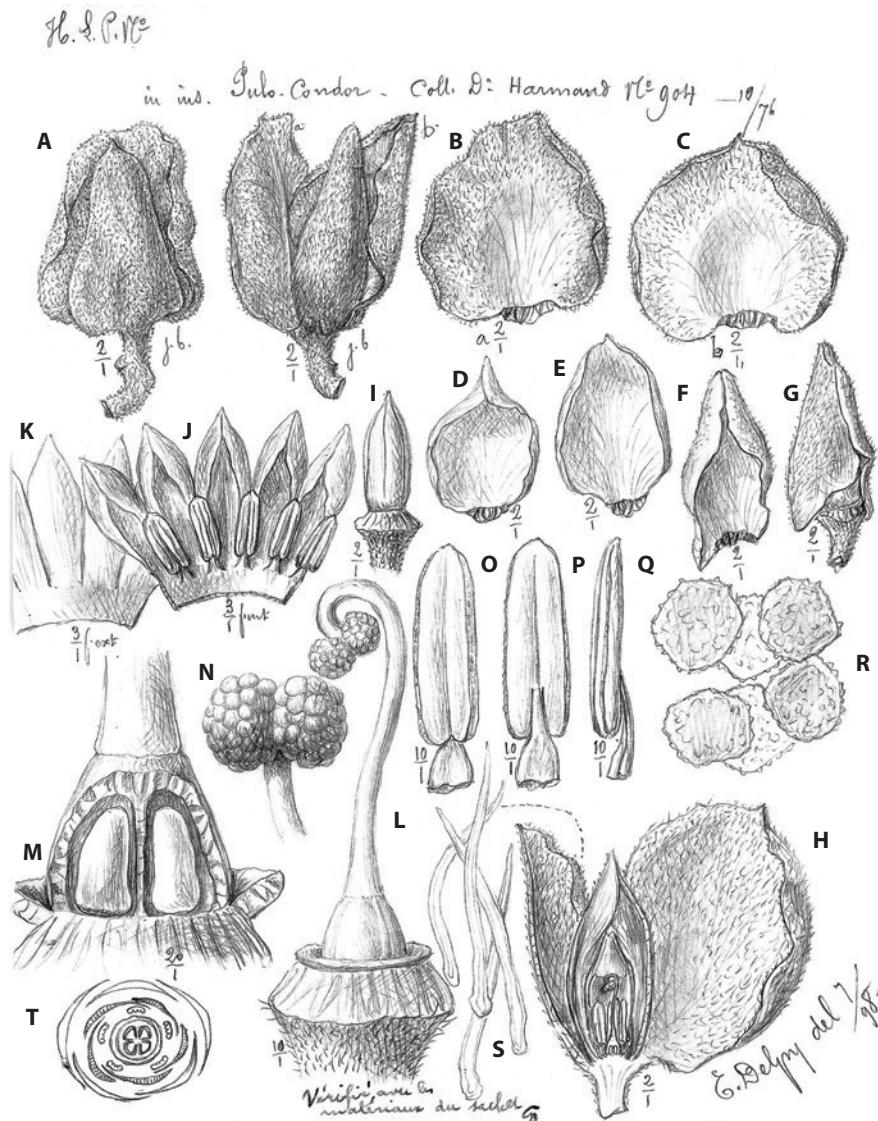


Material studied

Known only from the type gathering.



11.20. *Ipomoea harmandii* Gagnep. A, indumentum on leaf surfaces, adaxial (top), abaxial (bottom); B, corolla in bud, opened, showing androecium; C, pistil, from bud, not fully expanded; D, habit; E, immature flower bud, calyx removed; F, sepals in abaxial view, outermost (left) to innermost (right). Drawn by Bernard Duhem. Voucher: Harmand 904 (P00288068).



11.21. *Ipomoea harmandii* Gagnep. A, immature flower bud, two views; B–F, sepals, adaxial surfaces, outermost (B) to innermost (F); G, flower bud with 2 inner sepals only (outer 3 sepals removed); H, immature flower bud in longitudinal section; I, immature flower bud, corolla only (calyx removed); J, immature corolla opened, adaxial view, showing androecium; K, immature corolla opened, abaxial view; L, immature pistil, not fully expanded; M, ovary, wall partly cut away to show septum and 2 ovules; N, stigmas; O, stamen, adaxial view; P, stamen, abaxial view; Q, stamen, lateral view; R, pollen grains; S, simple trichomes from abaxial surface of an outer sepal; T, floral diagram. Drawn by E. Delpy, July 1898. Voucher: Harmand 904, in Oct. 1876 (P00288068).

13. *Ipomoea hederifolia* L.



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Ipomoea hederifolia L., Syst. Nat. ed. 10, 925 (1759); Ooststr., Fl. Males., Ser. I, Spermat. 5: 563 (1958); P.H.Hô, Cây cỏ Việt Nam 2 (2): 993 (1993); R.C.Fang & Staples, Fl. China 16: 301 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 169 (2005); Staples, Fl. Thailand 10: 415 (2010). – Type: [icon] “*Ipomoea foliis cordatis*” in Plumier, Pl. Amerique: t. 93, f. 2 (1756) (lecto, designated by O'Donell in Lilloa 29: 48 (1959)).

Ipomoea angulata Lam., Tabl. Enc. 1: 464 (1791); Ooststr., Blumea 3: 553 (1940), Fl. Males., Ser. I, Spermat. 4: 481 (1953). – *Quamoclit angulata* (Lam.) Bojer, Hort. Maurit. 224 (1837); Kerr, Fl. Siam. 3 (2): 21 (1954). – Type: Île de France [=Mauritius], collector unknown (holo P).

Ipomoea coccinea auctt. non L.: Gagnep. & Courchet, Fl. Indo-Chine 4: 236 (1915); T.N.Nguyễn in Averyanov et al., Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 994 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 168 (2005).

Annual herbaceous twiners, all parts glabrous or sparsely pilose; stems 2–5 m long. Leaves ovate to orbicular in outline, entire or more often angulate, coarsely dentate, or obscurely 3-lobed, 3–15 × 3–10 cm, base cordate, apex acuminate, mucronulate; petiole 3–12 cm long.

Inflorescences axillary or terminal, few to many-flowered; peduncles 3–20 cm long; pedicels 0.5–0.7 cm long, lengthening in fruit; bracts triangular, 1.5–2.0 mm. Flowers diurnal, weakly zygomorphic; sepals unequal, oblong-rectangular, apex broadly obtuse or truncate with 3–4 mm long awn inserted below top, outer sepals 2.0–2.5 mm, inner ones longer; corolla salverform, orange-red, tube 3.0–4.5 cm long, slightly curved, base narrowed, limb spreading, 2.0–2.5 cm diam., 5-toothed; stamens exserted, filaments slightly unequal, glabrous; pistil exserted, ovary glabrous.

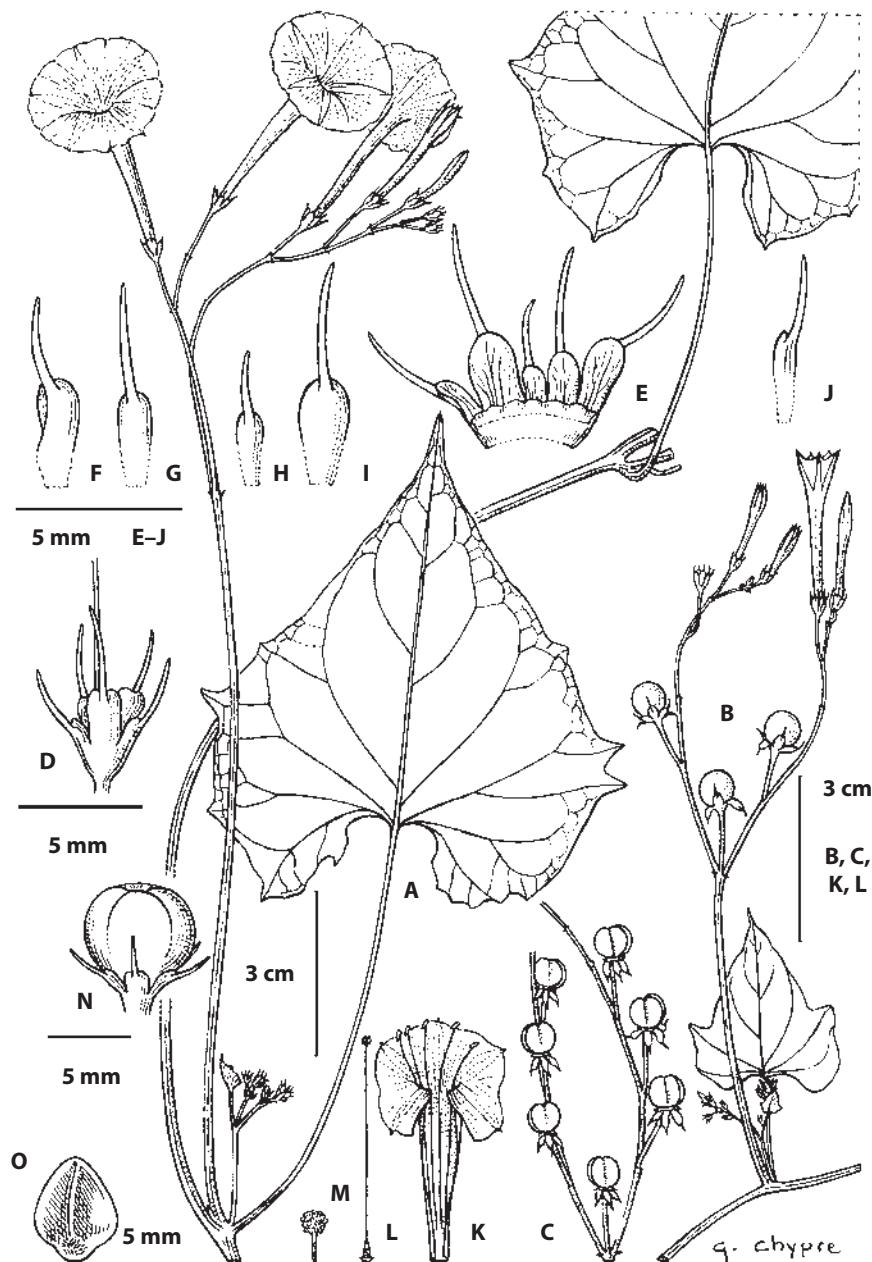
Capsules globose, 5–7 mm, glabrous; septa persistent, translucent with brownish margin; fruiting sepals spreading then reflexed. Seeds c. 4 mm long, black, pubescent.

Distribution. Native in tropical America; from there introduced and naturalized in ‘Indo-chine’ (without country or locality), India, Myanmar, Thailand.

Ecology. The two old specimens seen have no ecological or phenological information. Typically this is a plant of disturbed sites near human habitation.

Material studied

s. loc.: ‘Indochina’, Talm 273 (P); Evrard 2807 [legit Dong 144] (P).



11.22. *Ipomoea hederifolia* L. A, flowering stem; B, flowering and fruiting stem; C, infructescence after fruit dehiscence and fall of the outer walls, showing persistent septa inside capsules; D, calyx; E, calyx opened, adaxial view; F–J, sepals, abaxial view; K, corolla, opened lengthwise; L, pistil; M, stigma, enlarged; N, fruiting calyx and capsule; O, seed (From Heine 1984).



11.23. *Ipomoea hederifolia* L. Flower, buds (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).



14. *Ipomoea imperati* (Vahl) Griseb.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea imperati (Vahl) Griseb., Cat. Pl. Cub. 203 (1866); LaValva & Sabato, Taxon 32: 110–114 (1983); R.C.Fang & Staples, Fl. China 16: 308 (1995), Staples, Fl. Thailand 10: 415 (2010). – *Convolvulus imperati* Vahl, Symb. Bot. 1: 17 (1790). – Type: [icon] “*Convolvulo marino*” in Imperato, Hist. Nat. (1672) unnumbered plate cited by Vahl as ‘671’ (lecto, designated by LaValva & Sabato (1983)).

Ipomoea stolonifera Gmel., Syst. Nat. ed. 3, 2: 345 (1791); Ooststr., Blumea 3: 540 (1940), Fl. Males., Ser. I, Spermat. 4: 478 (1953); Kerr, Fl. Siam. 3 (2): 18 (1954); T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 43 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 991 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 172 (2005). – *Convolvulus stolonifer* Cyrillo, Pl. Rar. Neapol. 1: 14, t. 5 (1788) (“*stoloniferus*”), nom. illeg. – Type: Italy, *Petagna s.n.* (lecto PORUN, Herb. Petagna, designated by LaValva & Sabato (1983)).

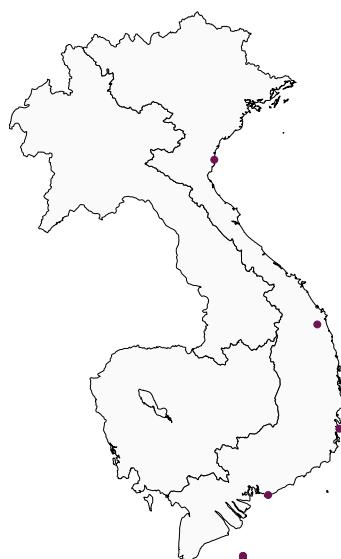
Ipomoea carnosa R.Br., Prodr. 485 (1810); Gagnep. & Courchet, Fl. Indo-Chine 4: 238 (1915). – Type: Australia, Carpenteria Island, *R. Brown s.n.* [Iter Austral. 2749] (holo BM).

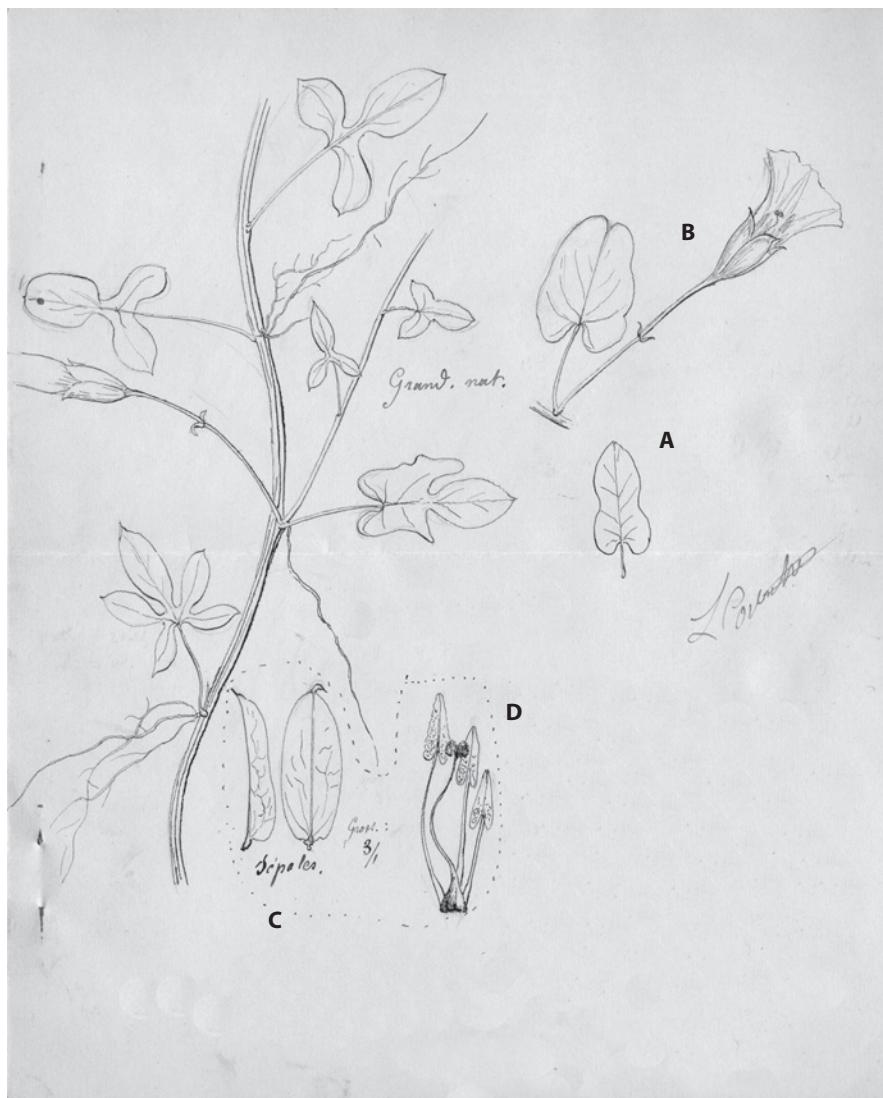
Ipomoea denticulata auct. non R.Br.: Choisy in DC., Prodr. 9: 379 (1845).

Perennial, rather fleshy trailers, entirely glabrous; stems to 5 m, rooting at nodes. Leaves variable, often linear, lanceolate, oblong, or ovate on same plant, 1.5–3.0 × 0.8–2.0 cm, semi-succulent, base truncate or shallowly cordate, margins entire, undulate, or 3–5-lobed, middle lobe ovate to oblong, secondary lobes smaller, apex obtuse or emarginate to bilobed; petiole 0.5–4.5 cm.

Flowers diurnal, usually solitary, occasionally 2 or 3 together; peduncles c. 2 cm; bracts deltoid, c. 2 mm; pedicels 0.7–1.5 cm, stout; sepals oblong, unequal, more or less leathery, glabrous, apex obtuse or acute, mucronulate, outer 2 sepals 7–11 mm, inner sepals to 15 mm; corolla funnelform, 3.5–4.0 cm, white, tube pale yellow, sometimes with dark red centre, glabrous; stamens included; pistil included, ovary glabrous.

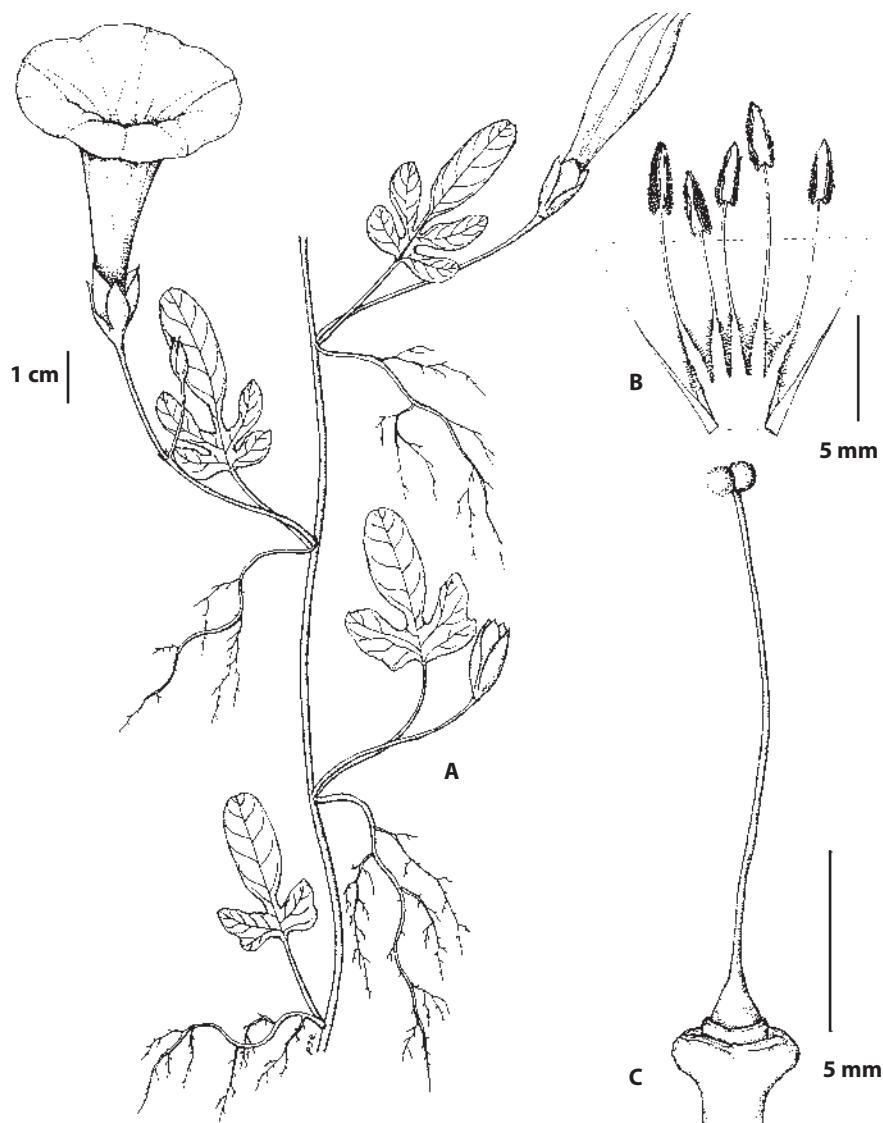
Capsules subglobose, c. 10 mm, smooth, glabrous. Seeds c. 8 mm, tomentose, margins with longer trichomes.





11.24. *Ipomoea imperati* (Vahl) Griseb. A, habit of flowering plant, showing variability in leaf blade shapes; B, flower in lateral view; C, sepals; D, pistil and 3 stamens, showing proportionality between androecium and gynoecium, unequal stamens, and sagittate anthers. Drawn by L. Courchet. Voucher: not stated; the drawing is pinned to sheet bearing *Harmand 936* (P03866342) but Courchet's handwritten note on the drawing indicates "No. 504 and following".

Distribution. Vietnam and China, Thailand, Malaysia. This littoral species is found on tropical and subtropical seacoasts and in inland sandy habitats almost world-wide; although widely distributed the species is seldom abundant.



11.25. *Ipomoea imperati* (Vahl) Griseb. A, habit; B, opened corolla with stamens; C, pistil. Drawn by P. Inthachub (From Staples 2010).

Ecology. Sandy beaches, dunes, grasslands in coastal localities; elevation: 0–100 m. Often growing intermingled with *I. pes-caprae*.

Usage. employed in medicine (Poilane 2996).



11.26. *Ipomoea imperati* (Vahl) Griseb. Habit, flowers (credit: G. Staples; voucher: U.S.A., not collected).

Vernacular name

Vietnam. dây rau mu (Annamite, Poilane 2996).

Material studied

Vietnam. s. loc.: Feb. 1958, Pham Hoang Ho 5261 (P). Ba Ria-Vung Tau: plage de Phuoc Hai, près du Cap, 2 Jan. 1921, Evrard 435 (P). Khanh Hoa: îles de Poulo Condor, 1875–1877, Harmand 936 (P, SING); l. c., Oct. 1867, Talmy s.n. (P); île Tres, près de Nha Trang, 11 Apr. 1922, Poilane 2996 (P). Quang Ngai: Long Tri, July 1934, Pételot 5353 (P). Thanh Hoa: Cua Bang, 16 Sep. 1892, Bon 5683 (P, SING).

15. *Ipomoea indica* (Burm.) Merr.

 J F M A M J J A S O N D	 J F M A M J J A S O N D
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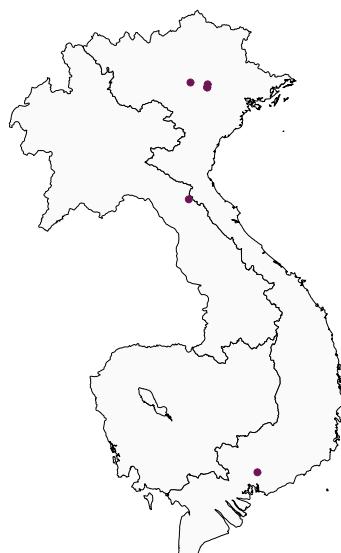
Ipomoea indica (Burm.) Merr., Interpr. Herb. Amboin. 445 (1917); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 987 (1993); R.C.Fang & Staples, Fl. China 16: 305 (1995); Staples et al., Thai J. Bot. 6: 83 (2014). – *Convolvulus indicus* Burm., Index Univ. Herb. Amb. 7: 6 (1755). – *Pharbitis indica* (Burm.) Hagiwara, Bot. & Zool. 6: 1238 (1938); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 178 (2005). – Type: [icon] “*Convolvulus indicus flore violaceo*” in Besler, Hort. Eyst. Aest. Or. (1613) 13, fol. 8, f. 2 (lecto, designated by Fosberg, Bot. Notiser. 129: 36 (1976)).

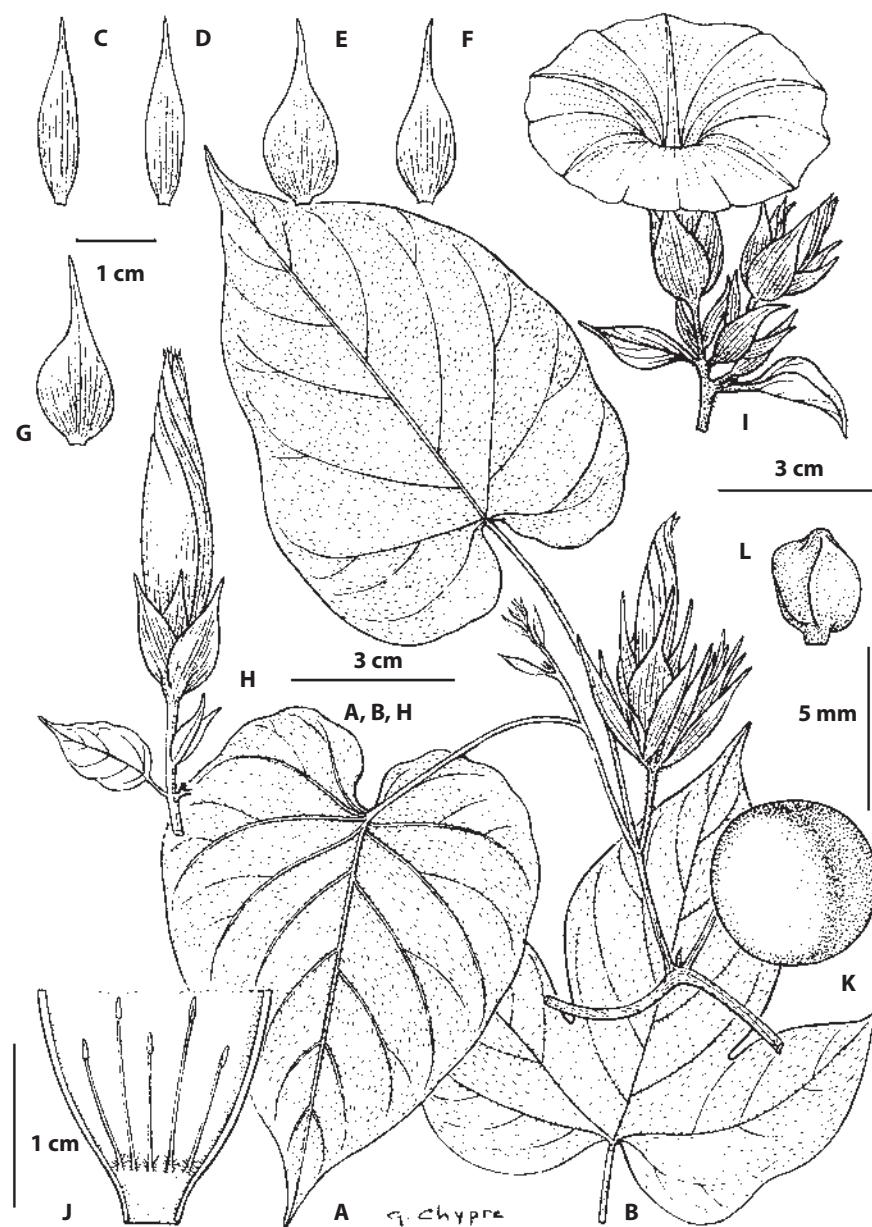
Ipomoea learii Paxt., Bot. Mag. 6: 267 (1839); Prain, J. Asiatic Soc. Bengal, Pt. 2, Nat. Hist. 74 (2): 312 (1905); Gagnep. & Courchet, Fl. Indo-Chine 4: 242 (1915). – *Pharbitis learii* (Paxt.) Lindl., Edwards's Bot. Reg. 27: t. 56 (1841); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990). – Type: England, cult. Chelsea, Lear s.n. (holo CGE).

Ipomoea congesta R.Br., Prod. 485 (1810); Ooststr., Blumea 3: 500 (1940), Fl. Males., Ser. I, Spermat. 4: 465 (1953); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 986 (1993). – *Pharbitis congesta* (R.Br.) H.Hara, Enum. Sperm. Jap. 1: 166 (1948); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 178 (2005). – Type: Australia, Endeavour River, Banks & Solander s.n. (holo BM).

Perennial herbs, twining or sometimes prostrate; stems 3–10(–16) m long, sometimes rooting at nodes, all axial parts ± densely, retrorsely pubescent. Leaves ovate or circular, 5.0–15.0 × 3.5–14.0 cm, upper sides densely soft pubescent, undersides ± sparsely pubescent, base cordate, margins entire or 3-lobed, apex acuminate or abruptly acuminate; petiole 2–18 cm.

Inflorescences several-flowered, crowded umbellate cymes with very short branches; peduncles 4–20 cm long; bracts linear, sometimes lanceolate, 8–15 mm long; pedicels 2–5(–8) mm. Flowers diurnal; sepals nearly equal, 1.0–1.6 cm, gradually linear-acuminate apically, glabrous to appressed pilose with soft trichomes (never with erect, bristly trichomes), outer 3 sepals linear-lanceolate, 3–5 mm wide near base; inner 2 sepals linear, narrower; corolla funnelform, 5–8 cm long, deep bluish purple, ageing reddish purple or red, with a paler centre, glabrous; stamens included, white, filament bases with curly trichomes; pistil included, ovary glabrous, 3-locular, stigma 3-lobed.





11.27. *Ipomoea indica* (Burm.) Merr. A, flowering stem with entire leaves; B, lobed leaf; C-G, sepals; H, flower bud; I, inflorescence and flower; J, corolla, opened showing androecium ; K, fruit, calyx and bracts removed; L, seed (From Heine 1984).



11.28. *Ipomoea indica* (Burm.) Merr. Flower (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Capsules (rarely produced) ± globose, 6-lobed, 1.0–1.3 cm diam., glabrous. Seeds 6 or fewer, c. 5 mm long, glabrous.

Distribution. A native of South America, now circumtropical as a cultivated and naturalized plant; sporadically distributed in Asia: Laos, Vietnam, China, Japan, peninsular Malaysia, throughout Malesia, and eastward to the Pacific Islands. This species was “importé d’Amérique” according to Gagnepain and Courchet (1915: 243).

Ecology. Along track through forest, in hills; elevation up to 900 m.

Vernacular name

Vietnam. cay kho ai giải (*Eberhardt* 3827).

Material studied

Laos. Bolikhamsai: env. de Napè, *Delacour* s.n. (P).

Vietnam. s. loc.: “Cochinchine”, *Baudouin* s.n. (E, P). Thanh Hoa: in montibus Hoang Cuong, 10 Feb. 1882, *Bon* 1350 (P, SING). Vinh Phuc: forêt de Tamdao, au bord de la piste, 20 Dec. 1994, *Tirvengadum* et al. 3302 (P); Vinh Yen, *Eberhardt* 3826 (P, SING); *Eberhardt* 3827 (P).

16. *Ipomoea littoralis* Blume

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea littoralis Blume, Bijdr. Fl. Ned. Ind. 713 (1825); Ooststr., Fl. Males., Ser. I, Spermat. 6: 941 (1972); D.F.Austin, Econ. Bot. 45: 251–256. (1991); R.C.Fang & Staples, Fl. China 16: 307 (1995); Staples, Fl. Thailand 10: 417 (2010). – Type: Java, Blume 1710 (holo L!).

Ipomoea denticulata (Desr.) Choisy, Mém. Soc. Phys. Genève 6: 447 [Conv. Orient. 85] 1834, nom. illegit. – *Convolvulus denticulatus* Desr. in Lam., Encycl. 3: 540 (1792). – Types: Seychelles, Mahé, Commerson s.n. (syn P-LA); île trois Frères, Commerson s.n. (syn P-LA).

Ipomoea gracilis auctt. non R.Br.: Ooststr., Blumea 3: 516 (1940), Fl. Males., Ser. I, Spermat. 4: 471 (1953); Kerr, Fl. Siam. 3 (2): 13 (1954); T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 43 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 179 (1990); D.F.Austin, Econ. Bot. 45: 251–256 (1991); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 988 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 169 (2005).

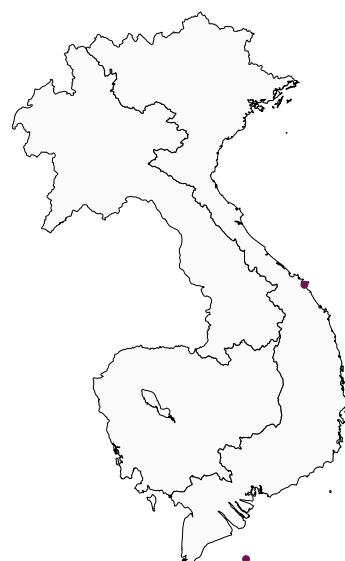
Perennial herbaceous creepers or twiners, mostly glabrous; stems prostrate, rooting at nodes, or tips twining. Leaves ovate to oblong, occasionally circular or reniform, 1.0–10.0 × 1.0–7.5 cm, glabrous or nearly so, base cordate, margins entire, minutely undulate to angular, or obscurely 3-lobed, apex acute, obtuse or emarginate, mucronulate; petiole 0.5–7.0 cm.

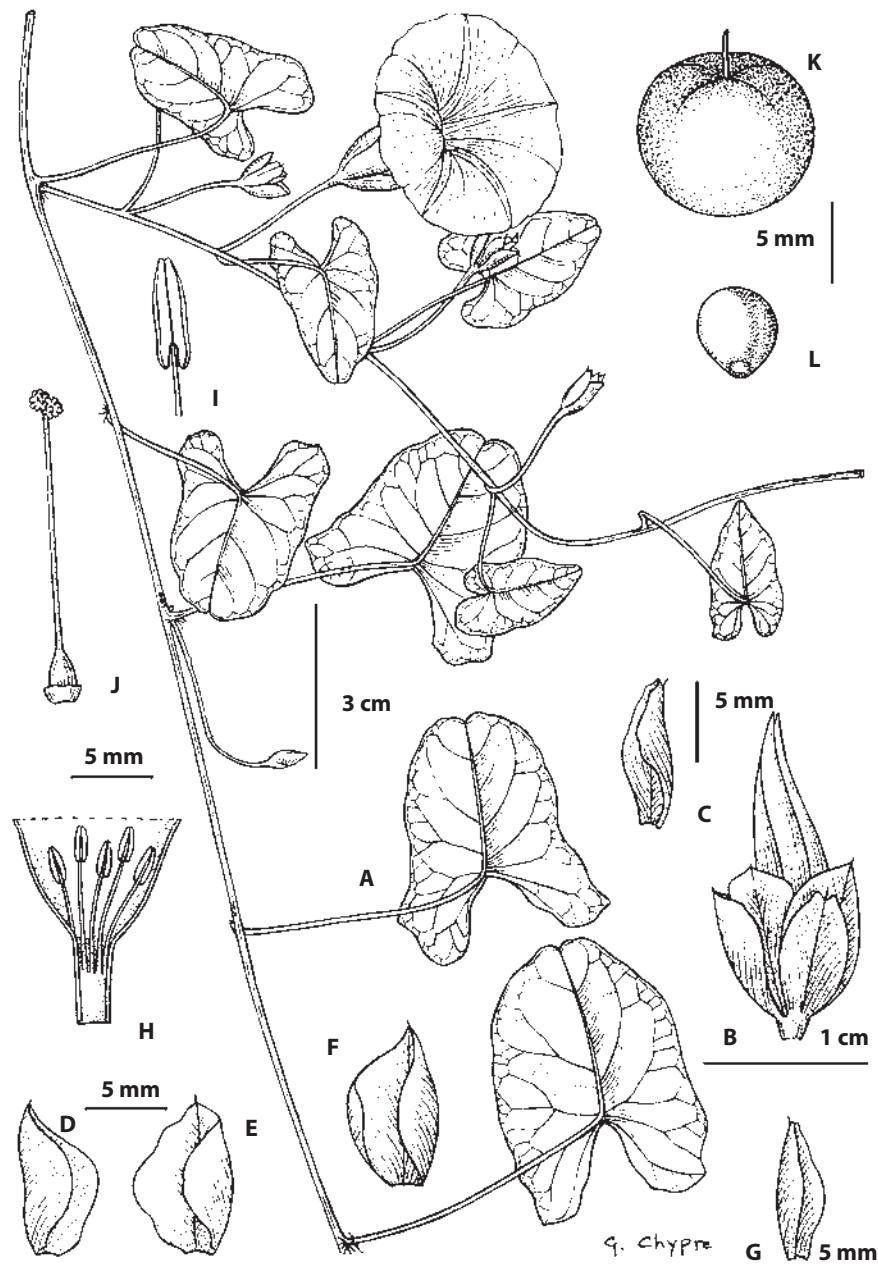
Inflorescences usually 1- (or few-) flowered; peduncles 0.1–3.0 cm; bracts early deciduous, 1–2 mm; pedicels 1–4 cm, glabrous. Flowers diurnal; sepals unequal, glabrous, outer 2 sepals convex, oblong-elliptic, 6–10 mm, apex acute to obtuse, inner sepals elliptic to subcircular, 8–12 mm; corolla funnelform, 3.0–4.5 cm, pink or pink-purple, centre darker, glabrous; stamens included, filaments unequal, glandular pubescent on basal half; pistil included, ovary glabrous.

Capsules depressed-globose, c. 9 mm diam. Seeds ovoid, 3.5–4.0 mm, black, glabrous.

Distribution. Vietnam and India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, Australia, Pacific Islands; also in Madagascar and the Indian Ocean islands.

Ecology. A littoral species found on or near seacoasts, including in coastal forests, on sandy soils; elevation: 0–100 m.





11.29. *Ipomea littoralis* Blume. A, flowering stem; B, flower bud; C–G, sepals; H, lower corolla, opened, showing androecium; I, anther; J, pistil; K, capsule, calyx removed; L, seed (From Heine 1984).



11.30. *Ipomoea littoralis* Blume. Habit, flower (credit: Jean-François Butaud; voucher: French Polynesia, Butaud 3402 (PAP)).

Notes. Gagnepain and Courchet included this species (as the synonym *I. denticulata*) in the *Flore générale de l'Indochine* based on a single specimen, collected by Gaudichaud near Tourane in 1837. Surprisingly, only one further collection has been made since then in the CLV area, despite this being a common littoral species on sea beaches, which Cambodia and Vietnam have in abundance. This is surely an artefact of under-collecting and not an accurate reflection of the species distribution and abundance in the region.

Material studied

Vietnam. Ba Ria-Vung Tau: Poulo Condor, Oct. 1867, *Talmy s.n.* (P, mixed with *I. imperati*). Da Nang: Tourane vic., Jan. 1837, *Gaudichaud 142* (P).

17. *Ipomoea mauritiana* Jacq.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea mauritiana Jacq., Collect. 4: 216 (1791); Ooststr., Fl. Males., Ser. I, Spermat. 6: 941 (1972); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 994 (1993); R.C.Fang & Staples, Fl. China 16: 310 (1995); Staples, Fl. Thailand 10: 417 (2010); Leti *et al.*, Flore Photogr. Cambodge 176 (2013); Staples *et al.*, Thai J. Bot. 6: 83 (2014). – Type: [icon] Hort. Schoenbr. 2: t. 200 (1797) (lecto, designated by Bosser & Heine, Fl. Mascareig. 127: 36 (2000)).

Ipomoea digitata auctt. non L.: Gagnep. & Courchet, Fl. Indo-Chine 4: 239 (1915); Ooststr., Blumea 3: 558 (1940), Fl. Males., Ser. I, Spermat. 4: 483 (1953); Kerr, Fl. Siam. 3 (2): 12 (1954); T.N.Nguyễn in Averyanov *et al.*, Materialy po flore i rastitelnosti ostrovnogo V'etnama 42 (1988); T.N.Nguyễn in Averyanov *et al.*, Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 169 (2005).

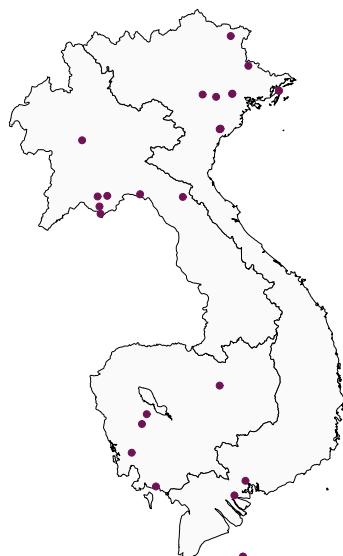
Perennial herbaceous climbers; roots tuberous; stems 3–10 m, axial parts glabrous or minutely muricate. Leaves circular in outline, 7–18 × 7–22 cm, glabrous or sparsely pubescent along midvein, usually palmately 5–7-parted to or beyond middle, rarely entire or shallowly lobed, segments lanceolate or elliptic, entire or irregularly undulate, apex acuminate or acute, mucronulate; petiole 3–11 cm.

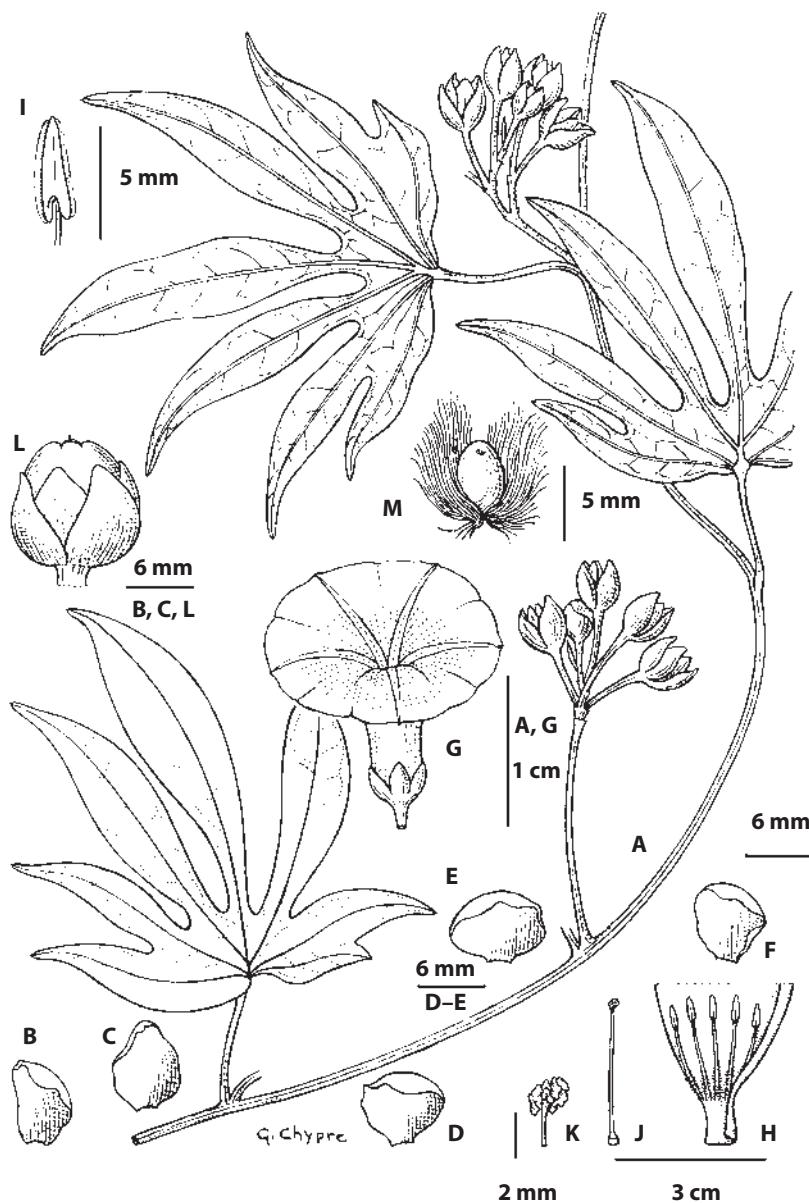
Inflorescences few- to many-flowered; peduncles 2.5–20.0 cm; bracts early deciduous; pedicel 0.9–2.2 cm. Flowers diurnal; sepals subcircular, oblong to broadly elliptic, strongly convex, equal or outer 2 sepals shorter, 7–12 mm, glabrous, apex obtuse; corolla funnelform, 5–6 cm, pink or reddish purple, with a darker centre, limb 5–7 cm diam., undulate; stamens included; pistil included, ovary glabrous.

Capsules ovoid, 12–14 mm long, tan-brown, glabrous. Seeds c. 6 mm, dark brown, woolly-sericeous with long, easily detached trichomes.

Distribution. Cambodia, Laos, Vietnam, as well as Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, Pacific Islands. Now pantropical through cultivation.

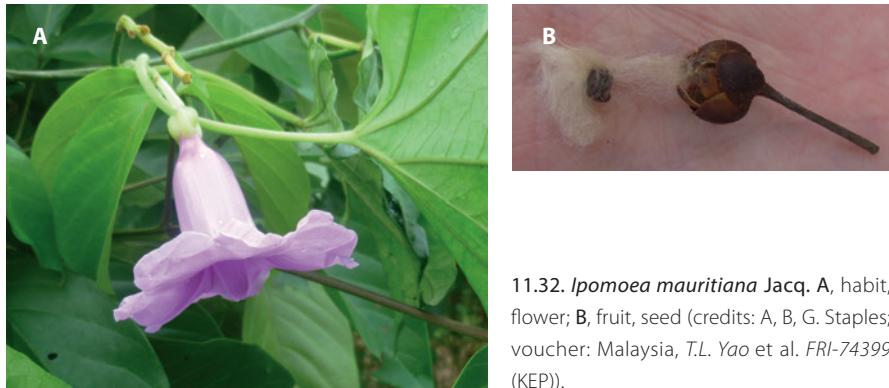
Ecology. Open areas in secondary vegetation and disturbed sites, scrub, thickets, grassy swamp country, vacant land in towns, seacoasts, often on sandy soils; elevation: 0–400 m.





11.31. *Ipomoea mauritiana* Jacquin. A, flowering stem; B–F, sepals; G, flower; H, corolla, lower portion opened, showing androecium; I, anther; J, pistil; K, stigma, enlarged; L, capsule, cupped by calyx; M, seed (From Heine 1984).

Usage. the enlarged storage roots are edible (C.Bg. III.93).



11.32. *Ipomoea mauritiana* Jacq. A, habit, flower; B, fruit, seed (credits: A, B, G. Staples; voucher: Malaysia, T.L. Yao et al. FRI-74399 (KEP)).

Vernacular names

Cambodia. vol avôpô (*Poilane* 458).

Laos. phǎn mǎ 'ha khua (*Pottier* s.n.), dok pha (*Spire* 346).

Vietnam. läng leo (*Bon* 526), khoai tím, yành mó (*C.Bg. s.n., in Mar.* 1893), khua (Annamite, *Poilane* 458).

Material studied

Cambodia. Kampot: 16 Aug. 1903, *Geoffray* 64 (P). Koh Kong: Phnom Penh to Koh Kong, 15 Nov. 2009, *Cheng* et al. CL1164 (SING); Km 174 route de Sre Ambel ("triunbell"), 19 Aug. 1919, *Poilane* 458 (P); track between Tmor Baing and Phum Vial Peuch, 15 Nov. 2009, *Simões* et al. 36 (BM). Pursat: route de Pursat, 14 June 1875, *Godefroy* 327 (P). Stung Treng: Koh Peang island in Mekong River, Ramsar site, *Monyrak* 142 (A, L).

Laos. Bolikhamsai: Paksan road, 2 miles, 21 Aug. 1955, *Talbot de Malahide* 69 (SING). Khammouane: Kham Keut ("Cam Keut"), *Spire* 346 (P). Louang Prabang: Ban Khoy, 22 Aug. 1969, *Pottier* 436 (P). Vientiane: Ban Keun vic., 24 July 1955, *Talbot de Malahide* 53 (SING); Chi Nai Mo, 10 Aug. 1953, *Vidal* 2341 (P); Hatxiafong distr, Ban Khuay Daeng, 1 July 1999, *Soejarto & Southavong* 10736 (L); Nong Thevada, 16 Oct. 1955, *Tixier* 16/10/57-07 (P); 20 km N of Vientiane, 5 Aug. 1956, *Holiday* 6 (SING).

Vietnam. Ba Ria-Vung Tau: Poulo-Condor, July, *Germain* 93 (P); *l. c.*, *Pham Hoang Ho* 5276 (P). Cao Bang: 17 Mar. 1893, *C.Bg. s.n.* (P). Hai Duong: Sept Pagodes, Aug. 1908, *Mouret* 194 (P); 195 (P). Ha Noi: env. de Hanoi, May 1909, *d'Alleizette* s.n. (P). Hoa Binh: Sontay, 10 Aug. 1886, *Balansa* 3548 (P). Ho Chi Minh Ville: 1862–1866, *Thorel* 411 (E, P, SING). Lang Son: Ky Lua, 20 Oct. 1911, *Lecomte & Finet* 109 (P). Ninh Binh: Cho Ganh, July 1923, *Pételot* 984 (P, SING); Khang Thuong, in remore Ma Cò, 21 Oct. 1880, *Bon* 17 (P); *l. c.*, 18 July 1881, *Bon* 526 (P). Quang Ninh: Sai Waong Mo Shan (Sai Vong Mo Leng), "Lomg Ngong Village", Dam Ha, 18 July – 9 Sept. 1940, *Tsang* 30163 (E, P, SING, UPS); *l. c.*, *Tsang* 30468 (E, P, S, SING, UPS). Tien Giang: My Tho, *Baudouin* 173 (P).

18. *Ipomoea nil* (L.) Roth

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea nil (L.) Roth, Cat. Bot. 1: 36 (1797); Ooststr., Blumea 3: 497 (1940), Fl. Males., Ser. I, Spermat. 4: 465 (1953); Kerr, Fl. Siam. 3 (2): 14 (1954); P.H.Hô, Cây cỏ Việt Nam 2 (2): 987 (1993); R.C.Fang & Staples, Fl. China 16: 305 (1995); Staples, Fl. Thailand 10: 418 (2010); Staples et al., Thai J. Bot. 6: 83 (2014). – *Convolvulus nil* L., Sp. Pl. ed. 2, 1: 219 (1762). – *Pharbitis nil* (L.) Choisy, Mém. Soc. Phys. Genève 6: 439 [Conv. Orient. 57] (1834); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 179 (2005). – Type: [icon] “*Convolvulus caeruleus, hederaceo folio, magis anguloso*” in Dillenius, Hort. Eltham. 1, t. 80, f. 91 (1732) (lecto, designated by Verdc., Taxon 6: 232–233 (1957)).

Ipomoea hederacea auctt. non Jacq.: Gagnep. & Courchet, Fl. Indo-Chine 4: 241 (1915).

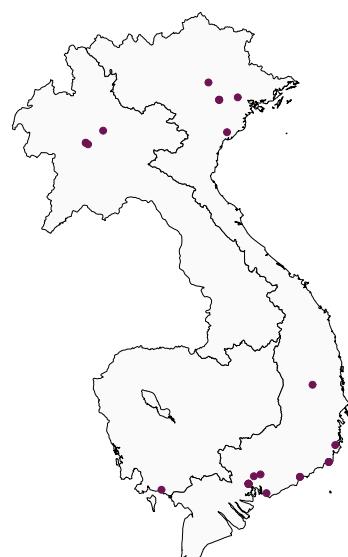
Annual herbaceous twiners; stems 2–5 m long, axial parts hirsute with retrorse trichomes. Leaves broadly ovate or nearly circular, 4.0–15.0 × 4.5–14.0 cm, hirtellous, base cordate, margins entire or obscurely 3-lobed (rarely 5-lobed), apex acuminate; petiole 2–15 cm.

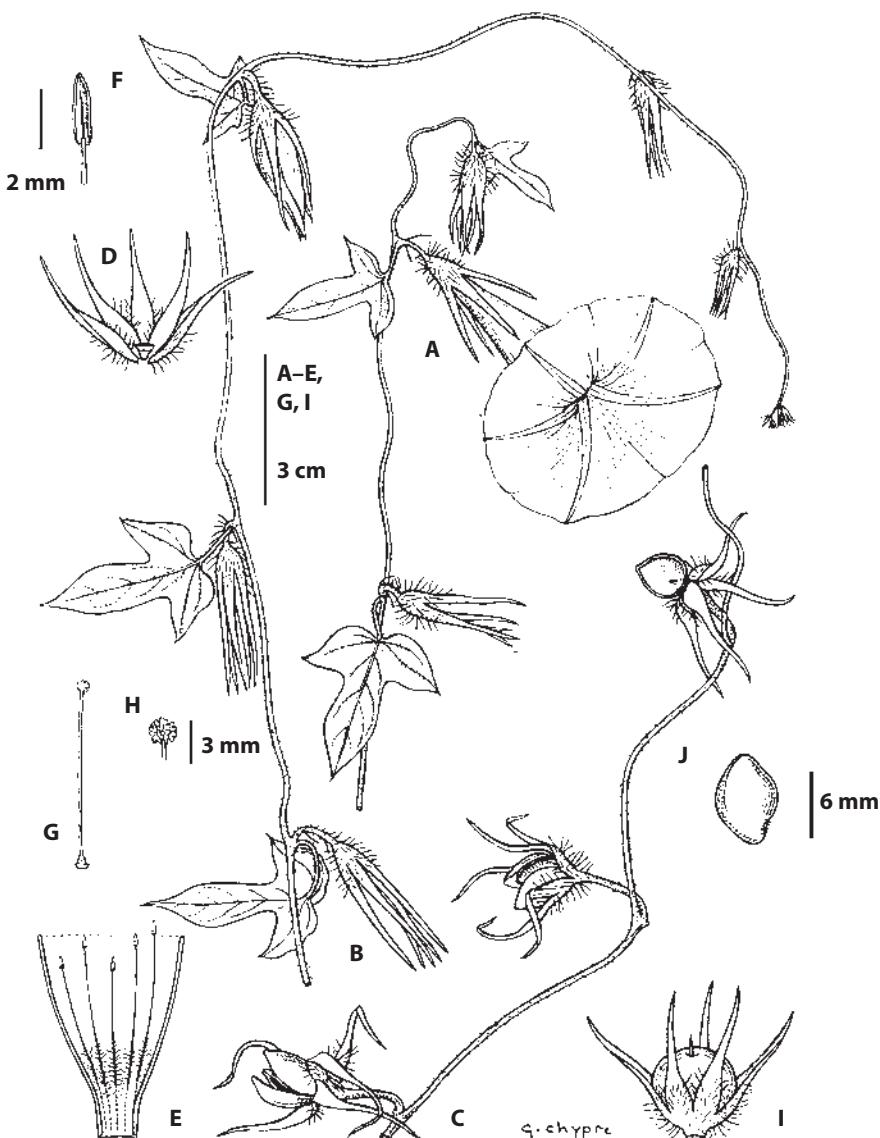
Inflorescences axillary, 1- to few-flowered; peduncles 1.5–18.5 cm; bracts linear or filiform, 5–8 mm, spreading hirtellous; pedicels 0.2–0.7 cm. Flowers diurnal; sepals lanceolate, subequal, 17–25 mm, outsides spreading hirsute, trichomes with a swollen base, subglabrous apically, with a linear acumen; corolla funnelform, 5–6 cm, pale to bright blue with whitish tube, fading to pinkish in age, glabrous; stamens included, unequal; pistil included, ovary glabrous, 3-locular, stigma 3-lobed.

Capsules ovoid to subglobose, 8–10 mm diam., straw-coloured, glabrous. Seeds 6 or fewer, ovoid-trigonous, 5–6 mm, black, grey puberulent.

Distribution. Native of South America, now nearly circumtropical as a naturalized weed and cultivated ornamental: in Cambodia, Laos, Vietnam, Kashmir, Pakistan, Nepal, India, Sri Lanka, Myanmar, China, Thailand, New Guinea, Australia.

Ecology. In sunny places in degraded and secondary vegetation, as well as vacant lots, gardens, rubbish dumps, edges of rice paddies, roadsides, on diverse soil types including rocky, poor soil; elevation: 300–1000 m.





11.33. *Ipomoea nil* (L.) Roth. A, B, flowering stem; C, fruiting stem; D, calyx, adaxial view; E, lower corolla, opened, showing androecium; F, anther; G, pistil; H, stigma; I, capsule with fruiting calyx; J, seed (From Heine 1984).

Widely cultivated and naturalized, *Ipomoea nil* is a typical short-day plant, flowering when daylength decreases and nights are at their longest during the cool dry season (October through December). As long ago as 1880 it was noted that *I. nil* was introduced to, and then escaped from, gardens in Tonkin (Bon 76).



11.34. *Ipomoea nil* (L.) Roth. Flower, showing sepal hairs (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Vernacular names

Laos. khua 'khaö 'khôn (*Pottier 494*), chi cho² noy² khua (*Pottier 414*).

Vietnam. hoa bìm bìm (*Bon 76*), dây hắc súu (*Hiệp 92*), biêm biêm dây (Annamite, *Chevalier & Nguyen 39772*), ré (*Poilane 8951*), re cai da (*Poilane 9883*).

Material studied

Cambodia. Kampot: 10 Sep. 2005, *Khuon et al. OD-277* (E).

Laos. Louang Prabang: Ban Phabath, 22 Aug. 1969, *Pottier 414* (P); Luang Prabang vic., *Dupuy 70* (P, SING); bord de rivière, 4 Sep. 1969, *Pottier 494* (P); along Hwy 13 between Luang Prabang and Vientiane about Kms 373–374, 4 Nov. 2012, *Staples et al. 1503* (HNL, PTK, SING).

Vietnam. Ba Ria-Vung Tau: in montibus Dinh ad Baria, Oct. 1866, *Pierre s.n.* (P, SING). Binh Thuan: route de Phanri, 7 Nov. 1924, *Evrard 1742* (P); rive droite de la rivière de Phan Thiet, 27 Oct. 1924, *Evrard 1586* (P). Dac Lac: route Hyoam Cham, Nov. 1967, *Dournes 67.10* (P). Dong Nai: Baoca, in "prov. Bien hoa", Feb. 1877, *Pierre s.n.* (E). Ha Noi: 1909, *d'Alleizette s.n.* (P); *I. c.*, Oct. 1890, *Balansa 4661* (P); env. de Hanoi, rizière, Oct 1912, *Lemarié 59* (P). Ho Chi Minh Ville: Jardin botanique de Saigon, 7 Dec. 1918, *Hiệp 92* (P); env. de "Saigon", 19 Jan. 1919, *Chevalier & Nguyen Tuong Du 39772* (P); *I. c.*, *Chevalier & Nguyen Tuong Du 40231* (P); *Germain 14* (P); 1875, *Godefroy s.n.* (P); May 1877, *Pierre 1963* (P, SING). Lang Son: Mom Quan, 21 Oct. 1911, *Lecomte & Finet 160* (P). Ninh Binh: Phuc Nhac, 26 Oct. 1880, *Bon 76* (P, SING). Ninh Thuan: Ca Na, "pro. Phan Rang", 30 Nov. 1923, *Poilane 8951* (P); *I. c.*, 29 Oct. 1925, *Poilane 12521* (P); 30 Oct. 1925, *Poilane 12538* (P); Ka Rom, "pro. Phanrang", 4 Mar. 1924, *Poilane 9883* (P). Thanh Hoa: Mat Son, 29 Oct. 1892, *Bon 5731* (P, SING). Vinh Phuc: Tham Dao, 17 Aug. 1997, *Phengklai et al. 10659* (BKF).

19. *Ipomoea obscura* (L.) Ker Gawl.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Ipomoea obscura (L.) Ker Gawl., Bot. Reg. 3: t. 239 (1817); Gagnep. & Courchet, Fl. Indo-Chine 4: 246 (1915); Ooststr., Blumea 3: 519 (1940), Fl. Males., Ser. I, Spermat. 4: 471 (1953); Kerr, Fl. Siam. 3 (2): 15 (1954); T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 43 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 179 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 991 (1993); R.C.Fang & Staples, Fl. China 16: 307 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 171 (2005); Staples, Fl. Thailand 10: 418 (2010); Leti et al., Flore Photogr. Cambodge 177 (2013); Staples et al., Thai J. Bot. 6: 83 (2014). – *Convolvulus obscurus* L., Sp. Pl., ed. 2, 1: 220 (1762). – Type: [icon] “*Convolvulus flore minore lacteo, fundo atro-rubente*” in Dillenius, Hort. Eltham. 1: 98, t. 83, f. 95 (1732) (lecto, designated by Meeuse, Bothalia 6: 746 (1958)).

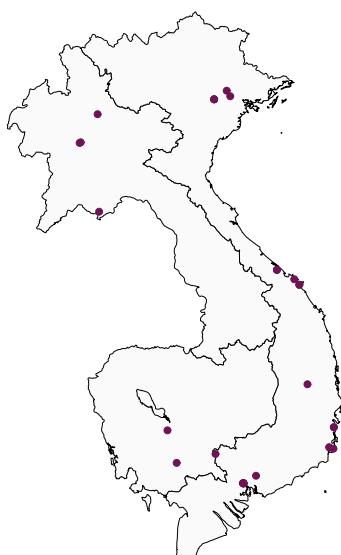
Herbaceous twiners; axial parts glabrous, spreading pubescent, or almost woolly; stems slender, 2–15(–20) m long. Leaves cordate-circular or ovate, occasionally reniform, 2.0–8.0 × 1.6–8.0 cm, both sides glabrous or sparsely pilose, base cordate, margins entire or minutely undulate, apex attenuate, acute; petiole 1.5–3.5 cm.

Inflorescences 1–3-flowered; peduncles almost filiform, 1.4–4.0 cm; bracts subulate, c. 1.5 mm; pedicels 0.8–2.0 cm, nearly glabrous, thickened and deflexed in fruit. Flowers diurnal; sepals elliptic-ovate, nearly equal, 3–4 mm, outside glabrous or slightly pubescent, mucronulate, outer sepals with whitish margins; corolla funnelform, 2.0–2.5 cm, white or pale yellowish, with darker midpetaline bands, centre wine-red to deep purple; stamens included, filaments very unequal; pistil included, ovary glabrous.

Capsules conical-ovoid or subglobose, 6–8 mm diam., apiculate; fruiting sepals reflexed. Seeds 4–5 mm, black-brown, densely grey-brown tomentellous.

Distribution. Cambodia, Laos, Vietnam, as well as India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea; E Africa, N Australia, Pacific Islands.

Ecology. A ubiquitous weed in urban waste land and vacant lots, and often found in sunny lawns, pastures,





11.35. *Ipomoea obscura* (L.) Ker Gawl. Habit (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

roadsides, and sometimes in clearings in forest or dry thickets, on all soil types but thriving in sandy, poor soils; elevation: 30–300 m.

Vernacular names

Cambodia. gêk kok (Cham, *Martin 1658*).

Laos. khua paõ luat (*Pottier 509B*).

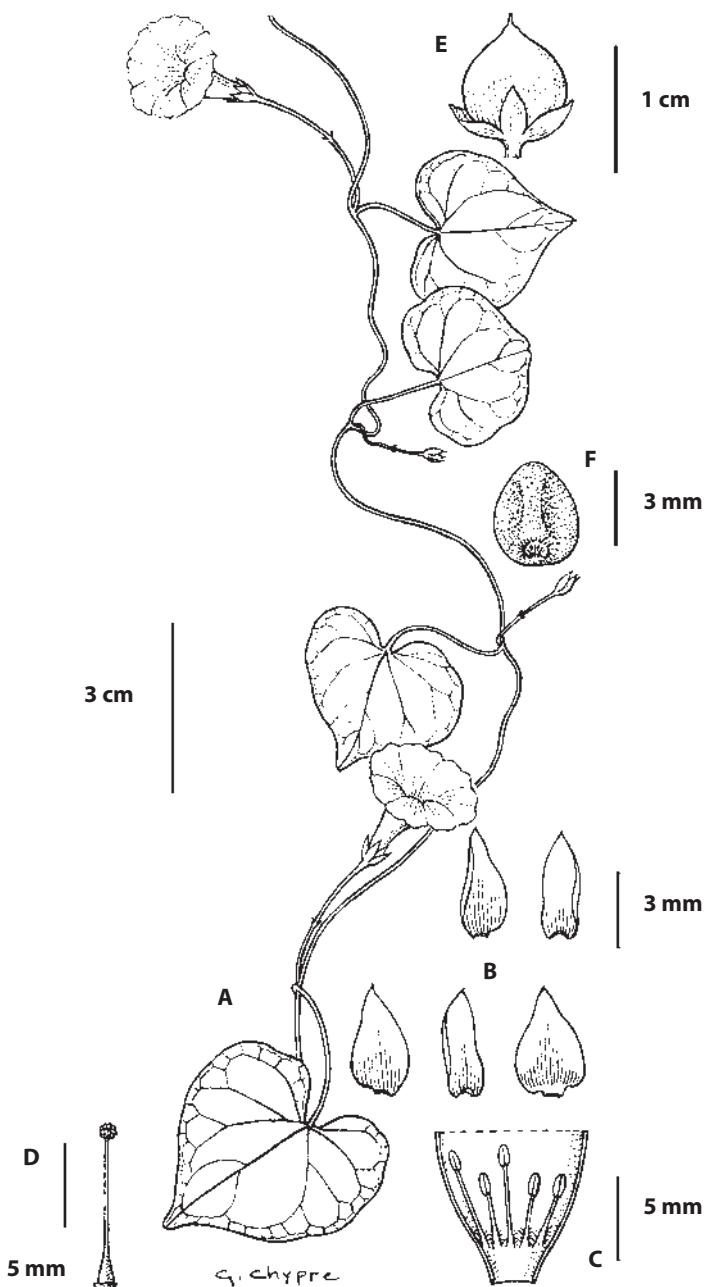
Vietnam. giây bông trăng (*Trò 13*), cây dây biên sắc súu (Annamite, *Poilane 40077*), dding-diong (hre?) (*Jörail, Dournes s.n.*), cây bìm sé (Annamite, *Bauche 12*), dây huồng (*Bauche 28*).

Material studied

Cambodia. Kompong Chhnang: village Cham de O Russey, 22 Dec. 1969, *Martin 1658* (P). Ta Keo: Phnom Tamao, 4 Oct. 2007, *Cheng et al. CL-628* (P).

Laos. Louang Prabang: Ban Naluang, 4 Sep. 1969, *Pottier 541* (P); bord de fleuve, 27 Dec. 1969, *Pottier 509* (P); along road from riverbank into central Luang Prabang, 5 Nov. 2012, *Staples*





11.36. *Ipomoea obscura* (L.) Ker Gawl. A, flowering stem; B, sepals, adaxial view; C, lower corolla, opened, showing androecium; D, pistil; E, capsule with calyx; F, seed (From Heine 1984).

et al. 1520 (HNL, PTK, SING). Vientiane: Dongdok area, near National University of Laos, 28 Apr. 2005, *Sengsophou* et al. OD-44 (E).

Vietnam. Bac Giang: Phu Lang Thuong, 16 Dec. 1913, *Chevalier* 29565 (P, SING). Dac Lac: Hau Bon (Cheo Reo), Jan., *Dourness.s.n.* (P). Da Nang: Tourane vic., Jan. 1837, *Gaudichaud* 139 (P); *l. c.*, May–July 1927, *Clemens & Clemens* 4086 (P). Dong Nai: Arboretum de Trang Bom, "prov. de Bien Hoa", 1 Apr. 1934, *Poilane* 205 (P, SING). Hai Duong: Sept Pagodas, Aug. 1906, *Mouret* 193 (P). Ha Nam: Bach Bat (Man Quyen), 14 Sep. 1881, *Bon* 759 (P). Ha Noi: citadelle de Hanoi, 1883–1885, *Couderc s.n.* (P); *l. c.*, Oct. 1890, *Balansa* 4647 (P, SING); Université de Hanoi, 29 Oct. 1995, *Allorge* 1043 (P). Ho Chi Minh Ville: Jardin Botanique de Saigon, 19 Mar. 1920, *Chevalier [Tro legit] s.n.* (P, SING); env. du "Saigon", 26 Jan. 1919, *Chevalier & Nguyen Tuong Du* 39757 (P); "Saigon", 2 Jan. 1901, *Debeaux s.n.* (P); Sep. 1865, *Pierre* 2 (P); 1862–1866, *Thorel* 339 (E, P, SING); 14 Jan. 1865, *Lefèvre* 151 (P). Khanh Hoa: Nha Trang vic., 11–26 Mar. 1911, *Robinson* 1103 (P); *l. c.*, *Robinson* 1186 (P). Long An: Rach Cat, "prov. de Cholon", 14 Mar. 1919, *Poilane* 40077 (P, SING). Ninh Thuan: Ba-Rau, "pro. Phan Rang", *Poilane* 10105B (P); Nua Chua National Park, E side of the road Vinh Hy - Khanh Hai, 17 Jan. 2010, *Soejarto* et al. DDS-14727 (P). Tay Ninh: Nga Ba Lo Go, 12 June 2008, *Dang* et al. 15 (E, P, SING, VNM). Thua Thien-Hue: citadelle de Hue, 13 Feb. 1909, *Bauche* 28 (P); *l. c.*, 25 Apr. 1910, *Bauche* 12 (P); Lang Co, *Eberhardt* 1642 (P, SING).

20. *Ipomoea pes-caprae* (L.) R.Br.



Ipomoea pes-caprae (L.) R.Br. in Tuckey, Narr. Exped. Zaire 477 (March 1818); Ooststr., Fl. Males., Ser. I, Spermat. 6: 941 (1972); T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 43 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 179 (1990); P.H.Hô, Cáycô Việtnam 2 (2): 992 (1993); R.C.Fang & Staples, Fl. China 16: 308 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 171 (2005); Staples, Fl. Thailand 10: 419 (2010); Leti et al., Flore Photogr. Cambodge 178 (2013); Staples et al., Thai J. Bot. 6: 83 (2014). – *Convolvulus pes-caprae* L., Sp. Pl. 1: 159 (1753). – *Ipomoea pes-caprae* (L.) Sweet, Hort. Suburb. Lond. 35 (July 1818), isonym; Ooststr., Blumea 3: 532 (1940), Fl. Males., Ser. I, Spermat. 4: 475 (1953); Kerr, Fl. Siam. 3 (2): 15 (1954). – Type: India, Linnean Herbarium No. 218.59 (lecto LINN!, designated by St. John in 9th Pacific Sci. Congress Abstr. 65 (1957)).

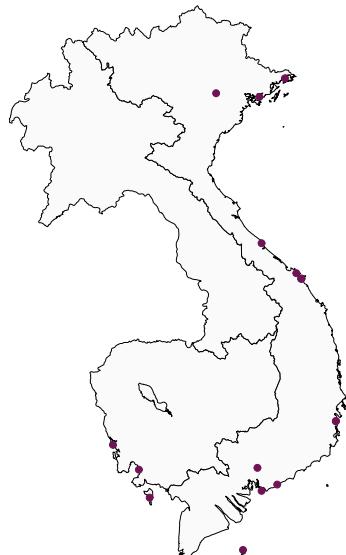
Ipomoea biloba Forssk., Fl. Aegypt.-Arab.: 44 (1775); Gagnep. & Courchet, Fl. Indo-Chine 4: 259 (1915). – Type: Yemen, Zebid, Forsskål s.n. (lecto BM, designated by Verdc., Fl. Trop. E. Africa, Convolvul. 121 (1963)).

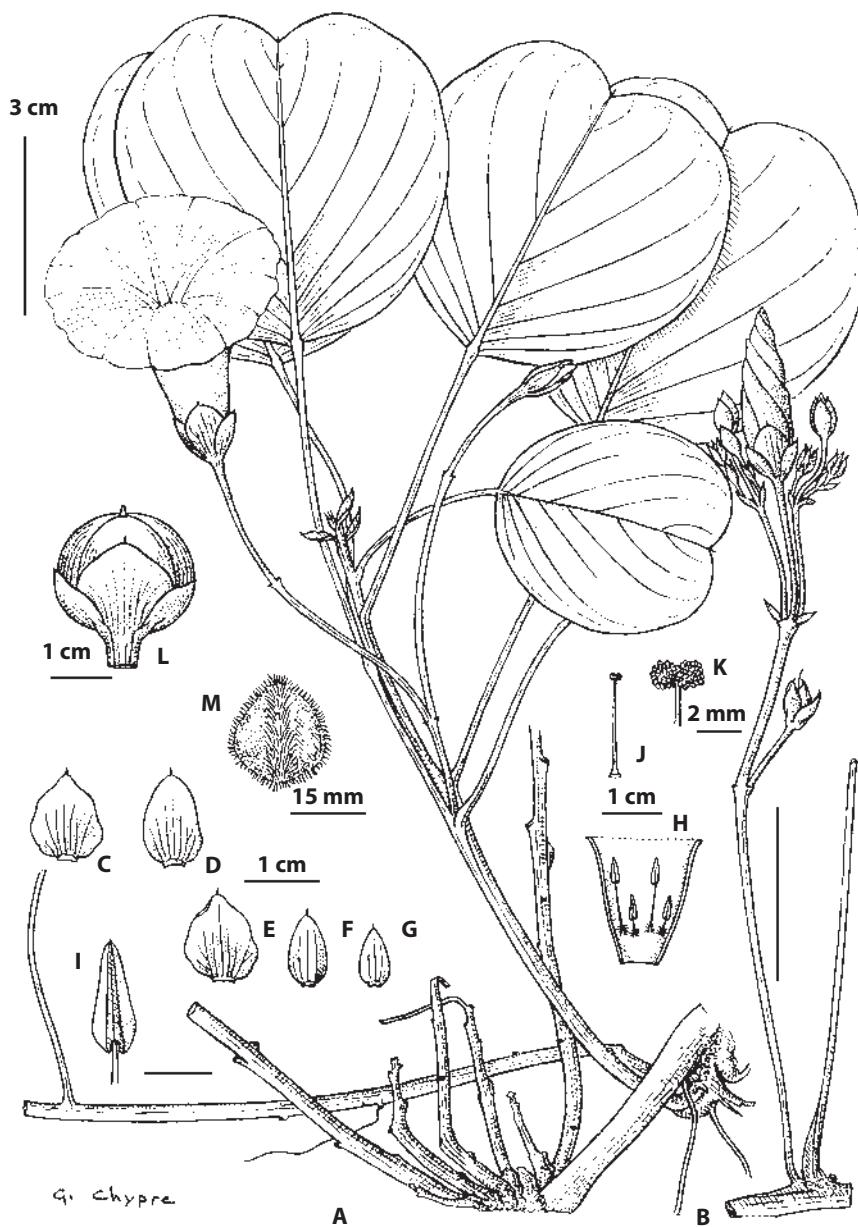
Perennial herbaceous creepers, glabrous; tap roots thick; stems 1.8–20.0 m long, prostrate, sometimes tips twining, rooting at nodes. Leaves ovate, elliptic, circular, reniform or subquadrate to oblong, 3.5–9.0 × 3.0–10.0 cm, succulent-fleshy, base broadly cuneate, truncate, or shallowly cordate, with 2 glands underneath, apex emarginate or deeply 2-lobed, mucronulate; petiole 2–10 cm.

Inflorescences 1- to several-flowered; peduncles stout, 4–14 cm; bracts early deciduous, broadly deltoid, 3.0–3.5 mm; pedicels 2.0–2.5 cm. Flowers diurnal; sepals unequal, more or less leathery, glabrous, apex obtuse, mucronulate, outer 2 sepals ovate to elliptic, 5–8 mm, inner sepals nearly circular and concave, 7–11 mm; corolla funnelliform, 4–5 cm, purple or reddish purple, centre darker; stamens included; pistil included, ovary glabrous.

Capsules subglobose, 11–17 mm, glabrous, leathery. Seeds trigonous-globose, 7–8 mm, black, densely brownish tomentose.

Distribution. A littoral species found on tropical seacoasts world-wide: present in Cambodia, Vietnam, and throughout the region.





11.37. *Ipomoea pes-caprae* (L.) R.Br. A, flowering stem; B, inflorescence; C–G, sepals; H, lower corolla, opened, showing androecium; I, anther; J, pistil; K, stigma; L, capsule and fruiting calyx; M, seed (From Heine 1984).



11.38. *Ipomoea pes-caprae* (L.) R. Br. Habit, flowers (credit: Imin K.; voucher: Malaysia, FRI-59479 (KEP)).

Ecology. Sea beaches and sunny, sandy coastal areas, less often inland on clayey soils; elevation: 0–70 m.

Usage. "fixe naturellement le sable des dunes marines que préfère cette plante" (ex FIC p260).

Notes. Ooststroom (1953) and many other authors have recognized two subspecies (*pes-caprae* and *brasiliensis* (L.) Ooststr.) based on the depth of lobing at the leaf apex. This character varies on the same plant and is not worthy of taxonomic recognition, so no infraspecific taxa are recognized here.

Vernacular names

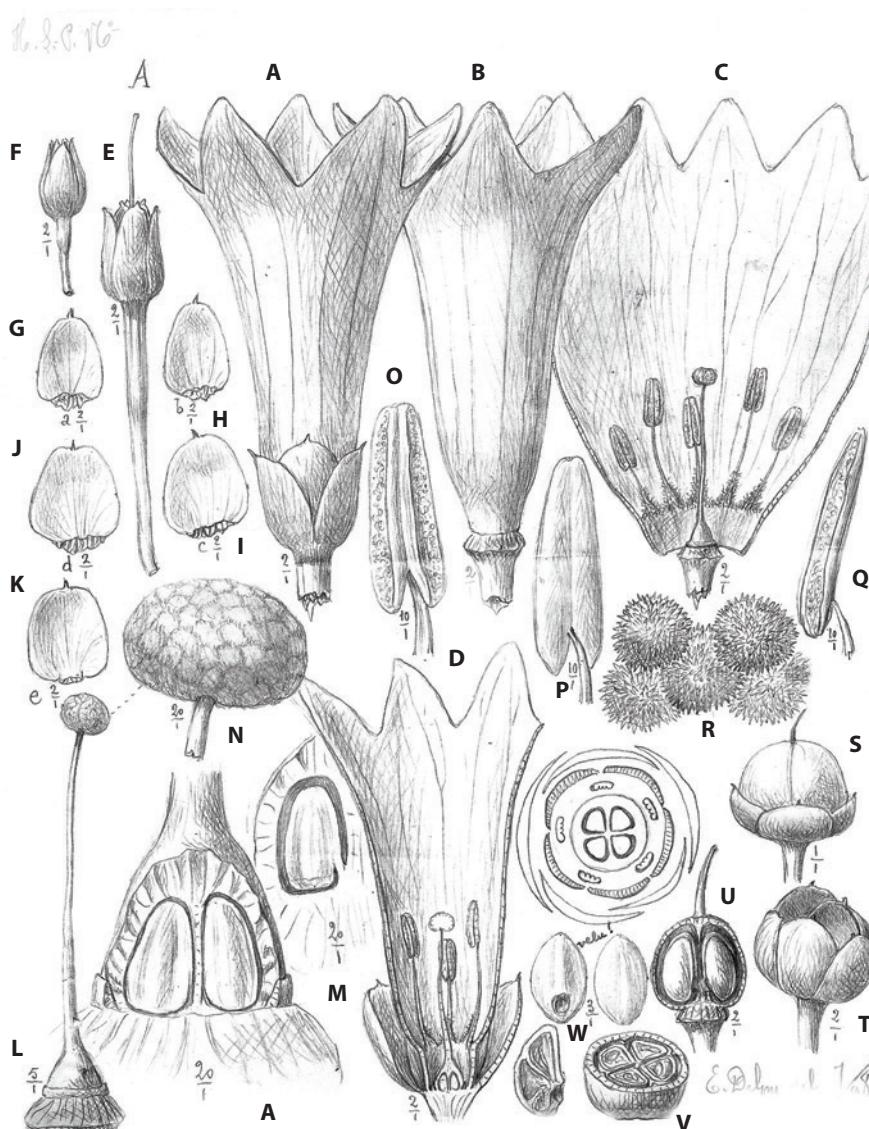
Cambodia. voa trêkuon thêt (Martin 1622).
trâkuon ték samott (Long et al. CL-581, P00626454).

Vietnam. dây rau mu (Annamite, *Poilane* 4727), cây dây rao müông đô (Annamite, *Poilane* 594), rau müông biêng (*Bauche* s.n.), muống biển (Julie Nguyen Ngoc 80).

Material studied

Cambodia. Koh Kong: Chkae Prus, village de bord de mer, 7 Dec. 1969, Martin 1622 (P, SING); Koh Kong, 7 Feb. 2007, Long et al. CL581 (P); Km 174 route de Sre Ambel, bord de la mer, 19 Aug. 1919, *Poilane* [sub Chevalier #] 455 (P). Sihanoukville: Koh Rong Sanloem, 10 May 1895, Hahn s.n. (P).

Vietnam. s. loc.: "Ha Mat", 25 Feb. 1892, Bon 5197 (P, SING); "Cochinchine", 1862–1866, Thorel 110 (P). Ba Ria-Vung Tau: Cap St. Jacques, 18 Oct. 1919, *Poilane* 594 (P, SING); plage de Ho Coc, Binh Chau (resort), Xuyen Moc, 28 Dec. 2004, Ngoc et al. JNN-80 (P); Poulo Condor, plages, Germain s.n. (P, SING). Ha Noi: 1883–1885, Couderc s.n. (P, SING). Da Nang: Tourane vic., July 1927, Clemens & Clemens 4046 (P); l. c., Jan. 1837, Gaudichaud 141 (P); baie de Tourane, 1883–1885, Couderc s.n. (P, SING). Khanh Hoa: Hoa Cat, près de Nha Trang, 27 Sep. 1922, *Poilane* 4727 (P, SING); Nha Trang vic., 11–26 Mar. 1911, Robinson 1327 (P). Kien Giang: Ham Ninh, Phu Quoc, 30 Sep. 1875, Godefroy 874 (P). Lang Son: "Phu-Long-Chuang", 23 Oct. 1911, Lecomte & Finet 276 (P). Quang Ngai: Long Tri, July 1934, Pételet 5353 (P). Quang Ninh: Baie d'Ha-long, île du cimitière, 9 July 1901, Debeaux 296 (P); Tsai Wong Mo Shan vic., Tong Fa market, Ha Coi, at seashore, 11–23 Sept. 1939, Tsang 29479 (P, SING). Quang Tri: village Cua tung, 18 Oct. 1909, Bauche 105 (P). Thua Thien-Hue: Lang Co, Eberhardt 1709 (P, SING).



11.39. *Ipomoea pes-caprae* (L.) R. Br. A, whole flower, lateral view; B, corolla, lateral view, calyx removed; C, corolla opened, showing androecium and gynoecium; D, flower in longitudinal section; E, F, pedicel and calyx, after corolla dehiscence; G-K, sepals, adaxial surfaces, outermost (G) to innermost (K); L, pistil; M, ovary, wall partly cut away, showing septum and 2 ovules, inset placentalation of one ovule; N, stigma; O, anther, adaxial view; P, anther, abaxial view; Q, anther, lateral view; R, pollen grains; S, whole fruit; T, dehisced fruit after seeds fall out; U, fruit in longitudinal section; V, fruit in cross-section; W, seeds in various views [Delpy noted the seeds are velvety]; X, floral diagram. Drawn by E. Delpy, July 1898. Voucher: L. Pierre s.n., without date (P03539066).

21. *Ipomoea pes-tigridis* L.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Ipomoea pes-tigridis L., Sp. Pl. 1: 162 (1753); Gagnep. & Courchet, Fl. Indo-Chine 4: 268 (1915); Ooststr., Blumea 3: 504 (1940), Fl. Males., Ser. I, Spermat. 4: 467 (1953); Kerr, Fl. Siam. 3 (2): 16 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 179 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 987 (1993); R.C.Fang & Staples, Fl. China 16: 306 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 171 (2005); Staples, Fl. Thailand 10: 421 (2010). – Type: India, Linnean Herbarium No. 219.11 (lecto LINN!), designated by Meeuse in Bothalia 6: 744 (1958).

Annual herbaceous twiners; stems 0.5–8.0(–15.0) m long, axial parts hispid with spreading trichomes. Leaves circular or transversely elliptic in outline, 2–10 × 3–13 cm, palmately deeply divided, segments usually 5–9, elliptic or oblong, tapered at both ends, both sides densely pubescent, apices mucronate; petiole 2–8 cm.

Inflorescences capitate, few-flowered, involucrate; peduncles 4–11 cm; bracts hirsute, outer bracts oblong to linear-oblong, 20–25 mm, inner bracts smaller; pedicels absent or very short. Flowers nocturnal; sepals lanceolate, slightly unequal, 10–14 mm, hirsute on both sides; corolla subsalverform, 3–4 cm long, white, limb spreading, 5-angled, midpetaline bands sparsely pubescent; stamens included, filaments glabrous; pistil included, ovary 2-locular, glabrous.

Capsules ovoid, c. 7 mm, 4-valved. Seeds ellipsoidal, c. 4 mm, grey tomentellous.

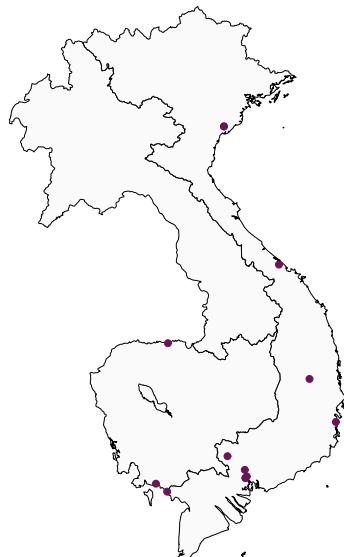
Distribution. Cambodia, Vietnam, and Kashmir, Pakistan, Nepal, India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, Australia, the Pacific Islands and Africa. Probably present in Laos as well.

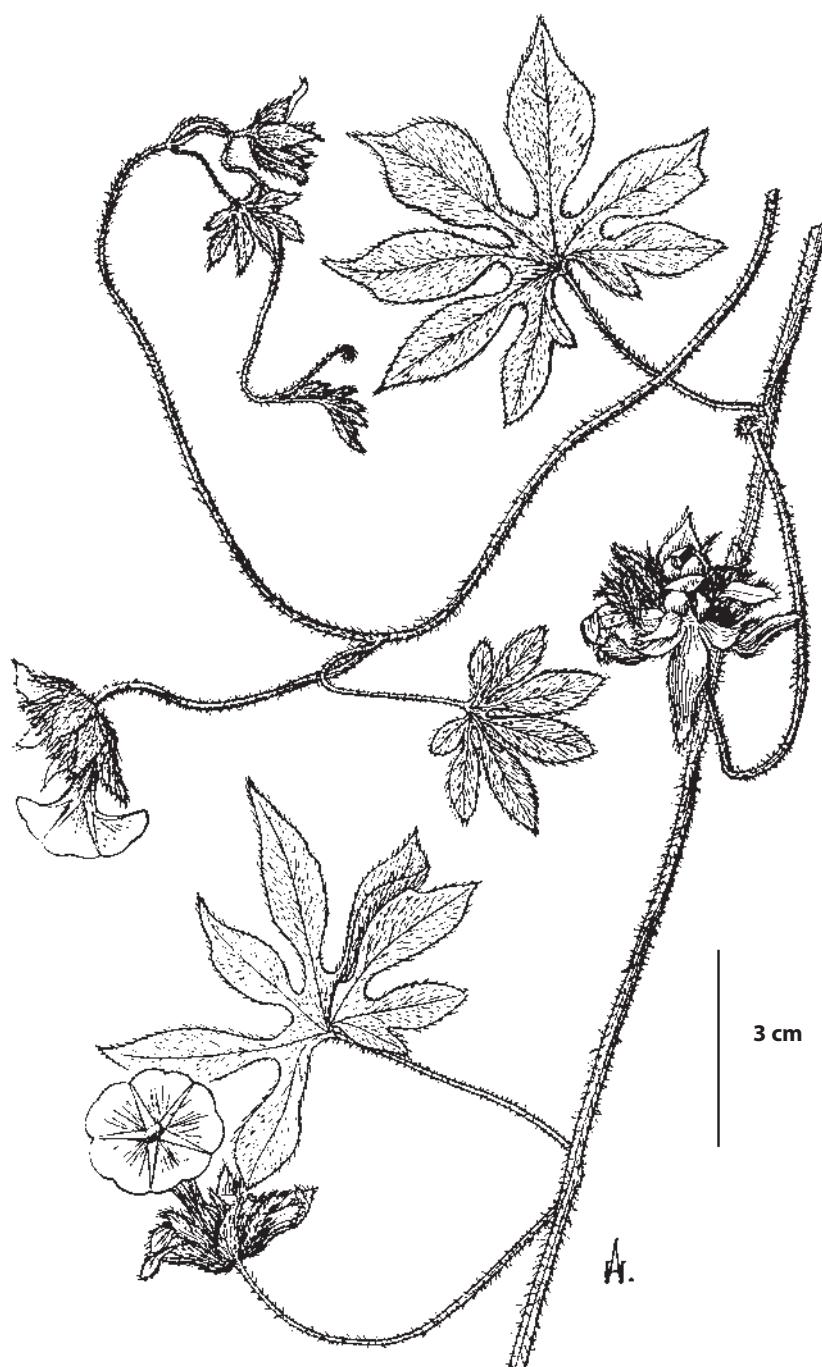
Ecology. Often in open, sunny, grassy places such as roadsides, pastures, old clearings in forest, and edges of cultivated fields, on sandy or rocky, poor soils; elevation: 50–200 m.

Notes. A night-flowering species; the corolla morphology and colour are consistent with a nocturnal, moth pollination syndrome.

Vernacular names

Vietnam. dây bìm bìm (*Hiệp 148*), rui aban tỉ, rok kô (*Jörail, Dournes s.n.*).





11.40. *Ipomoea pes-tigridis* L. Branches with flowers and fruits (From Ooststroom & Hoogland 1953).



11.41. *Ipomoea pes-tigridis* L. Fruits (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Material studied

Cambodia. Banteay Meanchey: "confin pro. Battambang et Siêm Réap", au pied du massif Dangrêk, entre Co Binh Song et Benteay Chhmar, 25 Oct. 1927, *Poilane* 14408 (P). Kampot: 20 Dec. 1903, *Geoffray* 270 (P); Tropaing Thom village, 10 Sep. 2005, *Khuon* et al. OD275 (E).

Vietnam. Binh Duong: Thu Dau mot, Dec. 1865, *Pierre* 2 (P). Dac Lac: Hau Bon (Cheo Reo), *Dournes* s.n. (P). Ho Chi Minh Ville: Jardin botanique de Saigon, 13 Dec. 1918, *Hiép* 148 (P); Saigon vic., 1892, *Goodenough* s.n. (SING); palissades aux env. de Saigon, 28 July 1864, *Lefèvre* 534 (P). Khanh Hoa: Ba Ha, route de Ba Ha à Ninh Hoa, 29 Apr. 1923, *Poilane* 6106 (P). Ninh Binh: Phuc Nhac, 1 Aug. 1881, *Bon* 534 (P); *l. c.*, 16 Nov. 1881, *Bon* 1052 (P). Tay Ninh: route de Tay Ninh à Saigon, 12 Sep. 1920, *Evrard* 20 (P). Thua Thien-Hue: Baika, *Eberhardt* 2484 (P); "Gialong", 15 Nov. 1911, *Lecomte & Finet* 1144 (P).



11.42. *Ipomoea pes-tigridis* L. Leaf, flower (credit: Pramote Triboun, TISTR; voucher: Thailand, not collected).

22. *Ipomoea pierrei* Gagnep.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Ipomoea pierrei Gagnep., Notul. Syst. (Paris) 3: 146 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 249 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 179 (1990). – *Merremia pierrei* (Gagnep.) P.H.Hồ, Cây cỏ Việt Nam 2 (2): 981 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 175 (2005). – Type: Vietnam, Bà Rịa-Vũng Tàu, ad Baria, July 1867, Pierre s.n. (holo Pl, P00288070; iso Pl, P00288071).

Perennial herbs, basally subwoody; stems twining, all parts velutinous. Leaves ovate-acuminate, 5–8 cm × 4–6 cm, base cordate, apex obtuse, mucronate, upper sides pilose, trichomes rigid, undersides softly greyish pilose; secondary veins 7 or 8 either side of midvein, ultimate veins indistinct; petiole 3–4 cm long, shortly hirsute.

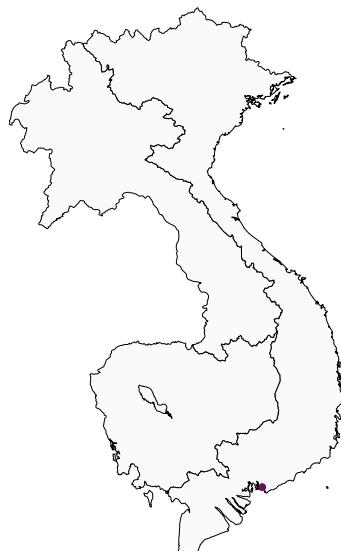
Inflorescences axillary, cymose, few-flowered; peduncles 3–6 cm long, shortly pilose; pedicels 1–2 cm long; bracts caducous; flower buds c. 25 mm long, sericeous outside. Flowers not seen; sepals equal, ovate-obtuse, c. 7 × 5 mm, outsides velutinous; corolla shortly funnel-form, tube 2.5 cm long, limb 3 cm diam., ruffled, entire; stamens unequal, included, filaments inserted near corolla base, 3–6 mm or longer, bases dilated and papillose, threadlike and glabrous above, anthers ovoid, 2.5 mm long; disc annular, ovary conical-acuminate into style, 2-locular, 4-ovulate, glabrous, style c. 1 cm long, stigma biglobose.

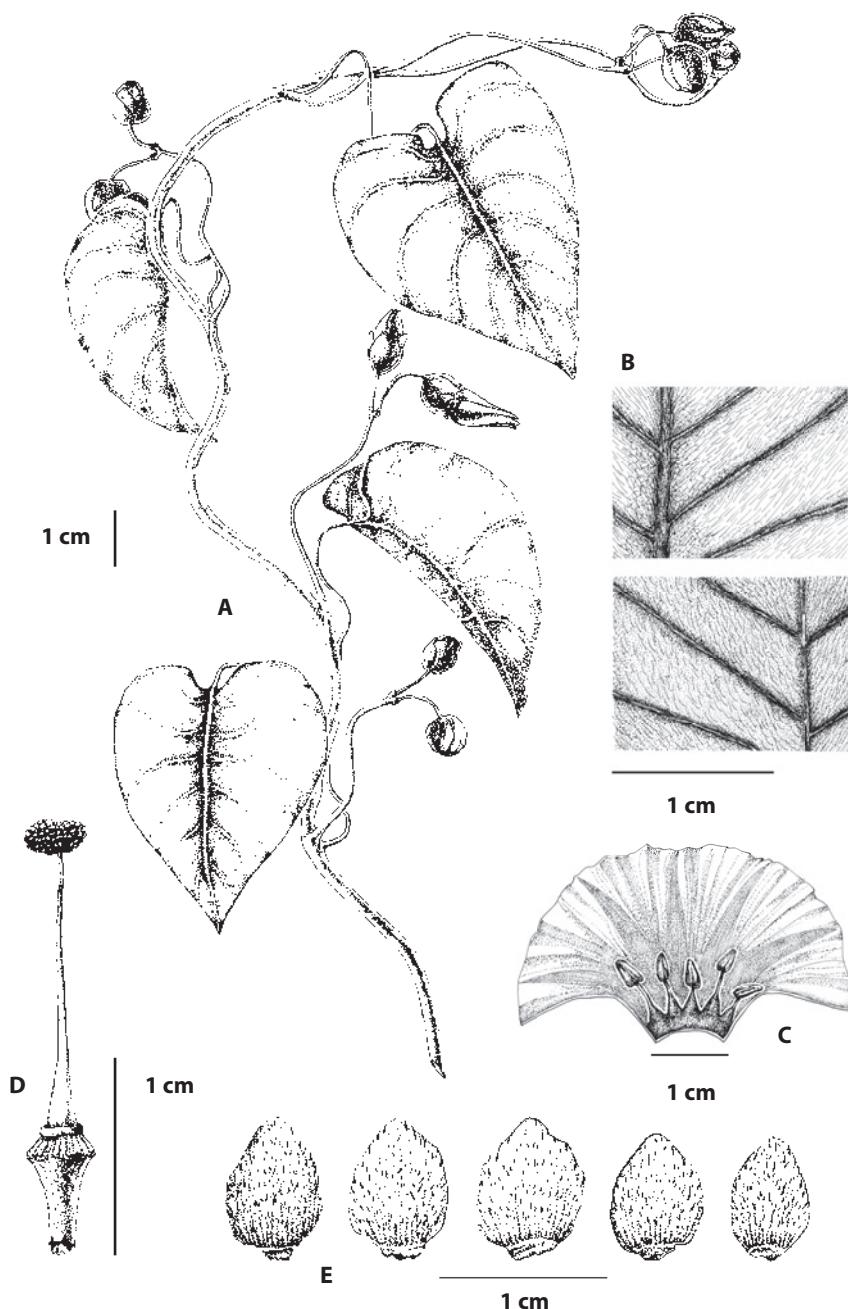
Capsules globose, 8–9 mm diam., 4-valved, glabrous, partly enclosed by slightly accrescent calyx. Seeds broadly ovoid-trigonous, 5 × 5 mm, glabrescent, trichomes few, very short; hilum basal, circular.

Distribution. Vietnam.

Ecology. Growing in hills.

Notes. An enigmatic species. The specimen identified as the holotype in Paris has a detailed pencil drawing by E. Delpy, dated 8/98, pinned on it; this drawing is clearly labelled as based on the Pierre specimen. Confusingly, the isotype sheet in Paris has an ink drawing by L. Courchet, undated and with handwritten measurements, pinned on it; this has no indication of the source. These two drawings show very different floral shapes and proportionality of internal floral structures. After careful comparison of the two drawings with the protologue, it is clear that Delpy's drawing agrees closely with the protologue, while Courchet's differs in some





11.43. *Ipomoea pierrei* Gagnep. A, flowering stem; B, leaf indumentum, abaxial (top), adaxial (bottom); C, corolla opened, showing androecium; D, pistil; E, sepals, abaxial view, outermost (left) to innermost (right). Drawn by Héloïse Krob. Vouchers: A, Pierre s.n., in July 1867 (P00288070); B, Pierre s.n., in July 1867 (P00288071); C-E adapted from drawings by E. Delpy attached to sheet P00288070.

key criteria. It is possible that Courchet's drawing is pinned on the wrong sheet; Courchet has annotated it "voisin de *Ipomoea sepiaria*."

Although *Ipomoea pierrei* has been transferred to *Merremia*, the spinulose pollen grains shown in Delpy's drawing indicate that this species is a *bona fide* member of *Ipomoea*.

Material studied

Known only from the type collection.

23. *Ipomoea pileata* Roxb.



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Ipomoea pileata Roxb., Fl. Ind. 2: 94 (1824); Gagnep. & Courchet, Fl. Indo-Chine 4: 270 (1915); Ooststr., Blumea 3: 507 (1940), Fl. Males., Ser. I, Spermat. 4: 467 (1953); Kerr, Fl. Siam. 3 (2): 16 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); R.C.Fang & Staples, Fl. China 16: 306 (1995); Staples, Fl. Thailand 10: 422 (2010); Leti et al., Flore Photogr. Cambodge 179 (2013); Staples et al., Thai J. Bot. 6: 84 (2014). – Type: India, cultivated in Calcutta Botanic Garden, Roxburgh s.n. (not located).

Ipomoea involucrata auctt. non Beauv.: P.H.Hồ, Cây cỏ Việt Nam 2 (2): 987 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 170 (2005).

Annual herbaceous twiners; stems 1–2 m long, axial parts densely hispid-pilose with retrorse trichomes. Leaves cordate-ovate, 2.5–9.0 × 2.5–7.5 cm, pilose, undersides more densely so, base cordate, margins entire, apex acuminate or attenuate; petiole 1.5–6.0 cm.

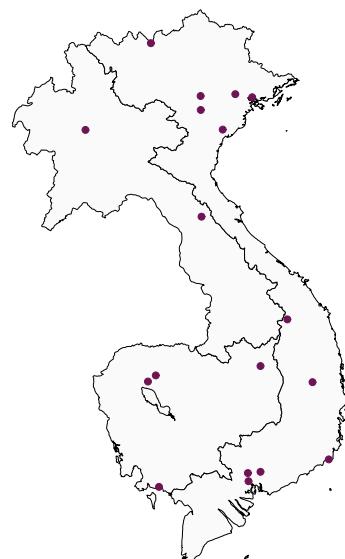
Inflorescences capitate, few- to several-flowered, involucrate; peduncles 1.5–7.0 cm; outer bract boat-shaped, tapered at both ends, 27–55 mm, outsides densely pubescent, insides long hirtellous, bracteoles oblong-spathulate, much smaller, villous. Flowers nocturnal; sepals nearly equal, 8–10 mm, outer 3 sepals elliptic-spathulate, inner 2 sepals narrower, lanceolate, villous, apex obtuse; corolla salverform, 2.5–3.0 cm, pink or purple, tube cylindrical, limb with deltoid lobes, midpetaline bands pilose; stamens inserted near middle of corolla tube; pistil included, ovary glabrous.

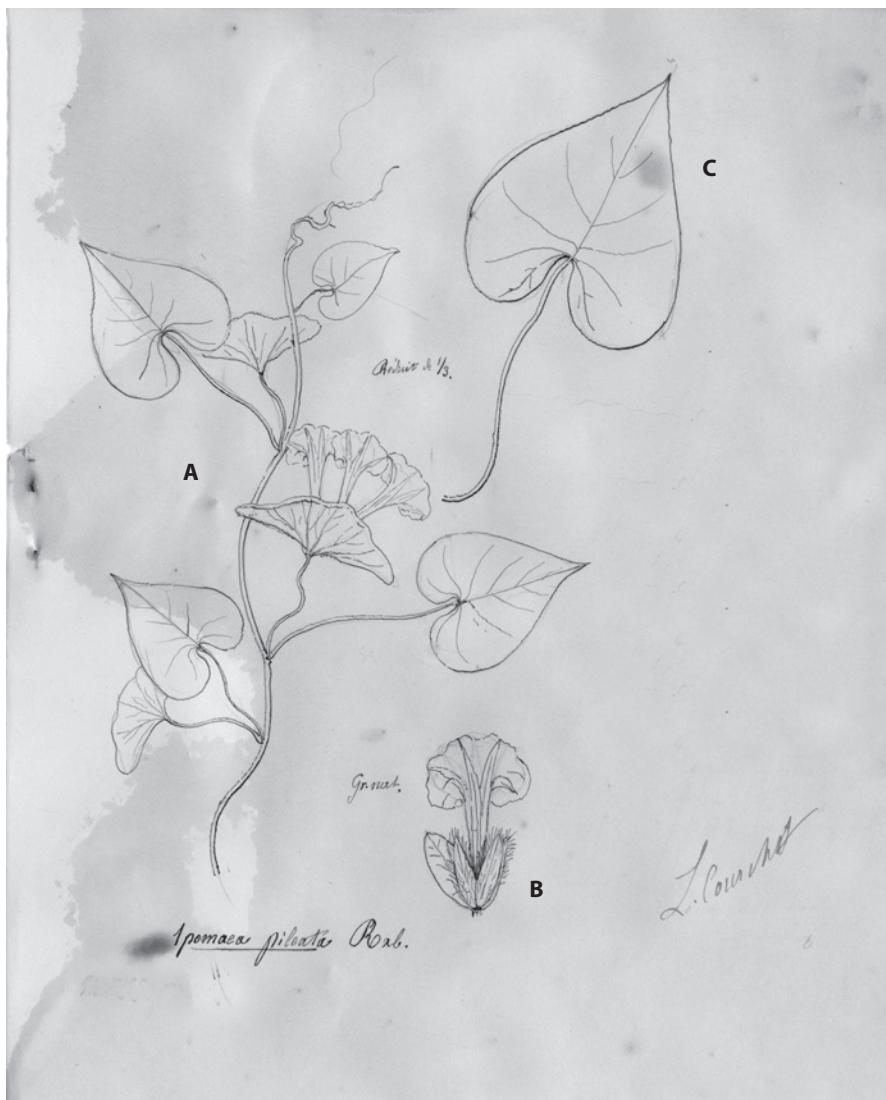
Capsules subglobose, 5–6 mm diam. Seeds 3–4 mm, dark brown, glabrous or shortly pubescent.

Distribution. Cambodia, Laos, Vietnam, and India, Sri Lanka, China, Thailand, Malaysia, Indonesia, the Philippines, Africa.

Ecology. In clearings and sunny areas in grassy fields, old clearings, margins of rice paddy, dry streambeds, and secondary regrowth on rocky and calcareous-clay soils; elevation: 100–650 m.

Notes. Several African floras state that the holotype of *I. pileata* Roxb. is Wallich Cat. 1376 in Kew, but this is false. Roxburgh's protologue clearly states the plant he was describing was grown in the Calcutta Botanic Gardens from seed obtained in China. None of the





11.44. *Ipomoea pileata* Roxb. A, habit of flowering plant; B, flower in lateral view showing calyx and 1 bracteole; C, single leaf showing deeply cordate base and principal venation. Drawn by L. Courchet. Voucher: Geoffray 236 (P03539812).

gatherings conserved in the Wallich Herbarium at Kew indicate Calcutta Botanic Garden as the source; all sheets have original labels indicating provenance in southern peninsular India, Bangladesh, or Myanmar. The whereabouts of Roxburgh's authentic original material remain unknown.



11.45. *Ipomoea pileata* Roxb. Habit, flower (credit: G. Staples; voucher: Thailand, Staples et al. 1449 (QBG)).

Vernacular names

Vietnam. đam but (*Poilane* 9446), ting-bi-rüng (Jörai, *Dournes s.n.*).

Material studied

Cambodia. Kampot: 6 Dec. 1903, *Geoffray* 236 (P). Kratie: Sambor, *Harmand s.n.* (E); *I. c.*, bords du Mekong, Dec. 1875, *Harmand* 54 (P). Ratanakiri: Veal Thmor Longley, 22 Nov. 2007, *Cheng* et al. CL719 (P, SING). Siem Reap: region des Temples d'Angkor, 30 Nov. 1997, *Hul* et al. 513 (P); Phnom Kulen, 15 Dec. 1968, *Martin* 1310 (P, SING).

Laos. Khammouane: Houay Mai Kuang, 29 Oct. 2005, *Newman* et al. LAO 629 (E, P).

Vietnam. *s. loc.*: "Cochinchine", *Germain* 16 (P). Binh Duong: Thu dzau mot, Dec. 1866, *Pierre* 11 (E, P, SING). Cao Bang: Long Tcheou, *Simond* 276 (P). Dac Lac: Hau Bon (Cheo Reo), Dec. 1967, *Dournes s.n.* (P). Hai Duong: Sept Pagodas, Aug. 1906, *Mouret* 197 (P). Ha Noi: Tu Phap env., 7 Oct. 1887, *Balansa* 3527 (P). Hoa Binh: canton du Cao Phong, Nov. 1926, *Pételot* 3674 (P). Ho Chi Minh Ville: "Saigon", Nov. 1874, *Godefroy s.n.* (P). Kon Tum: about 7 km S of Dak Gley town, near Dak Pet village, 12 Nov. 1995, *Averyanov* et al. VH-1510 (AAU, P). Lao Cai: Phu Lu, 8 Dec. 1935, *Poilane* 24987 (P, SING). Ninh Binh: Cho Ganh, Oct. 1922, *Pételot* 694 (P, SING). Ninh Thuan: Ca Na "pro. Phanrang", 1 Jan. 1924, *Poilane* 9446 (P). Quang Ninh: Ouonbi, Nov. 1885, *Balansa* 801 (P).

24. *Ipomoea polymorpha* Roem. & Schult.

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Ipomoea polymorpha Roem. & Schult., Syst. Veg. 4: 254 (1819); Ooststr., Blumea 12: 39-40 (1963); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 985 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 171 (2005); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – *Ipomoea heterophylla* R.Br., Prodr.: 487 (1810), nom. illeg.; Gagnep. & Courchet, Fl. Indo-Chine 4: 267 (1915). – Type: Australia, Carpenteria, *R. Brown s.n.* (syn BM, K).

Dimerodiscus fallax Gagnep., Notul. Syst. (Paris) 14: 25 (1950). – Type: Vietnam, Poulo Condor, Harmand 650 (holo Pl, P00607303; iso Pl, P00607304, P00607305).

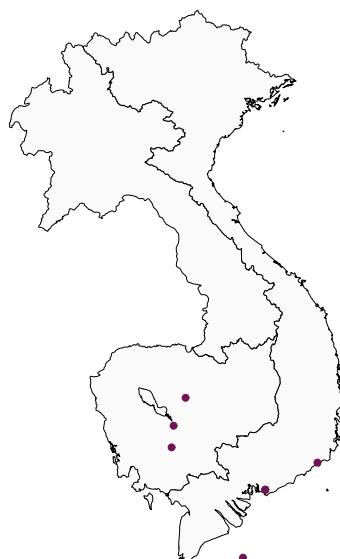
Herbaceous annuals; stems 8–60 cm long, simple and erect or branched from base and sprawling to ascending; densely pubescent when young, less so or glabrous at maturity. Leaves narrowly elliptic, elliptic-oblong, obovate, or oblanceolate, 1.5–7.5 × 0.5–3.0 cm, mostly attenuate at both ends, base acute, attenuate into petiole, apex acute, obtuse, or rounded, mucronulate, margins entire, undulate, or coarsely dentate, irregularly pinnatifid, or lyrate with few segments, glabrous or sparsely pilose; secondary veins 5 or 6 either side of midvein; petiole 0.5–3.0 cm, sparsely pilose.

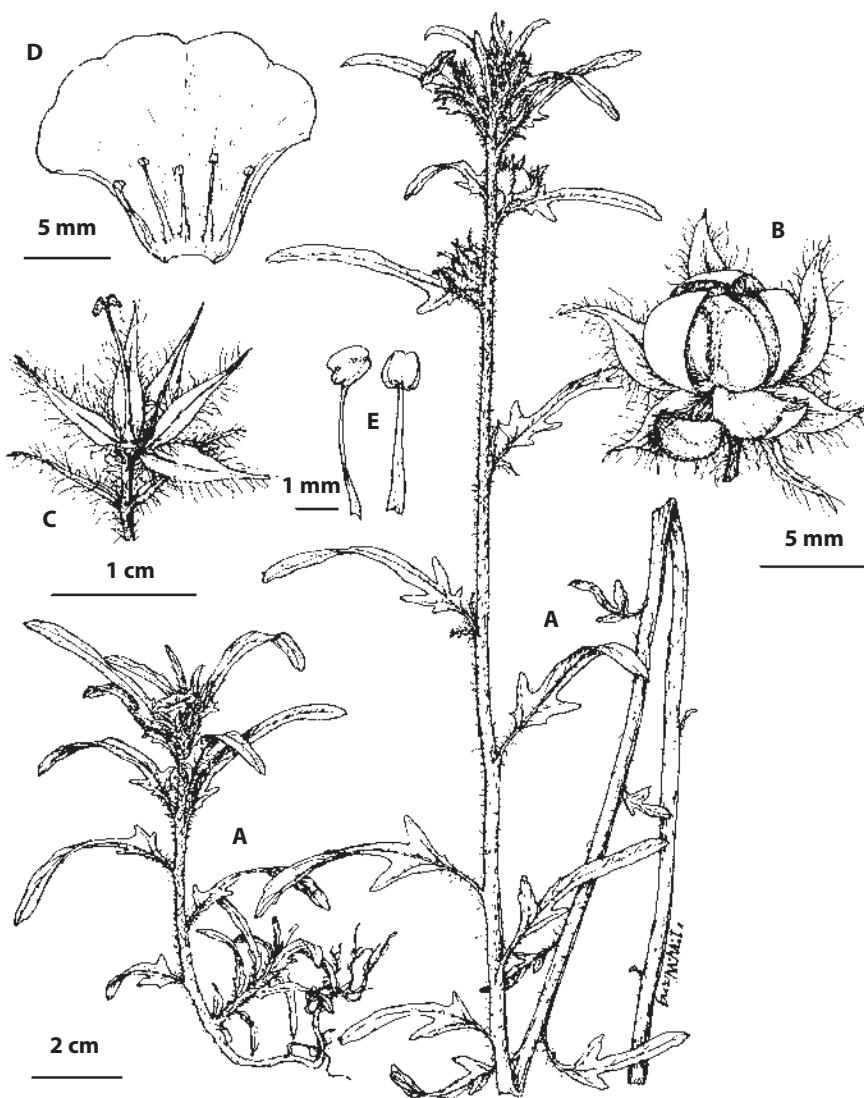
Flowers axillary, solitary, diurnal, inconspicuous, peduncles and pedicels very short or absent; bracts linear-filiform, c. 1 cm long, long-pubescent; sepals 8–10 mm long, pubescent, midrib prominent, outer sepals ovate-lanceolate, entire or toothed towards apex, inner ones lanceolate; corolla tubular-funnelform, red-purple, darker in centre, rarely white, c. 1.25 cm long, glabrous; stamens and pistil included, filaments pubescent basally, glabrous above; ovary and style glabrous, stigmas biglobose, white.

Capsules globose, shorter than calyx, 4–6 mm long, glabrous, straw-coloured, 2-locular, 4-valved. Seeds 4 or fewer, c. 2.5–3.25 mm long, with mottled brownish or greyish black pubescence.

Distribution. Cambodia, Vietnam, as well as India, China (Taiwan), Thailand, Indonesia, New Guinea, Australia, and NE Africa. Probably in Laos as well.

Ecology. A short-lived annual that depends on disturbance to open up bare soil, where the plants quickly





11.46. *Ipomoea polymorpha* Roem. & Schult. A, flowering branch; B, dehisced fruit; C, calyx and pistil; D, corolla and stamens; E, stamens (From Chang 1978).

grow up, reproduce, then die. On sea beaches, vacant lots, construction sites, typically on sandy soils; elevation: sea level to 100 m.

Notes. this species is so unlike typical, twining *Ipomoea* species that the erect habit and diminutive size misled Gagnepain into describing a new genus of Convolvulaceae for it: *Dimerodiscus*.

Material studied

Cambodia. s. loc.: 1876, Harmand 261 (P). Kompong Chhnang: 6 June 1875, Godefroy 261 (P). Phnom Penh: Oudon, 1866–1868, Thorel 2048 (P).

Vietnam. s. loc.: 1868, Baudouin s.n. (P); Pham Hoàng Hô s.n. (P). Ba Ria-Vung Tau: Baria, Aug. 1867, Baudouin 355 (P); “prov. Baria”, 1866, Pierre s.n. (E, GH, P); in sabulosis ad Baria, Dec. 1867, Pierre s.n. (A, E, P). Ninh Thuan: Song Long Song, “pro. de Phan ri”, 28 June 1919, Poilane 118 (P).

25. *Ipomoea quamoclit* L.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea quamoclit L., Sp. Pl. 1: 159 (1753); C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 199 (1883); Gagnep. & Courchet, Fl. Indo-Chine 4: 235 (1915); Ooststr., Blumea 3: 555 (1940), Fl. Males., Ser. I, Spermat. 4: 482 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 993 (1993); R.C.Fang & Staples, Fl. China 16: 301 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 171 (2005); Staples, Fl. Thailand 10: 422 (2010); Leti *et al.*, Flore Photogr. Cambodge 180 (2013); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – *Convolvulus quamoclit* (L.) Spreng., Syst. Veg. 1: 591 (1824). – Type: Herbarium Clifford: 66 “*Ipomoea* 1” (lecto BM!, designated by Biju in Taxon 51: 755 (2002)).

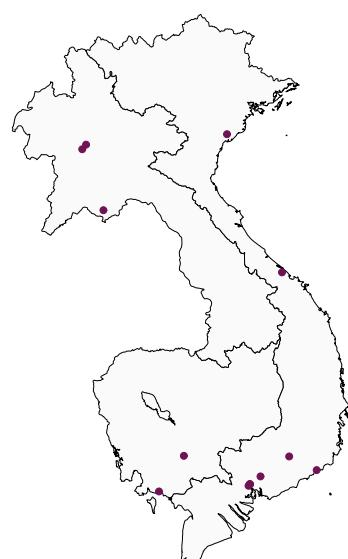
Convolvulus pennatus Desr. in Lam., Encycl. 3: 567 (1792). – *Quamoclit pennata* (Desr.) Bojer, Hort. Maurit. 224 (1837); Kerr, Fl. Siam. 3 (2): 22 (1954). – Type: France, Paris, ‘Jardin du Roi’, Lamarck s.n. (holo P-LA). *Quamoclit vulgaris* Choisy, Mém. Soc. Phys. Genève 6: 434 [Conv. Orient. 52] (1834), an illegitimate replacement name for *I. quamoclit*.

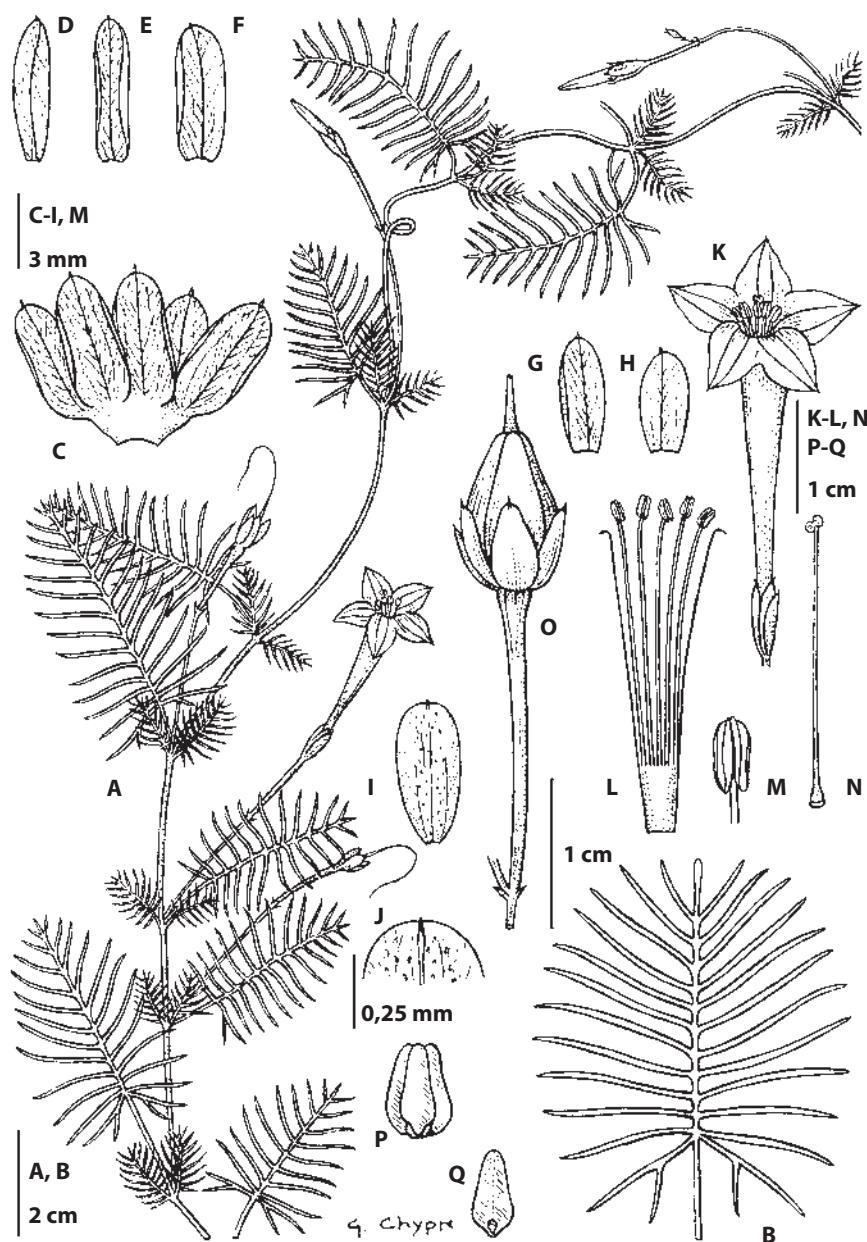
Annual herbaceous twiners, glabrous; stems 1–3 m. Leaves ovate or oblong in outline, 2–10 × 1–6 cm, pinnately parted to the midrib, with (8–)10–18 pairs of filiform segments, the lowermost often bifid; petiole 0.8–4.0 cm long, base often with leafy pseudostipules (tiny leaves from axillary bud).

Inflorescences axillary, cymosely 1- to few-flowered; peduncles (1.5–)10.0–14.0 cm long; pedicels (0.5–)0.9–2.0 cm, clavate in fruit; bracts deltoid, minute. Flowers diurnal; sepals oblong to oblong-spathulate, 4–6 mm long, outer ones shorter, warty outside, margins paler, apex obtuse, mucronate below top, mucro 0.75–1.0 mm long; corolla salverform, blood red (or white), tube 2.5–3.5 cm long, straight, limb spreading, 1.75–2.0 cm diam., 5-pointed; stamens exserted, filaments pubescent at base; pistil exserted, ovary glabrous.

Capsules ovoid-conical, 6–8 mm long, often apiculate with thickened style base; septa persistent, translucent, margins thicker, brownish. Seeds ovoid-oblong, 5–6 mm, brownish black, marmorate.

Distribution. Native in tropical America; now pantropical as a cultivated plant and naturalized weed: present in Cambodia, Laos, Vietnam, China and Thailand.





11.47. *Ipomoea quamoclit* L. A, flowering stem; B, leaf; C, calyx, opened, adaxial view; D–I, sepals, abaxial view; J, sepal apex, enlarged; K, flower; L, corolla opened, showing androecium; M, anther; N, pistil; O, capsule, with fruiting calyx; P, seeds positioned as in capsule; Q, seed, adaxial surface (From Heine 1984).



11.48. *Ipomoea quamoclit* L. habit, flowers (credit: S. Syahida Emiza; voucher: Malaysia, Syahida et al. FRI-84430 (KEP)).

Ecology. Cultivated ornamental and weedy in disturbed areas, villages, roadsides, hedges; elevation: sea level to 300 m.

Vernacular names

cay deuong leo, kam pen fung (Gagnepain & Courchet 1915).

Cambodia. voa che'eung niek (*Martin* 1818).

Laos. 'houp 'hap khua (*Pottier* 420).

Vietnam. tóc tiên, ngúi bàng (*Bon* 858), dây tóc tiên bông trảng (*Hiệp* 961), bông tóc tiên (*Hiệp* 162, 14 Dec. 1918), dây tóc tiên bông đõ (*Hiệp* 162, Jan. 1920).

Material studied

Cambodia. s. loc.: 1874, *Jullien* s.n. (P). Kampot: 6 Sep. 1903, *Geoffray* 83 (P). Phnom Penh: 6 July 1970, *Martin* 1818 (P).

Laos. Louang Prabang: Ban Khay, 22 Aug. 1969, *Pottier* 420 (P); bord de fleuve, Ban Phanluang, 5 July 1969, *Pottier* 209 (P); Ban Longlao Mai village, 5 Nov. 2012, *Staples* et al. 1525 (HNL, KKU, P, PTK, SING); Vientiane: Tha Ngon (mission), 10 Oct. 1965, *Vidal* 4068 (P).

Vietnam. s. loc.: "Cochinchine", 1868, *Talmy* 64 (P, SING). Binh Thuan: route de Phanri (Phan Thiêt), 29 Oct. 1924, *Evrard* 1628 (P, SING). Ho Chi Minh Ville: jardin botanique de Saigon, 14 Dec. 1918, *Hiệp* 162 (P); l. c., Jan. 1920, *Hiệp* 162 (P); 3 Jan. 1920, *Hiệp* 961 (P); Saigon, Nov. 1875, *Godefroy* s.n. (P). Lam Dong: Blao, *Schmid* s.n. (P). Ninh Binh: college de Phuc Nhac, 4 Oct. 1881, *Bon* 858 (P, SING). Thua Thien-Hue: Hue vic., Nov. 1911, *Lecomte & Finet* s.n. (P); Bai ca, Nov. 1911, *Lecomte & Finet* 1255 (P).

26. *Ipomoea rubens* Choisy



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Ipomoea rubens Choisy, Mém. Soc. Phys. Genève 6: 463 (1834); Ooststr., Fl. Males., Ser. I, Spermat. 6: 941 (1972); Staples, Fl. Thailand 10: 423 (2010). – Type: [Bangladesh.] Sillet, Wallich Cat. 1421 (lecto GI, bar code G00227258, designated by J.R.I.Wood, Kew Bull. 70: 31, p20 of 124 (2015)).

Pharbitis fragrans Bojer ex Choisy in DC., Prodr. 9: 341 (1845); Kerr, Fl. Siam. 3 (2): 12 (1954). – *Ipomoea fragrans* (Bojer ex Choisy) Hallier f., Bot. Jahrb. Syst. 18: 153 (1893); Ooststr., Blumea 3: 564 (1940). – Type: Madagascar, Foulepoint, 1839, Bojer s.n. (holo G-DC).

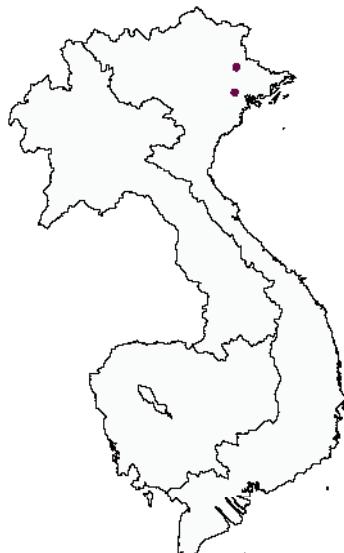
Ipomoea riparia G.Don, Gen. Syst. 4: 265 (1838); Ooststr., Fl. Males., Ser. I, Spermat. 4: 484. 1953. – Type: Saô Tomé, without date, G. Don s.n. (holo BM).

Ipomoea bonii Gagnep., Notul. Syst. (Paris) 3: 142 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 246 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 989 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 164 (2005), syn. nov. – Types: Vietnam, Ha Noi prov., near O-cách, Bon 2816 (syn P, not found); Ha Noi prov., near No-xa, Bon 4233 (syn K!, L!, P!, P00391920, P00391921, P00391922); Than Hoa prov., near Mat-sô, Bon 5725 (syn P!, P00391923).

Perennial herbaceous twiners, all parts whitish pilose; stems 1–4 m. Leaves broadly ovate to circular, 5–15 × 4–12 cm, base broadly cordate, apex acuminate, mucronulate, upper side glabrescent; secondary veins 7–9 either side of midvein; petiole slender, 3–12 cm long.

Inflorescences axillary, subumbellate, 1- to few-flowered; peduncles terete, 2–14 cm long, glabrous in basal portion; pedicels 0.7–1.5 cm. Flowers diurnal; sepals equal, 7–10 mm long, outer 2 elliptic-oblong, acute, inner ones broader, ovate-elliptic, less acute; corolla funnelform, 4–5 cm long, pink with darker centre, midpetaline bands sericeous outside; stamens included, filaments pubescent below insertion, glabrous above; pistil included, ovary glabrous.

Capsules globose, c. 12 mm diam., glabrous. Seeds c. 6 mm long, white villous.





11.49. *Ipomoea rubens* Choisy. Habit, flowers (credit: Somran Suddee, BKF; voucher: Thailand, not collected).

Distribution. Vietnam and Bangladesh, India, Thailand, Indonesia, the Philippines, also in tropical Africa, Madagascar, tropical America.

Ecology. A climber always found near or in freshwater: twining up grasses and reeds at the borders of marshes, lakes, ponds, and rice paddies; elevation: 0–10 m.

Notes. *Ipomoea rubens* is found in tropical freshwater habitats globally but is nowhere abundant. The biology of this lacustrine species remains enigmatic.

Vernacular name

Vietnam. bim bim (*Bon* 4233).

Material studied

Vietnam. s. loc.: 'Indo-Chine', *Pierre* s.n. (P).



27. *Ipomoea sagittifolia* Burm. f.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Ipomoea sagittifolia Burm. f., Fl. Indica 50 (1768); Gagnep. & Courchet, Fl. Indo-Chine 4: 260 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); Staples & Jacquemoud, Candollea 60: 451 (2005); Staples, Fl. Thailand 10: 423 (2010); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – Type: Java, *Garcin s.n.* (holo G-PREL!).

Convolvulus marginatus Desr. in Lam., Encycl. 3: 558 (1791). – *Ipomoea sepiaria* Koenig ex Roxb., Hort. Beng. 14 (1814); *nom. superfl. illeg.*; Ooststr., Fl. Males., Ser. I, Spermat. 6: 941 (1972). – *Ipomoea marginata* (Desr.) Manitz, Feddes Report. 85: 638 (1974); Verdc., Kew Bull. 42: 658 (1987), *isonym*; R.C.Fang & Staples, Fl. China 16: 308 (1995). – Type: [icon] *Tiru-tali*, in Rheede, Hort. Malab. 11: 109, t. 53. (1692) (holo).

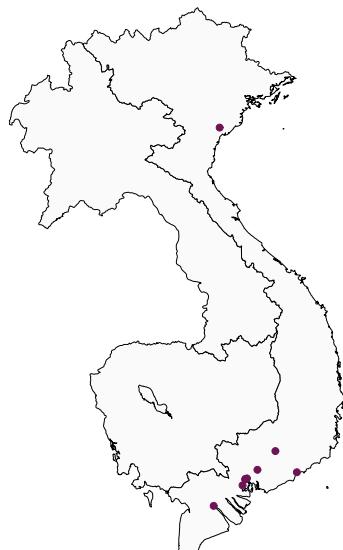
Ipomoea maxima auctt. non (L.f.) G.Don: Ooststr., Blumea 3: 525 (1940), Fl. Males., Ser. I, Spermat. 4: 472 (1953); Kerr, Fl. Siam. 3 (2): 14 (1954); P.H.Hô, Cây cỏ Việt Nam 2 (2): 990 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 170 (2005).

Perennial herbs from stout roots; stems twining or prostrate, 1–3 m, axial parts spreading hirsute or glabrous. Leaves elliptic-ovate or reniform to circular, upper leaves sagittate or hastate, 2–6 × 2–5 cm, glabrous, base deeply cordate or hastate, margins ciliolate, apex attenuate or abruptly acuminate; petiole 1–3 cm, sometimes minutely tuberculate.

Inflorescences cymose, crowded; peduncles 2–8 cm, thick, often flattened and verruculose apically; bracts persistent, ovate or oblong, c. 2 mm; pedicels 0.5–0.6 cm, sparsely verruculose. Flowers probably nocturnal; sepals ovate or elliptic-oblong, equal or inner longer, 4–7 mm, glabrous, apex obtuse; outer 2 sepals verruculose, margins paler; corolla subsalverform, 2.5–4.0 cm, white or pale purplish, darker in tube, limb weakly 5-lobed; stamens included; pistil included, ovary glabrous.

Capsules depressed-globose, 6–7 mm, glabrous. Seeds pale greyish-white tomentellous, angles often with longer cobwebby trichomes.

Distribution. Vietnam and India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, New Guinea, Australia, Pacific Islands, and Africa.





11.50. *Ipomoea sagittifolia* Burm. f. A, habit. B, flower, fruits (credits: A, S. Syahida Emiza; voucher: Malaysia, Syahida et al. s.n. (KEP); B, Rachun Pooma, BKF; voucher: Thailand, Pooma et al. s.n. (BKF)).



11.51. *Ipomoea sagittifolia* Burm. f. Flowering branch (From Ooststroom & Hoogland 1953, as *I. maxima* (L. f.) Don ex Sweet).

Ecology. Weedy in grassy vacant lots, roadsides, waste ground and disturbed areas, often in damp to wet soils; elevation: not reported.

Notes. The subsalverform, pale purplish corollas suggest nocturnal flowering and a moth-pollination syndrome although the pollination biology has not been reported.

Vernacular names

Vietnam. cây dây biên (Annamite, *Poilane sub Chevalier 40012*).

Material studied

Vietnam. s. loc.: "Cochinchine", *Germain* 14 (P, SING); *Talmy* s.n. (P). Binh Thuan: Phanthiet, 25 Oct. 1924, *Evrard* 1546 (P, SING). Can Tho: 27 Feb. 1971, *Vu Van Cuong* 1708 (P). Ho Chi Minh Ville: env. de Saigon, 10 Sep. 1864, *Lefèvre* 89 (P); Saigon, Mar.-Apr. 1868, *Pierre* 343 (P); 1862-1866, *Thorel* 40 p.p. (P). Long An: Rach Cat, "prov. de Cholon", 8 Mar. 1919, *Poilane* [Chevalier #] 40012 (P); Ruch Kiem, 1862-1866, *Thorel* 40 p.p. (E, P). Ninh Binh: Cho Ganh, Nov. 1923, *Pételot* 1262 (P, SING).



28. *Ipomoea sumatrana* (Miq.) Ooststr.

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Ipomoea sumatrana (Miq.) Ooststr., Blumea 3: 571 (1940), Fl. Males., Ser. I, Spermat. 4: 486 (1953); Kerr, Fl. Siam. 3 (2): 18 (1954); R.C.Fang & Staples, Fl. China 16: 310 (1995); Staples, Taiwania 41: 185–196 (1996); Staples, Fl. Thailand 10: 424 (2010); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – *Lettsomia sumatrana* Miq., Fl. Ned. Ind., Suppl. 560 (1860). – Type: Indonesia, Sumatra, Soengi Pagoe, Teyssmann herbarium 1150 (holo UI; iso LI, L0004205).

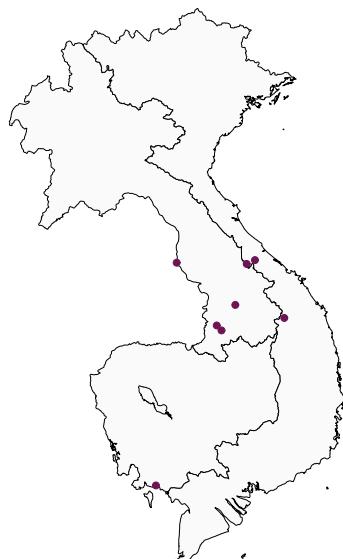
Ipomoea staphylina var. *malayana* Prain, J. Asiatic Soc. Bengal, Pt. 2, Nat. Hist. 63 (2): 106 (1894). – Types: Malaysia, Perak, Larut district, King's collector 2538 (syn K!, K000830808, SING!, SING0080754, Z!); same locality, King's collector 5091 (syn K!, K000830807, SING!, SING0080753, SING0080760); Penang, Wallich Cat. 1378 (syn K!, K000830804, K-W!, SING!, SING0076278).

Ipomoea staphylina auctt. non Roem. & Schult.: C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 210 (1883), p.p.; Gagnep. & Courchet, Fl. Indo-Chine 4: 250 (1915); C.E.Chang, Fl. Taiwan 4: 376 (1978); R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 99 (1979); P.H.Hô, Cây cỏ Việt Nam 2 (2): 991 (1993).

Merremia staphylina (Roem. & Schult.) T.N.Nguyễn, (1994); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 176 (2005).

Lianas; stems twining or prostrate, woody at the base, herbaceous near tips, 3–15 m long, axial parts glabrous, sometimes verruculose; sap milky white. Leaves broadly ovate, 7–16 × 6–13 cm, upper sides nearly glabrous, undersides often pubescent, base shallowly cordate to truncate, apex obtuse, acute, or shortly acuminate; secondary veins 11–14 either side of midvein, prominent underneath; petiole 4.5–10.0 cm, scabrous.

Inflorescences paniculate, composed of cymose units, 10–15 cm long; peduncles 3–13 cm; basal bracts leafy; bracteoles early deciduous, ovate, 1.0–1.5 mm; pedicels 0.7–1.0 cm. Flowers diurnal, fragrant; sepals slightly unequal, glabrous, outer 2 sepals broadly ovate, 3.5–5.0 mm, apex obtuse, inner sepals subcircular, 4.5–6.0 mm, apex broadly rounded or emarginate; corolla tubular-funnelform, 3.0–3.5 cm, pale purplish or greenish white, tube reddish purple inside, glabrous; stamens included, unequal, filaments inserted c. 1.5 mm above base of corolla; pistil included, ovary conical, glabrous.





11.52. *Ipomoea sumatrana* (Miq.) Ooststr. Habit (credit: Thamarat Phutthai, Mahidol University; voucher: Thailand, not collected).

Capsules ovoid, 8–9 mm, apex acute. Seeds c. 4 mm, black-brown, hilum with a tuft of long sericeous trichomes.

Distribution. Cambodia, Laos, Vietnam, Myanmar ?, China, Thailand, Malaysia, Indonesia.

Ecology. In evergreen or dry deciduous forest, secondary regrowth, secondary dry forest with bamboos and rich in primary forest elements, and reported on diverse soils including ‘terre rouge riche’, sand, and clay; elevation: 200–800 m.

Material studied

Cambodia. Kampot: 6 Dec. 1903, Geoffray 232 (P).

Laos. Champassak: entre B. Phinh et B. Kha Urong Keo, “prov. Bassac”, 18 Oct. 1928, Poilane 16018 (HNL, P); bassin de Se-Moun, Khong, Jan. 1876, Harmand 176 (P, SING). Saravane: près de Tateng, plateau des Bolovens, 8 Sep. 1928, Poilane 15513 (HNL, P). Savannakhet: Km 20 de la route No. 10, près de Savannakhet, 16 Feb. 1925, Poilane 12002 (P).

Vietnam. Kon Tum: about 3–4 km to W of Dak Gley town, 26 Nov. 1995, Averyanov et al. VH-2002 (AAU, P). Quang Tri: massif de Dong Cho, 22 Aug. 1924, Poilane 11266 (P, SING); Lang Tram, 23 Sep. 1939, Poilane 30079 (P, SING).

29. *Ipomoea triloba* L.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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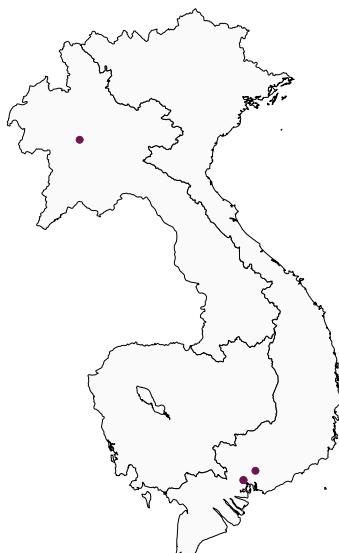
Ipomoea triloba L., Sp. Pl. 1: 161 (1753); Gagnep. & Courchet, Fl. Indo-Chine 4: 237 (1915); Ooststr., Blumea 3: 509 (1940), Fl. Males., Ser. I, Spermat. 4: 468 (1953); Kerr, Fl. Siam. 3 (2): 19 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 988 (1993); R.C.Fang & Staples, Fl. China 16: 307 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 172 (2005); Staples, Fl. Thailand 10: 425 (2010); Leti *et al.*, Flore Photogr. Cambodge 181 (2013); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – Type: [icon] “*Convolvulus pentaphyllus minor, flore purpureo*” in Sloane, Voy. Jamaica 1: 153, t. 97, f. 1 (1707) (lecto, designated by D.F.Austin, Bull. Torrey Bot. Club 105: 127 (1978)).

Annual herbaceous twiners; stems 1–5 m, glabrous or nodes sparsely pubescent. Leaves broadly ovate to circular in outline, 2.5–7.0 × 2.0–6.0 cm, glabrous or sparsely pilose, base cordate, margins entire, coarsely dentate to deeply 3-lobed; petiole 2.5–6.0 cm, sometimes tuberculate.

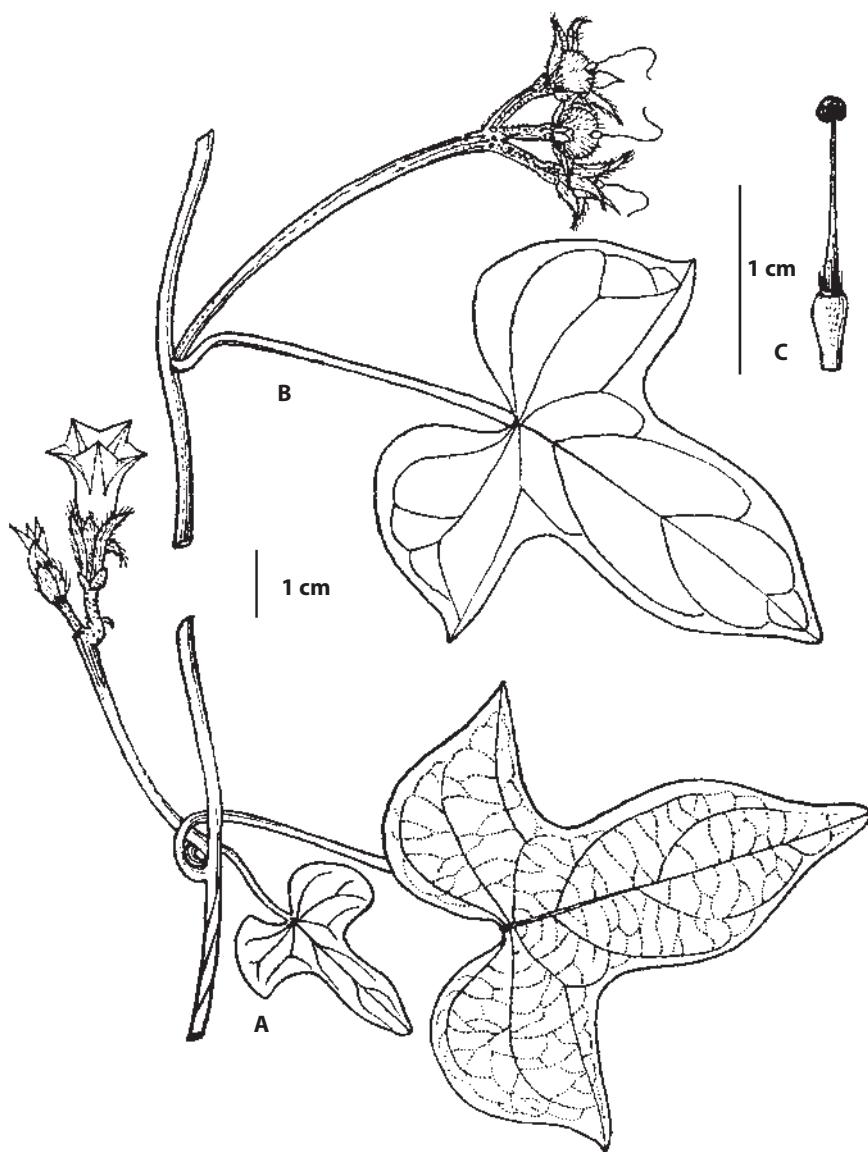
Inflorescences crowded umbellate cymes, few- to several-flowered (or flower solitary); peduncles 2.5–5.5 cm, glabrous, angular, verruculose distally; bracts lanceolate-oblong, minute; pedicels 0.5–0.7 cm, sometimes angular, verruculose. Flowers diurnal; sepals slightly unequal, 5–8 mm, outer sepals oblong, slightly shorter, inner sepals elliptic-oblong, all glabrous or sparsely pilose outside, margins fimbriate, apex obtuse or acute, mucronulate; corolla funnel-form, 1.5–2 cm, pink or pale purple, darker inside tube, glabrous, limb obtusely 5-pointed; stamens included; pistil included, ovary pubescent.

Capsules subglobose, 5–6 mm, bristly pubescent, apiculate. Seeds c. 3.5 mm, dark brown, glabrous.

Distribution. native to the West Indies and now a circum-tropical weed found in Laos, Vietnam, Indonesia, Sri Lanka, China, Thailand, Malaysia, the Philippines, New Guinea, and the Pacific Islands. Almost certainly present in Cambodia as well.



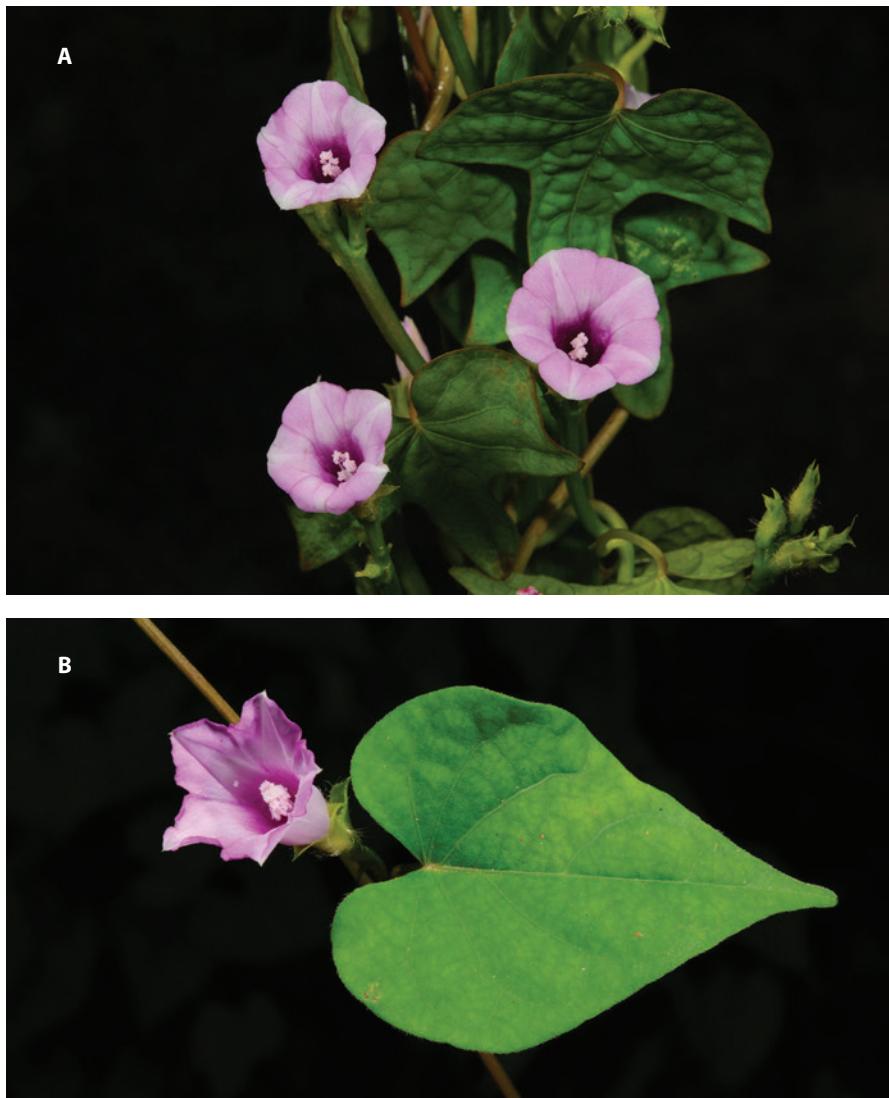
Ecology. Weedy on waste ground, disturbed areas, agricultural fields, along paths and roadsides, on all soil types; elevation: 25–300 m.



11.53. *Ipomoea tribola* L. A, flowering branch; B, fruiting branch; C, pistil (From Ooststroom & Hoogland 1953).

Vernacular name

Vietnam. dây bìm bìm (Annamite, Hiệp 325).



11.54. *Ipomoea triloba* L. A, habit, flowers; B, inset: ciliate sepals, cordiform leaf (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Material studied

Laos. Louang Prabang: along road from riverbank landing on Mekong into central Luang Prabang, 5 Nov. 2012, Staples et al. 1521 (HNL, SING).

Vietnam. Ho Chi Minh Ville: Jardin Botanique de Saigon, 8 Jan. 1919, Hiep 255 (P, SING); *l. c.*, 22 Jan. 1919, Hiep 325 (P, SING).

30. *Ipomoea violacea* L.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Ipomoea violacea L., Sp. Pl. 1: 161 (1753); Manitz, Feddes Repert. 88: 265–271 (1977); R.C.Fang & Staples, Fl. China 16: 311 (1995). – Type: [icon] in Plumier, Codex Boerhaavianus, plate 851 (lecto University Library, Groningen, designated by Manitz (1977).

Convolvulus grandiflorus Jacq., Hort. Vind. 3: 39 (1777). – *Calonyction grandiflorum* (Jacq.) Choisy, Mém. Soc. Phys. Genève 6: 442 [Conv. Orient. 60] (1834). – *Ipomoea grandiflora* (Jacq.) Hallier f., Bot. Jahrb. Syst. 18: 153 (1894). – Type: not located.

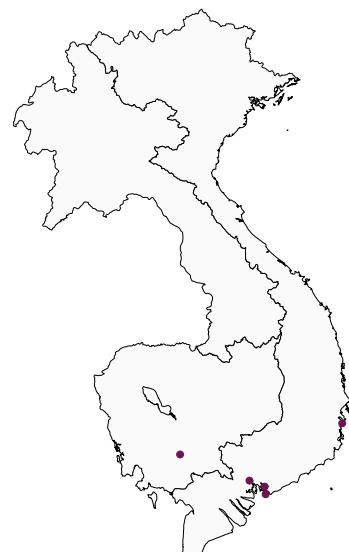
Ipomoea longiflora R.Br., Prodr. 484 (1810), nom. illeg. – *Ipomoea macrantha* Roem. & Schult., Syst. Veg. 4: 451 (1819), nom. nov., nom. illeg.; D.A.Powell et al., Brittonia 30: 201 (1978); Ooststr., Fl. Males., Ser. I, Spermat. 9: 558 (1982); P.H.Hô, Cây cỏ Việt Nam 2 (2): 996 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 170 (2005). – Type: Australia, Queensland, Sweer's Island, R. Brown s.n. [Iter Austral. 2741] (holo BM).

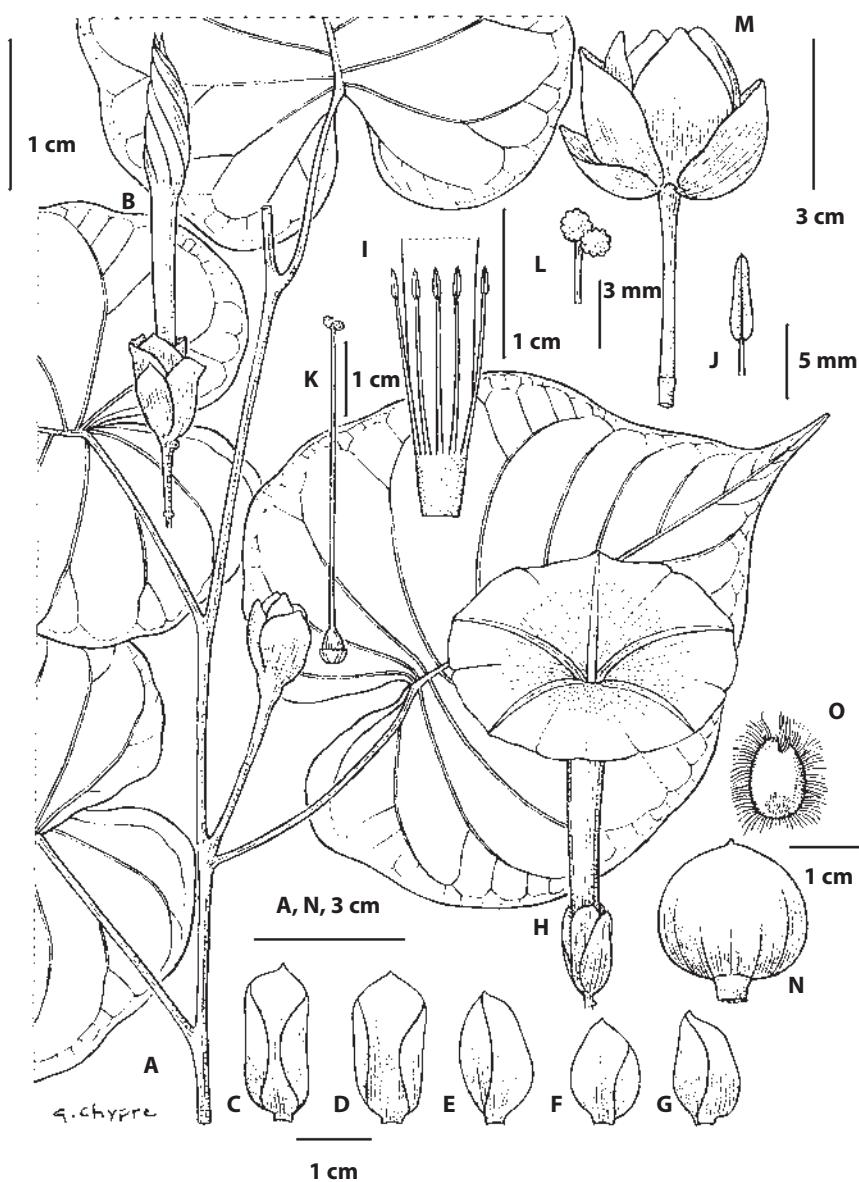
Convolvulus tuba Schltld., Linnaea 6: 735 (1831). – *Ipomoea tuba* (Schltld.) G.Don, Gen. Syst. 4: 271 (1838); Ooststr., Blumea 3: 542 (1940), Fl. Males., Ser. I, Spermat. 4: 487 (1953). – *Calonyction tuba* (Schltld.) Colla, Att. Sci. Ital. 150 (1840); Kerr, Fl. Siam. 3 (2): 21 (1954). – Type: U.S. Virgin Islands, St. Thomas, C.A. Ehrenberg s.n. (holo HAL).

Perennial climbers, glabrous; stems woody at base, 2–5 m long. Leaves circular or ovate, 5–16 × 5–14 cm, semi-fleshy in life, base deeply cordate, basal lobes rounded or rarely angular, apex acuminate, mucronulate; secondary veins 7 or 8 either side of midvein; petiole 3.5–11.0 cm.

Inflorescences 1- to few-flowered; peduncles 2.5–7.0 cm; pedicels 1.5–3.0 cm, thickened and clavate in fruit. Flowers nocturnal, odourless; sepals subcircular, equal or outer 2 sepals shorter, 15–25 mm, thinly leathery, apex obtuse or emarginate, mucronulate; corolla salver-form, 9–12 cm long, limb 8–10 cm diam., white with greenish midpetaline bands; stamens included, filaments inserted near base of corolla tube; pistil included, ovary glabrous.

Capsules ovoid to subglobose, 20–25 mm, pale brown, glabrous; fruiting calyx enlarged, reflexed. Seeds 4 or





11.55. *Ipomoea violacea* L. A, flowering stem; B, flower bud; C–G, sepals, adaxial sides; H, flower; I, lower corolla, opened, showing androecium; J, anther; K, pistil; L, stigma; M, capsule, enclosed by fruiting calyx; N, capsule, calyx removed; O, seed (From Heine 1984, as *I. macrantha* Roem. & Schult.).



11.56. *Ipomoea violacea* L. A, habit, flowers; B, capsule (credits: G. Staples; vouchers: A, not collected; B, Malaysia, Imin K. & Staples FRI-70039 (KEP)).

fewer, broadly ovoid, 10–12 mm, black, shortly tomentose, angles with c. 3 mm long sericeous trichomes.

Distribution. A pantropical seacoast species found on beaches in Cambodia, Vietnam and Sri Lanka, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, N Australia, and throughout the Pacific Islands; also in Africa, North America, South America.

Ecology. Sea beaches, seaside thickets, in mangroves near beaches, often on sandy soils or sometimes clay-mud; elevation: near sea level to 100 m.

Vernacular name

Vietnam. rao muôn biển (Annamite, *Poilane* 590).

Material studied

Cambodia. s. loc.: “Tran, ad montem Chiung Diung”, Feb. 1868, *Pierre* s.n. (P, SING).

Vietnam. Ba Ria-Vung Tau: ad montem Thi vay, “prov. Baria”, Aug. 1866, *Pierre* s.n. (P); Cap St. Jacques, 18 Oct. 1919, *Poilane* 590 (P, SING). Ho Chi Minh Ville: mangrove, “Saigon”, June 1967, *Vu Van Cuong* 573 (P). Khanh Hoa: Île de la Tortue, près de Nha Trang, 6 Apr. 1922, *Poilane* 2899 (P, SING).



Approximately 120 species: mainly in the Americas, a few species also in Africa and Asia; two species occur in CLV, one only in cultivation, and a third will likely be found in the near future as a weed. *Jacquemontia pentanthos* (Jacq.) G.Don, native in the Caribbean, is sporadically cultivated in Southeast Asia as an ornamental; it was erroneously named as a new species, *Convolvulus zimmermannii* Gagnep. [Fl. Indo-Chine 4: 302. 1915, nom. invalidum] based on a specimen from Bangkok. A weedy species from tropical America, *J. tamnifolia* (L.) Griseb. has recently reached Asia and will surely appear in CLV eventually. It is a common weed of agricultural fields and the seeds appear to be dispersed in commercial seed crops. The key p. 249 will distinguish these three species.

12. *Jacquemontia* Choisy

Mém. Soc. Phys. Genève 6: 476 (1833); Ooststr., Blumea 3: 267 (1939), Fl. Males., Ser. I, Spermat. 4: 431 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 25 (1993); R.C.Fang & Staples, Fl. China 16: 285 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 172 (2005); Staples, Fl. Thailand 10: 427 (2010); Staples *et al.*, Thai J. Bot. 6: 84 (2014).—Type: *Jacquemontia pentanthos* (Jacq.) G.Don.
Convolvulus L., p.p.; Gagnep. & Courchet, Fl. Indo-Chine 4: 300 (1915).

Herbaceous or woody twiners, rarely erect subshrubs, trichomes usually stellate. Leaves petiolate, often cordate, margin entire, rarely dentate or lobed.

Inflorescences axillary, often umbelliform or capitate cymes, less often capitula or flowers solitary; bracts linear, subulate, or foliose. Flower sepals equal or outer sepals often larger; corolla funnelform or campanulate, blue, lilac, or pink, rarely white, with 5 distinct midpetaline bands, limb 5-toothed or nearly entire; stamens included, filaments adnate to corolla basally, anthers ellipsoid; pollen globose, usually 5-zonocolpate, not spiny; pistil included, disc small or absent, ovary 2-locular, 4-ovuled, style 1, filiform, stigmas 2, elliptic or oblong, curved (like 2 small sausages).

Fruits capsules, 4- or 8-valved. Seeds 4 or fewer, smooth or minutely papillate, glabrous or velutinous, abaxial edges often with a narrow scarious wing.

Key to the species

1. Inflorescences capitate, dense heads subtended by enlarged bracts, the whole plant bristly yellowish tomentose *J. tamnifolia*
- . Inflorescences loose to dense umbelliform cymes, not as above 2
2. Stigmas sausage-shaped, decurved; bracts small to minute (5 mm or less); corollas 8–12 mm long, white, or pale bluish to pale purplish 1. *J. paniculata*
- . Stigmas elliptic; bracts linear to lanceolate, to 10 mm long; corollas 15–20 mm long, vivid blue or blue-purple with white throat *J. pentanthos*

1. *Jacquemontia paniculata* (Burm. f.) Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Jacquemontia paniculata (Burm. f.) Hallier f., Bot. Jahrb. Syst. 16: 541 (1893); Ooststr., Blumea 3: 269 (1939), Fl. Males., Ser. I, Spermat. 4: 432 (1953); Kerr, Fl. Siam. 3 (1): 98 (1951); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); P.H.Hò, Cây cỏ Việt Nam 2 (2): 977 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 25 (1993); R.C.Fang & Staples, Fl. China 16: 285 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 172 (2005); Staples & Jacquemoud, Candollea 60 (2): 449 (2005); Staples, Fl. Thailand 10: 429 (2010); Leti *et al.*, Flore Photogr. Cambodge 182 (2013); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – *Ipomoea paniculata* Burm. f., Fl. Indica 50 (1768). – *Convolvulus parviflorus* Vahl, Symb. 3: 29 (1794), nom. superfl.; Gagnep. & Courchet, Fl. Indo-Chine 4: 300 (1915). – Type: Java, without locality, 1760, Kleinhof s.n. (lecto G-PRELI, designated by D.O.Wijnands in Staples & Jacquemoud, Candollea (2005)).

Twining herbs, annual or perennial; stems terete, 1–5 m, pubescent when young, later glabrescent. Leaves ovate, 1.5–8.0 × 1.8–5.0 cm, both sides villous or upper sides glabrous, base shallowly cordate or rounded, apex acuminate, mucronulate; secondary veins 5–8 either side of midvein; petiole 1–6 cm, pubescent.

Inflorescences umbelliform-cymose, loose to dense; peduncles 3–40 mm; bracts tiny; pedicels 3–5 mm, pubescent. Sepals unequal, apically acuminate, pilose outside; outer 3 sepals ovate to elliptic-ovate, 5–7 × 4 mm, tapering toward base, inner 2 sepals smaller; corolla funnel-form, 8–12 mm, white, pale purplish, pale bluish, centre lighter, limb 5-pointed or 5-angled, glabrous or lobes sparsely pubescent apically; stamens included, filaments nearly equal, pubescent basally, anthers oblong; pistil included or just exserted, ovary glabrous, style 6–8 mm, stigmas sausage-shaped.

Capsules ovoid-globose, 3–4 mm diam., 8-valved. Seeds 1.5–2.0 mm, brown to purplish black, mottled by, and edges winged with, yellowish trichomes.

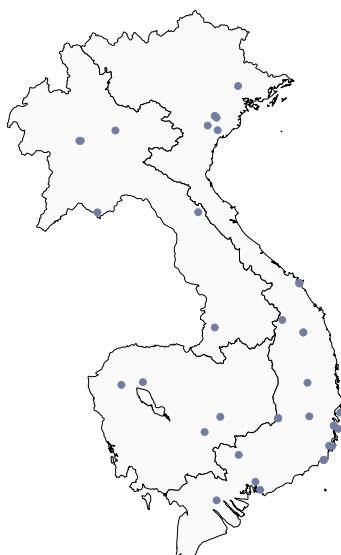
Distribution. Cambodia, Laos, Vietnam, as well as India, Sri Lanka, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea; also present in Africa, Australia, and the Pacific Islands.

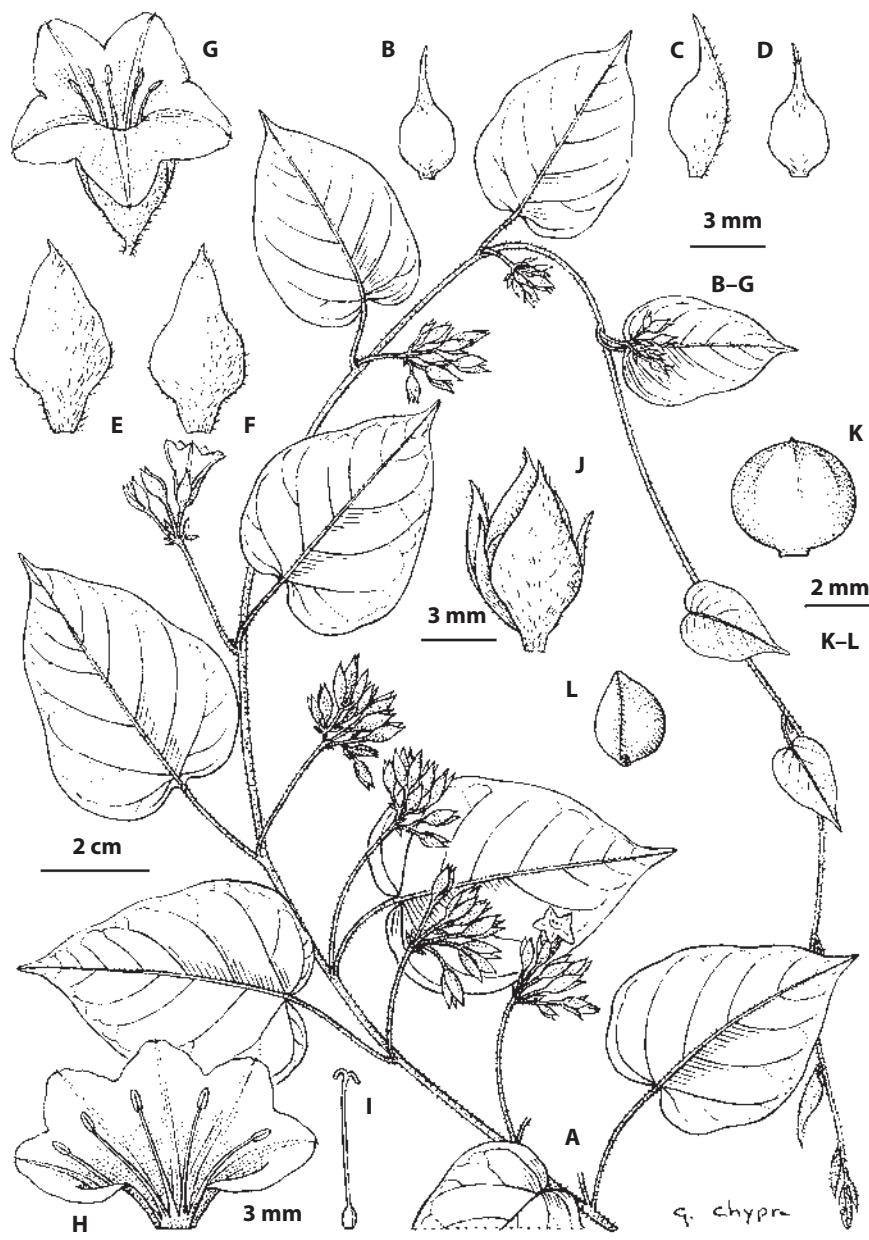
Ecology. Sunny sites in disturbed ruderal area, thickets, field edges, river banks, on all types of soil; elevation: 150–800 m.

Usage. Several collectors report the fruits are edible among the Cambodians.

Vernacular names

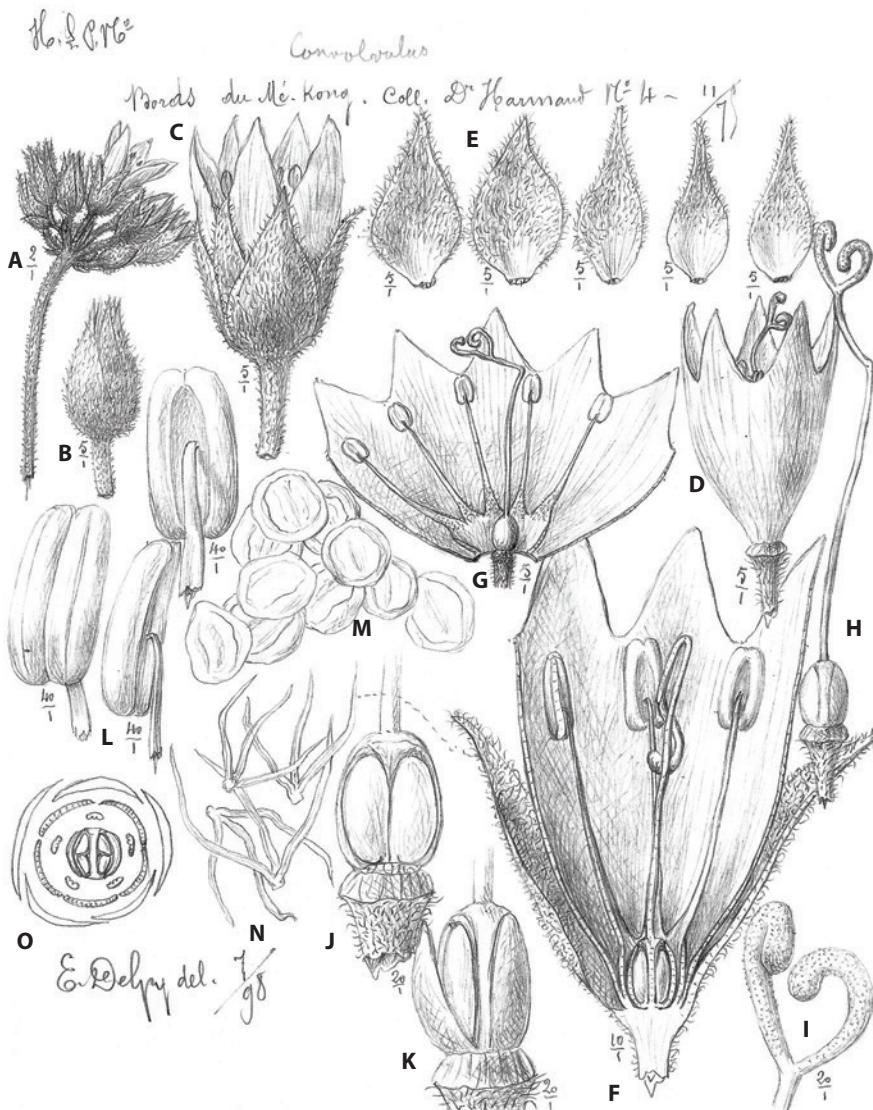
Cambodia. voa sraê lolok (Martin 1325), (vouâ) kaê rolok (Vidal 4672).





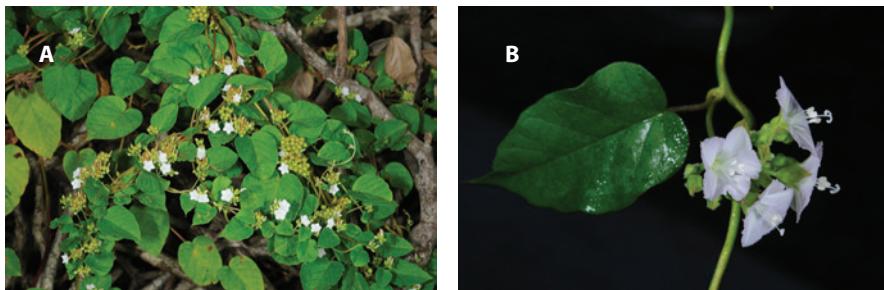
12.1. *Jacquemontia paniculata* (Burm. f.) Hallier f. A, flowering stem; B–F, sepals, abaxial view; G, flower; H, corolla, opened; I, pistil; J, fruiting calyx; K, fruit (capsule) with calyx removed; L, seed (From Heine 1984).

Laos. khua houn (Vidal 1361), phák iâ on (Spire 7112), (khua) khi duan (or Khi ka duan ?) (Vidal 4255).



12.2. *Jacquemontia paniculata* (Burm. f.) Hallier f. A, inflorescence; B, young flower bud; C, flower, side view; D, corolla, calyx removed; E, sepals, outermost (left) to innermost (right); F, flower in longitudinal section; G, corolla opened to show androecium and gynoecium; H, pistil, style not fully extended; I, stigmas, enlarged; J, ovary cut open to show 2 ovules; K, ovary, cut open; L, anthers, in 3 views; M, pollen grains; N, stellate trichomes on abaxial sepal surface; O, floral diagram. Drawn by E. Delpy, July 1898. Voucher: Harmand 4 (P03867225).

Vietnam. hoa bìm bìm (*Bon* 2305), anyam blot (A) (*Jörail, Dournes s.n.*), ray möi (Annamite, *Evrard* 2516).



12.3. *Jacquemontia paniculata* (Burm. f.) Hallier f. A, habit; B, flowers with stigmas (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Material studied

Cambodia. Battambang: entre Krachap et Pang Rolim, 15 Dec. 1965, *Vidal* 4672 (P). Kompong Cham: Chup, près de Kompong Cham, Nov. 1921, *Ervard* 749 (P). Kratie: rives du Mékong, 9 Mar. 1914, *Chevalier* 31863 (P). Pursat: piémont du Massif des Cardamomes, 24 Dec. 1958, *Martin* 1325 (P). Siem Riep: Angkor, 15 Dec. 1911, *Lecomte & Finet* 1766 (P).

Laos. s. loc.: bords du Mekong, Nov. 1875, *Harmand* 4 (P); Dec. 1956, *Holiday* E3 (SING); 11 Nov. 1955, *Tixier* 3 (P); *Spire* 7112 (P). Champassak: Bassac, 1866–1868, *Thorel* s.n. (E, K, P). Houa Phan: Ban Hat Sa roadside, 19 Oct. 2002, *Homsombath & Newman* 1382 (E, P). Khammouane: Houay Wang Jang, 22 Oct. 2005, *Newman* et al. LAO455 (BISH, E, P). Louang Prabang: 3 Nov. 1965, *Vidal* 4255 (P); farm fields adjacent to Pha Tad Ke Botanic Garden, 2 Nov. 2012, *Staples* et al. 1496 (HNL, KKU, P, PTK, SING). Vientiane: Vientiane vic., 16 Dec. 1951, *Vidal* 1361 (P).

Vietnam. s. loc.: delta du Mekong, 1875–77, *Harmand* s.n. (P); May 1931, *Carpentier* 329 (SING). Bac Giang: "Tonkin", Nov. 1897, *Mouret* 190 (P). Ba Ria-Vung Tau: in montibus Dinh ad Baria, 1867, *Pierre* 3721 (P). Dac Lac: Dac mil, Duc Minh, 13 Dec. 1979, *Ha* 469 (HN); Hau Bôn, *Dourne*s s.n. (P); Nam Da, 15 Dec. 1979, *Nguyen T. Nhan* 645 (HN); l. c., 16 Dec. 1979, *Tran Dinh Ly* 819 (HN); Krong Pac, Krong bong, 22 Dec. 1979, *Nguyen Thi Nhan* 686 (HN). Da Nang: Lazaret, 12 Nov. 1911, *Lecomte & Finet* 927 (P); l. c., *Lecomte & Finet* 966 (P); Tourane, May 1927, *Clemens & Clemens* 3153 (P). Dong Nai: Long Tan, in "prov. Bien Hoa", Dec. 1865, *Pierre* s.n. (P); flumen Song cay in "prov. Bien hoa", Mar. 1877, *Pierre* s.n. (P). Ha Nam: Kien Khe in planicie Dong Ham, 19 Nov. 1883, *Bon* 2305 (P); inter Lan Mat et Ban Phet, 21 Nov. 1883, *Bon* 2313 (P); Lat Son, Dong Ham, 25 Apr. 1883, *Bon* 2108 (P). Ha Noi: Vo xa, in monte Chua Hac, 23 Oct. 1884, *Bon* 2786 (BM, P). Khanh Hoa: He nui Hon Mun, près de Nha Trang, 24 Apr. 1922, *Poilane* 3129 (P); île Hon Lon, "prov. Nha Trang", 6 Jan. 1966, *Vidal* 4890 (P); Nha Trang env., 4–5 Feb. 1916, *Chevalier* 30439 (P); Nha Trang, 11 May 1929, *Nielsen* 588 (C); l. c., 11–26 Mar. 1911, *Robinson* 1221 (P). Kon Tum: Dak Gley district, about 6–8 km N of Dak Gley town, 29 Nov. 1995, *Averyanov* et al. VH-2136 (AAU, P); Konplong, Tan Lap, 22 Nov. 1978, *Nguyen H.H.* 498 (HN); l. c., 24 Nov. 1978, *Tran Dinh Ly* 670 (HN). Ninh Binh: Cho Ganh, June 1923, *Pételot* 911 (P); Cuc Puong National Park, Km 11 to Bong, 27 Oct. 2000, *Cuong* et al. NMC-1174 (P). Ninh Thuan: Ba Rau, "prov. Phan Rang", 2 Mar. 1924, *Poilane* 10105 (P); Ca Na, "pro. Phan Rang", 26 Nov. 1923, *Poilane* 8767 (P); l. c., 28 Nov. 1923, *Poilane* 8855 (P); cabane forestière à l'ouest de Ca Na, 5 Nov. 1925, *Ervard* 2516 (P); Nui Chua National Park, Ninh Hai district, forest SW of Dahang Lake, Dahang village square, 15 Jan. 2010, *Soejarto* et al. DDS-14691 (P).

1b. *Jacquemontia paniculata* (Burm. f.) Hallier f. var. *grandiflora* Ooststr.

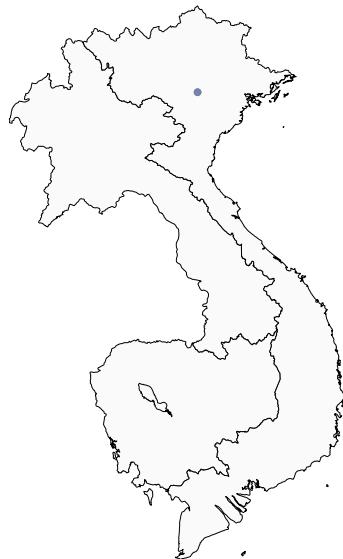


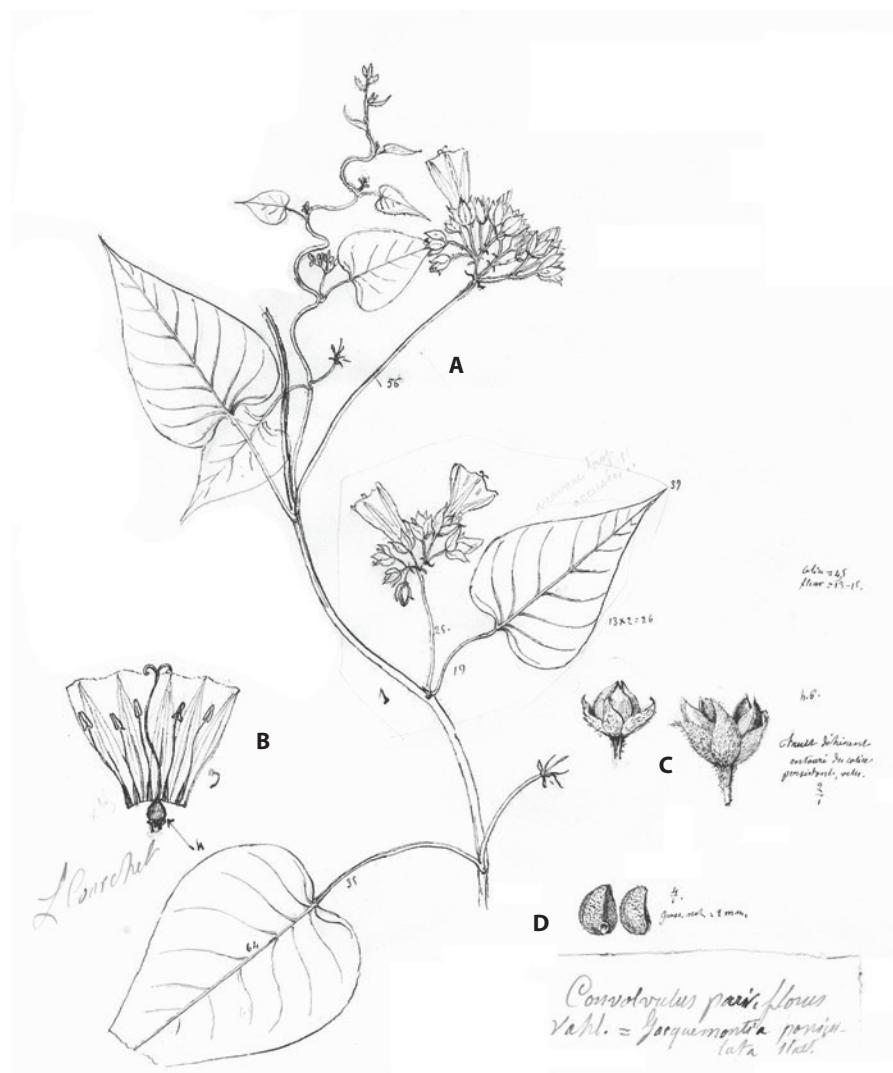
Jacquemontia paniculata (Burm. f.) Hallier f. var. *grandiflora* Ooststr., Blumea 3: 273 (1939).—Type: Vietnam, Tu-Phap, Balansa 3539 (holo L!, L0004213; iso BR, K!, L!, L0281925, Pl, P03867238, P03867267, P03867268).

Differs in having a larger corolla, 15 × 20 mm, of a pale rose colour.

Material studied

Known only from the type collection.





12.4. *Jacquemontia paniculata* (Burm. f.) Hallier f. var. *grandiflora* Ooststr. A, habit of flowering stem; B, flower, dissected, showing stamens and pistil; C, capsules, intact (left), dehisced (right); D, seeds, adaxial view (left), side view (right). Drawn by L. Courchet. Voucher: Balansa 3539 (P03867267).



A genus comprising six species: one in Africa, the others distributed in Asia, Malesia, and Australia; two species occur in CLV.

13. *Lepistemon* Blume

Bijdr. Fl. Ned. Ind. 722 (1825); Gagnep. & Courchet, Fl. Indo-Chine 4: 287 (1915); Ooststr., Blumea 5: 340 (1943), Fl. Males., Ser. I, Spermat. 4: 489 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); R.C.Fang & Staples, Fl. China 16: 312 (1995); T.N.Nguyễn & Đ.H. Dùóng, Checkl. Pl. Sp. Vietnam 3: 173 (2005); Staples, Kew Bull. 62: 223–232 (2007), Fl. Thailand 10: 429 (2010); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – Type: *Lepistemon flavescens* Blume.

Herbaceous or woody twiners, usually pubescent. Leaves petiolate, ovate to orbicular, herbaceous, base cordate, margin entire or angulate-lobed.

Inflorescences axillary, dense, umbelliform cymes; sessile or pedunculate; bracts early deciduous, small. Sepals subequal, apex acute or obtuse, persistent and slightly accrescent in fruit; corolla urceolate, limb shallowly 5-lobed, midpetaline bands pubescent outside; stamens included, filaments inserted near base of corolla, dilated basally into a large concave scale that arches over ovary, anthers narrowly elliptic to linear; pollen globular, pantoporate, finely spiny; pistil included, disc cupular, 5-lobed, or ring-like, ovary glabrous or pubescent, 2-locular, 4-ovuled, style 1, very short, stigmas biglobose.

Fruits capsules globose, 4-valved. Seeds 4 or fewer, glabrous or puberulous.

Note

According to Article 62.2(a) of the *International Code of Nomenclature*, generic names ending in *-stemon* are masculine in gender, and therefore the species epithets must take a masculine ending. The *Code* now requires that epithets with the wrong ending be corrected; binomials and polynomials used here have been adjusted to take this into account; some are different from names long used in the botanical literature, which are noted [in brackets].

Key to the species

1. Sepal apices long-tapering attenuate; corollas finely puberulent above middle; seeds at first finely velutinous, soon glabrous, black, glistening, minutely foveolate **1. *L. binectarifer***
- . Sepal apices acute to attenuate; corollas glabrous; seeds (at least initially) yellowish pilose-villous **2. *L. intermedius***

1. *Lepistemon binectarifer* (Wall.) Kuntze

Lepistemon binectarifer (Wall.) Kuntze, Rev. Gen. Pl. 416 (1891) [as *binectariferum*]; Ooststr., Blumea 3: 341 (1940), Fl. Males., Ser. I, Spermat. 4: 489 (1953); Kerr, Fl. Siam. 3 (2): 9 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 998 (1993); R.C.Fang & Staples, Fl. China 16: 312 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 173 (2005); Staples, Kew Bull. 62: 227 (2007), Fl. Thailand 10: 431 (2010); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – Type: [icon] Wallich Collection drawing no. 45 (lecto BM!, Botany Library, designated by Staples (2007)).

Lepistemon flavescens Blume, Bijdr. Fl. Ned. Ind. 722 (1825); Gagnep. & Courchet, Fl. Indo-Chine 4: 287 (1915). – Type: Java, Gunung Parang, Blume 1234 (syn L!, L0004218).

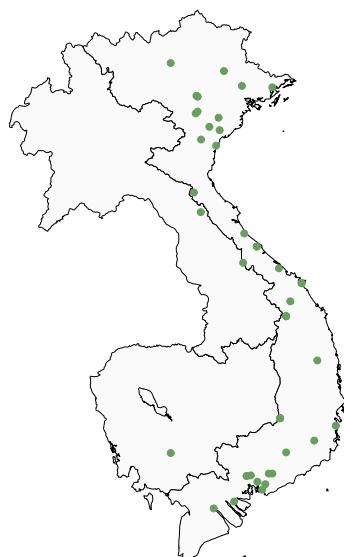
Ipomoea pierrei var. *subsessilis* Gagnep., Notul. Syst. (Paris) 3: 147 (1915), Fl. Indo-Chine 4: 250 (1915). – Type: Vietnam, Đồng Nai, Biên Hòa district, Bao Chanh, Oct. 1865, Pierre s.n. (holo Pl. P00288072; iso Pl. P00288073).

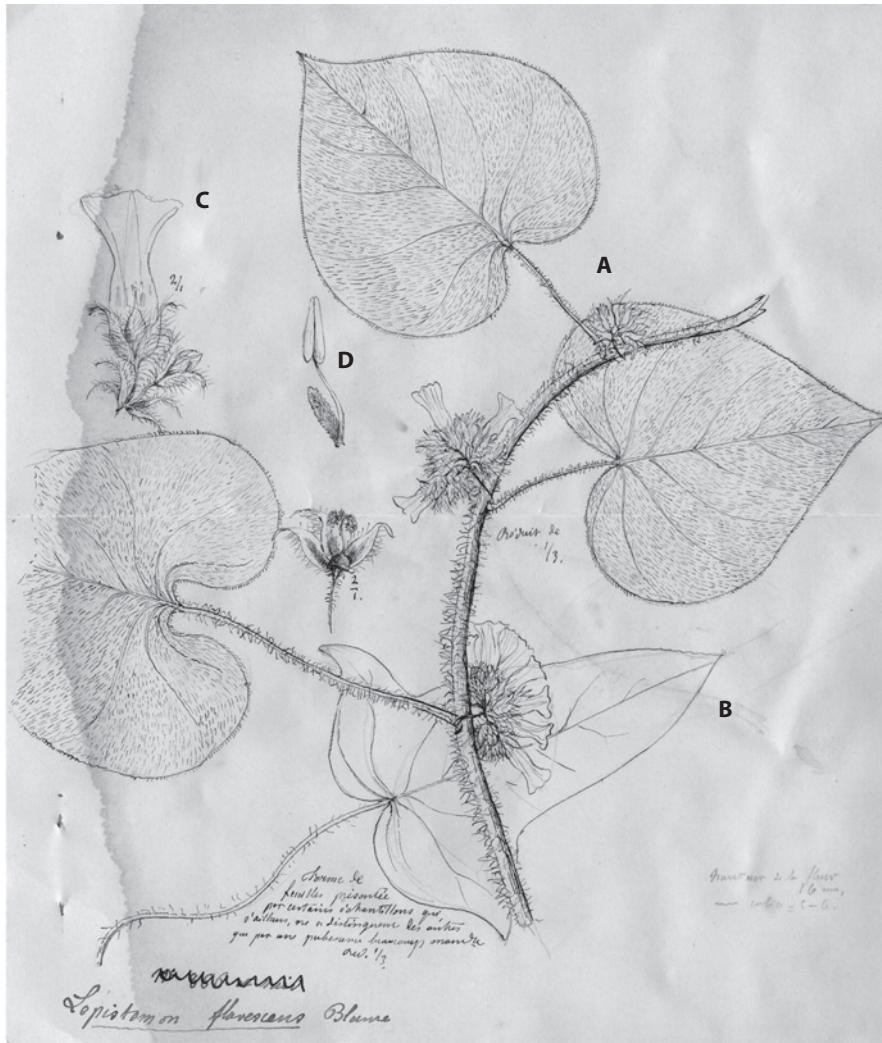
Twining herbs; stems 1–10 m long, bases c. 1 cm diam., axial parts densely brown pilose, trichomes spreading or retrorse; sap milky. Leaves cordate-ovate, 5–18 × 5–15 cm, appressed pilose, base deeply cordate, margins entire, angulate, or shallowly 3–7-lobed, lobes acute or acuminate; petiole 3–16 cm, pilose.

Inflorescence axillary, few to many-flowered; peduncles 0–5 mm (14 mm in fruit); pedicels c. 7 mm. Sepals lanceolate, nearly equal or inner sepals shorter, 5.0–7.5 mm, slightly enlarged in fruit, herbaceous, hirsute outside, attenuate-acuminate; corolla 1.0–1.5 cm, white or yellowish white, tube inflated basally, contracted apically, upper tube and midpetaline bands pubescent outside, limb spreading; filament scales papillose abaxially; pistil included, disc 5-lobed, ovary glabrous or pubescent.

Capsules globose to ovoid, 6–8 mm, apiculate. Seeds ovoid, 3–4 mm, black, velutinous at first, later glabrate.

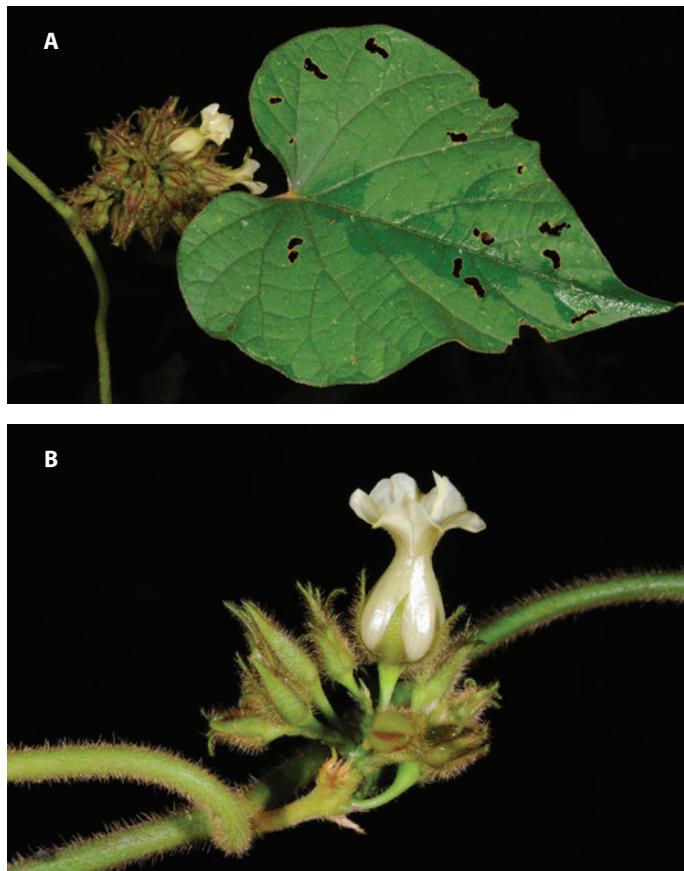
Notes. There is considerable variation in leaf size and blade shape, as well as the indumentum density and trichome type, in *L. binectarifer*. Some distinctive morphotypes have been recognized with varietal names, but they are hard to differentiate consistently





13.1. *Lepistemon binectarifer* (Wall.) Kuntze. A, flowering stem with cordate-ovate leaves; B, hastate leaf; C, partial inflorescence with flower in side view, bud, and bracts; D, one stamen with enlarged scale. Drawn by L. Courchet. Voucher: Balansa 3545 (P00392074).

from the polymorphism that characterizes this species. Their ecological preferences overlap entirely with the species as a whole. The key that follows should distinguish the most distinctive phenotypes. Two of these varieties are described below while a third variety (*eymae*) is dubious in the CLV region; it has been included in the key, based on *bona fide* specimens from Malesia.



13.2. *Lepistemon binectarifer* (Wall.) Kuntze A, habit, inflorescence; B, flower (credits: Preecha Karaket, BKF; voucher: Thailand, D. Middleton et al. 4761 (BKF)).

Key to the Varieties

1. Sepals glabrous or with a few trichomes only on sepal tips **var. *glaber***
— Sepals ± densely pubescent with erect or appressed trichomes **2.**
2. Trichomes on sepals shorter, more appressed, greyish **var. *eymae***
— Trichomes on sepals longer, patent, fulvous **3.**
3. Inflorescence dense, crowded, peduncle 0–2 mm long; style shining white pubescent **var. *taynguyenensis***
— Inflorescence few to many-flowered, peduncle up to 5 mm long; style glabrous **var. *binectarifer***

1a. *Lepistemon binectarifer* var. *binectarifer*



Calyx covered in long patent fulvous trichomes. Ovary glabrous.

Distribution. Cambodia, Laos, Vietnam, and India, Bangladesh, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, Pacific Islands.

Ecology. A vigorous twiner forming 'vegetable blankets' in thickets and scrub, abundant in disturbed sites and also growing in clearings and along edges of primary evergreen and secondary forests, on diverse soil types including sand, clay, and limestone; elevation: sea level to 800(–1500 ?) m.

Usage. The leaves are fed to pigs and rabbits as fodder (*Poilane* 31266).

Vernacular names

Vietnam. la sen (*Poilane* 2471), dây bim bim trang (*Poilane* 5188), bìm bìm (*Squires* 13), dây pim pim (*Poilane* 31266), hoa bìm bìm (*Bon* 2376).

Material studied

Cambodia. Kompong Speu: Somrong Tong, Apr. 1870, *Pierre* s.n. (G, P).

Laos. Khammouane: Sam Ma Dai, 27 Oct. 2005, *Newman* et al. LAO587 (BISH, E, P).

Vietnam. s. loc.: "Lang Luong", 19 Dec. 1883, *Bon* 2376 (P). Ba Ria-Vung Tau: in montibus Dinh ad Baria, July 1866, *Pierre* s.n. (BM, E, K, P). Ben Tre: ad flumen Baraï, propre Ben tre, Feb. 1868, *Pierre* s.n. (P). Binh Duong: Lai Thieu, Apr. 1875, *Pierre* s.n. (P); ad pagum Laithieu, Feb. 1875, *Pierre* s.n. (A, P). Can Tho: 27 Feb. 1970, *Vu Van Cuong* 1708 (P). Dac Lac: Dak Iao, 10 Dec. 1979, *Nguyen Thi Nhan* 593 (HN); Dak Mil, 12 Dec. 1979, *Tran Dinh Ly* 754 (HN); Duc Minh, 9 Dec. 1979, *Nguyen Thi Nhan* 589 (HN). Da Nang: près du village Moï de Dac Bo, confins S de la province de Quang Nam, 28 Feb. 1941, *Poilane* 31908 (P, SING); Ban na nui chua, 31 Dec. 1996, *Phengklai & Fukuoka* 10305 (BKF); Tourane, 11 Feb. 1960, *Smitinand & Abbe* 6423 (BKF). Dong Nai: Gia Ray, montagne de Chia chan, 2 Feb. 1921, *Poilane* 2471 (P, SING); "prov. du Haut Donnai", km 152 de "Saigon" route col. No. 20, 12 Jan. 1934, *Poilane* 23374 (P, SING); ad Long Tan, in "prov. Bien Hoa", Feb. 1866, *Pierre* 5 (P); Tan huyen in "prov. Bien Hoa", Jan. 1866, *Pierre* s.n. (BM, E, G, K, P); Tri huyen secis flumen Dongnai, Feb. 1873, *Pierre* s.n. (BM, E, P). Gia Lai: Ha Tam, in forestry field, 24 Dec. 1977, *Bu Duc Binh* B320 (HNU). Ha Giang: Kien Khe, 17 Apr. 1883, *Bon* 2070 (P, SING). Ha Noi: Ha Son Binh, 4 Jan. 1965, *Doan Khao Việt-Trung* 3497 (HN); Tu Phap, Jan. 1888, *Balansa* 3544 (BR, G, K, P, SING); l. c., *Balansa* 3545 (G, K, P); Vo Xa, in monte Chua Hac, 15 Feb. 1887, *Bon* 3336 (P); Trung Ha forestry field, Jan. 1932, *Pételot* 2539 (HNU). Ha Tinh: Huong Son district, Nga Doi, 18 May 1998, *Hiep* et al. VA-718 (SING). Hoa Binh: plaine de Chu, 11 Jan. 1886, *Balansa* 816 (P). Khanh Hoa: Phu Su, "pro. Nha Trang", 13 Jan. 1923, *Poilane* 5188 (P). Kon Tum: Dak Gley, 15 Jan. 1947, *Poilane*

32694 (P); about 6–8 km N of Dak Gley town, 28 Nov. 1995, Averyanov et al. VH 2071 (AAU, P). Lam Dong: vallée du Dong Nai sud de Dran, 10 Jan. 1924, Poilane 9558 (P); base N du Pnom Sapoum, près de la Station agricole de Blao, 11 Jan. 1935, Poilane 23850 (P, SING). Lang Son: 4 Jan. 1965, *China-Vietnam Inspection team* 997 (IBSC). Nghe An: Qui Chau, 28 Jan. 1883, Bon 1926 (P, SING). Ninh Binh: Cuc Phuong National Park, Thanh Yen district, Sanh village, 1 Jan. 2001, Cuong et al. NMC1316 (P); Kim Son district, Cho Ganh, Jan. 1924, Pételet 1364 (HNU). Quang Binh: Binh Tri Thien, 9 Jan. 1979, *Thai & Thuan* 24 (HN); *l. c.*, 24 Jan. 1979, *Thai & Thuan* 39 (HN). Quang Ninh: Kau Nga Shan vic., Tien Yen, 1–9 Jan. 1937, Tsang 27528 (E). Quang Tri: Lao Rao, 27 Dec. 1924, Poilane 11348 (P); vallée de la haute rivière de Ou Bi, Eberhardt 2041 (P); Salung, 8 Jan. 1941, Poilane 31266 (P, SING); *l. c.*, 25 Nov. 1941, Poilane 31886 (SING). Thai Nguyen: Lang Hut, 17 Dec. 1939, Pételet 2527 (A, HNU). Thanh Hoa: Yen Cat, 1 Feb. 1985, Doan Vietnam 8856 (HN). Thua Thien-Hue: Hue, seashore, Jan.–May 1927, Squires 13 (BM, E, K, P, SING).

1b. *Lepistemon binectarifer* var. *glaber* T.N.Nguyễn

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Lepistemon binectarifer var. *glaber* T.N.Nguyễn, J. Biol. (Vietnam) 7 (2): 41 (1985) [as *glabrum*]; T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 173 (2005); Staples, Kew Bull. 62: 228 (2007). – Type: Vietnam. Gia Lai / Kon Tum: Kon Plong to Mang Canh, 22 Nov. 1978, Nguyen Thi Nhan 459 (iso HN!).

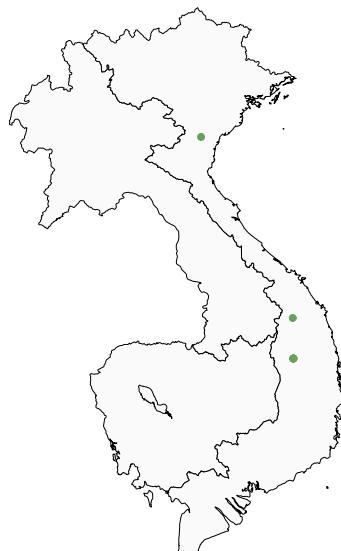
Differing from the typical var. *binectarifer* by the sepals totally glabrous or with a few trichomes only at the tips.

Distribution. Found so far in Gia Lai, Ha Noi, and Kon Tum provinces, Vietnam.

Ecology. In secondary growth on mountains; up to 1400 m elev.

Material studied

Vietnam. Gia Lai: between Kong Plong and Mang Canh, 22 Dec. 1978, *Ha Tue* 52 (HN); *l. c.*, 22 Dec. 1978, *Ha* 336 (HN); *l. c.*, 25 Nov. 1978, *Tran Dinh Ly* 684 (HN); *l. c.*, 23 Nov. 1978, *X.P. Vu* 701 (HN). Ha Noi: Ha Son Binh, Lam Son forestry field, 30 Nov. 1984, *Bu Duc Binh* B-1139 (HNU). Kon Tum: on N slope of Ngoc Linh mountain system, 12 Mar. 1995, Averyanov et al. VH-670 (AAU, HN, P).



1c. *Lepistemon binectarifer* var. *taynguyenensis* T.N.Nguyễn



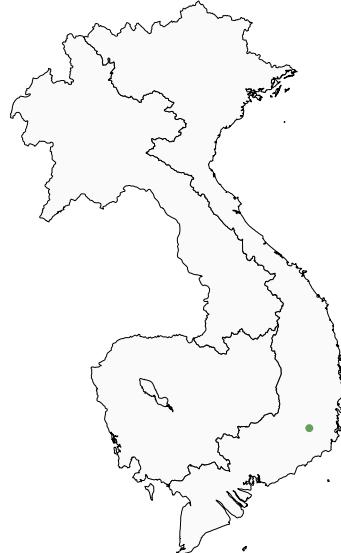
J F M A M J J A S O N D



J F M A M J J A S O N D

Lepistemon binectarifer var. *taynguyenensis* T.N.Nguyễn, J. Biol. (Vietnam) 7 (2): 41 (1985) [as *taynguyenense*]; T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 173 (2005); Staples, Kew Bull. 62: 228 (2007). – Type: Vietnam. Lâm Đồng: Đà Lạt vic., 30 Dec. 1982, *Lien Xo-Viet Nam* 1076 (holo HN!, on 2 sheets).

Differing from typical var. *binectarifer* by the very dense inflorescences, peduncles absent or very short (0–2 mm long), and the style shining-white pubescent.



Distribution. Known only from Lam Dong province, Vietnam.

Ecology. Growing at 1500 m elev.

Material studied

Known only from the type gathering.

unconfirmed in CLV *Lepistemon binectarifer* var. *eymae* Ooststr.

Lepistemon binectarifer var. *eymae* auctt. non Ooststr.?; T.N.Nguyễn, J. Biol. (Vietnam) 7 (2): 41 (1985); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 173 (2005).

Genuine var. *eymae* differs by the indumentum shorter, less patent and more appressed, greyish in colour; ovary glabrous.

Notes. Vietnamese authors have taken up this varietal name for some specimens, but the identification requires confirmation. It seems unlikely that this Malesian variety would be present in Vietnam. I have not seen any CLV material that conforms with genuine *L. binectarifer* var. *eymae*.

2. *Lepistemon intermedius* Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Lepistemon intermedius Hallier f., Bot. Jahrb. Syst. 28: 31 (1899); Staples & S.-Z.Yang, Fl. Taiwan, ed. 2, 4: 376–377 (1998) [as *intermedium*]; Staples, Kew Bull. 62: 229 (2007). – Type: Taiwan, without locality, 1892, A. Henry 1530 (holo CAL; iso K!, MO!, NY!, NY0099492).

Lepistemon lobatum Pilger, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1029 (1926); R.C.Fang & Staples, Fl. China 16: 313 (1995). – Type: China. Chekiang [Zhejiang]: prope Lung-chiung Hsien, Sep. 1920, H.H. Hu 451 (holo B†, photo!; iso A!).

Lepistemon urceolatum auctt. non (R.Br.) F.Muell.: T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 173 (2005).

Herbaceous twiners; stems to 4 m long, glabrous or sparsely tomentellous. Leaves broadly ovate-cordate, 5–8 × 4–8(–10) cm, both sides ± pilose to glabrous, base deeply cordate, margins sinuately 3–5-lobed distally, apices obtuse or apiculate; petiole 5–10 cm long.

Inflorescences umbelliform, cymose, many-flowered; peduncles c. 1 cm; pedicels slender. Sepals ovate or ovate-lanceolate, 2.5–3.0 mm, sparsely pilose to nearly glabrous abaxially, apices obtuse or acute; corolla whitish green, 1.8–2.2 cm; tube inflated, slightly contracted distally, limb 1.5–1.8 cm diam., nearly entire; stamens included in tube, filaments filiform, c. 3 mm long, basal scales ovate-lanceolate or ovate-elliptic, c. 2.5 × 3.5 mm, papillose-pilose abaxially, anthers c. 2 mm long; nectary disc ring-like, c. 1 mm long, style 1.5–2.0 mm, stigmas globose-capitate, papillose.

Fruit enclosed by persistent calyx; capsule ovoid, 6–7 mm long, glabrous. Seeds 4 or fewer, dark brown, nearly ovoid, c. 4 mm, sparsely pale yellowish villous.

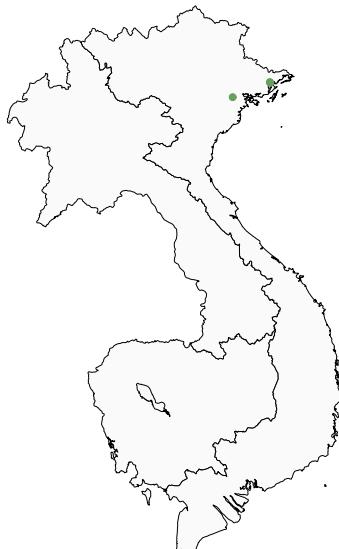
Distribution. Vietnam, China, Taiwan.

Ecology. Hillsides, on shrubs.

Notes. This species has been collected a few times in northern Vietnam. Vietnamese authors misidentified these specimens as *L. urceolatum* (R.Br.) F.Muell., an Australian-Melanesian species that does not occur on the Asian continent.

Vernacular name

Vietnam. hoa (Nguyen Huu Hien B406).



Material studied

Vietnam. Ha Nam: Cuc Phuong, Xom Mac, *Nguyen Huu Hien* B-406 (HN). Quang Ninh: Kau Nga Shan vicinity, Tien Yen, 13–22 Dec. 1936, *Tsang* 27349 (C, E, IBSC, K, P); *l. c.*, 23 Sep.–7 Oct. 1940, *Tsang* 30595 (B, BKF, E, G, IBSC, K, L, P, SING, UPS).





Merremia tuberosa (L.) Rendle, habit (credit: G. Staples; voucher; cultivated, not collected)

As historically conceived, *Merremia* comprised approximately 100 species worldwide in the tropics and warm temperate zones (Staples 2010: 483); at least 19 species occur in CLV. *Merremia* is one of the larger and more ill-defined genera in the Convolvulaceae. Preliminary molecular analysis showed it to be a polyphyletic grade rather than a monophyletic genus, which accounts for the lack of unifying characters that can be used to recognize all species assigned to it.

After the FCLV Convolvulaceae account was submitted, a new classification was published for *Merremia* (Simões & Staples 2017) that led to several name changes; these are listed on page 14 but it was too late to rewrite the account of *Merremia* and take up the new generic concepts

Several species are referred to in Vietnam by the generalized vernacular name *bìm bìm*.

14. *Merremia* Dennst. ex Endl., nom. cons.

Gen. Pl. 1: 1403 (1841); Ooststr., Blumea 3: 267–371 (1939), Ooststr., Fl. Males., Ser. I, Spermat. 4: 439 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 30 (1993); R.C.Fang & Staples, Fl. China 16: 291 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 174 (2005); Staples, Gard. Bull. Sing. 61: 483–522 (2010), Fl. Thailand 10: 431 (2010); Staples *et al.*, Thai J. Bot. 6: 84. 2014.—Type: *Merremia hederacea* (Burm. f.) Hallier f.

Herbs or shrubs, often twining, sometimes prostrate. Leaves usually petiolate, rarely sessile, margins entire or dentate, lobed, or palmately or pedately lobed or compound.

Inflorescences axillary, few- to many-flowered, cymose; bracts usually small. Flowers: sepals variable in shape, often markedly convex, nearly equal or outer 2 sepals smaller, persistent, often enlarged in fruit; corolla funnelform or campanulate, often yellow or white, sometimes with a darker centre, usually glabrous or minutely hair-tufted at apex, midpetaline bands rarely sericeous outside, limb entire or 5-angled, veins often distinct in midpetaline bands; stamens included, often unequal, filaments dilated basally, filiform distally, anthers often spirally twisted; pollen 3–12-colporate or polyrugate, not spiny; nectary annular; pistil included, ovary (imperfectly 2–)4-locular, 4-ovuled, style 1, filiform, stigmas 2-globular.

Fruits capsules, 1–4-locular, usually 4-valved or ± irregularly dehiscing. Seeds 4 or fewer, glabrous or pubescent to villous especially on angles.

Ecology. Sun-loving climbers or creepers, typically in thickets, forest gaps and margins, along roadsides and watercourses. Some species readily take advantage of human disturbance and thrive in areas opened to sunlight by human activity, such as fallow fields, logging roads, vacant lots, pastures, etc.

Usage. Most of the species are used medicinally.

Notes

Two widespread species have been mentioned for Vietnam but no bona fide specimens have been seen to document these reports. The weedy American species, *Merremia aegyptia* (L.) Urban (cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 979 (1993)) is widely naturalized across the tropics generally; the figure in Cây cỏ Việt Nam looks correct for this species. A species widespread throughout Asia, *Merremia emarginata* (Burm. f.) Hallier f., has not so far been documented in the CLV area; it is to be expected there. On the other hand a tropical American species widely cultivated as an ornamental and frequently naturalized, *Merremia tuberosa* (L.) Rendle, has been reported as cultivated in Vietnam [P.H.Hồ, Cây cỏ Việt Nam 2 (2): 983 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 176 (2005)]. I have seen no specimens and there is no evidence it has naturalized in CLV; it has been included in the key to facilitate its identification.

Taxonomy

In the field and herbarium, *Merremia* has often been confused with *Ipomoea*, which has pantoporate, spinulose pollen, straight anthers and very few species with yellow corollas,

and with *Operculina*, which consistently has a circumscissile fruit and many species with pubescent midpetaline bands on the corolla. The distribution of trichomes on the corolla is taxonomically important in *Merremia*; this is most easily discerned on mature flower buds.

Key to the species

1. Leaf blades palmately lobed or parted, or leaves palmately compound 2
 - . Leaf blades simple, entire or sometimes irregularly angled or lobed 4

2. Woody climbers; leaves palmately lobed or parted; corollas bright yellow, 5–6 cm long; fruits papery, tardily shattering, cupped by enlarged, woody calyx ***M. tuberosa***
 - . Herbaceous twiners; leaves palmately compound, leaflets usually 5; corollas white or pale cream, 1.5–4.0 cm long; fruits valvate capsules, regularly dehiscent, calyx persistent but not much accrescent in fruit 3

3. Leaflets entire; plants glabrous to hirsute, never glandular; corollas 2.3–4.0 cm long; seeds ovoid-trigonous, apex crested with dark brown scales, otherwise glabrous **12. *M. quinata***
 - . Leaflets serrate to undulate-dentate; peduncles and pedicels with glandular indument; corollas 1.5–2.5 cm long; seeds subrotund, covered in curly, appressed trichomes **13. *M. quinquefolia***

4. Stems with paired auricles at sides of petiole base or leaf scar; corolla with minute hair tuft at apex of each midpetaline band, otherwise glabrous 5
 - . Stems lacking paired auricles; corolla either totally glabrous (hair tufts absent) or midpetaline bands densely sericeous 9

5. Plants softly whitish puberulent all over, sometimes glabrate in age 6
 - . Plants glabrous or nearly so, sometimes sparsely pubescent along veins on underside of leaves 7

6. Inflorescence umbelliform, crowded; leaf bases cordate, lobes rounded
 **17b. *M. umbellata* subsp. *orientalis***
 - . Inflorescences corymbose, lax, appearing 1-sided; leaf bases hastate-cordate, lobes quadrate **14. *M. sagittoides***

7. Corollas white, yellow inside at tube base; sepals subequal, 16–21 mm long **9. *M. kingii***
 - . Corollas yellow or pale orangish, darker inside tube; sepals unequal, 7–12 mm long 8

8. Corollas vivid lemon yellow; sepals 7–10 mm long **17a. *M. umbellata* subsp. *umbellata***
 - . Corollas pale orangish or pale yellow; sepals 9.5–12.0 mm **1. *M. bambusetorum***

9. Woody lianas; capsules bicoloured: the upper part straw-yellow, the lower part dark brown **10**
 - . Herbaceous twiners or trailers, capsules uniformly tan or dark brown **14**

10. Plants glabrous	11
—. Plants puberulent to villose	12
11. Flowers 7–8 cm long; corolla white or pale yellow, glabrous outside	10. <i>M. mammosa</i>
—. Flowers 1.4–3.2 cm long; corolla bright yellow, sericeous outside on midpetaline bands	3a. <i>M. boisiana</i> var. <i>boisiana</i>
12. Corolla white, 6 cm long; plant whitish or yellowish tomentose-villose	4. <i>M. eberhardtii</i>
—. Corolla 1.4–3.2 cm long; plant yellowish or reddish tomentose	13
13. Outer 2 sepals longer than inner 3, tapering acute, c. 12 mm long	2. <i>M. bimbitum</i>
—. Outer 2 sepals shorter than inner 3, obtuse or rounded, 6–9 mm long	3b. <i>M. boisiana</i> var. <i>fulvopilosa</i>
14. Sepals adaxially fleshy tuberculate	18. <i>M. verruculosa</i>
—. Sepals adaxially smooth or slightly striate	15
15. Leaves (at least some) irregularly, coarsely crenate or serrate or margins weakly angulate-lobate	16
—. Leaves all simple, entire	18
16. Corollas 2.5–5.5 cm long; capsule valves smooth outside	19. <i>M. vitifolia</i>
—. Corollas < 2 cm long; capsule valves reticulate or wrinkled outside	17
17. Outer sepals broadly obovate to orbicular, emarginate, not or slightly mucronulate; corollas 1.5–2.0 cm long; capsules coarsely wrinkled	5. <i>M. gemella</i>
—. Outer sepals broadly obovate to spathulate, broadly notched at apex and distinctly mucronulate, mucro pointing outwards; corollas c. 1 cm or less, capsules reticulately wrinkled	7. <i>M. hederacea</i>
18. Corollas white, yellow inside at tube base	11. <i>M. poranoides</i>
—. Corollas pale to bright yellow, sometimes white at tube base	19
19. Outer 3 sepals acute to attenuate, glandular-hirsute; stems and leaves ± viscid	16. <i>M. thorelii</i>
—. Outer sepals obtuse, glabrous; stems and leaves glabrous or pubescent, never viscid	20
20. Sepals with purple margins; corollas 0.9–1.8 cm long; leaves often variable in shape on one stem	8. <i>M. hirta</i>
—. Sepals green, without darker margins; corollas 1.8–2.0 cm or longer; leaves all same shape on one stem	21
21. Inflorescences 1–3-flowered; leaves subtending inflorescences ± clasping peduncle bases; bracts deciduous	15. <i>M. subsessilis</i>
—. Inflorescences few- to many-flowered; leaves subtending inflorescences petiolate, not clasping peduncle bases; bracts persistent, falcate	6. <i>M. hainanensis</i>

1. *Merremia bambusetorum* Kerr

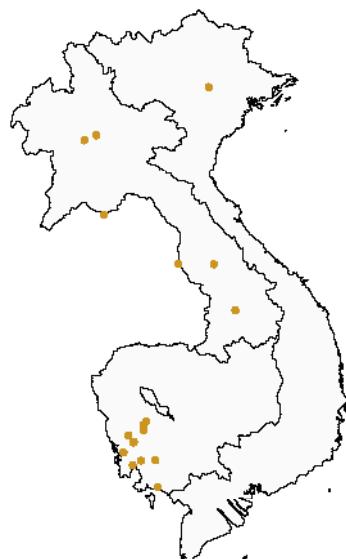
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Merremia bambusetorum Kerr, Bull. Misc. Inform. Kew 1941: 18 (1941), Fl. Siam. 3 (2): 1 (1954); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 31, 84–85 (1993); Staples, Fl. Thailand 10: 433 (2010), Gard. Bull. Singapore 61: 486 (2010); Leti *et al.*, Flore Photogr. Cambodge 183 (2013); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – Type: Thailand, Chanthaburi, Khao Kuap, A.F.G. Kerr 17704 (holo K!, iso BK!).

Perennial twiners; stems 1–8 m long, glabrous. Leaves oblong-lanceolate to narrowly elliptic, 5.5–13.2 × 1.7–5.5 cm, glabrous or undersides finely puberulent along veins, base cordate, lobes rounded or angulate-dentate, apex acuminate, mucronulate; secondary veins 7–9 either side of midvein; petiole 0.8–1.2 cm, base with 2 tiny pseudostipules.

Inflorescence axillary, usually 1–5-flowered; peduncles 3.0–4.5 cm, glabrous; bracts minute; pedicels 10–16 mm, thicker apically. Sepals subequal, deeply convex, glabrous, outer 2 broadly elliptic, 9.5–12.0 × 7.0–8.0 mm, apices broadly rounded to subtruncate, midvein dark, keeled, ending in mucro, inner sepal margins hyaline; corolla tubular-funnelform, 2.9–4.2 cm long, yellow, limb 5-pointed, points minutely hair-tufted outside, otherwise glabrous; stamens included, papillose below filament insertion, anthers 4 mm long, opening lengthwise; pistil included, 16–18 mm, glabrous, ovary conical.

Capsules ellipsoid-conical, c. 12–15 mm long, brown, glabrous, base cupped by persistent calyx. Seeds globose-trigonous, 4–5 mm long, densely yellowish pubescent.



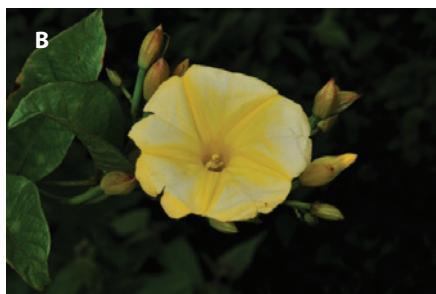
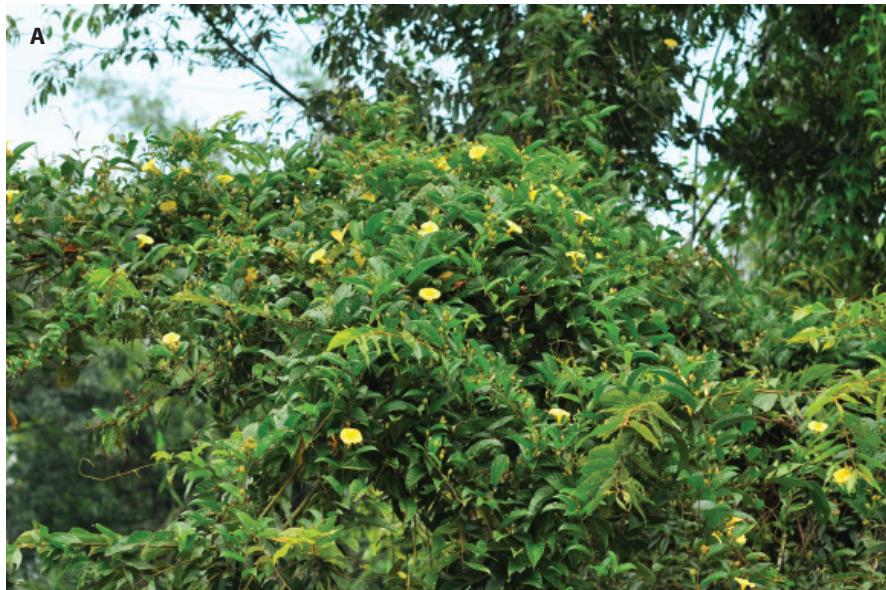
Distribution. Cambodia, Laos, Vietnam, China, Thailand.

Ecology. In open situations along roadsides, in bamboo thickets, and secondary regrowth, often along streams or near waterfalls, on sandy or rich red soils; elevation: 200–500(–1100) m.

Vernacular names

Cambodia. voa taeuk (*Martin* 1125), voa tapok srieng (*Martin* 1697), voeur ta aerk phnom (*Long* *et al.* CL560).

Laos. (kheua) 'khi² kă duan (*Vidal* 4122).



14.1. *Merremia bambusetorum* Kerr. A, habit; B, flower (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Baing and Phum Vial Peuch, 15 Nov. 2009, Simões et al. 35 (K); 5 Feb. 2007, Cheng CL560 (P); track between Trapaing Roungh and Phnom Penh, 18 Nov. 2009, Simões et al. 45 (BM, SING). Kompong Speu: route de Kirirom, 25 Jan. 1966, Vidal 5045 (P).

Laos. Louang Prabang: Luang Prabang env., 1969, Pedrono 93 (P); Phou Soun mt., 28 Feb. 1932, Poilane 20204 (P, SING). Saravane: Plateau des Bolovens, station agricole, Poilane 28672 (P, SING). Savannakhet: 11 Feb. 1925, Poilane 11934 (P, SING); Km 60 de la route de Savannakhet à Quang Trí, 14 Jan. 1925, Poilane 11616 (P); Km 20 de la route de Savannakhet à Quang Trí, 28 Jan. 1925, Poilane 11806 (P). Vientiane: env. de Ban Na Hai, 22 Oct. 1965, Vidal 4122 (P).

Vietnam. Vinh Phuc: Lang nuc, Eberhardt 3767 (P, SING).

Material studied

Cambodia. Kampot: 13 Dec. 1903, Geoffray 251 (P). Koh Kong: près de Andaung Teuk, 4 Dec. 1968, Martin 1125 (P); Koh Kong, bord de route, 5 Feb. 2007, Long et al. CL560 (P); ca. 30 km from Koh Kong, road to Phnom Penh, 12 Nov. 2009, Simões et al. 28 (BM); track between Koh Kong and Tmor Baing, 14 Nov. 2009, Simões et al. 32 (BM); près du village Tatey Leu (Massif des Cardamomes), 31 Jan. 1970, Martin 1697 (P); vic. of Tatey Leu, 16 Nov. 2009, Simões et al. 39 (BM, SING); Thma Baing, Tatey Leu, 20 Dec. 2008, Newman et al. 2113 (E, L, P, RUPP); track between Tmor

2. *Merremia bimbim* (Gagnep.) Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Merremia bimbim (Gagnep.) Ooststr., Blumea 3: 343 (1939); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 980 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 174 (2005); Staples, Gard. Bull. Sing. 61: 487 (2010). – *Ipomoea bimbim* Gagnep., Notul. Syst. (Paris) 3: 140 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 247 (1915). – Type: Vietnam, Hanoi, Bon 2700 (holo Pl., P00608896; iso Pl., P00608897, P00608898).

Woody scramblers (twining?); stems terete, at first shortly pilose, later glabrous. Leaves suborbicular, 13–15 cm diam., base deeply cordate, appearing subpeltate, apex shortly acuminate, broad, upper sides glabrous, undersides softly rufus-velutinous, basal auricles side-by-side or margins superposed; secondary nerves 8–10 either side of midvein, arching-confluent at margins, smaller nerves very numerous, parallel, all impressed above, prominent beneath, conspicuous, smallest nerves scarcely conspicuous, forming a dense network; petiole c. 11 cm long, thinly velutinous.

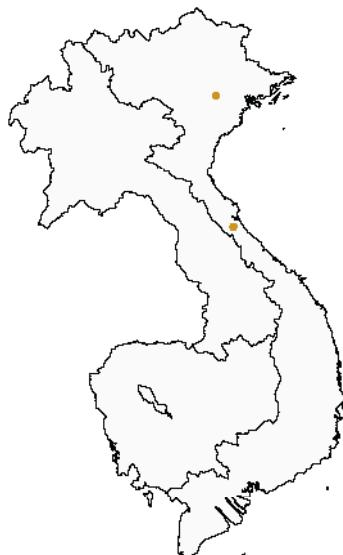
Inflorescences axillary, long-pedunculate, many-flowered corymbs, to 5 × 7 cm; peduncles 16–20 cm long, naked; branches about 8, 2–4 cm long; bracts linear-acuminate, 3–5 mm long, moderately persistent; pedicels (before anthesis) 5 mm long. Sepals (in bud) unequal, outer 2 longer, elliptic-ovate, 12 × 10 mm, glabrous on both sides or outsides glabrescent, chartaceous, apices tapering acute, inner ones subcordate, a little shorter, mucronate, margins scarios; corolla yellow, 3 cm long (*teste collector*), sericeous outside; stamens included, anthers oblong, 3–4 mm long; ovary acute, 2-locular, glabrous, style short, stigma capitate, biglobose.

Capsules narrowly ovoid, cupped by slightly accrescent calyx, valves 4, dark brown basally, the upper part straw-yellow, glabrous. Seeds 4 or fewer, narrowly ovoid-trigonous, 6–8 mm long, velvety-brown pubescent, trichomes longer on angles.

Distribution. Vietnam, China.

Ecology. In forest clearings and secondary growth on hills.

Notes. Very similar morphologically to *M. boisiana* and in particular to var. *fulvopilosa*; Gagnepain used the following characters to distinguish his new species: the red-velvety indumentum on the branches, petioles, inflorescence axes and the undersides of the leaves; the persistent, linear-acuminate bracts; the



ovate-acute sepals, twice as long and as wide as in *M. boisiana*. Considerable confusion exists around the correct application of these names in Chinese herbaria, where collections are fairly abundant. The few, historic collections from CLV seem easily distinguishable but addition of new collections could change that impression.

Vernacular name

Vietnam. bimbim (Annamite).

Material studied

Vietnam. Quang Binh: village de Duc Thi, July 1930, Pételet 7194 (P).



3. *Merremia boisiana* (Gagnep.) Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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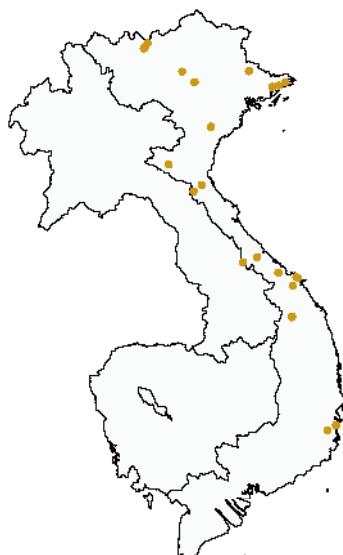
Merremia boisiana (Gagnep.) Ooststr., Blumea 3: 343 (1939); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 980 (1993); R.C.Fang & Staples, Fl. China 16: 298 (1995); T.N.Nguyễn & Đ.H. Dùòng, Checkl. Pl. Sp. Vietnam 3: 174 (2005); Staples, Gard. Bull. Sing. 61: 487 (2010); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – *Ipomoea boisiana* Gagnep., Notul. Syst. (Paris) 3: 141 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 263 (1915). – Types: [Laos to Vietnam] ‘iter Mekong à Hué’, Harmand 1827 (syn Pl, P03536895); Vietnam, Lang Son, montagnes du Caï Kinh, route de Than Môï à Van Linh, Bois 138 (syn Pl, P00608899); Lào Cai, mont Chapa, Lecomte & Finet s.n. (syn Pl, P03536883, P03536884); Nghê An, Canh Trap, Spire 1049 (syn Pl, P03536873); ‘Indochine’ without locality, Harmand 142 (syn Pl, P0356893).

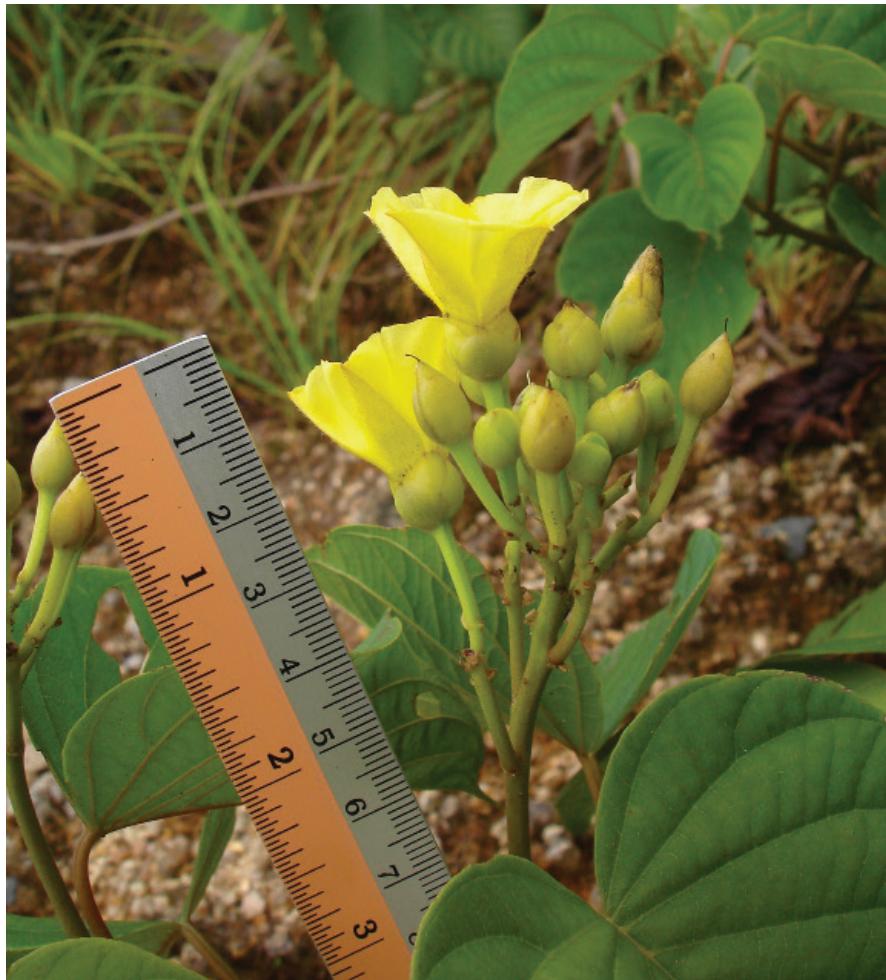
Lianas, stems 3–20(–30) m long, terete, fistulose, older stems woody, tips herbaceous, all axial parts glabrous or greyish yellow tomentose. Leaves entire, blade nearly circular, rarely broadly ovate, 9.5–15.5 × 7.0–14.0 cm, glabrous or puberulous along veins abaxially, base cordate, margins entire, apex abruptly acuminate or cuspidate; secondary veins 6–8 either side of midrib; petiole 4.5–12.0 cm.

Inflorescences ± flat-topped, many-flowered, corymbiform cymes; peduncles 5–24(–35) cm, terete and glabrous basally, slightly applanate distally, dull yellow pubescent; bracts early deciduous, narrowly triangular, 1.5–2.0 mm, densely yellowish pubescent; pedicels 1–2 cm, enlarged in fruit. Flowers diurnal, erect; sepals subequal, outer 2 slightly shorter, 6–13 mm, slightly accrescent in fruit; outer 2 sepals broadly ovate, outside dull yellow pubescent, apices obtuse or rounded; inner 3 sepals nearly circular, glabrous, apices obtuse; corolla yellow, broadly funnelform or campanulate, 1.4–2.0(–3.2) cm, midpetaline bands yellowish sericeous outside, limb undulate-lobed; stamens included, filaments with 2 longitudinal pubescent lines below insertion, anthers belatedly twisted; pistil included, ovary conical, glabrous; style filiform, glabrous, stigma biglobose.

Capsules brown, yellow apically, conical-ovoid, 1.0–1.2 cm, glabrous. Seeds broadly trigonous-ovoid, c. 5 mm, densely scaly pubescent along angles.

Distribution. Laos, Vietnam, China, Indonesia (Sumatra).





14.2. *Merremia boisiana* (Gagnep.) Ooststr. Flower (credit: Jana Leong-Skornickova; voucher: Vietnam, Leong-Skornickova et al. HB-134 (E)).

Ecology. Primary forest as well as deforested areas and secondary regrowth, often in moist valleys, on sandy to rocky soils; 300–1000 m.

Usage. In Vietnam the young shoots (pousses) are edible (*Poilane* 10935).

Notes. Superficially similar to (and in the herbarium often confused with) *Ipomoea sumatrania* in the dried state, but easily distinguished from it by the pollen, which is not spiny, the pubescent midpetaline bands on the corolla, and the peduncle typically longer than the subtending leaf. Living plants are immediately separable at anthesis because *Merremia*

boisiana has a yellow corolla whereas *I. sumatrana* has a greenish white corolla with a rose-pink centre.

For confusion with *M. bimbim*, see notes under that species. The two varieties in CLV intergrade, especially in indumentum density, but the following key will help to discriminate the extremes in variation:

Vernacular names

Vietnam. dok khua khan muok (*Spire* 1049), prô he (*Poilane* 10935).

Key to the varieties

1. Branchlets, petioles, leaves, peduncles and pedicels glabrous to sparsely yellowish pubescent; sepals 6–13 mm long **3a. *M. boisiana* var. *boisiana***
1. Branchlets, petioles, leaves, peduncles and pedicels greyish yellow or rusty tomentose; outer 2 sepals 5 mm long, inner ones c. 7 mm long **3b. *M. boisiana* var. *fulvopilosa***

Material studied. [var. *boisiana*]

Vietnam. s. loc.: "Dong Jing, Da Huang Mao Shan", 10–23 June 1939, *Zeng* 29207 (HITBC); Switring et Baum Mo, 17 May 1921, *Hayata* 346 (P). Da Nang: Col des Nuages près Tourane, 9 Sep. 1923, *Poilane* 7911 (P); base of Mt. Bana, May 1927, *Clemens & Clemens* 3238 (BM, G, K, P). Ha Tinh: Huong Son district, Nga Doi, 17 May 1998, *Hiep* et al. VA-576 (SING). Khanh Hoa: Cam Lam district, Hon Ba N.R., along the road to Yersin House, 7 July 2011, *Leong-Skornickova* et al. HB134 (E); Day Lanh (nord) "pro. Nha Trang", 30 June 1923, *Poilane* 6892 (P); forêt W de Nha Trang, 29 May 1922, *Poilane* 3879 (P, SING). Kon Tum: along Dak Mek River near Muong Hoong village, 31 Mar. 1995, *Averyanov* et al. VH1063 (AAU, P); NW slope of Ngoc Linh mountain system, 5–10 km N of village Muong Hoong, 14 Apr. 1995, *Averyanov* et al. VH1380 (AAU, P). Lang Son: env. de Pho Vi, 5 June 1936, *Pételot* 5778 (P, SING). Lao Cai: route de Lao Cay à Chapa, Km 10–18, July 1931, *Pételot* 4325 (P, SING); July 1899, *Wilson* 2762 (K). Nghe An: réserve forestière de Co Ba, 7 May 1914, *Fleury* [sub *Chevalier*] # 32397 (P); l. c., 12 May 1914, *Chevalier* 32471 (P). Ninh Binh: Cuc Phuong National Park, headquarters helipad 200 m NE direction, 11 May 1999, *Cuong* 127 (P). Phu Tho: Phu Ho, June 1923, *Pételot* 1055 (P). Quang Ninh: Kau Nga Shan vic., Tien Yen, 23–29 Dec. 1936, *Tsang* 27409 (A, C, E, K, P); Sai Wong Mo Shan (Sai Vong Mo Leung), Lomg Ngong village, Dam Ha, 18 July–9 Sep. 1940, *Tsang* 30211 (B, BO, C, E, K, P, SING); Lung Wan Village, Dam Ha, 18 May–5 July 1940, *Tsang* 30052 (B, BO, C, E, K, P, UPS); l. c., *Tsang* 30075 (B, BO, C, E, K, P, SING); Taai Wong Mo Shan, near Chuk Phai, Ha Coi, 3 May–22 June 1939, *Tsang* 29207 (B, BO, C, E, K, P, SING, UPS). Quang Tri: route de Dong Ha à Lao Bao, 5 May 1940, *Vidal* 931 (P); Lang Vieng Ap, "pro. Quang Tri", 14 June 1924, *Poilane* 10935 (P, SING); La Pa Ka, "pro. de Quang Tri", 10 May 1927, *Poilane* 13305 (P). Thua Thien-Hue: env. Cam Hai, 24 Apr. 1943, *Vidal* 736 (P); Lang Co, *Eberhardt* 1710 (P, SING). Yen Bai: Trahutt à Yen Bai, 1911, *Lecomte & Finet* 641 (P).

3b. *Merremia boisiana* var. *fulvopilosa* (Gagnep.) Ooststr.



Merremia boisiana var. *fulvopilosa* (Gagnep.) Ooststr., Blumea 3: 344 (1939); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 980 (1993); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 174 (2005). – *Ipomoea boisiana* Gagnep. var. *fulvopilosa* Gagnep., Notul. Syst. (Paris) 3: 142 (July 1915). – *Merremia boisiana* (Gagnep.) Ooststr. var. *rufopilosa* C.Y.Wu, Rep. Yunnan Trop. Subtrop. Fl. Res. Inst. 1: 113 (1965), nom. superfl. – Type: Vietnam, in régione de Lac-thô, Bon 4801 (holo PI, P00622201; iso PI, P00622202, P03536892). *Ipomoea boisiana* var. *rufopilosa* Gagnep., Fl. Indo-Chine 4: 263 (Sept. 1915). – sphalm ‘*fulvopilosa*’ invalid name.

Lianas to 3 m; branchlets, petioles, leaves, peduncles, and pedicels greyish yellow tomentose. Outer sepals c. 5 mm long, inner sepals 7 mm.

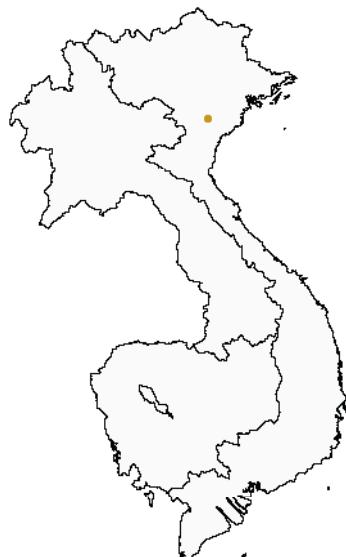
Distribution. Vietnam, China.

Ecology. Forest slopes.

Notes. Gagnepain must have made a slip when he published the var. *rufopilosa* in September 1915, intending it to be *fulvopilosa*, as published in July 1915.

Some collections of var. *fulvopilosa* intergrade with *M. bimbim*, which differs mainly in the size of the flower sepals and capsules. Chinese authors have misinterpreted these two taxa.

Material studied
Known only from the type collection.



4. *Merremia eberhardtii* (Gagnep.) T.N.Nguyễn



J F M A M J J A S O N D



J F M A M J J A S O N D

Merremia eberhardtii (Gagnep.) T.N.Nguyễn, in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 43 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); T.N.Nguyễn & Đ.H.Dùong, Checkl. Pl. Sp. Vietnam 3: 174 (2005); Staples, Gard. Bull. Sing. 61: 492 (2010). – *Ipomoea eberhardtii* Gagnep., Notul. Syst. (Paris) 3: 145 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 268 (1915); P.H.Hô, Cây cỏ Việt Nam 2 (2): 997 (1993). – Type: Vietnam, Thùa Thiên Huê, Lang Cô, Eberhardt 1708 (holo Pl. P00288066; iso Pl. P00288067).

Lianas or scandent climbers, stems 15–20 m long, solid, slightly woody, softly yellowish tomentose. Leaves orbicular or broadly ovate, 10–15 cm diam., base cordate, apex abruptly acuminate, the acumen subfiliform, both sides yellowish-villoso, undersides more densely so, basal lobes semiorbicular, closely approaching; secondary veins 8 or 9 either side of midvein, arcuate; petiole 5 cm long, softly and more densely tomentose.

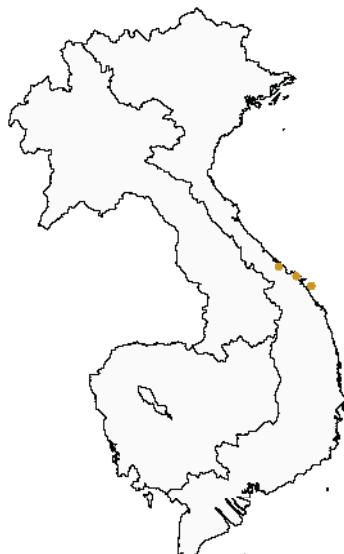
Inflorescences axillary, corymbiform, several-flowered; peduncles robust, 12–15 cm long, softly yellow-tomentose, branches 3–7, tomentose, 2-bracteate at apex; bracts long-filiform, base dilated, tomentose; bracteoles similar but base scarcely dilated; pedicels stout, 10–15 mm, tomentose. Sepals broadly ovate-obtuse, to 18 × 12–15 mm, outsides tomentose, yellow-brown, apices mucronate, inner slightly smaller, subglabrous; corolla campanulate, white, purple inside tube base, 6 cm long, limb 4–5 cm diam., inconspicuously lobed, lobes mucronulate, outside sericeous; stamens included, filaments 7 mm long, decurrent above and below insertion, ciliate from insertion to the corolla base, anthers elliptical, c. 5 mm long; pistil included, ovary obtuse, glabrous, 2-locular, scarcely attenuate into style base, style filiform, 2 cm long, stigma capitate, biglobose.

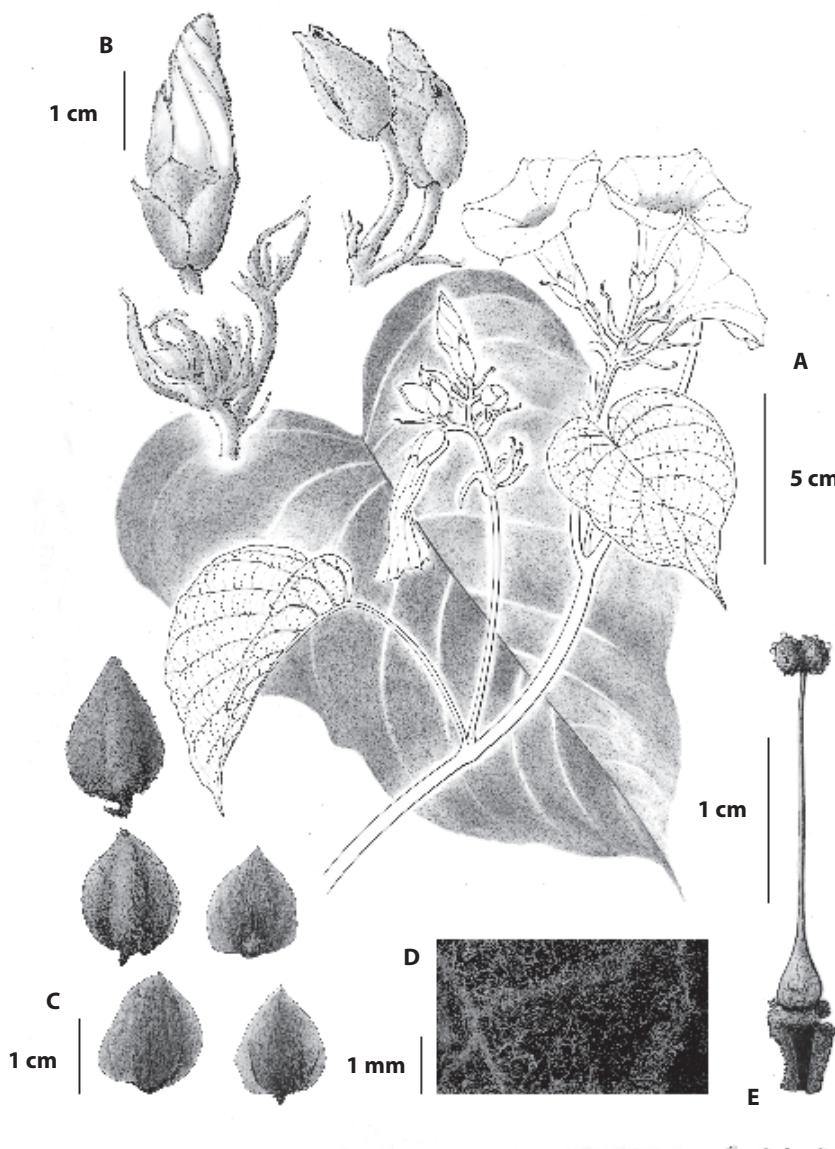
Capsules conical, 1.8–2.0 cm long, pale brown, cupped by accrescent calyx. Seeds 4, ovoid-trigonous, pubescent.

Distribution. Vietnam.

Ecology. In hillside thickets near the sea.

Notes. I have seen the type and one other specimen from Hue province. Nguyễn Thị Nhan (1988: 43) cited two collections from adjacent Da Nang province that have not been studied but seem to be reliably named. This species appears to be narrowly endemic to Vietnam; colour photos of live plants surfaced on the Internet in 2013 that show the plants are locally profuse where they occur.





14.3. *Merremia eberhardtii* (Gagnep.) T.N.Nguyễn. A, flowering stem; B, inflorescence, flower buds; C, sepals; D, indumentum, abaxial leaf surface; E, pistil. Drawn by Bernard Duhem. Voucher: *Eberhardt* 1708 (P00288066, P00288067) plus color photos of living plants.

Material studied

Vietnam. Thua Thien-Hue: Hue vic., in thickets near sea, 3 Aug. 1927, Clemens & Clemens 4091 (A, BM, G, K, NY, P).

5. *Merremia gemella* (Burm. f.) Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Merremia gemella (Burm. f.) Hallier f., Bot. Jahrb. Syst. 16: 552 (1893); Ooststr., Blumea 3: 297 (1939), Fl. Males., Ser. I, Spermat. 4: 441 (1953); Kerr, Fl. Siam. 3 (2): 2 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 981 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 39 (1993); R.C.Fang & Staples, Fl. China 16: 293 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 174 (2005); Staples, Fl. Thailand 10: 435 (2010), Gard. Bull. Singapore 61: 493 (2010); Staples *et al.*, Thai J. Bot. 6: 84 (2014). – *Convolvulus gemellus* Burm. f., Fl. Indica 46, t. 21 (1768). – *Ipomoea gemella* (Burm. f.) Roth, Nov. Pl. Sp.: 110 (1821). – Type: Java, without locality or date, collector unknown s.n. (lecto G-PREL!, designated by Staples & Jacquemoud, Candollea 50: 448 (2005)).

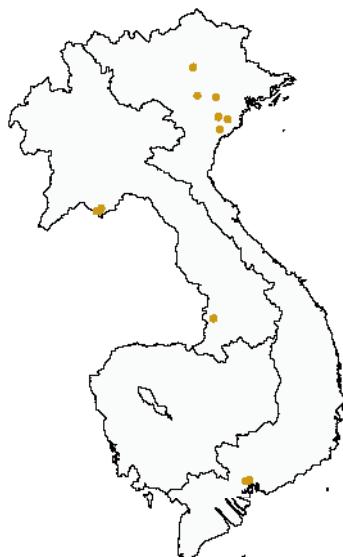
Ipomoea polyantha Miq., Fl. Ned. Ind. 2: 613 (1857); Gagnep. & Courchet, Fl. Indo-Chine 4: 256 (1915). – Type: Java, Oengaran, Horsfield Conv. 3 (holo U; iso K!, K000830849, K000830850, L!, L0004228).

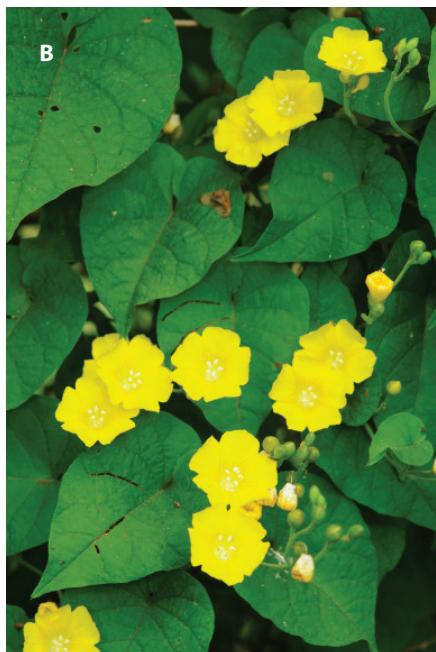
Herbaceous twiners or creepers; stems 1–4 m long, often rooting when touching ground, axial parts smooth, appressed yellowish pubescent. Leaves often ovate, 2.5–6.5 × 1.5–4.3 cm, glabrous or shortly pilose, base broadly cordate, proximal margins entire, undulate or coarsely crenate, sometimes 3-lobed, apex attenuate, mucronulate; petiole 1.5–6.0 cm, rarely minutely tuberculate.

Inflorescences umbelliform or forked with short raceme-like branches, few-flowered; peduncles 2.5–10.0 cm; bracts early deciduous, minute, pedicels 3–6 mm. Flower sepals broadly obovate to subcircular, unequal, margins scarious, emarginate, slightly mucronulate or not, outer 2 sepals 4–6 mm, abaxial surfaces pilose, inner sepals 6–7 mm, subglabrous; corolla campanulate to funnelform, 1.5–2.0 cm, yellow, midpetaline bands dark, glabrous outside, limb shallowly 5-lobed, lobes quadrate and mucronulate; stamens included, filaments pubescent basally; ovary glabrous.

Capsules depressed-globose, c. 7 mm, coarsely wrinkled; calyx slightly enlarged and reflexed in fruit. Seeds trigonous, dark grey or brownish puberulent.

Distribution. Laos, Vietnam, and Sri Lanka, China, Thailand, Malaysia, Indonesia, the Philippines, New





Guinea, Pacific Islands, Australia. Surely also in Cambodia (and Myanmar) but no collections have been seen from either.

Ecology. Roadsides and disturbed areas, secondary regrowth; elevation: 0–300 m.

Vernacular names

Laos. khi ka duan (Vidal 1975).

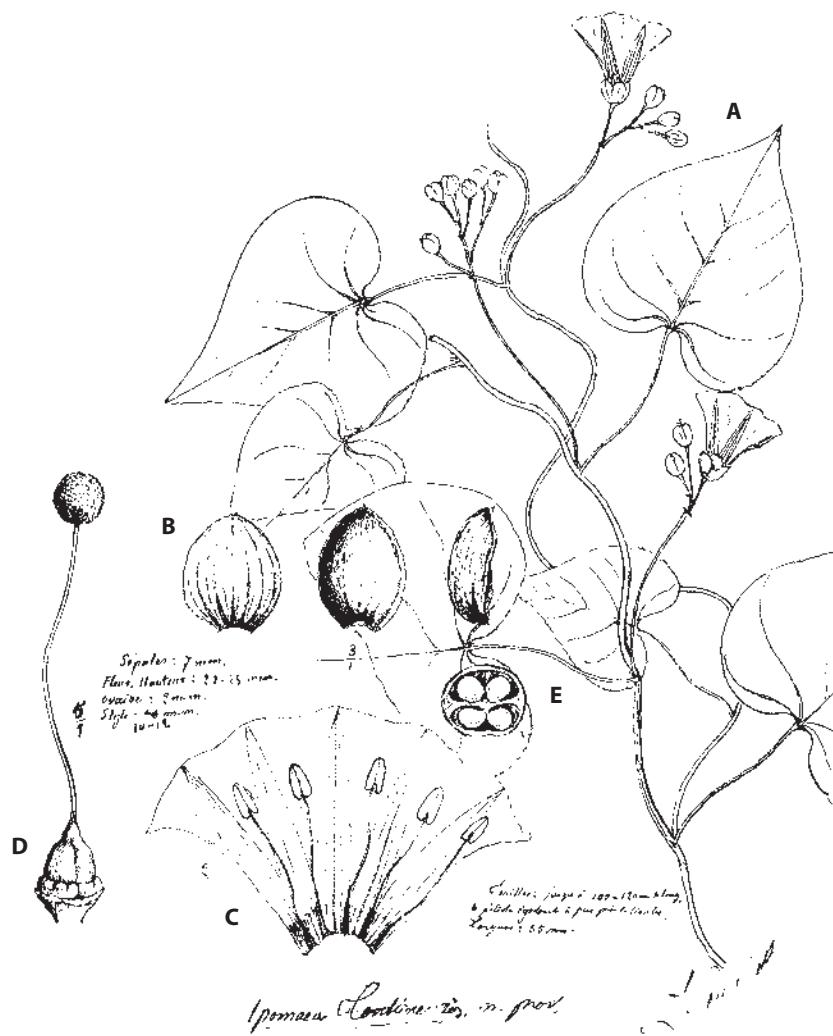
Vietnam. caí cỏ bìm bìm (Annamite, Chevalier 29063).

Material studied

Laos. Champassak: Pakse, gorge du Mekong, 6 Nov. 1938, Poilane 28334 (P, SING). Vientiane: route Ban Don Noun to Phou Khien, 2 Nov. 1952, Vidal 1975 (P); env. de Vientiane, 1 Nov. 1948, Vidal 679 (P); île de Ban Mo, 23 Dec. 1951, Vidal 1358 (P).

14.4. *Merremia gemella* (Burm. f.) Hallier f. A, calyx; B, habit (credits: Preecha Karaket, BKF; voucher: Thailand, Staples et al. 1333 (BKF)).

Vietnam. Dong Nai: Cat Lai, 11 Nov. 1887, Bon 3547 (P, SING). Ha Nam: Kien Khe, 19 Nov. 1883, Bon 2304 (P). Ha Noi: Nov. 1890, Balansa



14.5. *Merremia gemella* (Burm. f.) Hallier f. A, flowering stem; B, sepal in abaxial (left), adaxial (center), and lateral (right) views; C, corolla, opened, showing androecium; D, pistil; E, ovary, cross-section. Drawn by L. Courchet. Voucher: Bon 3547 (P03551236).

4550 (P, SING); "Tonkin", Tu Phap, Dec. 1888, *Balansa* 3540 (P). Hồ Chí Minh Ville: "Saigon", 6 Feb. 1898, *Debeaux* 116 (P). Ninh Bình: delta du fleuve rouge, Nam Định env., 22 Nov. 1913, *Chevalier* 29063 (P); Choquan, Jan. 1868, *Talmy* s.n. (P, SING). Tuyên Quang: Sontay, 1885, *Brousmiche* s.n. (P).

6. *Merremia hainanensis* H.S.Kiu



Merremia hainanensis H.S.Kiu, Fl. Hainan. 3: 587 (1974); R.C.Fang & Staples, Fl. China 16: 293 (1995); Staples, Gard. Bull. Sing. 61: 493 (2010). – Type: China. Hainan: Po-ting, 6 Apr. 1935, F.C. How 71693 (iso A!, A00054671).

Herbs, twining; stems 2–10(–15) m long, dull yellow hirsute. Leaf blade ovate, 3.5–7.5 × 2.0–4.0 cm, glabrous, base cordate, margin entire, apex acute or acuminate, mucronulate; petiole 1.5–3.0 cm, sparsely villous.

Inflorescences few to many-flowered; peduncle 2.0–3.5 cm, glabrous; bracts persistent, ovate, falcate, 3–4 mm, apex acuminate; pedicel slender, 5–15 mm. Sepals unequal, glabrous, apex obtuse, apiculate; outer sepals elliptic, c. 9 mm; inner sepals oblong, c. 10 mm; corolla pale-yellow, broadly funnelform, 1.8–2.0 cm, midpetaline bands brown-veined, outside glabrous; stamens included, filaments c. 1 cm, slightly dilated basally, fimbriately scaled, anthers twisted, 3–4 mm; ovary ovoid-conical, c. 2 mm, glabrous; style c. 3 mm.

Capsule unknown.

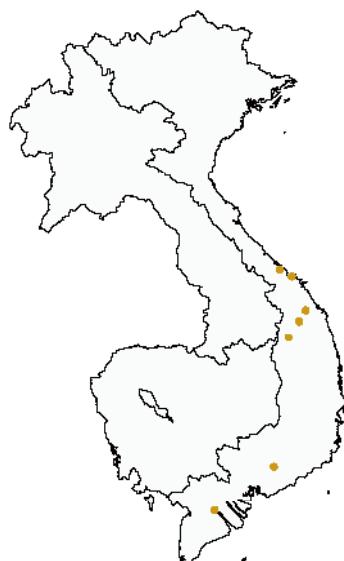
Distribution. Vietnam, China (Hainan).

Ecology. Marshes, forests near waterfalls and streams, in humid places, always on granitic or schistaceous soil; 500–1500 m elevation.

Notes. *Merremia hainanensis* was formerly considered endemic to China; it has proven to be widespread and locally abundant in Vietnam.

Material studied

Vietnam. Binh Dinh: plaine de Nuoc Ngot, Eberhardt 3182 (P). Can Tho: Km 30, route de Cân tho à Long xuyen, 2 Nov. 1967, Vu Van Cuong 690 (P). Dong Nai: Caocang, "pro. Bien Hoa", 20 Nov. 1932, Poilane 21422 (P). Kon Tum: entre les villages Moï de Dac-To & Mang-luu, 3 Mar. 1941, Poilane 31923 (P). Quang Nam: près village Moï de "Go-Oi" SW de la province du Quang-Nam, 23 Feb. 1941, Poilane 31507 (P); près du village Moï de Mang Tra, confin sud de la prov. de Quang Nam, 27 Feb. 1941, Poilane 31867 (P, SING). Thua Thien-Hue: env. de Hue, Eberhardt 3224 (P, SING).



7. *Merremia hederacea* (Burm. f.) Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Merremia hederacea (Burm. f.) Hallier f., Bot. Jahrb. Syst. 18: 118 (1894); Ooststr., Blumea 3: 302 (1939), Fl. Males., Ser. I, Spermat. 4: 441 (1953); Kerr, Fl. Siam. 3 (2): 3 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 182 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 981 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 41 (1993); R.C.Fang & Staples, Fl. China 16: 293 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 175 (2005); Staples, Fl. Thailand 10: 435 (2010); Leti *et al.*, Flore Photogr. Cambodge 184 (2013); Staples *et al.*, Thai J. Bot. 6: 85 (2014). – *Evolvulus hederaceus* Burm. f., Fl. Indica 77. t. 30, f. 2 (1768). – Type: Java, collector unknown s.n. (lecto G-PREL!, designated by Ooststr. (1939: 306)).

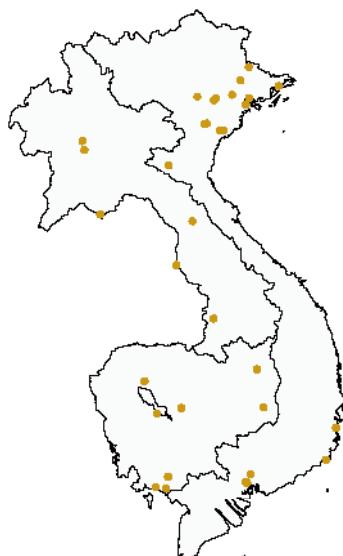
Merremia convolvulacea Dennst., Schlüss. Hort. Malab. 12, 23, 34 (1818); Hallier f., Bot. Jahrb. Syst. 16: 552 (1893). – Type: unknown.

Ipomoea chryseides Ker Gawl., Bot. Reg.: t. 270 (1818); Gagnep. & Courchet, Fl. Indo-Chine 4: 254 (1915). – *Merremia chryseides* (Ker Gawl.) Hallier f., Bot. Jahrb. Syst. 16: 552 (1893). – Type: ‘Indies orientale’, Koenig s.n. (syn BM).

Herbaceous twiners or creepers; stems 1–4 m, rooting at nodes, axial parts glabrous or sparsely hirsute, often minutely tuberculate. Leaves cordate-ovate, 1.5–7.5 × 1.0–5.0 cm, nearly glabrous to sparsely puberulous, base cordate or broadly cordate, margins entire, irregularly crenate, or 3-lobed; petiole 0.5–5.0 cm.

Inflorescences (1–) few- to many-flowered, umbelliform; peduncles (3–) 8–50 cm, thicker than petiole; bracts early deciduous, narrowly obovate; pedicels 2–5 mm. Sepals broadly obovate to spatulate or oblong, unequal, outer 2 sepals 3.5–4.0 mm, inner sepals c. 5 mm, glabrous, apices emarginate and distinctly mucronate, mucro directed outward; corolla shortly campanulate, 0.6–1.0 cm, tube white inside, limb yellow, 10-lobed, outside glabrous; stamens just exserted, white, filaments sparsely villous basally; pistil exserted, ovary biglobose, white, glabrous.

Capsules depressed globose or broadly conical, 5–6 mm, reticulately (but not coarsely) wrinkled; calyx reflexed in fruit. Seeds trigonous-globose, 2.5–3.5 mm, puberulent to glabrous or woolly along angles and at hilum.



Distribution. Cambodia, Laos, Vietnam, and Pakistan, Nepal, India, Sri Lanka, Bangladesh, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, N Australia, Pacific Islands, Africa and naturalized in tropical America.

Ecology. A common weed of cultivation: in disturbed areas, ruderal land, hedges along roadsides, or dry deciduous forest on sandy soils; elevation: 10–350 m.

Usage. The leaves and flowers are eaten in soup in Cambodia (*Collard s.n.*), and the plant is used medicinally “pour soigner les feroncles” (Martin 197).

Vernacular names

Cambodia. voeur ta èk (khmer, *Hul & Yok* 314, 413), voeur trâ èk (Guinet 88), voa ta-aeuk (Martin 197), tahock (*Collard s.n.*, s.d.).

Laos. nhâ pok quek (Spire 1141).

Vietnam. dây bìm bìm (*Hiệp* 752).

Material studied

Cambodia. s. loc.: 1874, Jullien s.n. (P, SING);

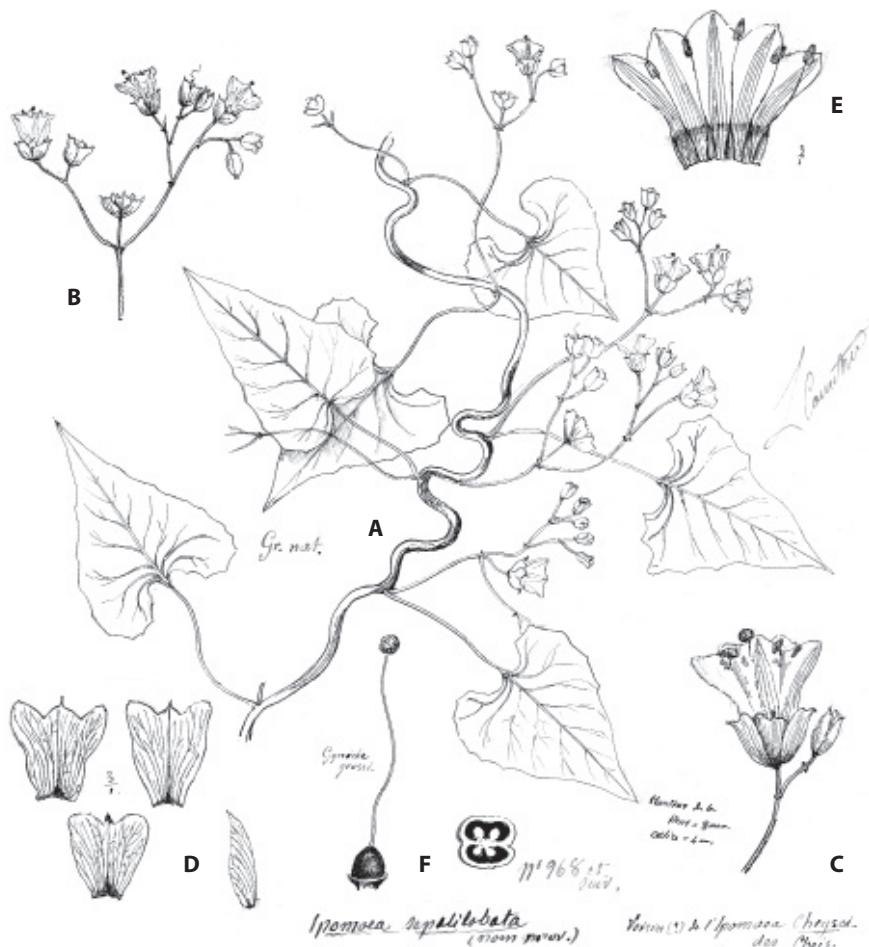
Guinet 88 (P). Kampot: 18 Oct. 1903, *Geoffray* 128 (P); de Kampot à Phnom Penh, 9 Dec. 1911, *Lecomte & Finet* 1677 (P); N of Kampong Trach, *Schmid* s.n. (P). Kompong Thom: *Collard* 7 (P). Mondulkiri: 30 Oct. 2006, *Long* et al. CL364 (P). Pursat: Kompong Luong, 22 Jan. 1966, *Martin* 197 (P). Ratanakiri: Banlong, Yeak Laom, 18 Nov. 1997, *Hul & Yok* 314 (P, RUPP); *l. c.*, 21 Nov. 1997, *Hul & Yok* 413 (P, RUPP). Siem Reap: Angkor Wat, 12 Dec. 1911, *Lecomte & Finet* 1808 (P).

Laos. Champassak: ville de Pakse, 23 Nov. 1938, *Poilane* 28550 (P, SING). Khammouane: inundation zone near Nakai, 7 Nov 2005, *Newman* et al. LAO958 (E). Louang Prabang: *Dupuy* 216 (P, SING); along Hwy 13 between Luang Prabang and Vientiane, Km marker 331, 4 Nov. 2012, *Staples* et al. 1513 (HNL, KKU, PTK, SING). Savannakhet: 13 Nov. 1998, *Munzinger* 90 (HNL, MO, P). Vientiane: Parcours derrière le That Luang vers le sud en direction de Chinaimo, 11 Nov. 1955, *Tixier* 11/11/55-24 (P).

Vietnam. Bac Giang: Pho Cam, 14 Jan. 1886, *Balansa* 808 (P). Baria-Vung Tau: Phu my, 19 Dec. 1919, *Hiep* 204 (P, SING). Dong Nai: bord du Dong Nai à Tam hip Bien Hoa, 7 Jan. 1971, *Vu Van Cuong* s.n. (P). Hai Duong: Sept Pagodes, Sept. 1906, *Mouret* 198 (P). Hai Phong: Nov. 1885, *Balansa* 809 (P). Ha Nam: in monte Lan Mat, 3 Feb. 1881, *Bon* 184 (P); *l. c.*, 1 Mar. 1883, *Bon* 1965 (P). Ha Noi: May 1908, *d'Alleizette* 432 (P); env. de Hanoi, 22 Dec. 1902, *Bois* 403 (P); Tu Phap, Oct. 1887, *Balansa* 3536 (NY, P); Yen Xa, 19 Sep. 1882, *Bon* 1791 (P). Ho Chi Minh Ville: palissades aux env. de “Saigon”, 21 Oct. 1864, *Lefèvre* 134 (P); *Lefèvre* 225 (P); vic. Saigonensis,



14.6. *Merremia hederacea* (Burm. f.) Hallier f. A, habit, flower; B, fruits (credits: A, Preecha Karaket, BKF; B, Paweeena Traiperm, Mahidol University; vouchers: A, Thailand, Staples et al. 1319 (BKF); B, Laos, Staples et al. 1513 (HNL)).



14.7. *Merremia hederacea* (Burm.f.) Hallier f. A, flowering stem; B, inflorescence; C, flower, side view showing emarginate sepals; D, sepals; E, corolla, opened showing androecium; F, pistil (left) and ovary, cross-section (right). Drawn by L. Courchet. Voucher: Geoffray 128 (P03549008).

Dec. 1874, *Pierre* 1482 (NY); *I. c.*, Dec. 1870, *Pierre* 1013 (E, HN, K, L, NY, P, SING); *I. c.*, 1862–1866, *Thorel* 340 (E, NY, P); Saigon botanic garden, 22 Mar. 1920, *Hiep* 752 (P). Khanh Hoa: Nha Trang vic., 11–26 Mar. 1911, *Robinson* BS1352 (NY, P). Lang Son: bords sablonneux de la rivière, 27 Jan. 1886, *Balansa* 807 (P). Nghe An: Canh trap, *Spire* 1141 (P). Ninh Binh: Cho Ganh, 1868, *Talmy* s.n. (P, SING); *I. c.*, Oct. 1922, *Pételot* 738 (P); Cuc Phuong National Park, Bong Center, 20 Oct. 2000, *Cuong* et al. NMC-1092 (P); Cuc Phuong National Park, Thach Lam Village, 8 Jan. 2002, *Mai Van Xinh* MVX-142 (P); Phuc Nhac, 25 Oct. 1880, *Bon* 39 (P, SING). Ninh Thuan: Ca Na “pro. Phan Rang”, 18 Feb. 1924, *Poilane* 9622 (P). Quang Ninh: Ouonbi env., 1885, *Balansa* 806 (P); Sai Wong Mo Shan (Sai Vong Mo Leng), Lomg Ngong village, Dam Ha, 18 July–9 Sept. 1940, *Tsang* 30453 (B, C, E, G, P, SING, UPS).

8. *Merremia hirta* (L.) Merr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Merremia hirta (L.) Merr., Philipp. J. Sci., C, 7: 244 (1912); Ooststr., Blumea 3: 307 (1939), Fl. Males., Ser. I, Spermat. 4: 442 (1953); Kerr, Fl. Siam. 3 (2): 4 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 183 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 982 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 44 (1993); R.C.Fang & Staples, Fl. China 16: 294 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 175 (2005); Staples, Fl. Thailand 10: 437 (2010), Gard. Bull. Singapore 61: 494 (2010); Leti *et al.*, Flore Photogr. Cambodge 185 (2013); Staples *et al.*, Thai J. Bot. 6: 85 (2014). – *Convolvulus hirtus* L., Sp. Pl. 1: 159 (1753). – Type: India, Osbeck 11 (lecto LINN 218.56!, designated by Merr. (1912)).

Ipomoea linifolia Blume, Bijdr. Fl. Ned. Ind. 721 (1825); Gagnep. & Courchet, Fl. Indo-Chine 4: 262 (1915). – Type: Indonesia, Moluccas, Blume s.n. (syn L.).

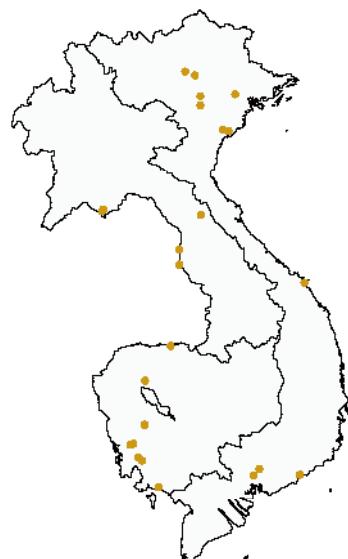
Convolvulus caespitosus Roxb., Fl. Ind. 2: 70 (1824). – *Ipomoea caespitosa* (Roxb.) Kuntze, Rev. Gen. 2: 443 (1891). – Type: India, cultivated in Calcutta Botanic Garden, Roxburgh s.n. (not found).

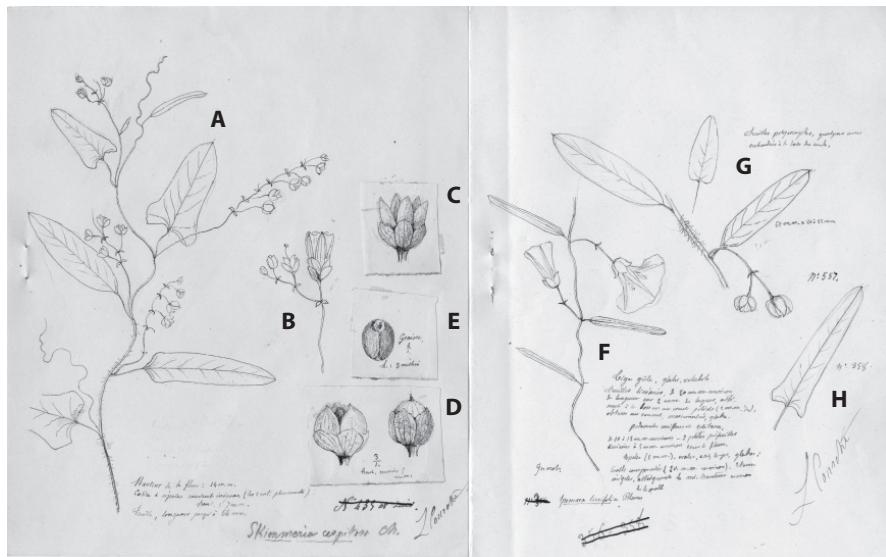
Herbaceous twiners or creepers; stems rooting, 0.5–3.0 m, spreading hirsute to glabrous. Leaves linear, oblong-lanceolate, ovate-oblong, or ovate, 1.9–6.0 × 0.5–2.5 cm, sparsely appressed hirsute or glabrous, base truncate, rounded, slightly auriculate to hastate, margins entire, apex obtuse, acute or slightly emarginate and mucronulate; petiole 0.1–0.5(–2.0) cm.

Inflorescences 1–4(–8)-flowered; peduncles filiform, 1.5–3.5(–7.5) cm, glabrous or sparsely pubescent basally; bracts persistent, ovate, 1–2 mm, glabrous; pedicels 5–10 mm, glabrous. Sepals elliptic or elliptic-oblong, unequal, outer 2 sepals 3–5 mm, inner 3 sepals c. 6 mm, exposed margins purplish, apices obtuse; corolla broadly funnelform, 0.9–1.1(–1.8) cm, pale yellow or whitish, midpetaline bands dark-veined, glabrous outside; stamens included, filaments dilated and pubescent basally; pistil included, ovary glabrous.

Capsules broadly ovoid to globose, 6–7 mm, thinly papery, glabrous. Seeds trigonous-ellipsoid, c. 3 mm, brownish black, glabrous or sparsely floccose at angles and hilum.

Distribution. Cambodia, Laos, Vietnam, India, Myanmar, Thailand, Malaysia, Indonesia, the Philippines, N Australia.





14.8. *Merremia hirta* (L.) Merr. A, flowering stem with many-flowered inflorescences, showing persistent bracteoles; B, inflorescence fragment; C, flower, lateral view; D, capsules enclosed in accrescent calyx; E, seed; F, glabrous flowering stem with solitary flowers and linear leaf blades; G, hirsute fruiting stem with oblong and narrowly ovate leaf blades; H, hastate leaf blade. Drawn by L. Courchet. Vouchers: A–E, Bon 5755 (P03867869); F, unknown collector 356; G, unknown collector 557; H, unknown collector 358.

Ecology. Disturbed ground, roadsides, fallow fields, pastures and lawns, rice paddies, marshy land, and secondary vegetation, often on poor, sandy soils; elevation: 0–400 m.

Notes. Extraordinarily variable in leaf blade shape and base, but rather constant in floral characters; the purplish margins of the sepals are a good field character.

Vernacular names

None recorded in CLV.

Material studied

Cambodia. Banteay Mean Chey: au pied du massif Dangrek, entre Battambang et Siem Reap, 26 Oct. 1927, *Poilane* 14451 (P). Kampot: 20 Dec. 1903, *Geoffray* 263 (P). Koh Kong: road between Koh Kong and Phnom Penh, 19 Nov. 2009, *Simões* et al. C46 (BKF, BM, SING); proche village de Pourn Vial Puoch, 15 Nov. 2009, *Cheng* et al. CL1161 (P, SING); track between Tmor Baing and Phum Vial Peuch, 15 Nov. 2009, *Simões* et al. C34 (BM, SING); *l. c.*, *Simões* et al. C37 (BM, SING); track between Trapern Roungh and Phnom Penh, 17 Nov. 2009, *Simões* et al. C42 (BM); *l. c.*, 18 Nov. 2009, *Simões* et al. C44 (BM, SING). Siem Riep: Baray, 1 Dec. 1997, *Hul* et al. 546 (P, RUPP).



14.9. *Merremia hirta* (L.) Merr. Leaf, flower (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

Laos. Khammouane: hills N and W of Ban Mak Pheung on N side of Nam Theun, 1 Nov. 2005, Newman et al. LAO796 (E, FOF); entre la Se Bang Faï et Takhet, 19 Oct. 1938, Poilane 28148 (P). Savannakhet: 12 Oct. 1938, Poilane 27997 (P). Vientiane: Dong Dok area, near National University of Laos, 2 May 2005, Sengsomphou OD58 (E); env. de Vientiane, 17 Oct. 1948, Vidal 663 (P).

Vietnam. s. loc.: 2 Nov. 1925, Evrard [legit Khai 115] 2627 (P). Binh Thuan: Phanthiet, tombeaux des mandarins, 5 Nov. 1924, Evrard 1694 (P). Da Nang: Tourane vic., May–July 1927, Clemens & Clemens 3121 (P). Dong Nai: rizières de Bien Hoa, 1862–1866, Thorel 591 (E, NY, P); Trian, près Bien Hoa, 19 Oct. 1920, Evrard 55 (P). Hai Duong: Sept Pagodas, Aug. 1908, Mouret 200 (P). Ha Noi: Tu Phap, 7 Oct. 1887, Balansa 3541 p.p. (P); l. c., Balansa 3542 (P). Hoa Binh: Phuong Lam, 10 Nov. 1887, Balansa 3541 p.p. (P). Ninh Binh: Cho Ganh, Nov. 1922, Pételet 764 (P). Quang Ninh: Dinh Huong, 12 Nov. 1892, Bon 5755 (P, SING). Vinh Phuc: de Phu Tho à Phu Doan, 26 Oct. 1911, Lecomte & Finet 692 (P). Yen Bai: 1911, Lecomte & Finet 615 (P).

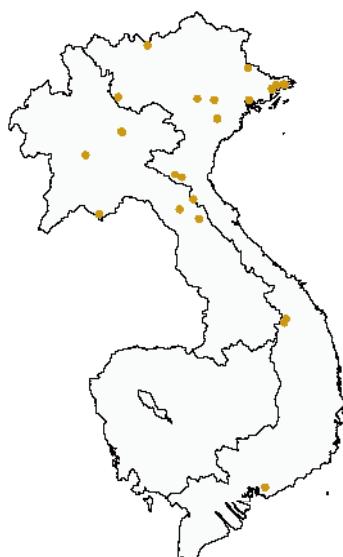
9. *Merremia kingii* (Prain) Kerr

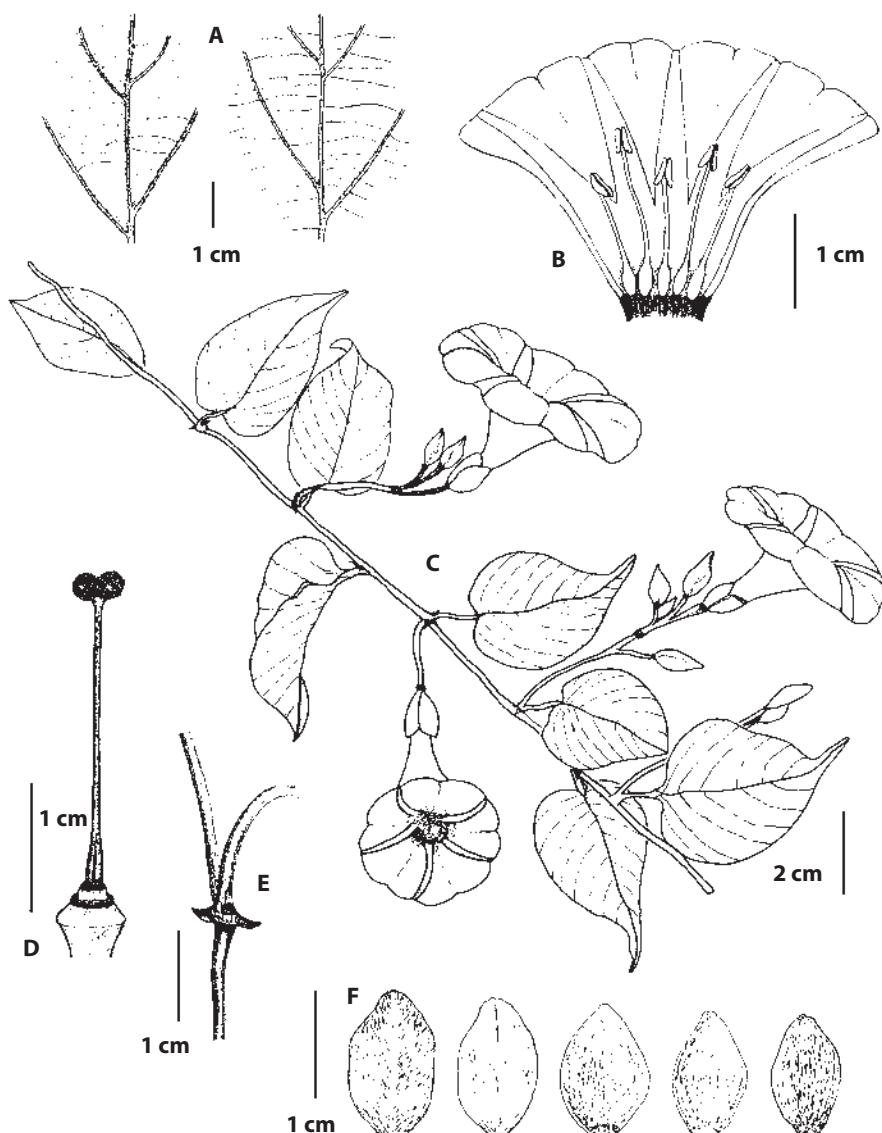
	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Merremia kingii (Prain) Kerr, Fl. Siam. 3 (2): 5. (1954); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 47, 84–85 (1993); Staples, Fl. Thailand 10: 438 (2010), Gard. Bull. Singapore 61: 495 (2010); Staples et al., Thai J. Bot. 6: 85 (2014). – *Ipomoea kingii* Prain, J. Asiatic Soc. Bengal, Pt. 2, Nat. Hist. 63 (2): 110 (1894). – Type: India. West Bengal, Darjiling district, Rishap, Oct. 1872, J.S. Gamble 3408A (lecto K!, K000380861, designated by Simões & Staples, J. Linn. Soc. Bot. 83: 582 (2017)).
Ipomoea cymosa var. *macra* C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 212 (1885). – Type: India, Assam, Griffith s.n. (syn K!); Khasia Hills, J.D. Hooker & Thomson s.n. (syn K!, P!, P03561634).
Ipomoea tonkinensis Gagnep., Notul. Syst. (Paris) 3: 149 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 252 (1915), syn. nov., p.p. – *Merremia tonkinensis* (Gagnep.) T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 183 (1990); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 177 (2005). – Type: Vietnam, [Ha Noi] Ha Tây, env. Tu-Phap, Dec. 1888, Balansa 3537 (lecto Pl, P00288086, designated by T.N.Nguyễn, (1990); isolecto Pl, P00288085).
Ipomoea petaloidea auctt. non (Choisy) Ooststr.: Gagnep. & Courchet, Fl. Indo-Chine 4: 257 (1915).
Merremia petaloidea auct. non (Choisy) Burkhill: T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 183 (1990).

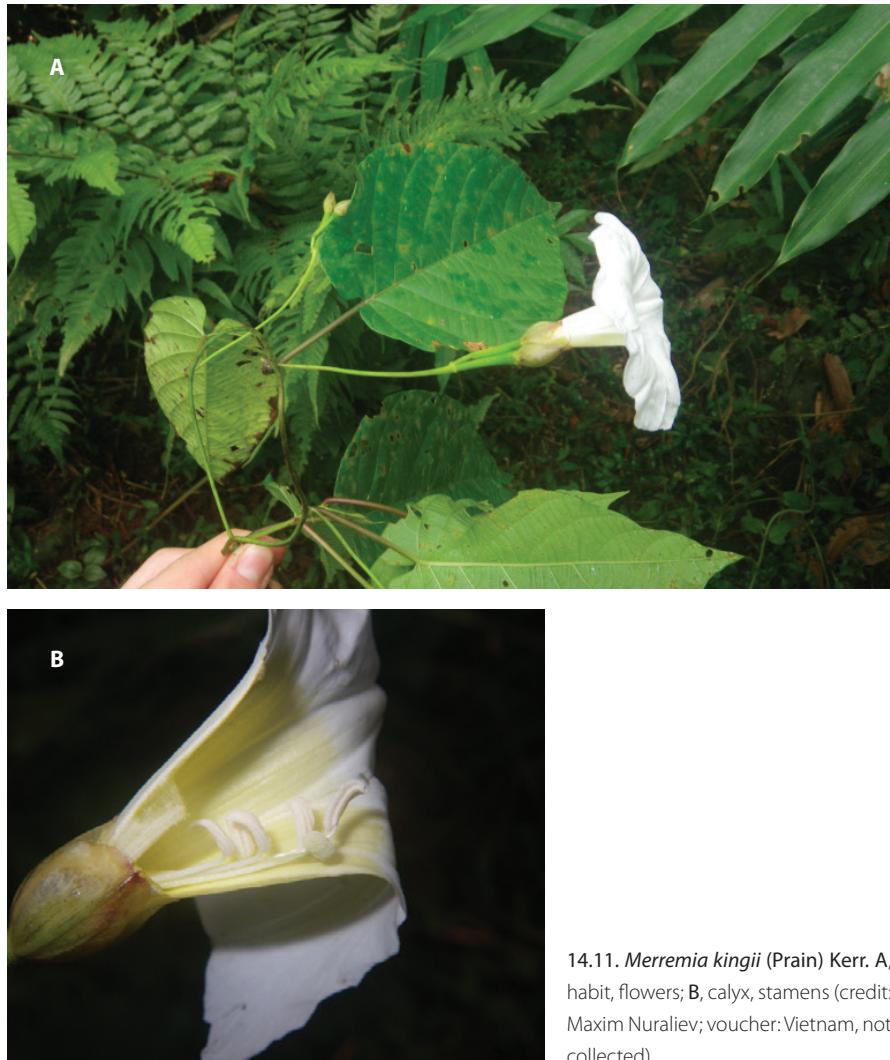
Perennial climbers; stems to 5–6 m long, terete. Leaves ovate, 9.0–14.0 × 5.0–8.8 cm, glabrous or sparsely pubescent along veins underneath, base cordate, apex attenuate-acuminate; petiole 2.5–10.0 cm, puberulous, base with paired, subulate auricles, 2–3 mm long.

Inflorescences lax, cymose panicles, usually 5–12-flowered; peduncles 5–15 cm long, glabrous; lower bracts foliose; pedicels clavate, 25–50 mm long, flanged and minutely verrucose apically, grooved between pedicel apex and sepal bases. Sepals unequal, deeply concave, broadly elliptic to narrowly obovate, 16–21 mm long, medially coriaceous, margins thinner, apices rounded or obtuse, persistent and reflexed in fruit; corolla funnel-form, 3.8–5.3(–6.3) cm long, white to pale yellowish, tube base cylindrical, flaring abruptly, limb c. 5 cm diam., 5-lobed, minutely hair-tufted on lobe tips,





14.10. *Merremia kingii* (Prain) Kerr. A, indumentum on leaf, abaxial side (left) and adaxial side (right); B, corolla opened, showing androecium; C, flowering stem; D, pistil; E, paired auricles at petiole base; F, sepals in abaxial view, outermost (left) to innermost (right). Drawn by Aurélia Dumas. Vouchers: A, Tsang 30070 (P03562410); B, Balansa 802 (P03536855) & Tsang 30070 plus photos of living plants; C, Balansa 802 & Leong-Škorničková et al. 2361 (P00843115) and color photos of living plants; D, E, Leong-Škorničková et al. 2361; F, Tsang 26848 (P03562412).



14.11. *Merremia kingii* (Prain) Kerr. A, habit, flowers; B, calyx, stamens (credit: Maxim Nuraliev; voucher: Vietnam, not collected).

otherwise glabrous; stamens included, unequal, filaments sparsely pilose below insertion, anthers opening lengthwise, apex curved.

Capsules ovoid-conical, 10–12 mm long, dark brown, glabrous. Seeds subglobose-trigonalous, c. 6–7 mm long, brownish pubescent.

Distribution. Laos, Vietnam, India, Bhutan, Myanmar, Thailand.

Ecology. In clearings, thickets, secondary regrowth, along watercourses, on sandy, clay, or poor granitic soils; elevation: 540–1200 m.

Notes. There is considerable taxonomic and nomenclatural confusion about the identity of this species; species delimitation between *M. kingii*, *M. bambusetorum*, and *M. umbellata* remains ambiguous. Firstly Prain, in the protologue, cited numerous specimens from Assam, Khasia Hills, Naga Hills, Shan Hills, Bhutan, and Sikkim; under the current *Code* these would all be considered syntypes of *I. kingii*. Duplicates of some of the collections Prain cited are located in Kew (isosyntypes) and have been examined. Where corolla colour is mentioned on the labels, it is only reported to be white. CLV specimens agree with these isosyntypes but corolla colours from white to cream to pale yellowish and even yellow are reported. Probably *M. kingii* is variable in flower colour, like others in *Merremia* sect. *Xanthips*.

Ipomoea tonkinensis was based on five syntypes and, as interpreted here, three are conspecific with *M. kingii* while two syntypes are actually *M. umbellata* subsp. *orientalis*. To add to the confusion Gagnepain & Courchet misinterpreted *Ipomoea petaloidea*; the CLV specimens they called by that name are mostly referable to *M. kingii*. A thorough revision of this species complex across tropical Asia is greatly needed.

Vernacular name

Laos. (khua) hou ka tay (*Vidal* 4322).

Material studied

Laos. Bolikhamsai: Borikhane, env. Ban Phon Ngam, 8 Feb. 1965, *Vidal* 4322 (P). Houa Phan: road from Ban Sakok to Luang Phabang, 253 km marker, 20 Oct. 2002, *Homsombath & Newman* 1410 (E, P); *I. c.*, *Homsombath & Newman* 1420 (E); Vieng Thong district, Nam Et Phou Louey Natural Protected Area, Khew King Mt., 6 June 2013, *Leong-Skornickova* et al. JLS 2361 (E, P, QBG, SING). Khammouane: tracks S of Ban Mak Pheuang, 31 Oct. 2005, *Newman* et al. LAO659 (E, FOF, P). Louang Prabang: along Hwy 13 between Vientiane and Luang Prabang, at Km 309, outskirts of Ban Phoudam village, 4 Nov. 2012, *Staples* et al. 1514 (HNL, PTK, SING). Vientiane: bords de routes, talus, 24 Oct. 1948, *Vidal* 670 (L).

Vietnam. "Tonkin", *Bon* 6116 (P). Binh Thuan: vallée de la haute rivière de Cu Bi, *Eberhardt* 1994 (P, syntype *I. tonkinensis*). Ha Giang: Lat Son, vallée de Dong Ham, 5 Nov. 1884, *Bon* 2813 (K, P, SING). Ha Noi: Port du Papier, 1908, *d'Alleizette* s.n. (P); env. de Tu Phap, 23 Nov. 1887, *Balansa* 3538 (P, syntype *I. tonkinensis*). Ha Tinh: Huong Son district, Ngam Thep vic., near field camp, 3 May 1998, *Hiep & Xiem* VA-432 (SING). Kon Tum: Dak Gley, 15 Jan. 1947, *Poilane* 32694 (P, SING); W slope of Ngoc Linh mountain system between Dak Mek River and Long Nam village, 17 Mar. 1995, *Averyanov* et al. VH830 (AAU, P). Lang Son: Quan Ho, 20 Oct. 1911, *Lecomte & Finet* 18 (P). Lao Cai: July 1897, *Wilson* 2761 (K). Nghe An: Con Cuong district, Khe Bu, 28 Apr. 1998, *Hiep* et al. VA-695 (SING); vic. Gianh An River, Khe Lo village, Luc Dia, 17 Oct. 2008, N.V. Du et al. HNK-3143 (K). Quang Ninh: Ho Yung Shan vic., Tien Yen, 13 Oct.–22 Nov. 1940, *Tsang* 30645 (B, BO, C, E, K, L, P); Kau Nga Shan vic., Tien Yen, 23 Sept. 23–7 Oct. 1940, *Tsang* 30487 (B, BO, C, E, K, L, P, S, UPS); Ouon Bi, 14 Sep. 1885, *Balansa* 802 (K, P); *I. c.*, 19 Nov. 1885, *Balansa* 823 (P); Sai Wong Mo Shan (Sai Vong Mo Leng), Lung Wan village, Dam Ha, 18 May–5 July 1940, *Tsang* 30070 (C, E, K, P); Taai Wong Mo Shan vic., Chuk-phai, Ha-coi, 23–31 Oct. 1936, *Tsang* 27070 (C, E, K, P); Tong Fa market, Ha Coi, 11–23 Sept. 1939, *Tsang* 29610 (B, BO, C, E, K, L, P, UPS).

10. *Merremia mammosa* (Lour.) Hallier f.



Merremia mammosa (Lour.) Hallier f., Teysmannia 7: 164 (1897); Ooststr., Blumea 3: 345 (1939), Fl. Males., Ser. I, Spermat. 4: 451 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 183 (1990); P.H.Hồ, Cây có Việt Nam 2 (2): 982 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 50 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 175 (2005); Staples, Fl. Thailand 10: 439 (2010), Gard. Bull. Singapore 61: 496 (2010). – *Convolvulus mammosus* Lour., Fl. Cochinch.: 108 (1790). – *Ipomoea gomezii* C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 211. 1883, p.p.; Gagnep. & Courchet, Fl. Indo-Chine 4: 254 (1915). – Type: Vietnam, “frequenter cultus in agris Cochinchinae” Loureiro s.n. (not located).

Ipomoea gomezii C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 211. 1883, p.p.; Gagnep. & Courchet, Fl. Indo-Chine 4: 254 (1915). – Type: Myanmar, Tavoy, W. Gomez s.n. (syn Kl, K000830866, K000830867).

Lianas with perennial, fasciculate tubers to 25 cm long; stems 5–15 m, fistulose, glabrous. Leaves orbicular to transversely elliptic, 6–12 × 5–15 cm, base cordate, apex abruptly acuminate, mucronulate; secondary veins 7–9 either side of midvein; petiole slender, 6–10 cm long.

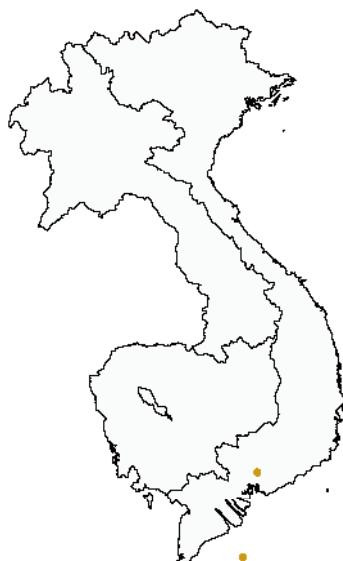
Inflorescences axillary, cymose, 3–30-flowered; peduncles terete, 3–15 cm long; bracts 7–10 mm, deciduous; pedicels 12–15 mm long, thickened apically. Sepals subequal, concave, outer 3 broadly ovate to broadly elliptic, 24–36 mm long, apices obtuse, inner 2 narrower, all glabrous, venose, accrescent and persistent in fruit; corolla broadly funnelform, 7–8 cm long, white, tube base yellow inside, glabrous (no apical hair tufts!), minutely gland-dotted outside; stamens included, filament bases pubescent, anthers spirally twisted; pistil included, disc cupular, 3 mm long, ovary glabrous.

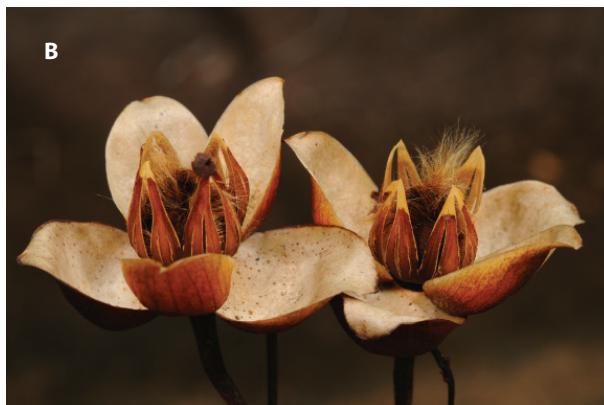
Capsules enclosed by persistent calyx, 4-valved, brown below the middle and straw-yellow above, the valves with secondary tears that do not reach the apex. Seeds c. 8 mm long, grey-black, angles long-hairy.

Distribution. Vietnam, India, Myanmar, Thailand, Indonesia.

Ecology. none reported for CLV.

Notes. Loureiro named this species from material he saw cultivated in Cochinchina. Since then, *M. mammosa* has been collected in Vietnam only once, c. 1875. It is





14.12. *Merremia mammosa* (Lour.) Hallierf. A, habit, flowers, B, fruit (credit: Preecha Karaket; Thailand, not vouchered).

found in eastern Thailand and is likely to be in Cambodia as well. It is surprising that it has not been collected in recent years, because the plants are large and the flowers are showy.

Ipomoea gomezii, the name Gagnepain & Courchet used for this species, is a mixed concept based on two different species; one of the syntypes, *Gomez s.n.*, in flower, is *M. mammosa*; the other syntype is fruiting material of *Operculina riedeliana* (Oliv.) Ooststr., a species not so far found in CLV.

Vernacular name

Vietnam. khoai tù (Loureiro, 1790: 108).

Material studied

Vietnam. Ba Ria-Vung Tau: Poulo Condor, 1875–1877, Harmand s.n. (P).

11. *Merremia poranoides* (C.B.Clarke) Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D

Merremia poranoides (C.B.Clarke) Hallier f., Bull. Herb. Boiss. 5: 375 (1897); Staples, Edinburgh J. Bot. 61: 91–92 (2005); Staples & Traiperm, Thai Forest Bull., Bot. 36: 106 (2008); Staples, Fl. Thailand 10: 440 (2010), Gard. Bull. Singapore 61: 498 (2010). – *Ipomoea poranoides* C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 208 (1883). – Type: C.B. Clarke 9189A, India, Darjeeling (lecto K!, K000195200, designated by Staples (2005)).

Ipomoea courchetii Gagnep., Notul. Syst. (Paris) 3: 144 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 261 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 178 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 996 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 168 (2005). – Type: Vietnam, Kiendi, Balansa 4459 (holo PI, P00288065).

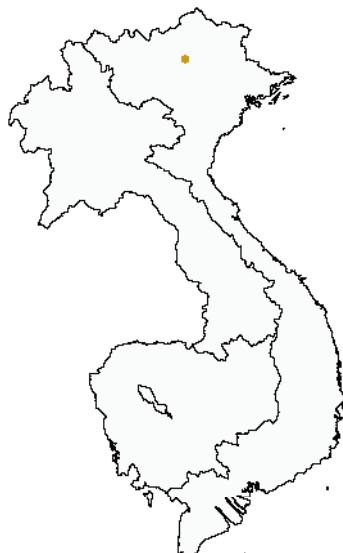
Ipomoea longipedunculata C.Y.Wu, Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 117 (1965), nom. illeg. – *Merremia longipedunculata* R.C.Fang, Fl. Reipubl. Popularis Sin. 64 (1): 77 (1979). – Type: China, Yunnan, Jenn-Yeh Hsien, C.W. Wang 80171 (holo KUN!, KUN1218200; iso A!, A00054657).

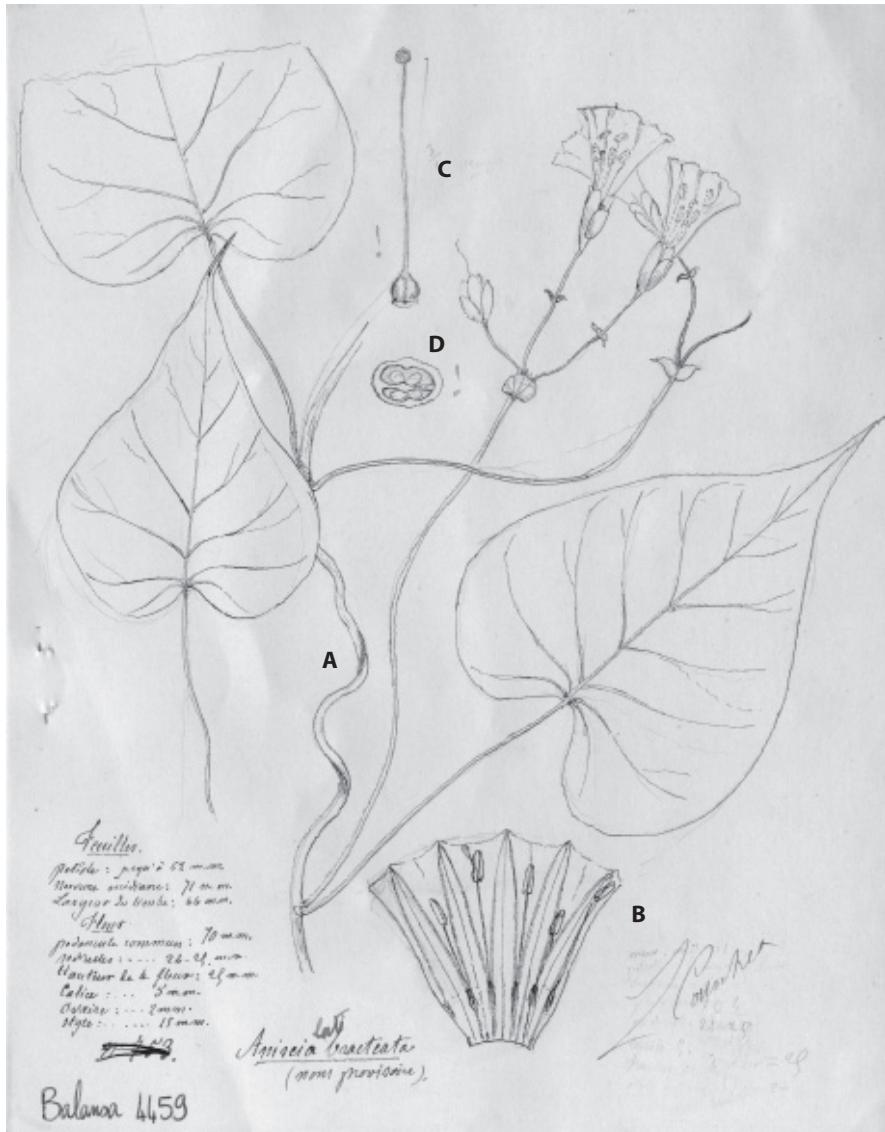
Herbaceous twiners, stems 1–2 m, axial parts mostly glabrous. Leaves cordate, basal leaves c. 15 × 14 cm, upper leaves 5–6 × 4–5 cm, both sides sparsely puberulous to glabrescent, base cordate, margins shortly ciliate, apex long acuminate; petiole 5–15 cm.

Inflorescences 6–17-flowered; peduncles 6–12 cm, yellowish villous distally; lowest bract foliose, sessile, clasping peduncle apex, upper bracts and bracteoles persistent, c. 2.5 mm; pedicels 15–30 mm, thickened distally, yellowish villous. Sepals purple-brown, elliptic, unequal, outer sepals c. 7 × 5 mm, inner sepals c. 9 × 6 mm, outsides glabrous or pale yellow villous, margins scarious, apices rounded or emarginate; corolla funnel-form, 2.0–2.5 cm, white, yellow inside tube, limb with 5 short triangular lobes, pilose apically; stamens included, inserted below middle of corolla tube, filaments pilose basally, anthers oblong, c. 3 mm; pistil included, ovary glabrous.

Capsules subglobose, c. 12 mm, brown. Seeds black, 5–6 mm, glabrous.

Distribution. Vietnam, India, China, Thailand.

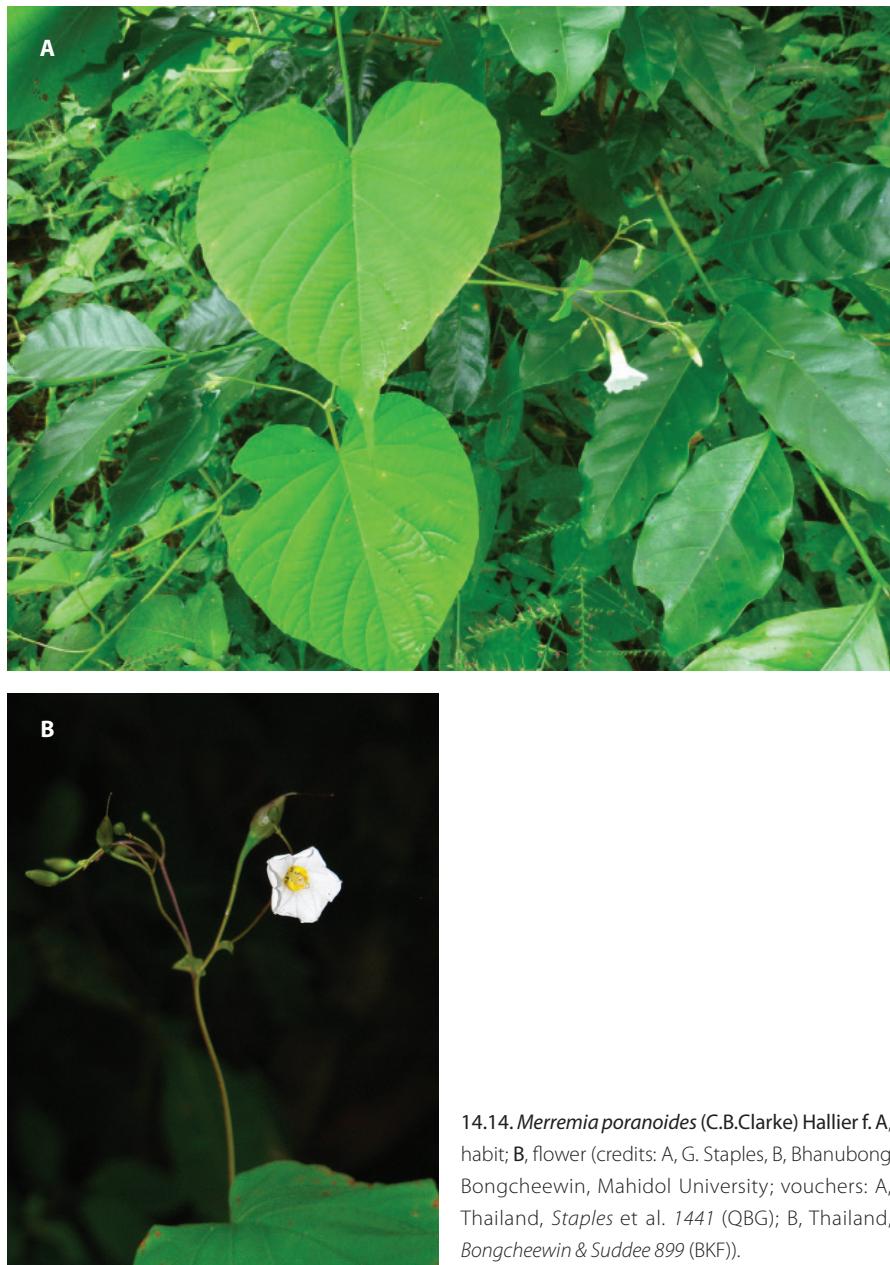




14.13. *Merremia poranoides* (C.B.Clarke) Hallier f. A, flowering stem; B, corolla, opened, showing androecium; C, pistil; D, ovary in cross-section. Drawn by L. Courchet. Voucher: *Balansa 4459* (P00288065).

Ecology. A montane species confined to higher elevation plateaux and mountain tops.

Notes. This species evidently has an extraordinarily wide distribution, yet few collections of it are extant in herbaria. The only collection known from the CLV region is the holotype of *I. courchetii*.



14.14. *Merremia poranoides* (C.B.Clarke) Hallier f. A, habit; B, flower (credits: A, G. Staples, B, Bhanubong Bongcheewin, Mahidol University; vouchers: A, Thailand, Staples et al. 1441 (QBG); B, Thailand, Bongcheewin & Suddee 899 (BKF)).

Material studied

Known only from the type collection.

12. *Merremia quinata* (R.Br.) Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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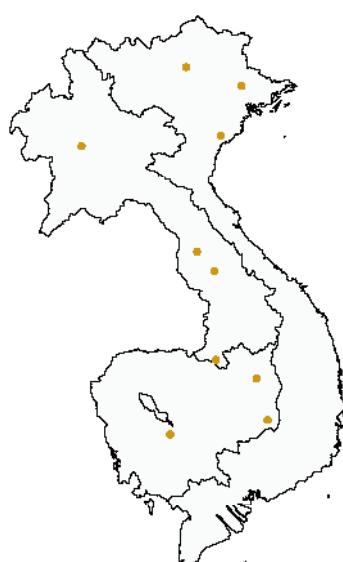
Merremia quinata (R.Br.) Ooststr., Fl. Males., Ser. I, Spermat. 4: 447 (1953), 6: 939 (1972); Kerr, Fl. Siam. 3 (2): 6 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 183 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 982 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 54 (1993); R.C.Fang & Staples, Fl. China 16: 294 (1995); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 176 (2005); Staples, Fl. Thailand 10: 440 (2010), Gard. Bull. Singapore 61: 499 (2010); Leti et al., Flore Photogr. Cambodge 186 (2013); Staples et al., Thai J. Bot. 6: 85 (2014). – *Ipomoea quinata* R.Br., Prodr. 486 (1810); Gagnep. & Courchet, Fl. Indo-Chine 4: 258 (1915). – *Convolvulus quinatus* (R.Br.) Spreng., Syst. Veg. 1: 590 (1824, t.p. 1825). – Type: Australia, Arnhem Bay, Mallinson's Island, R. Brown s.n. [Iter Austral. 2755] (syn BM; syn K!, K000874002; probable syn E!). *Ipomoea pentadactylis* Choisy, Mém. Soc. Phys. Genève 6: 471 [Conv. Orient. 89] (1834), nom. illeg. – Types: Myanmar, Toang Dong, 1826, Wallich Cat. 1367 (syn G-DC!, K-W!); India, Sukanagar, 18 Sep. 1810, Wallich Cat. 1354.C (syn G-DC!, K-W!).

Perennial herbaceous twiners or trailers; axial parts glabrous or yellowish hirsute; stems wiry, 1–2 m long. Leaves palmately compound, leaflets 5, linear, lanceolate, or oblong-elliptic, 1.5–4.2 × 0.25–1.5 cm, often glabrous, underside sometimes hirsute along midvein and margins, base attenuate, apex rounded to obtuse, mucronulate; petiole 1–3 cm.

Flowers solitary or paired; peduncles shorter than leaves; bracts lanceolate, 1–8 mm, apiculate; pedicels clavate, 3–9 mm; sepals elliptic to ovate-oblong, very unequal, outer 2 sepals 5–10 mm, obtuse, mucronulate, inner sepals 12–15 mm, glabrous, rounded to emarginate, all sepals persistent in fruit, inner side dark-pitted; corolla creamy white, narrowly funnelform, 2.3–4.0 cm, tube slightly curved; stamens included; stigmas included, ovary glabrous.

Capsules narrowly ovoid, 13–18 mm, straw-coloured, glabrous. Seeds ovoid-trigonous, 4–6 mm, black, crumbose, apices crested with brown scales.

Distribution. Cambodia, Laos, Vietnam, Myanmar, China, Thailand, Indonesia, the Philippines, New Guinea, N Australia.





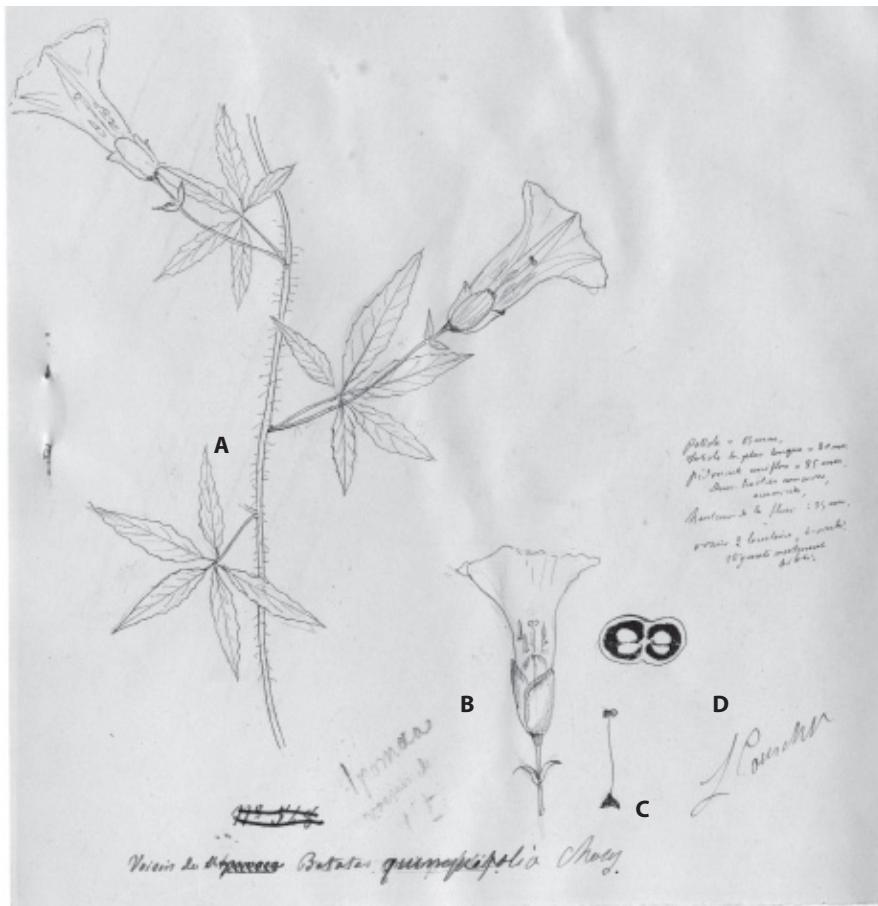
14.15. *Merremia quinata* (R. Br.) Ooststr.
A, habit, flower; B, fruits (credits: A, Paweena Traiperm, Mahidol University; B, Bruno David; vouchers: A, Laos, Staples et al. 1498 (HNL); B, Cambodia, K.C.Cheng et al. CL-802 (P)).

Ecology. Clearings and grassy understorey in dry dipterocarp forest, mixed deciduous forest, fire-influenced dry forest; elevation: 150–700 m.

Usage. Used medicinally in Cambodia (*Müller 431*).

Vernacular names

Cambodia. cög kluk sol (*Müller 431*).



14.16. *Merremia quinata* (R.Br.) Ooststr. A, flowering stem; B, flower, lateral view, indicating position of pistil and stamens inside; C, pistil; D, ovary in cross-section. Drawn by L. Courchet. Voucher: Massie s.n. (P03544662).

Material studied

Cambodia. Kompong Chhnang: Ho Thrir, 9 Oct. 1938, Müller 431 (P). Mondulkiri: 28 Oct. 2006, Long et al. CL318 (P). Ratanakiri: route de Lumphat, 26 Nov. 2007, Cheng et al. CL802 (P).

Laos. s. loc.: Apr. 1895, Massie s.n. (P, SING). Champassak: Expedition du Mekong, île du Khon, 1866–1868, Thorel 2421 p.p. (P); Penongs, 1866–1868, Thorel 2421 p.p. (P); Se Don, 1866–1868, Thorel 2421 p.p. (P). Louang Prabang: nearby Pha Tad Ke Botanic Garden, in fallow land, 2 Nov. 2012, Staples et al. 1498 (HNL, KKU, PTK, SING). Savannakhet: Xe Bang Fai, 24 Oct. 1938, Poilane 28296 (P, SING).

Vietnam. s. loc.: "Tonkin, Chau vil", Duport 149 (P, SING). Bac Giang: Phocam, 13 Jan. 1886, Balansa 803 (P). Ninh Binh: Cho Ganh, Nov. 1923, Pételet 1263 (P). Quang Ninh: Baie d'Halong, 8 Nov. 1911, Lecomte & Finet 784 (P).

13. *Merremia quinquefolia* (L.) Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Merremia quinquefolia (L.) Hallier f., Bot. Jahrb. Syst. 16: 552 (1893); P.H.Hô, Cây cỏ Việt Nam 2 (2): 983 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 176 (2005); Staples *et al.*, Thai J. Bot. 6: 85 (2014). – *Ipomoea quinquefolia* L., Sp. Pl. 1: 162 (1753). – Type: [icon] Plukenet, Alm. t. 167, f. 6. (1696) (lecto, designated by D.F.Austin, Ann. Missouri Bot. Gard. 62: 182 (1975)).

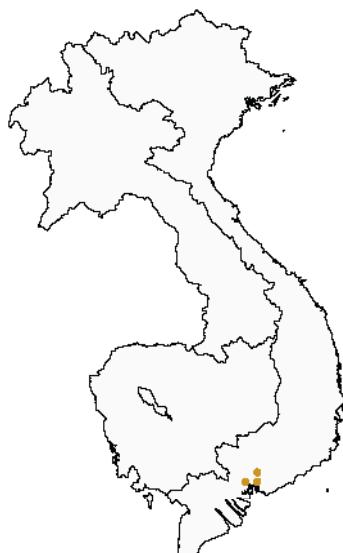
Ipomoea pentaphylla auctt. non Jacq.: Gagnep. & Courchet, Fl. Indo-Chine 4: 239 (1915).

Lianas; stems woody toward the base, to 2–3 cm diam., stem tips and branches herbaceous, slender, glabrous to densely hirsute with patent, yellowish trichomes. Leaves palmately compound, leaflets 5, glabrous, sessile or shortly petiolulate, oblong, narrow-oblong, or lanceolate, 2.5–6.0 × 0.5–2.0 cm, attenuate toward both ends, margins coarsely dentate to undulate or nearly entire, apex acute to obtuse and mucronulate; petiole 2–9 cm long, glabrous or sparsely yellowish hirsute.

Inflorescences axillary, cymose, 1–3-flowered; peduncles 4–7 cm long, glandular apically, the glandular indumentum sometimes mixed with patent, yellowish trichomes; bracts 1.0–1.5 mm long, narrowly triangular, acute; pedicels 5–7(–15) mm long, glabrous or sparsely glandular basally, typically enlarging to 15–20 mm long in fruit and thickened near the apex. Sepals subequal or the outer shorter, the outer 3–6 mm long, the inner 4–8 mm long, narrowly ovate to oblong, obtuse, mucronulate, glabrous, the outer at times subtruncate apically, slightly enlarged in fruit; corolla campanulate to broadly funnelform, 1.5–2.5 cm long, glabrous, white; stamens included, unequal, filaments adnate to the tube for about half their length, sparsely pubescent where attached, glabrous and free above, 5–7 mm long, anthers spirally dehiscent, creamy white, 2–3 mm long; pollen 3-colporate, smooth; ovary subglobose to slightly four-lobed, smooth, glabrous, 1 mm diam.; disc smooth, glabrous, annular.

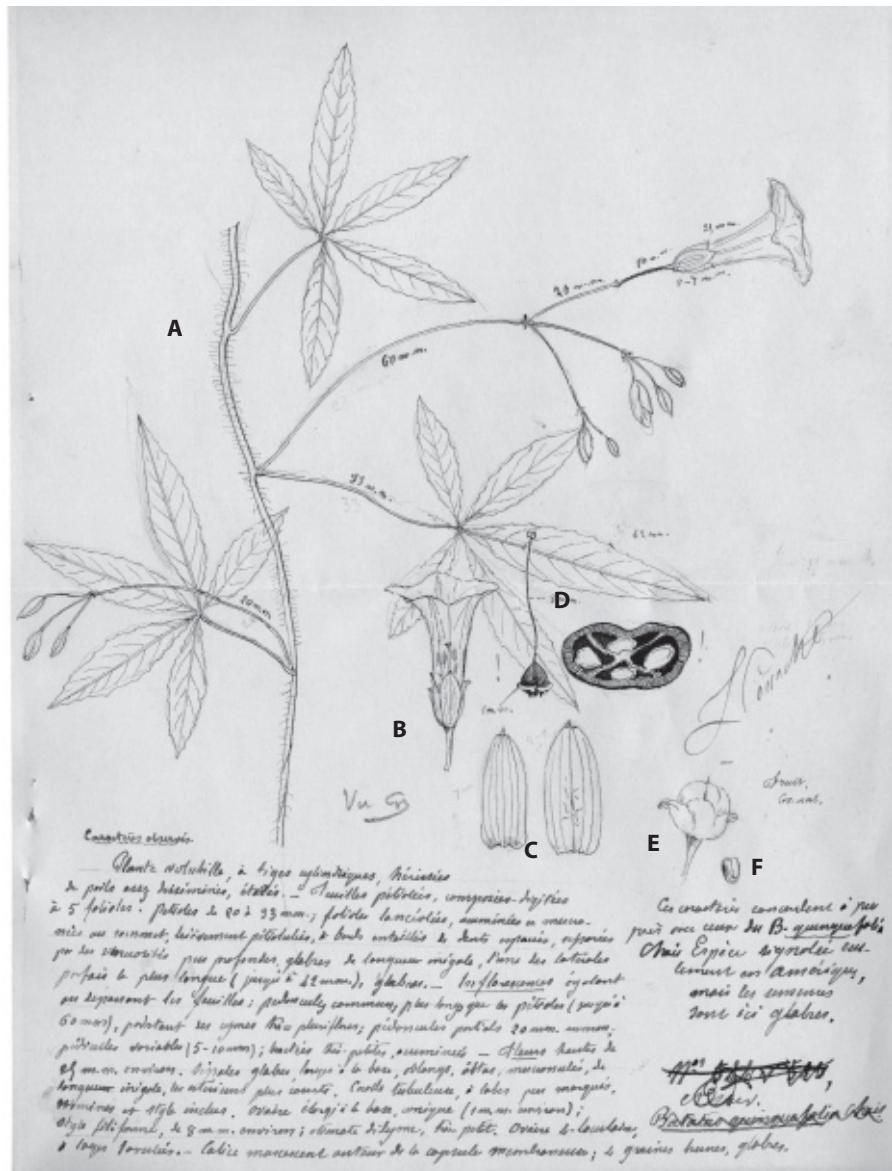
Capsules globose to depressed globose, 4-locular, 4-valved, 9–10 mm long. Seeds 4 or fewer, 4–5 mm long, black to brown, subrotund, with short, curled appressed indumentum.

Distribution. Native throughout tropical America; now widespread in the Old World tropics as a weed. In Asia





14.17. *Merremia quinquefolia* (L.) Hallier f. Habit (credit: Jean-François Butaud; voucher: French Polynesia, Tupai, Butaud 3048 (PAP)).



14.18. *Merremia quinquefolia* (L.) Hallier f. A, flowering stem; B, flower in lateral view; C, sepals, abaxial view; D, pistil (left), ovary in cross-section (right); E, capsule; F, seed. Drawn by L. Courched. Voucher: Talmey s.n. (P03544635).

it is known to be present in Vietnam, India, Indonesia, New Guinea, Australia (Queensland), and numerous Pacific islands.

Ecology. Cultivated in Saigon botanical garden and now present in southern Vietnam in clearings, roadsides, disturbed areas and secondary regrowth.

Note. Gagnepain & Courchet used the name "*Ipomoea pentaphylla*", which is a nomenclatural synonym of *M. aegyptia*, for Vietnamese plants that are actually *M. quinquefolia*.

Material studied

Vietnam. s. loc.: *Talmy* s.n. (P). Dong Nai: Long Lanh, Oct. 1865, *Pierre* s.n. (P). Ho Chi Minh Ville: Jardin Botanique de Saigon, Feb. 1866, *Pierre* 3 (P); "Saigon" vic., Nov. 1874, *Godefroy* s.n. (P).



14. *Merremia sagittoides* (Courchet & Gagnep.) Staples, comb. nov.

 J F M A M J J A S O N D	 J F M A M J J A S O N D
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Merremia sagittoides (Courchet & Gagnep.) Staples comb. nov. – *Ipomoea sagittoides* Courchet & Gagnep., Notul. Syst. (Paris) 3: 147 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 253 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 172 (2005). – Type: Vietnam, Ha Nội, *in montibus Bàn-Phết, Bon 2425* (syn Pl. P00288074, P03561589); Than Hoa, near Phú-Diêù, Bon 5216 (syn Pl. P00288075, P00288076, P00288077, P00288078).

Perennial herbs; stems twining, 1–3 m, softly whitish pilose, older stems glabrescent. Leaves oblong-acuminate, 7.0–9.0 × 2.5–3.5 cm, base hastate-cordate or cordate-truncate, basal auricles quadrate, spreading, often dentate along sides, blades long and narrowly acuminate toward apex, mucronate, upper sides glabrescent or slightly pilose, undersides softly pilose with whitish trichomes; secondary veins c. 7 either side of midvein, finer veins inconspicuous; petiole 1.0–2.5 cm long, softly pilose, with paired auricles at base.

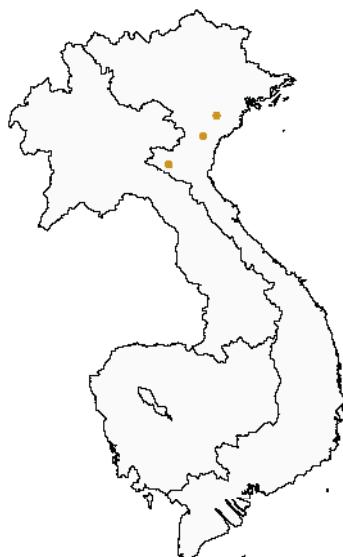
Inflorescences corymbose, many-flowered, appearing 1-sided; peduncles 2–4 cm long; secondary peduncles usually 2 or 3, 1.5–2.0 cm long, bearing 5–7 flowers each; bracts deciduous; pedicels crowded, c. 1.5 cm long, thicker towards apex. Flowers showy; sepals obovate to elliptic, convex, to 1.3 × 0.8 cm, margins scarious, apices obtuse, rounded or emarginate, mucronulate, outsides glabrescent, often lacerate in fruit; corolla funnelform, white, c. 3.5–4.0 cm long, tube outside glabrous, limb wide-spreading, c. 3 cm diam., 5-lobed, lobes short, triangular, with minute hair tuft outside at apex, otherwise glabrous; stamens included, unequal, filaments inserted near tube base, 15–19 mm long, dilated below insertion, edges of dilation ciliate with long trichomes, otherwise glabrous, anthers oblong, c. 3 mm long, white, bases sagittate, dehiscing longitudinally, not twisting; pistil included, longer than stamens, entirely glabrous, ovary acuminate, 2-locular, 4-ovulate, style filamentous, stigmas 2-globose.

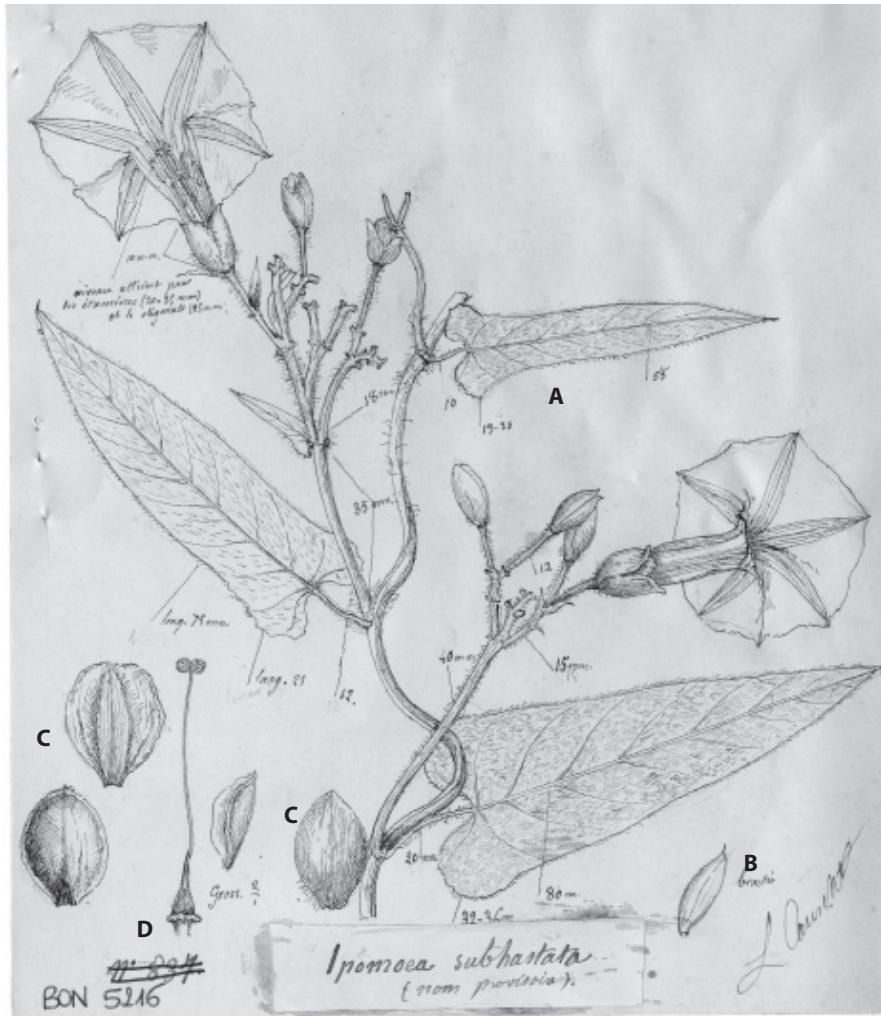
Capsule unknown.

Distribution. Vietnam.

Ecology. In open, sunny places.

Notes. I am, somewhat reluctantly, recognizing this as a distinct species of *Merremia*; its morphology clearly allies it with members of the *M. umbellata/bambusetorum/kingii* species complex, an extraordinarily intergrading continuum of variation. However, as noted





14.19. *Merremia sagittoides* (Courchet & Gagnep.) Staples. A, flowering stem; B, bract; C, sepals; D, pistil. Drawn by L. Courchet. Voucher: Bon 5216 (P00288075).

by Gagnepain when he described *I. sagittoides*, this species presents a different facies from other members of this complex: its abundant, soft, whitish pubescence; the leaves typically hastate basally; the inflorescence architecture having flowers crowded close together in an almost one-sided arrangement. Some specimens from Borneo share a similar facies. Further study of the Asian species related to *M. umbellata* is greatly needed.

Vernacular names

Vietnam. hoa bím bím (Annamite, Bon 2425), khua khan khon (Spire 1156).

Material studied

Vietnam. Nghe An: Canh trap, Spire 1156 (P).

15. *Merremia subsessilis* (Courchet & Gagnep.) T.N.Nguyễn

	J	F	M	A	M	J	J	A	S	O	N	D

Merremia subsessilis (Courchet & Gagnep.) T.N.Nguyễn, in Averyanov et al., Vasc. Pl. Syn. Vietnamese Fl. 1: 183 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 983 (1993); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 176 (2005); Staples, Fl. Thailand 10: 443 (2010), Gard. Bull. Singapore 61: 502 (2010); Staples et al., Thai J. Bot. 6: 85 (2014). – *Ipomoea subsessilis* Courchet & Gagnep., Notul. Syst. (Paris) 3: 148 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 255 (1915). – Types: Vietnam. Quang Ninh: Ouonbi, Balansa 811 (syn Pl, P00391926, P00391927); same loc., 7 Nov. 1885, Balansa 812 (syn Pl, P00391928, P00391929); 'île Verte, à l'est de la Baie de Fi-tsi-Long/ Balansa 813 (syn Pl, P00391930); [Hà Tinh ?] 'Lam', Sergent Mouret 189 (syn Pl, P00391925); 'Quang Yen', d'Alleizette 187 (syn Pl, P00288079).

Merremia collina auctt. non S.Y.Liu: Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 34–35 (1993).

Perennial herbaceous twiners; stems 1–3(–5) m long, glabrous. Leaves ovate-acuminate to oblong, membranaceous, 3–6 × 3–4 cm, base cordate, lobes semiorbicircular, overlapping; secondary veins 5–7 either side of midvein; petiole 0.4–0.7 cm long, glabrous.

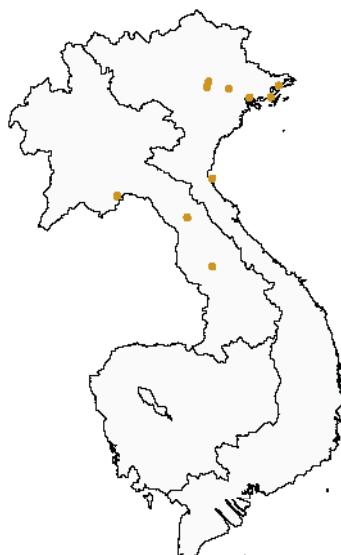
Inflorescences axillary, cymose, 1–3-flowered; peduncles to 2 cm long, emerging between basal leaf lobes; bracts opposite, lanceolate-ovate, 1–5 mm long, sessile; pedicels 10 mm long, thicker apically. Flowers weakly zygomorphic; sepals elliptic, unequal, outer 5–7 × 3 mm, inner c. 10 × 5 mm, all obtuse, outside glabrous, warty, dark-dotted inside when in fruit; corolla funnel-form, c. 2 cm long, pale yellow, tube slightly curved, limb 0.8–1.0 cm diam., weakly 5-lobed; stamen filaments c. 6 mm long, bases dilated, papillose; anthers oblong, 4 mm long, spirally twisted at dehiscence; ovary attenuate-ovoid, 2-locular, glabrous.

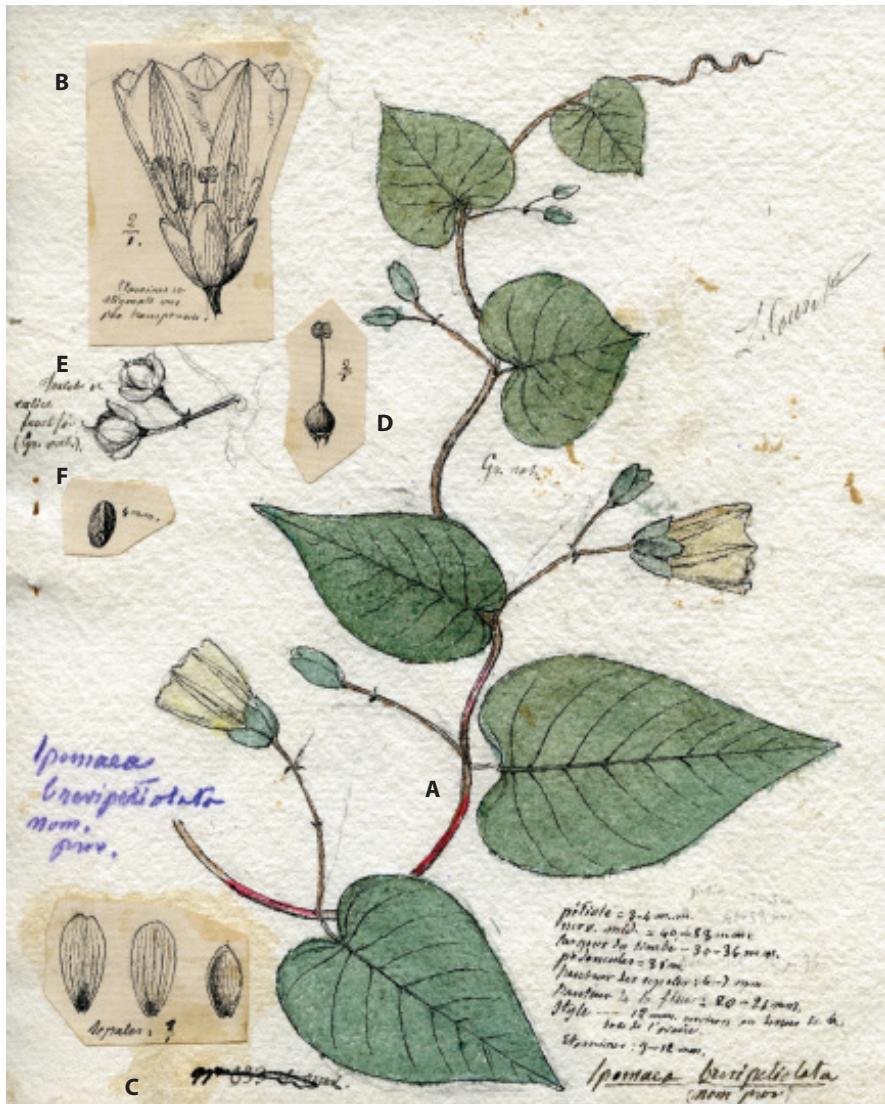
Capsules globose, c. 10 mm diam., 2-valved, enclosed in slightly enlarged sepals. Seeds ovoid, 4–5 mm long, glabrescent.

Distribution. Laos, Vietnam, Thailand.

Ecology. Twining in hedges or bushes, sprawling in undergrowth, usually on sandy soils.

Notes. An easily recognized species, distinctive for the lax panicles with a clasping, foliose bract at the base





14.20. *Merremia subsessilis* (Courchet & Gagnep.) T.N.Nguyễn. A, flowering stem; B, flower, lateral view; C, sepals; D, pistil; E, capsules; F, seed. Drawn and coloured by L. Courchet. Voucher: Mouret 189 (P00391925).

of the peduncle and for the curved corolla tube that gives the whole flower a slightly zygomorphic aspect.

Material studied

Laos. Bolikhamsai: Tat Luek Nam Tok, 3 Jan. 1994, *Fukuoka & Koyama L-65143* (BKF, L). Khammouane: Nakai district, Ban Sop Ma, 8 Oct. 2006, *Nanthavong et al. BT676* (E, P).



14.21. *Merremia subsessilis* (Courchet & Gagnep.) Nguyen T.N. Habit, flower (credit: G. Staples; voucher: Thailand, Staples et al. 1456 (QBG)).

Savannakhet: km 30 de la Route Coloniale no. 9, 18 Oct. 1938, Poilane 28096 (P, SING). Vientiane: Phou Khao Khouay [National Park], 29 Oct. 1971, Vidal 5739 (P).

Vietnam. Bac Giang: pagoda Soison, Nov. 1915, Pételet 2533 (HNU). Vinh Phuc: "prov. Vinh Yen", massif du Tam Dao, Eberhardt 3712 (P, SING); Tam Dao, 9 Feb. 1965, Doan Khao Viet-Trung 4606 (HNU).



14.22. *Merremia thorelii* (Gagnep.)

Staples Habit (credit: Preecha Karaket, BKF; voucher: Thailand, Staples et al. 1324 (BKF)).

16. *Merremia thorelii* (Gagnep.) Staples



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J F M A M J J A S O N D

Merremia thorelii (Gagnep.) Staples, Gard. Bull. Singapore 61:503 (2010); Staples & Traiperm, Thai Forest Bull., Bot. 36: 98 (2008) *nom. inval.*; Staples, Fl. Thailand 10: 444 (2010); Staples *et al.*, Thai J. Bot. 6: 85 (2014). – *Ipomoea thorelii* Gagnep., Notul. Syst. (Paris) 3: 148 (1915); Gagnep. & Courchet, Fl. Indo-Chine 4: 245 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 180 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 997 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 172 (2005). – Types: Laos, [Champassak:] Khong, 1866–1868, *Thorel s.n.* (syn Pl, P00288082); Vietnam, [Bình Duong:] Ti-tinh, 1862–1866, *Thorel s.n.* (syn Pl, P00288080, P00288081).

Merremia collina S.Y.Liu, Guihaia 4: 199 (1984); R.C.Fang & Staples, Fl. China 16: 296 (1995). – Type: China, Guangxi, Yongning Xian, S.Y. Liu 002112 (holo GXMI; iso IBK, KUN!, KUN1218193, KUN1218194).

Perennial herbaceous trailers; stems prostrate, 1–2 m, tips twining, axial parts, foliage, calyx rather densely hirsute, viscid. Leaves narrowly ovate to oblong-lanceolate, 1.8–6.5 × 0.8–3.8 cm, upper sides sparsely hirsute, undersides densely so, base emarginate to shallowly cordate, margins entire, ciliate, apex obtuse, mucronulate; petiole 0.3–1.2 cm.

Inflorescences usually 1(–3)-flowered; peduncles 1.2–5.5 cm; bracts 2, falcate, 2–11 mm. Sepals lanceolate to oblong, subequal, 10–15 mm, outer 3 glandular-hirsute outside, acute to attenuate, inner glabrous, apex rather obtuse; corolla funnelform, 2.5–3.0 cm, pale yellow, glabrous, tube base slightly curved, limb shallowly 5-lobed; stamens included, unequal, filaments fimbriate-scaly basally, anthers twisted; pistil included, ovary glabrous (or hirsute).

Capsules ovoid, c. 10 mm, glabrous (or hirsute). Seeds 4 or fewer, ellipsoid-trigonous, 3–4.5 mm, blackish, glabrous.

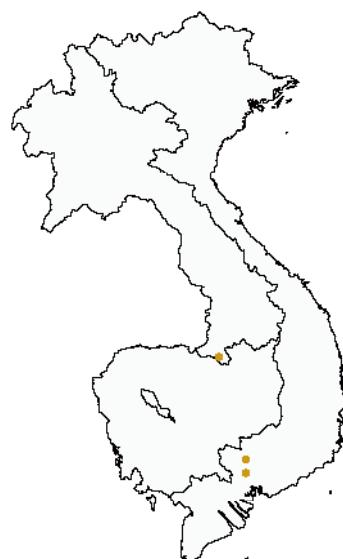
Distribution. Cambodia?, Laos, Vietnam, China, Thailand.

Ecology. Open situations in deciduous dipterocarp forest, on sandstone substrate.

Notes. I have collected *M. thorelii* along the Thai-Cambodian border, on the Thai side. It must be present in adjacent Cambodia as well.

Material studied

Vietnam. Binh Duong: Thu Dau Mot, Chon Thanh, Jan. 1914, Fleury sub Chevalier 30239 (P).



17. *Merremia umbellata* (L.) Hallier f.

Merremia umbellata (L.) Hallier f., Bot. Jahrb. Syst. 16: 552 (1893); T.N.Nguyễn in Averyanov et al., Materialy po flore i rastitelnosti ostrovogno V'etnama 43-44 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 184 (1990); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 57, 84–85 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 176 (2005); Staples, Fl. Thailand 10: 444 (2010), Gard. Bull. Singapore 61: 503 (2010); Leti et al., Flore Photogr. Cambodge 187 (2013). – *Convolvulus umbellatus* L., Sp. Pl. 1: 155 (1753). – Type: [icon] in Plukenet, Phytographia t. 167, f. 1. 1692 (lecto, designated by D.F.Austin, Florida Sci. 42: 221 (1979)).

See the two subspecies for descriptions.

Distribution. *M. umbellata* as a whole is nearly pantropical: throughout tropical America, tropical Africa, widespread across tropical Asia, Malesia, northern Australia, and the Pacific Islands.

Ecology. In its native habitats often found in moist to wet places, in sunny exposures. This species is weedy and thrives in areas disturbed by humans, who have greatly abetted its spread.

Notes. Ooststroom (1953) recognized Asian and Malesian plants as *M. umbellata* subsp. *orientalis* (Hallier f.) Ooststr. After seeing the considerable variability in Southeast Asian specimens, I hesitate to include it all within subsp. *orientalis*. Comparing material of subsp. *umbellata* from Vietnam side by side with abundant material of subsp. *orientalis* from the CLV region suggests to me that there are two distinct species involved, but there is undeniably so much polymorphic overlap in character states that it is hard to quantify the differences. Until a more detailed study of the variability can be made, and appropriate taxa recognized, I am continuing the recognition of two subspecies in *M. umbellata*. This is an extraordinarily polymorphic species, in the past much confused in herbaria and the field with *M. kingii* and *M. bambusetorum*, though now that adequate material is at hand the differences between these three species are becoming clearer. *Merremia umbellata* can be recognized by its whitish puberulent axial parts, especially the pedicels; the crowded, umbelliform inflorescences (the secondary and tertiary branches short or none); the unequal sepals, with the outer two shorter, obovate, tapering to narrow bases between which the inner sepals are visible. Generally, the flowers of *M. umbellata* are smaller and there are more of them per inflorescence than in *M. bambusetorum* and *M. kingii*, though the overlap is undeniable.

Key to the subspecies

1. Corolla campanulate-funnelform, bright yellow; sepals 7–10 mm long, drying reddish brown; stems and leaves glabrous or sparsely whitish puberulent; seeds pubescent to short-tomentose all over **17a. *subsp. umbellata***
1. Corolla funnelform, pale yellow or white, darker inside at tube base; sepals 5–7(–8) mm long, drying brown to blackish; stems and leaves always softly whitish puberulent; seeds tomentose on sides, with long villose trichomes on angles **17b. *subsp. orientalis***

17a. *Merremia umbellata* (L.) Hallier f. subsp. *umbellata*

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Merremia umbellata (L.) Hallier f. subsp. *umbellata* in Ooststr., Fl. Males., Ser. I, Spermat. 4: 450 (1953); P.H. Hô, Cây cỏ Việt Nam 2 (2): 984 (1993).
Ipomoea fastigiata auct. non Sweet: T.N. Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 179 (1990).

Vigorous climbers, stems to 5 m long, glabrous or nearly so. Leaves variable in shape, 4–12(–20) × 1–9 cm.

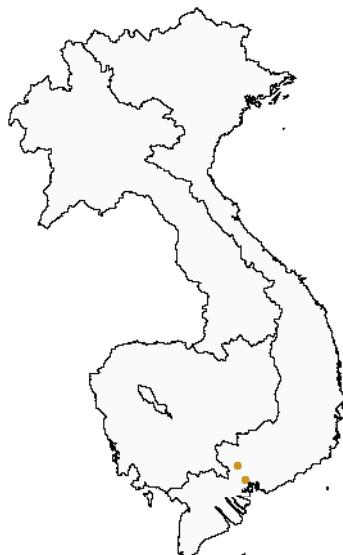
Inflorescences usually many-flowered (rarely flowers solitary); peduncles 1–7 cm long. Sepals 7–10 mm long, glabrous, drying reddish brown; corolla campanulate-funnelform, flaring above calyx, vivid lemon-yellow.

Capsules subglobose, c. 15 mm diam., valves ± broadly ovate. Seeds c. 5 mm long, pubescent to short tomentose all over.

Distribution. Native in tropical America and Africa; introduced and sparingly naturalized in several Asian countries, including Vietnam, as well as Australia and the Pacific Islands (French Polynesia, Hawaii).

Ecology. In disturbed areas near human habitation, climbing in thickets in moist areas.

Notes. Specimens at the herbarium in Paris from the CLV region that had been identified as "*Ipomoea fastigiata* Sweet" all proved to be the nominate subspecies of *M. umbellata*. Nomenclaturally *I. fastigiata* is a synonym of *I. tiliacea* (Willd.) Choisy, a tropical American species not known to be present in CLV. Evidently introduced to Saigon Botanical Garden, *M. umbellata* subsp. *umbellata* has not been collected in recent years but there is an excellent chance it has naturalized in the area, as it does everywhere it is planted.

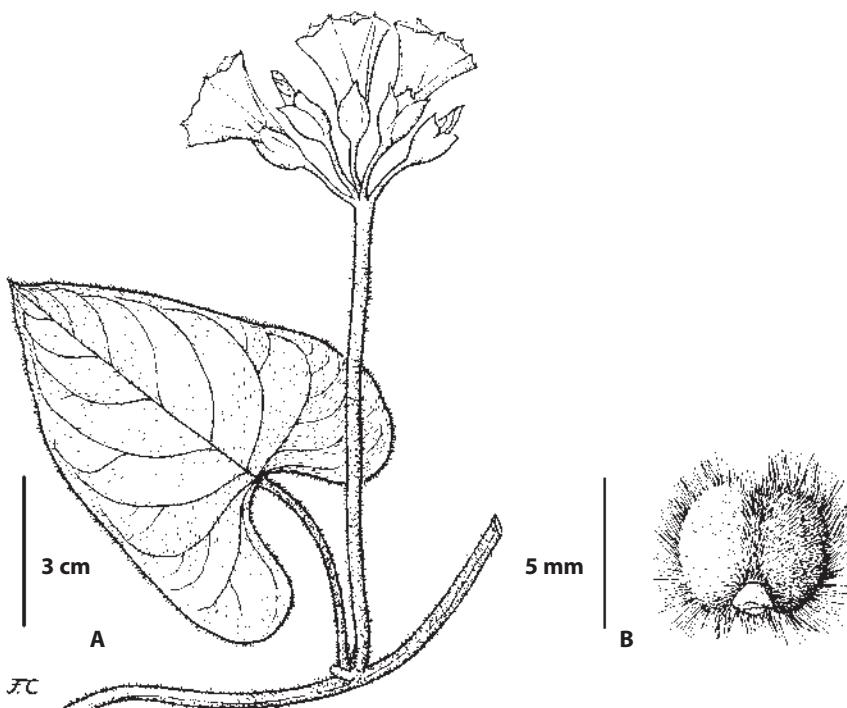


Vernacular name

None recorded in CLV.

Material studied

Vietnam. Ho Chi Minh Ville: jardin botanique de Saigon, 21 Dec. 1918, *Hiệp* 204 (P); Saigon, bords de l'arroyo de l'Avalanche, 24 Feb. 1898, *Debeaux* 118 (P); Saigon, dans les haies, 16 Jan. 1919, *Chevalier* 39850 (P); Saigon, Phu my, 19 Dec. 1919, *Hiệp* 516 (P).



14.23. *Merremia umbellata* (L.) Hallier f. subsp. *umbellata*. A, flowering stem; B, seed (From Bosser & Heine 2000, in part).



14.24. *Merremia umbellata* (L.) Hallier f. subsp. *umbellata*. Habit, flowers (credit: G. Staples; voucher: U.S.A., Hawaii, Staples 1566 (BISH)).

17b. *Merremia umbellata* (L.) Hallier f. subsp. *orientalis* (Hallier f.) Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
--	---	---	---	---	---	---	---	---	---	---	---	---	--	---	---	---	---	---	---	---	---	---	---	---	---

Merremia umbellata (L.) Hallier f. subsp. *orientalis* (Hallier f.) Ooststr., Fl. Males., Ser. I, Spermat. 4: 449 (1953); Kerr, Fl. Siam. 3 (2): 6 (1954); P.H.Hô, Cây cỏ Việt Nam 2 (2): 984 (1993); R.C.Fang & Staples, Fl. China 16: 296 (1995); Staples *et al.*, Thai J. Bot. 6: 85 (2014). – *Merremia umbellata* var. *orientalis* Hallier f., Verslag Staat's Lands Plantentuin Buitenzorg 1895: 132 (1896); Ooststr., Blumea 3: 333–342 (1939). – *Convolvulus cymosus* Desr. in Lam., Encycl. 3: 556 (1792). – *Ipomoea cymosa* (Desr.) Roem. & Schult., Syst. Veg. 4: 241 (1819), nom. illeg.; Gagnep. & Courchet, Fl. Indo-Chine 4: 251 (1915). – Type: “India Orientale” without locality, Sonnerat s.n. (syn P-LAI, P00666108); “fretto Magellanico” [in error], Commerson s.n. (syn P-Jusl, P00673173).

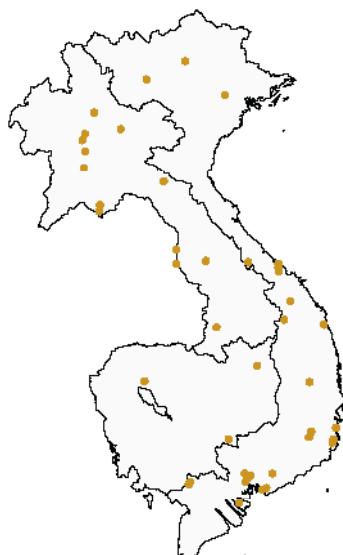
Perennial herbaceous twiners or creepers; axial parts softly whitish puberulent (or glabrate); stems 1–3 m long, rooting at nodes. Leaves ovate, ovate-oblong, or oblong-lanceolate, 3.5–14.5 × 1.3–10 cm, softly whitish puberulent, undersides more densely so, base cordate, apex emarginate, acute to acuminate; petiole 1–6 cm, base with 2 tiny, paired auricles.

Inflorescences umbelliform cymes, usually 3–40-flowered; peduncles (0.5–)2.0–4.0(–7.0) cm; bracts minute, early deciduous; pedicels 10–20(–30) mm, puberulent. Sepals strongly convex, unequal; outer 2 shorter, obovate, 5–6 mm, abaxial surfaces pubescent (rarely glabrescent), bases tapering cuneate, apices emarginate or truncate, mucronulate, inner sepals 6–7(–8) mm, margins scarious, drying dark brown or blackish; corolla funnelform, 2.5–4.0 cm, white or pale yellow, midpetaline bands whitish pubescent apically, limb slightly lobed; stamens included, anthers apically curved but not spirally coiled; pistil included, ovary glabrous or apex sparsely pubescent.

Capsules conical-ovoid, 9–12 × 6–8 mm, yellowish brown, glabrous or apex sparsely pubescent, apiculate, valves lanceolate to narrowly ovate. Seeds ovoid-trigonous, 4–5 mm, black, densely yellowish tomentose, angles with longer villose trichomes.

Distribution. Cambodia, Laos, Vietnam, Myanmar, Thailand, China, throughout Malesia, northern Australia.

Ecology. In sunny, open areas in degraded or secondary vegetation, thickets, margins of flooded places, stream banks, in river beds and forest understorey, on various soils including granitic-schistaceous, sandy, and red basaltic; elevation: 25–1200 m.



Vernacular names

Cambodia. (Jomäü) kiat drok (*Matras* 26), mohamèk (*Guinet* 183).

Laos. dok ti sau ka (*Spire* 898), khna chi cho² lièm¹ (*Pottier* 611), miò xang cô (*Müller* 308).

Vietnam. bönga yang hröi, bbon dron, cörol pönan (Jörail, *Dournes s.n.*), re ca ta (*Poilane* 9828).

Material studied

Cambodia. s. loc.: 1963, *Guinet* 183 (P). Koh Kong: track between Tmor Baing and Phum Vial Peuch, 15 Nov. 2009, *Simões* et al. 35 (BKF, BM, SING). Kompong Cham: en terrain inondé, Mimot, 2 July 1938, *Müller* 308 (P). Ratanakiri: près du village de Ban Tuh, 1967, *Matras* 26 (P, SING). Siem Reap: Angkor Wat, West part, 10 Feb. 2007, *Wang* 8578 (HITBC).

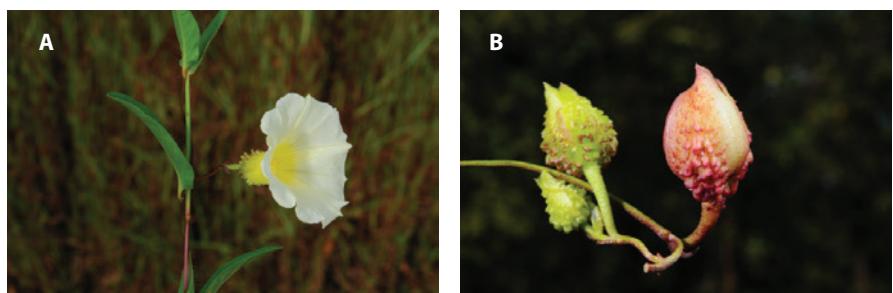
Laos. Champassak: bassin d'Attopeu, bords du Nam Kong, Feb. 1877, *Harmand* 1088 (P, SING). Khammouane: entre la Se Bang Fai et Takhet, 19 Oct. 1938, *Poilane* 28147 (P, SING). Louang Prabang: 2 Feb. 1970, *Pottier* 611 (P); l. c., 1903, *Spire* 898 (P); entre M. You et Danh quan, berge du cours de la N. Khan, 15 Feb. 1932, *Poilane* 20139 (P, SING); bas cours de la N. Hou, 21 Mar. 1932, *Poilane* 20460 (P); along Hwy 13 between Vientiane and Luang Prabang, ca. Kms 314–315, 4 Nov. 2012, *Staples* et al. 1517 (HNL, KKU, P, PTK, SING). Oudomsai: south part, by river side, 13 May 1993, *Tao* et al. 930622 (HITBC). Savannakhet: Phalane, 17 Jan. 1941, *Vidal* 945B (P, SING); Km 20 de la route No 10, près de Savannakhet, 16 Feb. 1925, *Poilane* 12003 (P). Vientiane: 5 km au nord de Dong Dok, 5 May 1995, *Deroïn* 190 (P, SING); env. de Kasi, 2 Mar. 1994, *Vidal & Svengsuka* 109 (P); Tha Ngon, 8 Feb. 1956, *Talbot de Malahide* 121 (SING); env. de Vientiane, 6 Mar. 1949, *Vidal* 823B (P); l. c., 16 Oct. 1949, *Vidal* 791B (P).

Vietnam. An Giang: montem Day in "prov. Chaudoc", Dec. 1866, *Pierre* s.n. (P, SING); l. c., Dec. 1867, *Pierre* s.n. (P). Bac Giang: bois de Co Phah, entre Hanoi et Bac Ninh, 10 May 1891, *Balansa* 4601 (P). Ba Ria-Vung Tau: montibus Dinh ad Baria, Oct. 1866, *Pierre* s.n. (E). Ben Tre: Mar. 1869, *Pierre* s.n. (P); Xu'ng dao, in "prov. Baria", Dec. 1866, *Pierre* s.n. (E, P). Binh Duong: Thu Dau Mot, 1862–1866, *Thorel* 656 (E). Binh Thuan: Trai Ca, "pro. Phan Rang", 10 Mar. 1924, *Poilane* 10051 (P). Dac Lac: Hau Bon (Cheo Reo), Mar., *Dournes* s.n. (P); Donao Mkoak, Dec. 1967, *Dournes* s.n. (P). Dong Nai: Baoca, Feb. 1877, *Pierre* 13 (NY); l. c., *Pierre* s.n. (NY, P); montibus Chiao Xhau, "prov. Bien Hoa", Mar. 1879, *Pierre* s.n. (P, SING); Giaray, "prov. de Bien Hoa", 1–3 Feb. 1919, *Chevalier* 39866 (P, SING). Hoa Binh: plaine de Chu, 11 Jan. 1886, *Balansa* 825 (P). Ho Chi Minh Ville: "Saigon"—Thi Nghe, *Pham Hoang Ho* 5134 (P); Thu duc, July 1861, *Pierre* s.n. (P). Khanh Hoa: Nha Trang vic., 11–26 Mar. 1911, *Robinson* 1441 (NY, P). Kon Tum: Dak Poko River ca. 20 km S of Dak Gley town, 30 Mar. 1995, *Averyanov* et al. VH1012 (AAU, P). Lam Dong: Dalat vic., March-April 1932, *Squires* 832 (BR, MO, NY, P); massif du Lang Bian, entre Danhim et Djiring, 19–20 Feb 1914, *Chevalier* 30977 (P, SING). Nghe An: Pu Mat, 1 Oct. 2001, *Wang* 5268 (HITBC). Ninh Thuan: Ka Rom, "pro. Phan Rang", 4 Mar. 1924, *Poilane* 9828 (P). Quang Nam: entre Bén Yang et le poste 6, 16 Mar. 1939, *Poilane* 29344 (P). Quang Ngäi: Phuoc Vinh, Army base, 28 Feb. 1971, *Hoffman* s.n. (MO). Quang Tri: Huong Hoa, prov. de Quang Tri, 30 Mar. 1920, *Poilane* 1238 (P, SING). Son La: pieds des roches de Notre-Dame (Rivière Noire), Mar. 1888, *Balansa* 3535 (K, P, syntype *Ipomoea tonkinensis*). Thua Thien-Hue:



14.25. *Merremia umbellata* (L.) Hallier f. subsp. *orientalis* (Hallier f.) Ooststr. Inflorescence, flowers (credit: G. Staples; voucher: Laos, Staples et al. 1517 (HNL)).

haut cours de Bo Giang, Eberhardt 2893 (P, SING); l. c., Eberhardt 2894 (P, SING); Hue, South River, 10 Mar. 1927, Squires 183 (E, NY, P); env. Hue, route de Gialong, 20 Mar. 1943, Vidal 899 (P); Kim Long, 27 June 1912, Eberhardt 1440 (NY, P).



14.26. *Merremia verruculosa* S.Y. Liu. A, habit, flower; B, fruit (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

18. *Merremia verruculosa* S.Y.Liu



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Merremia verruculosa S.Y.Liu, Bull. Bot. Res., Harbin 7 (2): 133 (1987); R.C.Fang & Staples, Fl. China 16: 298 (1995); Staples, Fl. Thailand 10: 445 (2010); Gard. Bull. Singapore 61: 504 (2010); Leti *et al.*, Flore Photogr. Cambodge 188 (2013); Staples *et al.*, Thai J. Bot. 6: 85 (2014). – Type: China. Guangxi: Yongning Xian, S.Y. Liu & S.J. Wei 1355 (holo GXCM; iso KUN!, KUN1218186).

Herbaceous twiners, all parts nearly glabrous; stems 1–2 m. Leaves lanceolate to oblong, 1.5–7.5 × 0.9–1.7 cm, adaxial surfaces sparsely puberulous, base obtuse, rounded, or truncate, apex obtuse, rounded, to attenuate-acuminate, mucronulate; petiole 0.3–1.0 cm, pubescent.

Flowers usually solitary (or paired); peduncles slender, 1–4 cm, minutely warty; bracts 2, lorate, 3–5 mm; pedicels 5–7 mm, thicker apically, warty; sepals unequal, outer 2 oblong to ovate-oblong, 6–12 mm, outsides fleshy tuberculate, apices rounded to obtuse, inner 3 oblong to obovate-oblong, 8–14 mm, smooth, apices acute to attenuate; corolla funnelform, 1.8–2.2 cm, yellow, glabrous; stamens included, subequal, filament bases with scaly-fimbriate appendages, anthers spirally twisted; pistil included, ovary ovoid, glabrous.

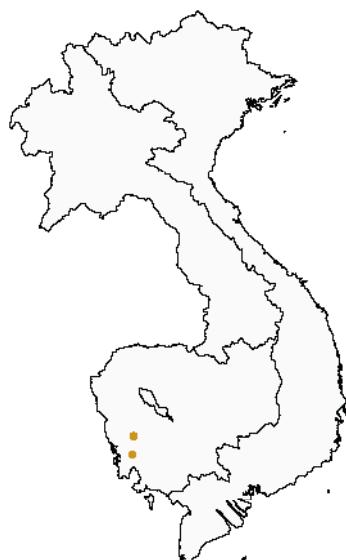
Capsules ellipsoid, 8–12 × 7–9 mm, shining yellowish, glabrous, base cupped by persistent calyx. Seeds ellipsoid-trigonous, c. 5 mm, at first golden crustose-scaly, later glabrescent, blackish.

Distribution. Cambodia, probably Laos, China, Thailand.

Ecology. In sunny, open areas in evergreen forest; elevation: 440 m.

Material studied

Cambodia. Koh Kong: from Phnom Penh to Koh Kong, 14 Nov. 2009, Cheng *et al.* CL1148 (SING); *l. c.*, Simões *et al.* 30 (BKF, BM, K, L, SING).



19. *Merremia vitifolia* (Burm. f.) Hallier f.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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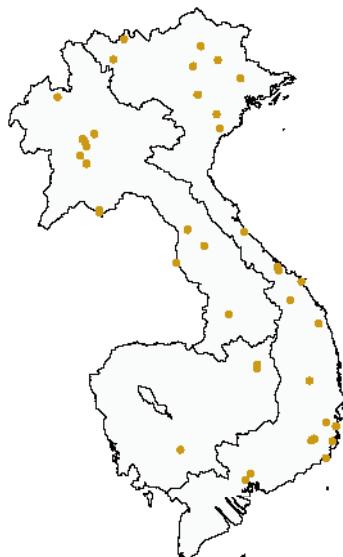
Merremia vitifolia (Burm. f.) Hallier f., Bot. Jahrb. Syst. 16: 552 (1893); Kerr, Fl. Siam. 3 (2): 7 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 184 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 984 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 61 (1993); R.C.Fang & Staples, Fl. China 16: 295 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 177 (2005); Staples & Jacquemoud, Candollea 60: 449 (2005); Staples, Fl. Thailand 10: 446 (2010) & Gard. Bull. Singapore 61: 505 (2010); Staples *et al.*, Thai J. Bot. 6: 85 (2014). – *Convolvulus vitifolius* Burm. f., Fl. Indica 45 (1768). – *Ipomoea vitifolia* (Burm. f.) Sweet, Hort. Brit.: 289 (1826), *nom. illeg.*; Gagnep. & Courchet, Fl. Indo-Chine 4: 269 (1915). – Type: Java, without locality, *Garzin s.n.* (lecto G-PREL!, designated by Staples & Jacquemoud (2005)). *Convolvulus angularis* Burm. f., Fl. Indica 46, t. 18, f. 1 (1768). – *Ipomoea vitifolia* var. *angularis* (Burm. f.) Choisy in DC., Prodr. 9: 361 (1845). – Type: Java, *Pryon s.n.* (lecto G-PREL!, designated by Staples & Jacquemoud (2005)).

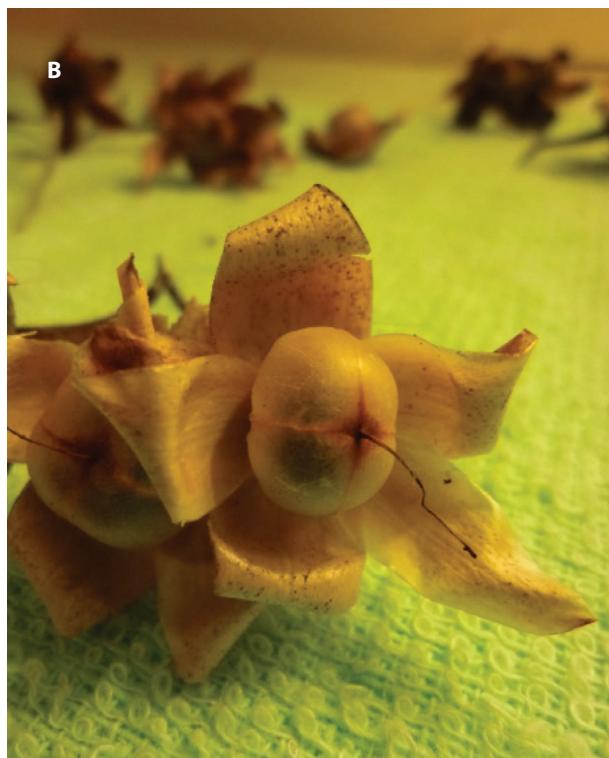
Perennial herbaceous twiners or creepers, stems purplish, to 1–6 m, terete or striate, all parts spreading yellowish hirsute or glabrate. Leaves palmately (3–)5–7-angled or lobed, 5.0–18.0 × 4.0–15.5 cm, yellowish hirtellous, undersides more densely so, base cordate, lobes broadly triangular or ovate-lanceolate, coarsely serrate or subentire, apex acuminate to obtuse; petiole usually 1–4 cm.

Inflorescences cymose, 1- to several-flowered; peduncles 2–5(–15) cm; bracts subulate, 1.5–2.0 mm; pedicels 10–16 mm, thicker apically. Sepals unequal, oblong or ovate-oblong, 14–18 mm, obtuse or somewhat acute, outer sepals hirsute outside, inner sepals glabrous, all enlarged in fruit, leathery, glossy and pitted inside; corolla funnelform, 2.5–5.5 cm, bright yellow, tube base inside deep red or yellow, glabrous outside, limb somewhat 5-angled; stamens included, c. 11 mm, anthers spirally twisted; pistil included, ovary glabrous.

Capsules subglobose, c. 12 mm, 4-valved, straw-coloured, chartaceous. Seeds trigonous-ovoid, c. 7 mm, black-brown, glabrous.

Distribution. Cambodia, Laos, Vietnam, Nepal, Bhutan, India, Sri Lanka, Bangladesh, Myanmar, China, Thailand, Malaysia, Indonesia.





14.27. *Merremia vitifolia* (Burm.f.) Hallier f. A, habit, flowers; B, fruits (credit: G. Staples; voucher: A, Thailand, Staples et al. 1364 (BKF); B, Malaysia, FRI-66723 (KEP)).

Ecology. Sunny areas and clearings in thickets and forest, degraded and secondary vegetation, cleared areas, fields, roadsides, reported on limestone-derived soil; elevation: 80–1200 m.

Usage. noted as a weed in legume fields, coffee and orange plantations (*Poilane* 31315), and as a medicinal (*Pedrono* 97), for treating fever (*Poilane* 9929).

Vernacular names

Cambodia. choy chola (Tompouon, *Matras* 125), (jomüü) juў chrat (boon, *Matras* 129).

Laos. mae cunh (*Poilane* 20206), khua chi cho (*Vidal* 822B, 2696), (khua) chi cho khôn (*Pedrono* 182), khua chi¹ cho², dok 'luang (*Pedrono* 50), fayz huâ (*Pedrono* 97), khua chi cho²'khôn (*Pottier* 618), ching cho, chi cho (*Vidal & Svengsuksa* 371), dok chi cho (*Spire* 1046).

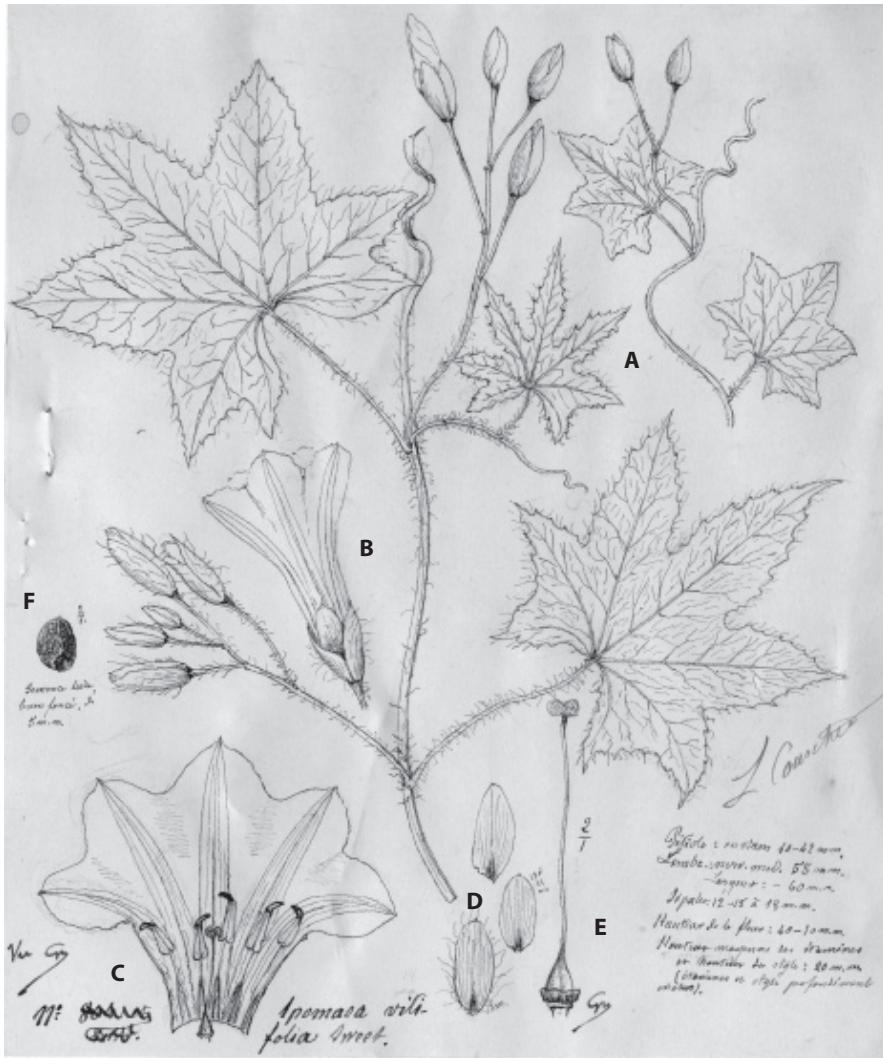
Vietnam. dây ráng môi (Annamite, *Poilane* 2615), tò ga lo (*Poilane* 2615), hoa bìm bìm (*Bon* 1958, 4104), dây bìm bìm (Annamite, *Chevalier* 1233), muek (Annamite, *Squires* 221), bim bim lum (*Squires* 197), hre aban-tí (Jörai, *Dournes* s.n.), re ha bui (*Poilane* 9929), lo (*Poilane* 9949).

Material studied

Cambodia. Phnom Penh: forêt du Phnom Penh, 4 Feb. 1935, *Bejaud* 23 (P, SING). Ratanakiri: près de Banlung, 1967, *Matras* 125 (P); près de Ban Tuh, 1967, *Matras* 129 (P).

Laos. Champassak: Paksong, Bolovens plateau, 4 Apr. 1957, *Holiday H-3* (SING). Khammouane: road from Gnommalad to Tha Khaek, 20 Feb. 2005, *Newman* et al. LAO355 (E, P). Louang Namtha: Luang Nam Tha - Na Læ border, 14 Jan. 2011, *Wongprasert* 111-23 (BKF). Louang Prabang: 2 Feb. 1970, *Pottier* 618 (P); route Ban Khi Mot, 14 Feb. 1969, *Pedrono* 50 (P); Nam Minh, 10 Feb. 1969, *Pedrono* 86 (P); Km 8, route Louang Prabang - Vientiane, 15 Feb. 1969, *Pedrono* 97 (P); Phou Kha Sak, 20 Feb. 1969, *Pedrono* 182 (P); Phou Soun, 28 Feb. 1932, *Poilane* 20206 (P, SING). Savannakhet: Km 20 de la route de Savannakhet à Quang Tri, 29 Jan. 1925, *Poilane* 11837 (P). Vientiane: Ban Souan Mon, 26 Feb. 1954, *Vidal* 2696 (P); M. Kasi, 28 Feb. 1994, *Vidal & Svengsuksa* 371 (P); env. de Vientiane, 6 Mar. 1949, *Vidal* 822 (P, SING); Bo O, Cluncumo, 7 Jan. 1956, *Tixier* 3 (P).

Vietnam. Bac Giang: Pho Cam, 15 Jan. 1886, *Balansa* 824 (P, SING). Bac Kan: Cho Moi mont, *Eberhardt* 4568 (P, SING). Dac Lac: Hau Bon, Mar., *Dournes* s.n. (P). Da Nang: haut cours de la rivière de Nam Ô près de Tourane, 16 Jan. 1941, *Poilane* 31315 (P, SING); SW de Trang, près de village Moï de Go-Oï, 24 Feb. 1941, *Poilane* 31632 (P, SING). Dong Nai: secus flumen Dong nai ad Tri huyen, in "prov. Bien Hoa", Jan. 1867, *Pierre* s.n. (E, NY, P, SING). Ha Nam: in montib. Ban Phet, 28 Feb. 1883, *Bon* 1958 (P, SING). Ha Noi: vallée de Baa Tai, à la base du Mont Bavi, 12 Apr. 1888, *Balansa* 3550 (P); Tu Phap, Mar. 1888, *Balansa* 3551 (P); Vo Xa, in introitu montium Do Xa, 27 Mar. 1889, *Bon* 4104 (P, SING). Ho Chi Minh Ville: "Saigon", 1862–1866, *Thorel* 34 (P). Khanh Hoa: Giang Che, "prov. de Nha Trang", 8 Feb. 1922, *Poilane* 2615 (P, SING); Nha Trang vicinity, 11–26 Mar. 1911, *Robinson* BS1353 (NY, P). Lai Chau: entre les villages de Nam Cai et de Chi Chanh, 12 Apr. 1936, *Poilane* 25721 (P, SING); Phong Tho, 7 Dec. 1937, *Poilane* 26745 (P). Lam Dong: massif du Lang Bian, Dran, 2 May 1919, *Chevalier* 40533 (P); vallée du Dong Hai, sud de Dran, 10 Jan. 1924, *Poilane* 9528 (P). Ninh Binh: Cho



14.28. *Merremia vitifolia* (Burm. f.) Hallier f. A, 2 flowering stems showing leaf variability; B, whole flower, lateral view; C, corolla opened showing androecium, gynoecium; D, sepals; E, pistil; F, seed. Drawn by L. Courchet. Voucher: *Balansa* 3551 (P03536273).

Ganh, May 1923, Pételet 992 (P). Ninh Thuan: Ca Na, récoltée près d'un champ Moï abandonné, 21 Mar. 1933, Poilane 5749 (P); Ka Rom, "pro. Phan Rang", 5 Mar. 1924, Poilane 9929 (P); l. c., Poilane 9949 (P). Quang Tri: Mailanh, 29 Mar. 1920, Chevalier [legit Poilane] 1233 (P). Thua Thien-Hue: route du tombeau de Gialong (Hue), 20 Mar. 1943, Vidal 900 (P); Hue vic., Jan. 1927, Squires 227 (SING); South River, Hue, 12 Mar. 1927, Squires 197 (P, SING); l. c., Squires 221 (E, NY, P). Tuyen Quang: Ban Chou, along irrigation ditch from Ban Chou to Na Hang, 6 Mar. 1994, Harder et al. 2371 (SING); Eberhardt 4049 (P, SING).



Twelve species: eight in Africa and four in Asia; two species occur in CLV

15. *Neuropeltis* Wall.

*in Roxb., Fl. Ind., 2: 43 (1824); C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 224 (1883); Gagnep. & Courchet, Fl. Indo-Chine 4: 290–292 (1915); Kerr, Fl. Siam. 3 (1): 90 (1951); Ooststr., Blumea 3: 80 (1939), 5: 268–273 (1942), Fl. Males., Ser. I, Spermat. 4: 400 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 184 (1990); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 64 (1993); R.C.Fang & Staples, Fl. China 16: 277 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 177 (2005); Staples, Fl. Thailand 10: 447 (2010). – Type: *Neuropeltis racemosa* Wall.*

Woody climbers. Leaves petiolate, simple, entire, chartaceous to coriaceous, pinnately nerved.

Inflorescences axillary, racemose to subpaniculate, rusty brown tomentose; bracts initially small, adnate to pedicel, in fruit much accrescent, broadly elliptic to orbicular, scarious, reticulately nerved, bearing the calyx and capsule near the centre; bracteoles minute, pubescent. Flowers small; sepals 5, subequal, hardly enlarged in fruit; corolla rotate to broadly campanulate, white or reddish, limb deeply 5-lobed, the lobes induplicate-valvate in bud; stamens 5, exserted or included, inserted below corolla sinuses, filaments glabrous or pubescent at insertion, filiform above; pollen non-spinose; ovary pubescent, perfectly or imperfectly 2-locular, 4-ovuled, styles 2, free, short, stigmas peltate, lobed or kidney-shaped.

Fruits dehiscent capsules, glabrous, 1-locular, 4-valved. Seed 1, globose, smooth, glabrous, dull black.

Notes

As pointed out already by Ooststroom (1942: 268), it is difficult to separate the species unless fully developed, open flowers are present; the vegetative and fruiting characters demonstrate extraordinary variability and I have been unable to correlate the floral characters in any meaningful way with this variability in leaves, fruits, fruiting bracts, and indumentum. A revision of the Asian species, taking into account the abundant collections now at hand, is much needed.

Key to the species

1. Corolla tube pubescent inside at the insertion of the filaments; styles as long as or shorter than the diameter of the stigma **2. *N. racemosa***
1. Corolla tube glabrous inside at the insertion of the filaments; styles much longer than diameter of the stigma **1. *N. indochinensis***

1. *Neuropeltis indochinensis* Ooststr.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Neuropeltis indochinensis Ooststr., Blumea 5: 270 (1942); Staples, Fl. Thailand 10: 448 (2010); Staples et al., Thai J. Bot. 6: 85 (2014). – Type: [Vietnam. Kien Giang:] "Cambodia, island of Phu Quoc, in the Gulf of Siam," Feb. 1874, Pierre s.n. (holo Pl. P00608763; iso Al. A00054680, Gl. Kl. K000097496, Pl. P03544543, PNH).

Neuropeltis racemosa auctt. non Wall.: Gagnep. & Courchet, Fl. Indo-Chine 4: 290. fig. 31 (1915), p.p.; Kerr, Fl. Siam. 3 (1): 90 (1951), p.p.; Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 65 (1993), p.p.

Neuropeltis maingayi auctt. non Peter ex Ooststr.: T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 184 (1990); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 177 (2005).

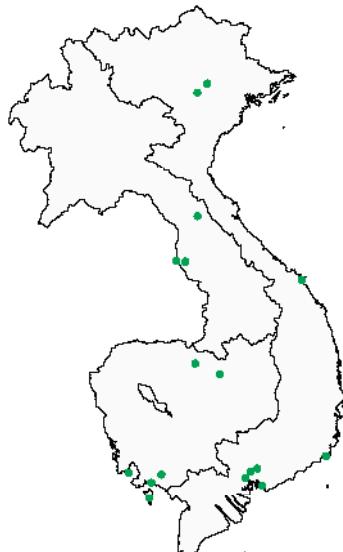
Woody climbers, stems 5–20 m long, lenticellate, bases to 3 cm diam., axial parts shortly appressed pilose, later glabrate. Leaves elliptic, elliptic-oblong, rarely oblanceolate, 6–15 × 2–6 cm, base cuneate, sometimes unequal-sided, apex tapering attenuate or acuminate, mucronulate, both sides appressed pilose, glabrescent; secondary veins 7–9 either side of midvein; petiole 0.5–1.5 cm.

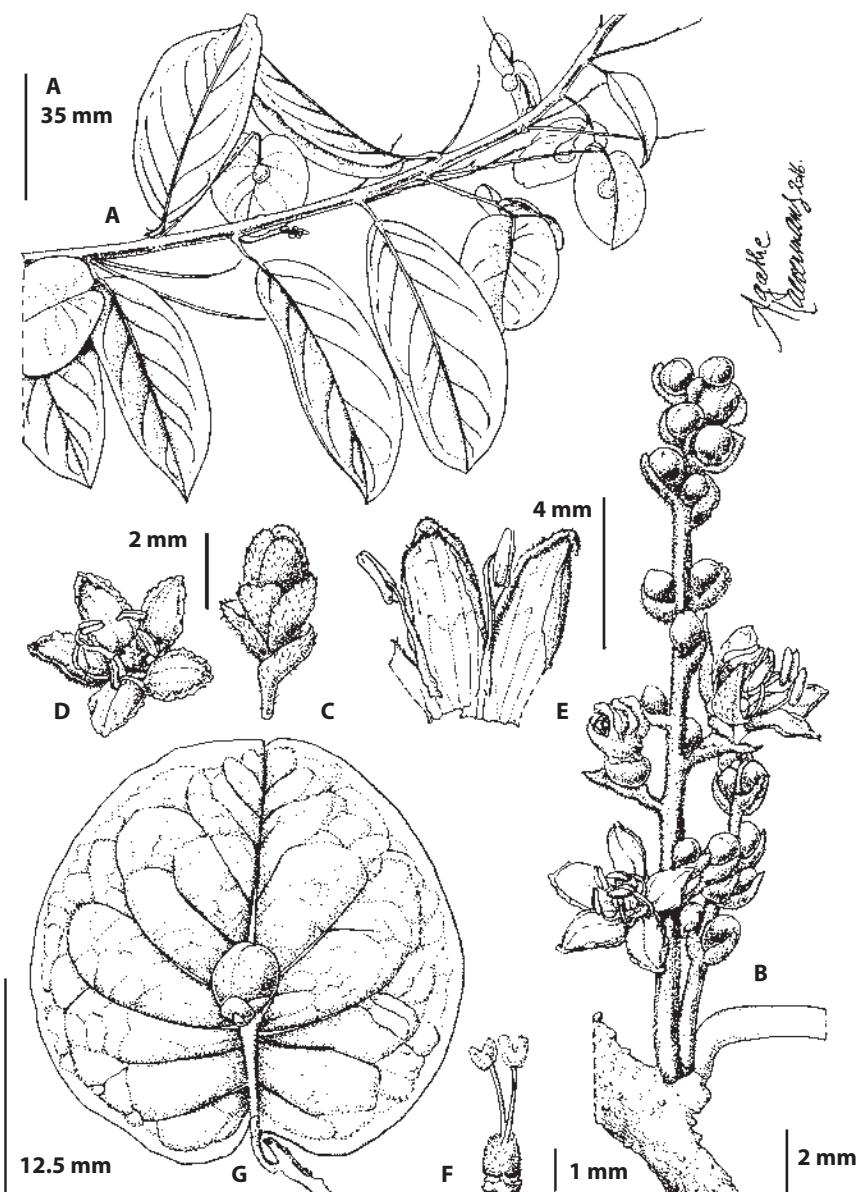
Inflorescences 1 or 2 per axil, rusty-tomentose, 3–8 cm; pedicels 2 mm; bracts ovate or elliptic, 2.0–2.5 mm; fruiting bracts broadly elliptic or orbicular, 2.5–4.0 cm long, bases rounded or subcordate, apices rounded, subemarginate, or attenuate, mucronulate, both sides shortly appressed pilose; bracteoles 2, minute. Sepals subequal, outer 2 elliptic, 2.5 mm, obtuse, tomentose, inner sepals orbicular, 2.0–2.25 mm, margins glabrous; corolla broadly campanulate or rotate, 5–8 mm long, white or cream, lobes elliptic-oblong, pilose outside, inside glabrous; stamen filaments glabrous at insertion, anthers oblong-sagittate; ovary ovoid, c. 5 mm, pilose, styles 2.0–2.5 mm, stigmas obscurely horseshoe-shaped.

Capsules subglobose, 5–6 mm long, brown, glabrous, borne slightly below midpoint of papery, accrescent bract. Seeds c. 4 mm diam.

Distribution. Cambodia, Laos, Vietnam, Thailand.

Ecology. In lowland evergreen forest, thickets near streams, on sandy, clay, or rocky soils; elevation: 575–700 m.





15.1. *Neuropeltis indochinensis* Ooststr. A, habit of fruiting stem; B, 2 inflorescences in leaf axil; C, flower bud showing bract before enlargement; D, whole flower; E, portion of corolla opened, showing glabrous filament bases; F, pistil showing style : stigma proportions; G, capsule attached to enlarged bract. Drawn by A. Haevermans, voucher: Thorel 629; P.v.Dieu 190; Pierre 1464; Pierre s.n. 4/1874; E, F adapted from Ooststroom 1942.

Usage. The bark is used for treating kidney ailments (*Poilane 8937*).

Notes. Kerr (1951) mentioned the extraordinary variability in Thai specimens of *Neuropeltis* and was the first to point out the characters of pubescent vs. glabrous filament bases and the proportion of style length to stigma diameter, yet nonetheless included all Thai specimens in *N. racemosa*. Ooststroom (loc. cit., 1942) used those very floral characters to segregate some Indochinese specimens as a new species, *N. indochinensis*, and pointed out that the specimen, *Thorel 629*, used by Gagnepain & Courchet to prepare figure 31 in *Fl. Indo-Chine* (loc. cit) is actually *N. indochinensis*. Van Ooststroom's floral characters work well for species delimitation as long as fully developed, open flowers are available.

Vernacular name

Vietnam. cây cà giang (*Pierre 27*).

Material studied

Cambodia. Kampot: montagne de l'Eléphant, route du Bokor, 7 Dec. 1933, *Poilane 23283* (P); Mts. Camchay, près de Kampot, Apr. 1874, *Pierre s.n.* (A, BR, C, E, G, GH, K, P, PNH); Nord-Kampot, 11 Feb. 1928, *Poilane 14782* (P, SING). Koh Kong: Cheko, near Sihanoukville, 22 Feb. 1965, *Osaka City University 824* (BKF). Preah Vihear: Melou Prey, *Harmand 218* (BR); forêt de Melou Prey, Jan. 1876, *Harmand 271* (P). Stung Treng: 3 km à l'Ouest de Stung Trang, 26 Dec. 1928, *Poilane 16272* (P, SING).

Laos. Bolikhamsai: at Keng Meow (Cat Waterfall) on the Nam Theun, 16 Feb. 2005, *Newman et al. LAO241* (E, P). Savannakhet: km 20 de la route de Savannaket à Quang tri, 28 Jan. 1925, *Poilane 11819* (P, SING); Km 22 de la route de Savannakhet à Quang Trí, 29 Jan. 1925, *Poilane 11855* (P).

Vietnam. s. loc.: "Trangbin", 21 Dec. 1922, *Phung van Dieu 190* (P). Ba Ria-Vung Tau: ad montem Dinh ad Baria, Oct. 1866, *Pierre s.n.* (P). Da Nang: Tourane vic., 10 Aug. 1927, *Clemens & Clemens 4175* (K, P, U). Dong Nai: Bien Hoa, 1862–1866, *Thorel 629* (E, K, P, SING). Ha Noi: environs de Tu Phap, Oct. 1887, *Balansa 4068* (K, P). Ho Chi Minh Ville: cult. in hort Bot. Saigon, *Pierre 1474* (P). Ninh Thuan: Ca Na, "pro. Phan Rang", 30 Nov. 1923, *Poilane 8937* (P, SING); l. c., 3 Dec. 1923, *Poilane 8988* (P). Vinh Phuc: Vinh Yen, *Eberhardt 3823* (P).

2. *Neuropeltis racemosa* Wall.



J F M A M J J A S O N D



J F M A M J J A S O N D

Neuropeltis racemosa Wall. in Roxb., Fl. Ind. 2: 44 (1824); Gagnep. & Courchet, Fl. Indo-Chine 4: 290 (1915), p.p.; Ooststr., Blumea 3: 81 (1938), 5: 269 (1942), Fl. Males., Ser. I, Spermat. 4: 400 (1953); Kerr, Fl. Siam. 3 (1): 90 (1951); P.H. Hô, Cây cỏ Việt Nam 2 (2): 971 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 65 (1993); R.C. Fang & Staples, Fl. China 16: 277 (1995); Staples, Fl. Thailand 10: 448 (2010); Leti *et al.*, Flore Photogr. Cambodge 189 (2013); Staples *et al.*, Thai J. Bot. 6: 86 (2014). – Type: Malaysia, Penang, Wallich Cat. 1322/1 (syn El!, Gl!, G-DC!, Kl!, K000097490, K000097491, K-W!, Pl!, P03544484, P03544485, SING!, SING0076300).

Lianas; stems c. 5 m long, mostly red-brown tomentose at first, later glabrescent. Leaves elliptic to elliptic-oblong, 6.0–12.0 × 2.0–6.5 cm, leathery, nearly glabrous, base broadly cuneate to attenuate into petiole, apex acute or short acuminate; secondary veins 7–10 either side of midvein; petiole 1.0–1.5 cm.

Inflorescences 1–6 per axil, racemose; axes brown tomentose; bracts ovate to ovate-lanceolate, 2–3 mm, mucronulate, 1 broadly elliptic to circular in fruit, enlarging to 3.0–4.5 cm, glabrous except along veins. Sepals unequal, densely pubescent abaxially; outer 2 sepals circular or slightly wider than long, 2.0–2.5 mm; inner 3 sepals wider than long, 1.75–2.0 mm; corolla broadly campanulate, c. 5 mm, white, deeply 5-lobed, lobes incurved, longer than tube, pilose outside, apex obtuse; stamen filaments c. 3 mm, pubescent at bases; pistil included, ovary ovoid, pubescent, styles 2, shorter than or equal to the width of a stigma, stigmas c. 1 mm wide.

Capsules subglobose, 5–6 mm diam. Seeds globose, blackish.

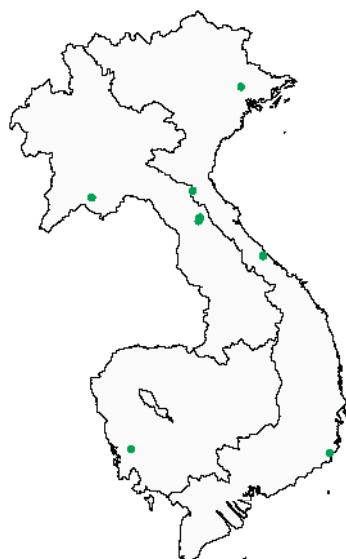
Distribution. Cambodia, Laos, Vietnam, Myanmar, Thailand, China, Malaysia, Indonesia.

Ecology. Edge of evergreen forest or secondary forest regrowth, along streams; elevation: 475–575 m.

Material studied

Cambodia. Koh Kong: Thma Baing, Prey Kravanh, 21 Dec. 2008, Newman *et al.* 2133 (E, P).

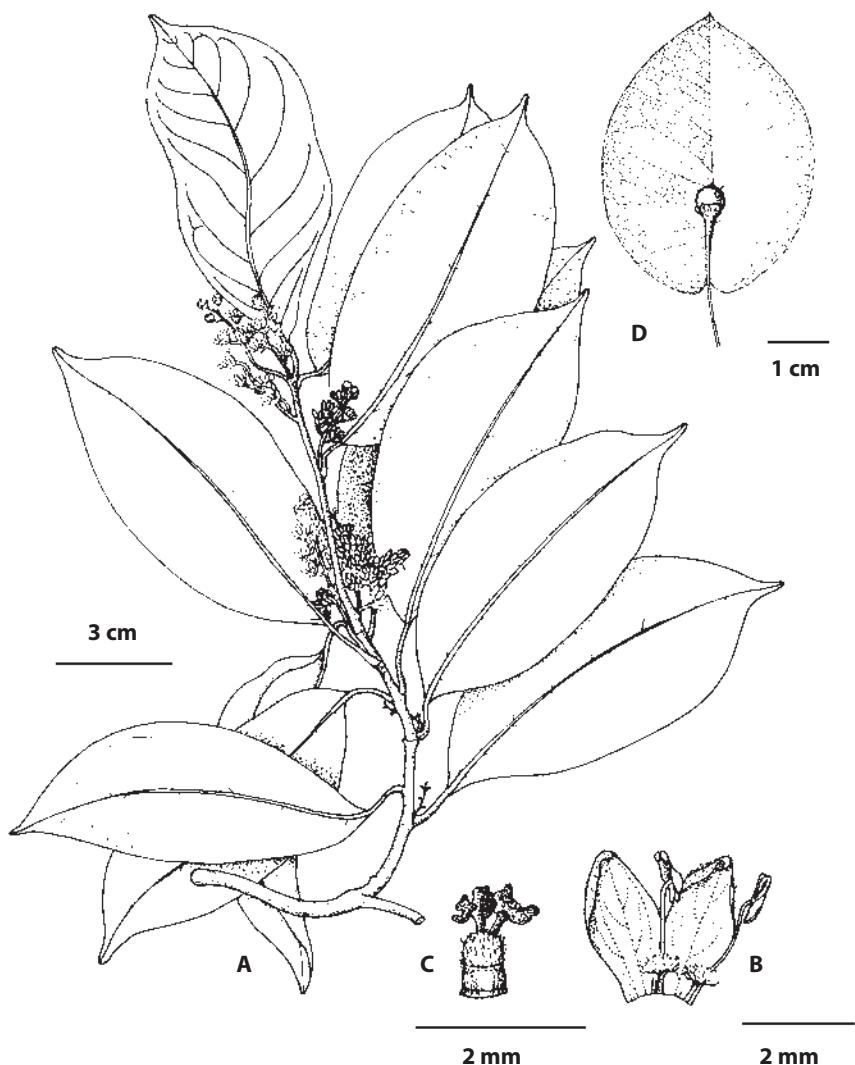
Laos. Khammouane: at edge of fields, Houay Mai Kuang, 29 Oct. 2005, Newman *et al.* LAO623 (E, FOF, HNL, P); tracks S of Ban Mak Phueang, 31 Oct. 2005,





15.2. *Neuropeltis racemosa* Wall. Capsules on bracts (credit: Tim Utteridge; voucher: Vietnam, HNK-1761 (K)).

Newman et al. LAO689 (E, FOF, P); near Kaeng Maew, Nam Theun, 4 Nov. 2005, Newman et al. LAO861 (E, FOF, P). Vientiane: Ban Ang Nhai, mountains N of village, 10 July 1999, Soejarto & Bouamanivong 10869 (K, L).



15.3. *Neuropeltis racemosa* Wall. A, flowering branch; B, opened corolla with stamens; C, pistil; D, fruit.
Drawn by P. Inthachub (From Staples 2010).

Vietnam. Bac Giang: Lam, Nov. 1907, Mouret 380 (P). Ha Tinh: Huong Son district, Son Hong munic., along Song Con river valley, 13 May 2004, Loc et al. HAL-5380 (SING). Ninh Thuan: env. de Phan Rang, June 1909, d'Alleizette s.n. (P). Quang Tri: haut cours de la rivière de Quang Tri, entre L. Bao Ching et L. Da Ban, 5 July 1927, Poilane 13557 (P, SING).



Sixteen species distributed throughout the tropics; two species occur in CLV. It is curious that *O. riedeliana* (Oliv.) Ooststr. has not been found in CLV; it occurs in several surrounding countries and is to be expected in future, when collecting density improves. Nguyen Thi Nhan's report [in Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990)] of "*O. brownii*", an Australian species, from Vietnam could be a misidentification of *O. riedeliana*; no specimens have been seen that could clarify this ambiguity.

16. *Operculina* Silva Manso

Enum. Subst. Bras.: 16 (1836); Ooststr., Blumea 3: 361 (1939), Fl. Males., Ser. I, Spermat. 4: 454 (1953); Kerr, Fl. Siam. 3 (2): 8 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 68 (1993); R.C.Fang & Staples, Fl. China 16: 300 (1995); Staples, Pacific Sci. 61: 587–593 (2007); Fl. Thailand 10: 451 (2010). – Type: *Operculina turpethum* (L.) Silva Manso
Ipomoea p.p., sensu C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 212 (1883); Gagnep. & Courchet, Fl. Indo-Chine 4: 257–264 (1915).

Herbaceous or woody climbers; stems, peduncles, and petioles often winged. Leaves petiolate, angular or palmate, bases often cordate, margins entire.

Flowers axillary, solitary or in few-flowered cymes; bracts often foliose, deciduous; sepals often accrescent in fruit, margins becoming lacerate; corolla broadly funnelform, campanulate or nearly salverform, glabrous or midpetaline bands pubescent outside, limb often 10-pleated, venation indistinct; stamens usually included, filaments basally adnate to corolla tube, filiform and free distally, anthers often spirally twisted at dehiscence; pollen 3-colporate, not spiny; pistil usually included; disc annular, ovary 2-locular, 4-ovuled, glabrous, style filiform, stigma 2-globose.

Fruits operculate capsules, circumscissile at or above middle, upper exocarp lid-like, leathery, separating from brittle endocarp, which shatters irregularly. Seeds 4 or fewer, trigonous or globular, glabrous or angles pilose.

Key to the species

1. Corolla pale yellowish; midpetaline bands sericeous; axial parts striate or terete, not winged **1. *O. petaloidea***
1. Corolla white, yellow inside at tube base; midpetaline bands glabrous; axial parts usually winged **2. *O. turpethum***

1. *Operculina petaloidea* (Choisy) Ooststr.

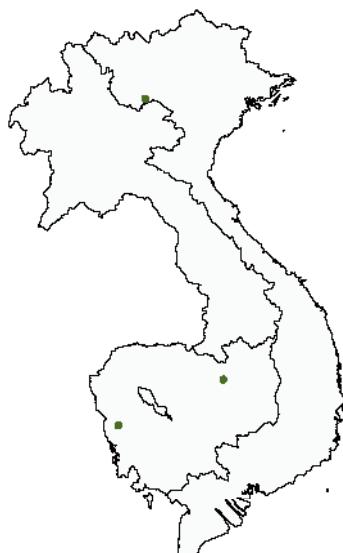
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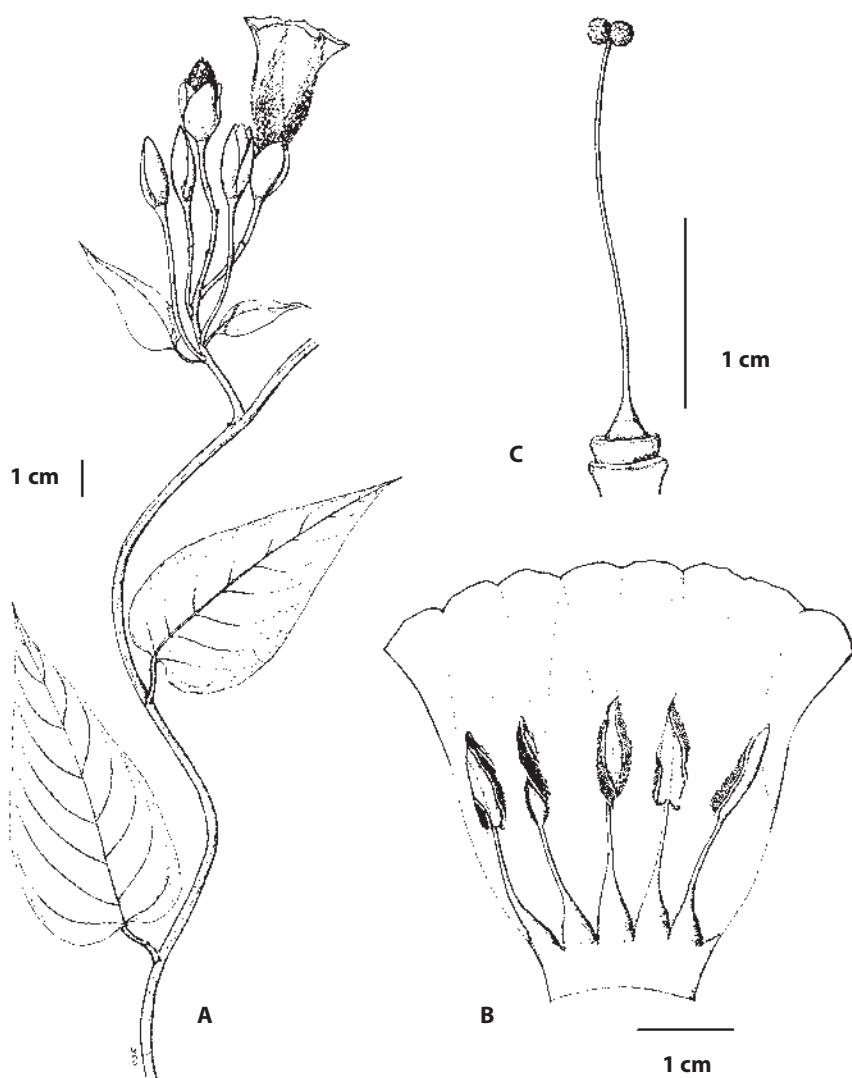
Operculina petaloidea (Choisy) Ooststr., Blumea 3: 369 (1939); Kerr, Fl. Siam. 3 (2): 8 (1951); P.H.Hô, Cây cỏ Việt Nam 2 (2): 979 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 68 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 178 (2005); Staples, Fl. Thailand 10: 451 (2010); Leti *et al.*, Flore Photogr. Cambodge 190 (2013). – *Ipomoea petaloidea* Choisy in DC., Prodr. 9: 360 (1845); Gagnep. & Courchet, Fl. Indo-Chine 4: 257 (1915). – *Merremia petaloidea* (Choisy) Burkhill, Bull. Misc. Inform. Kew 1935: 318 (1935); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 175 (2005). – Types: India, Gorakpur, 12 Apr. 1814, Hamilton herb. sub *Wallich Cat. 1403.B* (syn G!, G-DC!, K-W!); Myanmar, Prome, *Wallich Cat. 1403.1* (syn G-DC!). *Ipomoea petaloidea* var. *pauciflora* C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 212 (1883); Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 63 (2): 110 (1894). – *Operculina petaloidea* var. *pauciflora* (C.B.Clarke) Parmar, J. Econ. Taxon. Bot. 18 (2): 251–252 (1994). – Type: India, Kumaon, May 1845, T. Thomson 1156 (syn K!); without locality, J.D. Hooker & Thomson 'Ipomoea n. 44' (syn, not found). *Ipomoea xanthantha* Kurz, Forest Fl. Burma 2: 219 (1877). – Type: Myanmar, Pegu Yomah, Kurz 2336 (syn K!).

Herbaceous twiners; stems to 10 m long, terete, striate, or narrowly alate below nodes, glabrous or yellowish puberulent near nodes. Leaves ovate, broadly elliptic, to oblong-linear, 5.8–11.3 × 2.7–5.8 cm, pubescent when young, later glabrate, base rounded to truncate, apex obtuse or acute, mucronulate; secondary veins 7–9 either side of midvein; petiole 1.5–2.6 cm, ridged to narrowly winged.

Inflorescences axillary or terminal on branches, cymose, 1–9-flowered; peduncles terete, 0.9–2.0 cm; bracts linear-lanceolate, 7–20 mm, deciduous; pedicels clavate, striate-angulate, 10–18 mm. Sepals subequal, elliptic, concave, outer 2 narrower, 13–15 mm long, mucronulate, inner broader, 15 mm; corolla flaring funnelform, 3.5–4.0 cm, pale yellowish, midpetaline bands sericeous outside, inside glabrous; stamens subequal, included, filaments 14–18 mm, glandular below insertion, anthers spirally dehiscent; pistil included, 17–19 mm long, glabrous, ovary broadly ovoid.

Capsules c. 1.5 cm diam., tan, cupped by accrescent calyx. Seeds 4, ovoid, 5–6 mm long, black.





16.1. *Operculina petaloidea* (Choisy) Ooststr. A, habit; B, opened corolla with stamens; C, pistil. Drawn by P. Inthachub (From Staples 2010).

Distribution. Cambodia, Vietnam, India, Myanmar, Thailand.

Ecology. Uncommon, trailing on the ground or twining in thickets, deciduous forest, often along stream banks or watercourses, on clay or limestone soils; elevation: 80–250 m.



16.2. *Operculina petaloidea* (Choisy) Ooststr. Habit, flowers (credit: Thamarat Phutthai, Mahidol University; voucher: Thailand, not collected).

Vernacular name

Cambodia. voir sandek (*Eanghourt 38*).

Material studied

Cambodia. Pursat: N of the Chamcar Chrey stream, along road in Anlong Reap village, 21 Nov. 2000, *Eanghourt 38* (K). Stung Treng: 2 Apr. 2009, Cheng et al. CL1075 (P, SING).

Vietnam. Son La: Song Ma district, Muong Hung, 20 Oct. 1977, Ha 233 (HN).

2. *Opercilina turpethum* (L.) Silva Manso

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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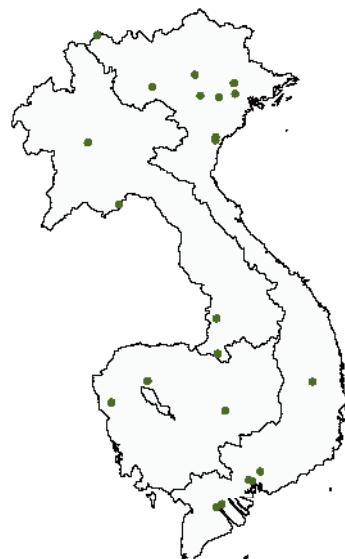
Opercilina turpethum (L.) Silva Manso, Enum. Subst. Bras.: 16 (1836); Ooststr., Blumea 3: 362 (1939), Fl. Males., Ser. I, Spermat. 4: 456 (1953); Kerr, Fl. Siam. 3 (2): 8 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990); P.H.Hô, Cây cỏ Việt Nam 2 (2): 979 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 72 (1993); R.C.Fang & Staples, Fl. China 16: 300 (1995); T.N.Nguyễn & Đ.H.Düòng, Checkl. Pl. Sp. Vietnam 3: 178 (2005); Staples, Pacific Sci. 61: 590 (2007), Fl. Thailand 10: 452 (2010); Leti et al., Flore Photogr. Cambodge 191 (2013); Staples et al., Thai J. Bot. 6: 86 (2014). – *Convolvulus turpethum* L., Sp. Pl. 1: 155 (1753). – *Ipomoea turpethum* (L.) R.Br., Prodr.: 485 (1810); Gagnep. & Courchet, Fl. Indo-Chine 4: 263 (1915). – Type: Sri Lanka, Herb. Hermann 2: 68, no. 74 (lecto BM, designated by Verdc., Fl. Trop. E. Africa, Convolvul. 61 (1963); isolecto LI!).

Perennial herbaceous climbers; roots fleshy, much-branched; stems reddish, 1–20(–30) m long, angular, winged, pilose-tomentose at first, later glabrescent. Leaves cordate-circular, ovate, broadly ovate, ovate-lanceolate, or lanceolate, 4.0–14.0 × 3.5–14.0 cm, upper sides appressed pilose to glabrous, undersides pubescent, base cordate, truncate or obtuse, margins entire or undulate, apex acute or acuminate, mucronulate; petiole 2–10 cm, often winged.

Inflorescences cymose; peduncles 0.5–3.0 cm; bracts 2, oblong to ovate-oblong, 1.0–2.5 cm, concave, pubescent; pedicels 1.5–2.0 cm, striate-angular, clavate, to 4 cm in fruit. Sepals ovate to broadly ovate, unequal, outer 2 sepals 1.5–2.0 cm, outsides pubescent, inner 3 sepals shorter, subglabrous; corolla broadly funnelform, 3.5–4.0 cm, white, sometimes with yellow inside tube, glabrous, minutely yellowish glandular outside, limb ruffled, subentire; stamens included, filaments pubescent basally, anthers spirally twisted.

Capsules depressed globose, c. 1.5 cm diam., enclosed in cup-shaped calyx. Seeds ovoid-trigonous, c. 6 mm, black, glabrous.

Distribution. Cambodia, Laos, Vietnam, and Pakistan, Nepal, India, Sri Lanka, Bangladesh, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, Pacific Islands, Australia; also tropical Africa and introduced in the Caribbean islands.





16.3. *Operculina turpethum* (L.) S. Manso. A, habit; B, opened corolla, spirally twisted anthers; C, young capsule (credits: A, B, Maxim Nuraliev; C, Preecha Karaket; vouchers: A, B, Vietnam, not collected; C, Thailand, Staples et al. 1332 (BKF)).

Ecology. Typically found in disturbed sites near human habitation: abandoned fields, roadsides, vacant lots, hedgerows, also in secondary regrowth and thickets, usually in well-watered sites such as stream banks, on all types of soil including granitic and muddy rice paddy edges; elevation: sea level to 300 m.

Usage. The flowers are reported as edible in Cambodia (*Pottier 30C*), and the enlarged root is used medicinally in many parts of Asia.

Vernacular names

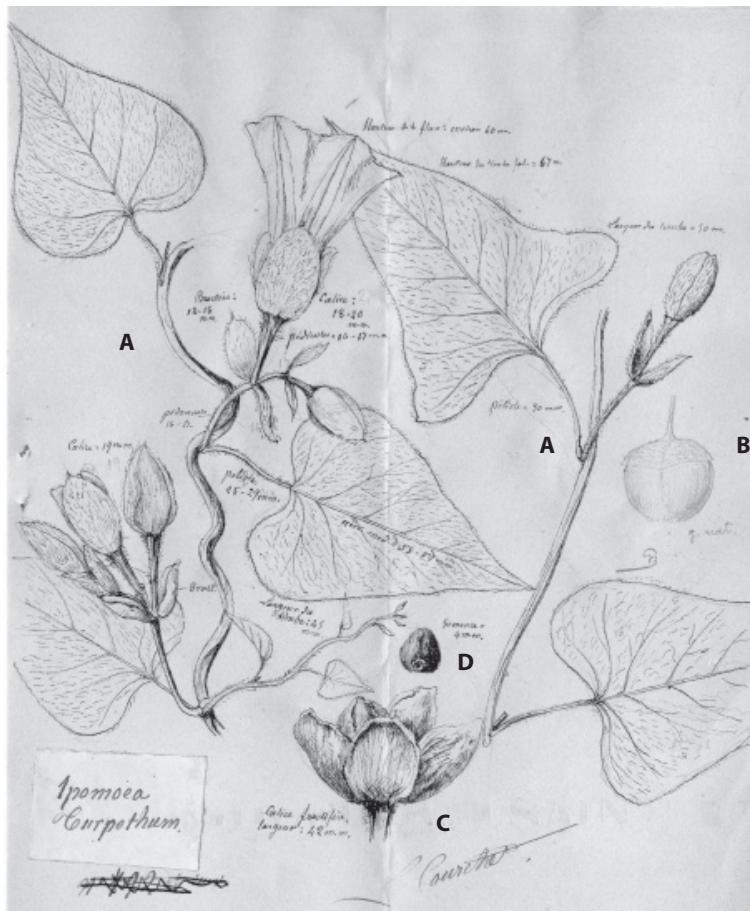
Laos. khua chi cho (*Vidal 2665*), keuah diem (*Maxwell 98–64*).

Vietnam. giay muõng (*Eberhardt 4415*), biêm biêm dai là (Annamite, *Chevalier 50*), aban töi' röman (c) (*Jörail, Dournes s.n.*).

Material studied

Cambodia. Kratie: rive du Mekong, route de Sambor, 04 Apr. 2009, *Cheng et al. CL1094* (P). Pailin: route Pailin - Battambang, 23 Dec. 2007, *Cheng & Leti CL885* (P). Siem Riep: Angkor, 12 Dec. 1911, *Lecomte & Finet 1765* (P).

Laos. Champassak: Khong Island, E side, Nawng Tohm area, 30 Jan. 1998, *Maxwell 98-64* (FOF, L); ville de Pakse, 23 Nov. 1938, *Poilane 28530* (P). Louang Prabang: bord de fleuve, 2 Mar. 1969, *Pottier 30* (P). Vientiane: Nong Thevada, 05 Feb. 1954, *Vidal 2665* (P).



16.4. *Operculina turpethum* (L.) S. Manso. A, 2 flowering stems showing variation in leaf shape, inflorescences, persistent bracts; B, young fruit with operculum and style attached; C, mature fruit enclosed in accrescent calyx; D, seed, adaxial view. Drawn by L. Courchet. Voucher: *Balansa* 810 (P03538126).

Vietnam. Bac Giang: Kep (villas), Dec. 1931, Pételot 2337 (HNU). Can Tho: s. loc., Dec. 1952, Pham Hoang Ho 5129 (P); station rizicole de Cantho, 25 Jan. 1914, Chevalier 30325 (P). Dac Lac: Hau Bon (Cheo Reo), Dournes s.n. (P). Dong Nai: bord Dong Nai, 7 Jan. 1971, Vu Van Cuong 1710 (P). Hai Duong: Sept Pagodes, Aug. 1908, Mouret 202 (P). Ha Nam: "Tonkin" Occidental, Tho Mat, 21 Aug. 1882, Bon 1718 (NY, P); l. c., 13 Nov. 1882, Bon 1841 (P). Ha Noi: Gia Lam distr., N of Hanoi, Nov. 1935, Pételot 2534 (HNU); Tu Phap, rive gauche de la rivière Noire, Oct. 1887, Balansa 3549 (K, P). Hoa Binh: Chu, 11 Jan. 1886, Balansa 810 (P). Ho Chi Minh Ville: cult. in hort. bot. Saigon, 1871, Pierre 5 (K, P). Phu Tho: "Cochinchine", 1862–1866, Thorel 52 (E, K, P); "La Pho", pro. Phu Tho, Eberhardt 4415 (P); de Phu Tho à Phu Doan, 26 Oct. 1911, Lecomte & Finet 654 (P); l. c., Lecomte & Finet 662 (P); Lecomte & Finet 701 (P). Thanh Hoa: "Nga la Bong", 24 Mart. 1892, Bon 5265 (P). Vinh Long: Caison (My Tho), 5 Mar. 1919, Chevalier 50 (P).



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A genus of two species, one from Southeast Asia and Malesia and one from Mexico. The first is present in CLV.

The generic concept adopted here for *Porana* follows the recent revision by Staples (2006). Many Asian species formerly assigned to *Porana* are now removed to other genera: see *Dinetus*, *Poranopsis*, and *Tridynamia* in this flora.

17. *Porana* Burm. f.

Fl. Indica 51. t. 21* (1768); Gagnep. & Courchet, Fl. Indo-Chine 4: 292 (1915); Ooststr., Blumea 3: 85 (1938), Fl. Males., Ser. I, Spermat. 4: 402 (1953); Kerr, Fl. Siam. 3 (1): 91–93 (1951); R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 24 (1979); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 179 (2005); Staples, Blumea 51: 455 (2006); Staples & D.F.Austin, Edinburgh J. Bot. 66: 145–150 (2009); Staples, Fl. Thailand 10: 453 (2010). – Type: *Porana volubilis* Burm. f.

Lianas; stems subglabrous, lenticellate. Leaves simple, entire, chartaceous; venation pinnate, veins prominent underneath.

Inflorescences thrysiform-paniculate, bracteose; lower bracts foliaceous and petiolulate, diminishing upward and becoming sessile; bracteoles 2, scale-like, borne at peduncle/pedicel junction. Flowers small, fragrant; sepals 5, free, subequal to unequal, covering lower half of corolla, accrescent in fruit; corolla broadly funnelform-campanulate, limb 5-lobed, midpetaline bands pubescent outside, otherwise glabrous; stamens unequal, longest exserted, filaments glabrous, anthers ellipsoid; pollen 3-colpate, nonspinose; pistil exserted, disc annular, ovary 1- or incompletely 2-locular, ovules 4, style unequally 2-branched, stigmas 2, reniform.

Fruits brittle, chartaceous utricles, wall shattering irregularly, protruding from chartaceous, papery calyx, all 5 sepals equally enlarged, 7–9-veined. Seed 1 (rarely 2), blackish, scurfy at first, smooth later, glabrous.

1. *Porana volubilis* Burm. f.

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Porana volubilis Burm. f., Fl. Indica 51. t. 21* (1768); Gagnep. & Courchet, Fl. Indo-Chine 4: 295 (1915); Ooststr., Blumea 3: 87 (1938), Fl. Males., Ser. I, Spermat. 4: 402 (1953); Kerr, Fl. Siam. 3 (1): 93 (1951); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 186 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 974 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 180 (2005); Staples & Jacquemoud, Candollea 60: 449–450 (2005); Staples, Blumea 51: 456 (2006), Fl. Thailand 10: 454 (2010); Staples *et al.*, Thai J. Bot. 6: 86 (2014). – Type: without locality, date or collector (neo G-PREL!, designated by Staples & Jacquemoud (2005)).

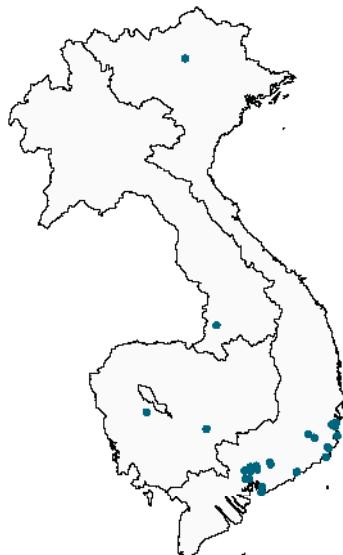
Lianas; stems 6–10(–20) m long, lenticellate, sparsely velutinous, later glabrescent, bases 10–20 cm diam. Leaves ovate, ovate-elliptic, or suborbicular, 5.8–10.7 × 3.7–6.3 cm, base truncate, emarginate or subcordate, apex acuminate-caudate, mucronulate, both sides glabrous or a few trichomes along veins underneath; secondary veins 5–8 either side of midvein; petiole 1.3–3.0 cm long.

Inflorescences thyrsiform, bracteose; lower bracts ovate, 2.4–4.7 cm, persisting; upper bracts and bracteoles smaller, deciduous; pedicels filiform, 3–5 mm. Flowers fragrant; sepals equal, 4–5 × 1–2 mm, outer 2 elliptic-ovate, inner elliptic; corolla 7–8 mm long, white, limb 5-lobed, outside sparsely puberulent, inside glabrous; stamens 5–6 mm long; pistil 7–8 mm long, ovary ovoid, apically sericeous, style branched above middle, sericeous basally, glabrous above, stigmas < 1 mm diam.

Utricles globose to ovoid, 2–4 mm diam., brown, attached to reflexed calyx, enlarged sepals 7–10 mm. Seeds subglobose, 1.5–3.0 mm diam.

Distribution. The natural distribution of *P. volubilis* has been obscured by human dispersal of the plant for ornamental purposes; it is probably native in south-east Asia or Malesia and from there seems to have been introduced to southern India, Myanmar, and the Philippines; it is present in Cambodia, Laos, Vietnam, and Thailand.

Ecology. Typically found in thickets and secondary regrowth that replaces cleared forest, on diverse soil types including white sands, rocky-clays, and basaltic soils; elevation: 50–800 m.





17.1. *Porana volubilis* Burm. f. Habit, flowers (credit: G. Staples; voucher: cultivated Singapore, Staples 1403 (SING)).

Usage. The roots are used in making medicines (*Phung v. Dien 300*) and the plant is also cultivated as an ornamental flowering climber in gardens.

Vernacular names

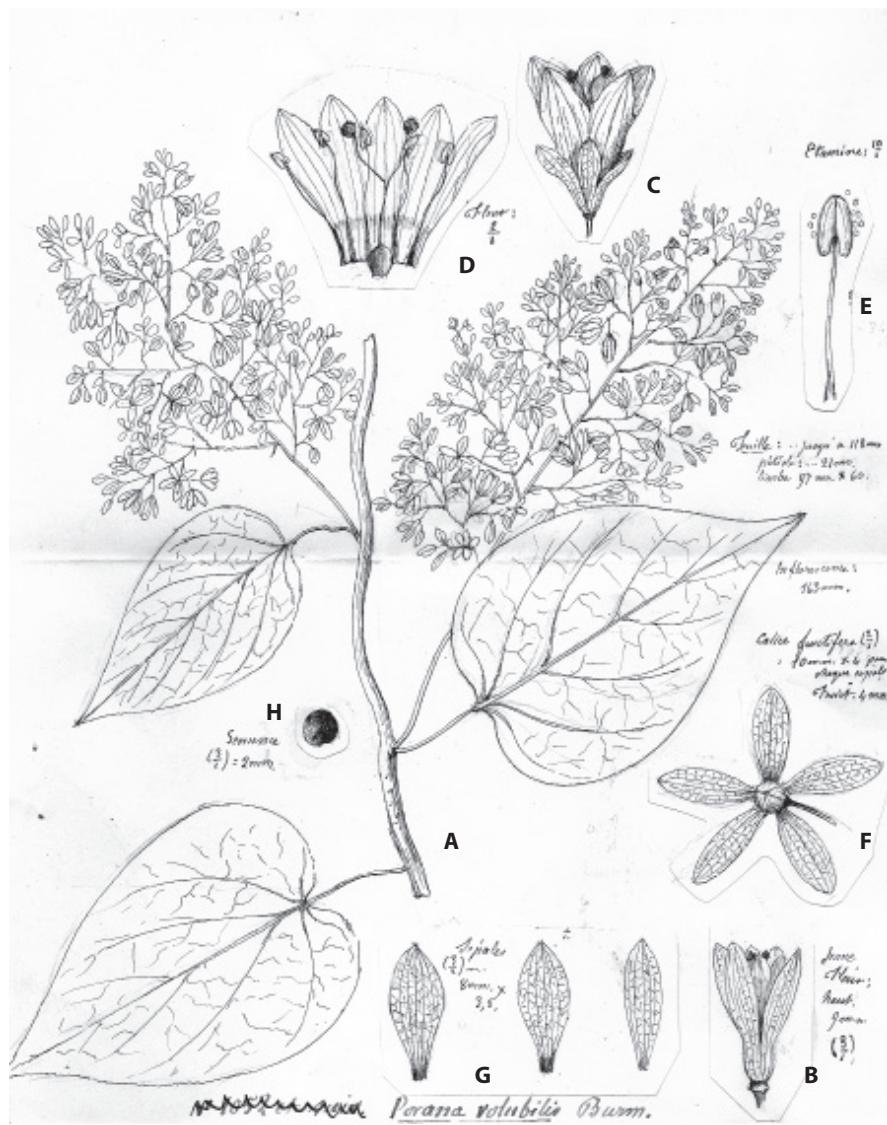
Vietnam. mac lôi (*Poilane 8956*), dây móí (Annamite, *Chevalier 39828*), dây bìm bìm núi (Annamite, *Poilane 2766*), mông tỏi rừng (Annamite, *Poilane 622*), day bim bim (Annamite, *Poilane 5472*), ure muôa (*Poilane 5472*), mông tỏi rừng (Annamite, *Poilane 622*), dây bông môî (Annamite, *Hiệp 1044, 1080*).

Material studied

Cambodia. Kompong Cham: Chup, Nov. 1921, *Evrard 755* (A, P). Pursat: montagne de Pursat, Jun 1874, *Godefroy-Lebeuf s.n.* (K, P).

Laos. Champassak: Bassac, Mar. 1876, *Harmand 964* (P).

Vietnam. s. loc.: "Cochinchine", 1862–66, *Thorel 84* (F); delta du Mekong, bords du Donnai, Nov. 1876, *Harmand 964* (BM, F, P); bords du Songbe, Nov. 1876, *Harmand 954* (P); "Tonkin", *Lecomte & Finet s.n.* (P). Ba Ria-Vung Tau: in montibus Dinh ad Baria, Oct. 1866, *Pierre 26* (A, BM, E, F, G, G-DEL, K, P); ad montem Mu xoai prope Baria, Oct. 1866, *Pierre 6* (A, K, P, US); Vung Tau ("Cap St Jacques"), 20 Oct. 1919, *Poilane 622* (P). Binh Duong: Tanuyen, 14 Jan. 1932,



17.2. *Porana volubilis* Burm. f. A, flowering stem; B, young flower at anthesis; C, flower in lateral view; D, corolla opened, showing androecium and gynoecium; E, stamen and pollen; F, utricle attached to accrescent calyx; G, fruiting sepals, showing venation; H, seed. Drawn by L. Courchet. Voucher: Thorel 584 (P03548696).

Phung v. Dien 300 (A, BISH, P); haies et bois, Thu Dau Moth, 1862–1866, Thorel 584 p.p. (BM, K). Binh Thuan: route de Phanri (Phan Thiet), 29 Oct. 1924, Everard 1627 (A, BISH, P); Phan Theit, aux tombeaux des mandarins, 5 Nov. 1924, Everard 1688 (P). Dong Nai: bois près de Bien Hoa, June 1909, d'Alleizette s.n. (L); ad flumen Dong Nai, in "prov. Bien Hoa", Dec. 1865,

Pierre 11 (A, BM, E, F, GH, K, P); "Bien Hoa prov." Oct. 1862–1866, *Thorel* 584 p.p. (A, E, G, P); *I. c.*, ad ripas flumen Be, Mar. 1877, *Pierre* 1957 (E, P); 5 km au N de Dinh Quan, 14 Dec. 1932, *Poilane* 21650 (A, BISH, E, GH, HN, K, L, MO, P). Ho Chi Minh Ville: bois à Thu Duc, July 1875, *Godefroy s.n.* (P); jardin botanique Saigon, 31 Jan. 1919, *Chevalier* 39828 (A, P); *I. c.*, Sep. 1920, *Hiep* 1044 (P); *I. c.*, 29 Nov. 1918, *Hiệp* 1080 (P). Khanh Hoa: Cam ranh, Lui-Gao, 22 Nov. 1911, *Lecomte & Finet* 1371 (P); Cau Da, Nov. 1956, *P.H. Hồ* 5240 (P); massif de Co Hin près de Nha Trang, 10 Mar. 1922, *Poilane* 2766 (A, BISH, P); Nha Trang et environs, 5 Feb. 1914, *Cheralin* 30524 (P); *I. c.*, 11–26 Mar. 1911, *Robinson* 1423 (NY, P); Nha Trang prov., Suoi Dau, 5 Jan. 1966, *Vidal* 4877 (L, P); Phuhu, entre Nha Trang et Ninh Hoa, 19 Jan. 1923, *Poilane* 5332 (A, P); *I. c.*, 25 Jan. 1923, *Poilane* 5472 (A, BISH, HN, L, P). Lam Dong: de Dran à Dalat, 26 Nov. 1911, *Lecomte & Finet* 1465 (P); route de Saigon à Dalat, km 120, 21 Dec. 1953, *Schmid s.n.* (P). Ninh Thuan: Ca Na, "pro. Phan Rang", 12 Nov. 1923, *Poilane* 8544 (P); *I. c.*, 30 Nov. 1923, *Poilane* 8956 (P); *I. c.*, 25 Oct. 1925, *Poilane* 12481 (P); entre Ca Na et Phan Rang, 20 Jan. 1961, *Schmid s.n.* (P); Tour cham, 19 Nov. 1924, *Evrard [Miéville legit]* 1864 (P).



Poranopsis paniculata, habit, flowers (credit: G. Staples; voucher: cultivated, Hawaii, Staples 1615 (BISH))

Three species: ranging across the Indian subcontinent to SW China and throughout Southeast Asia; two species occur in the CLV region, one of which is cultivated. *Poranopsis paniculata* (Roxb.) Roberty (photo above) is native to India and cultivated world-wide in the tropics for its masses of fragrant flowers. It is cultivated in Vietnam [cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990) as *Porana paniculata*] and has been included in the key to facilitate identification.

18. *Poranopsis* Roberty

Candollea 14: 26 (1952); Staples, Novon 3: 200 (1993); R.C.Fang & Staples, Fl. China 16: 280 (1995); Staples, Blumea 51: 459 (2006), Fl. Thailand 10: 454 (2010). – Type: *Poranopsis paniculata* (Roxb.) Roberty.

Porana auctt. non Burm. f.: Gagnep. & Courchet, Fl. Indo-Chine 4: 292–293 (1915), p.p.; R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 24. 1979, p.p.; T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990), p.p.; T.N.Nguyễn & Đ.H.Dúòng, Checkl. Pl. Sp. Vietnam 3: 179 (2005), p.p.

Lianas, dull yellow or greyish villous or sericeous, glabrate. Leaves simple, petiolate, cordate-ovate, papery, rugulose, abaxial surfaces densely pubescent; venation pedate or nearly palmate.

Inflorescences axillary (or terminal) bracteose panicles; bracteoles 2, scale-like, basal to calyx; pedicels filiform. Flowers tiny, often fragrant, fascicled; sepals free, quincuncial, unequally enlarged, outer 3 sepals greatly enlarged (inner 2 sepals slightly so); midvein 1, secondary veins reticulate; corolla funnelform, less than 8 mm, white, limb 5-lobed, outside villous apically, inside glabrous; stamens included or exserted, anthers ellipsoidal, longitudinally dehiscent; pollen 3-colporate, not spiny; pistil included, disc annular or absent, ovary 1-locular, ovules 4, style simple (nearly absent in 1 species); stigmas 2, globose.

Fruits papery, indehiscent utricles. Seed 1, smooth.

Key to the Species

1. Style very short, stigmas subsessile; stamens \pm equal, all included in corolla; fruiting sepals opaque and puberulent on inner face; trichomes on fruit 2-armed ***P. paniculata***
1. Style longer than ovary; stamens unequal, 3 longest protruding from corolla; fruiting sepals shiny and glabrous on inner face; trichomes on fruit simple, septate ***1. P. discifera***

1. *Poranopsis discifera* (C.K.Schneid.) Staples

	J	F	M	A	M	J	J	A	S	O	N	D
	J	F	M	A	M	J	J	A	S	O	N	D

Poranopsis discifera (C.K.Schneid.) Staples, Novon 3: 200 (1993); R.C.Fang & Staples, Fl. China 16: 280 (1995); Staples, Blumea 51: 463 (2006), Fl. Thailand 10: 455 (2010); Staples *et al.*, Thai J. Bot. 6: 86 (2014). – *Porana discifera* C.K.Schneid. in Sarg., Pl. Wilson. 3 (2): 358 (1916); Kerr, Fl. Siam. 3(1): 92 (1951); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 973 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 179 (2005). – Type: China, Yunnan, Szemao, Henry 12694 (holo A!; iso A!, Kl, MO!, NY!, W!).

Lianas; stems 5–15 m long, appressed pubescent, indumentum yellowish to rust-coloured, later glabrate. Leaves broadly ovate-cordate to nearly circular, 5.8–13.0 × 4.0–10.5 cm, smooth to slightly rugulose, undersides densely villous; petiole 2.1–5.0 cm.

Inflorescences crowded panicles; bracts ovate, leaf-like, small to very small; pedicels 3–5 mm, elongating in fruit. Flowers fragrant; sepals lanceolate-ovate, flat or convex, subequal, 1.0–1.5 mm; inner 2 sepals falcate, villous abaxially; corolla campanulate-funneliform, white or cream, limb 3–5 mm diam., 5-lobed, outside dull yellow villous distally; stamens unequal, 3 exserted, filaments basally pubescent; pistil just exserted, disc annular, ovary velutinous.

Utricles globose-obvoid, 4–6(–8) × 3–5 mm, brown, yellowish pilose, apiculate, attached to accrescent, spreading fruiting calyx; outer 3 sepals ovate-oblong to elliptic-oblong, 15–22 × 7–13 mm, tan to brownish, puberulent underneath. Seed globose, c. 3 mm, reddish to black-brown, smooth, glabrous or puberulent.

Distribution. Laos, Vietnam and NE India, SW China, N Myanmar, Thailand.

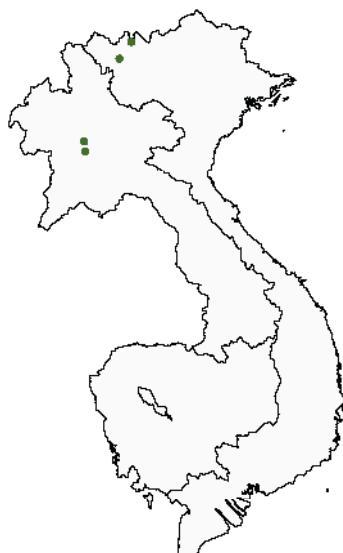
Ecology. In clearings of evergreen forests, thickets, scrub jungle, bamboo forest, often on calcareous soils; elevation: 300–900 m.

Vernacular name

Vietnam. m'ma (Meo, Poilane 26910).

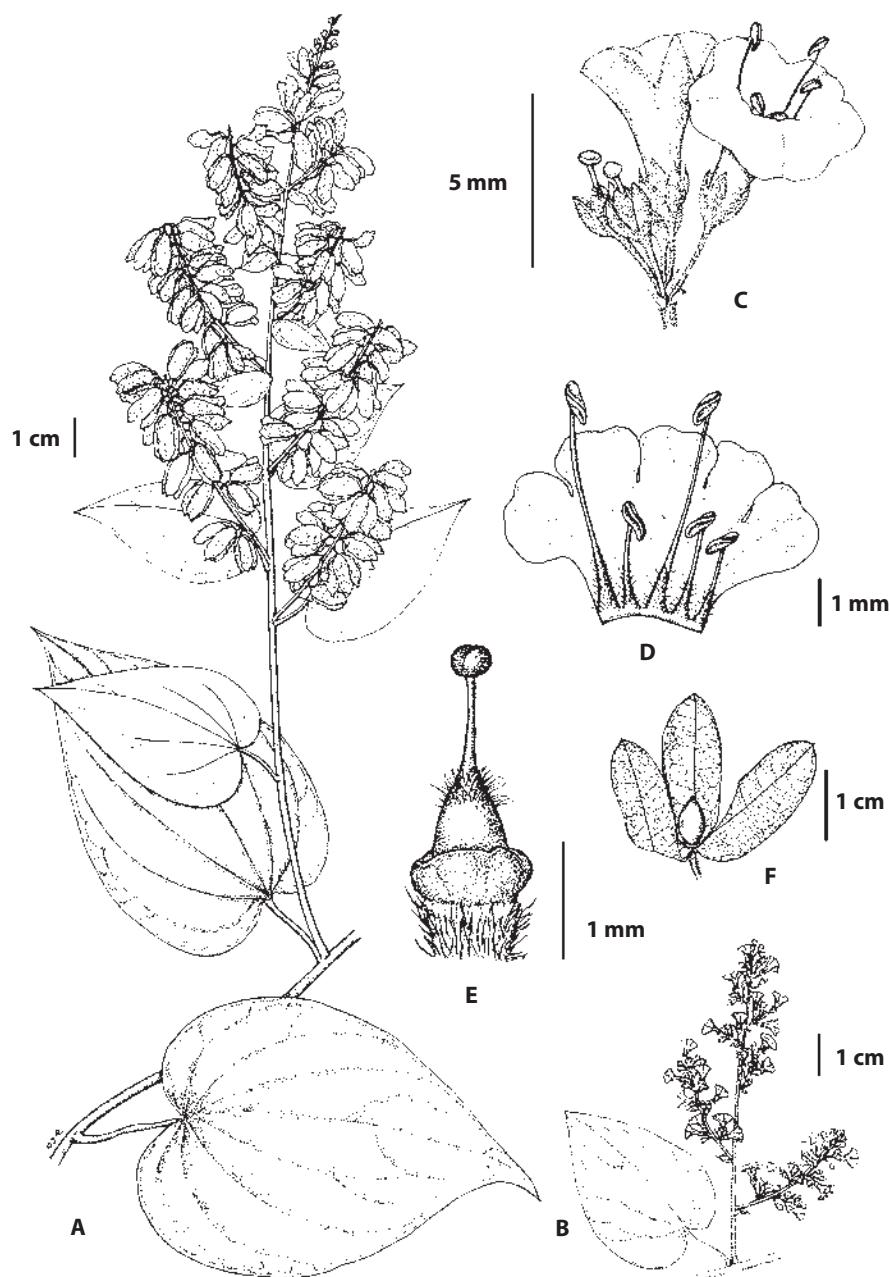
Material studied

Laos. Louang Prabang: alongside dirt track up to temple on slopes of Phu Souang mountain, 3 Nov. 2012, Staples *et al.* 1501 (HNL, KKU, PTK, SING); along Hwy 13 between Vientiane and Luang Prabang, approximately Kms 312–313, 4 Nov. 2012, Staples *et al.* 1515 (HNL, KKU, PTK, SING).





18.1. *Poranopsis discifera* (Schneider) Staples. A, habit; B, flowers; C, fruits (credit: A, B, Piyakaset Suksathan; C, G. Staples; vouchers: A, B, Thailand, Staples et al. 1374 (QBG); C, cultivated China, not voucherized).



18.2. *Poranopsis discifera* (Schneider) Staples. A, habit with fruits; B, inflorescence branch; C, flowers; D, opened corolla with stamens; E, pistil; F, fruit. Drawn by P. Inthachub (From Staples 2010).

Vietnam. Lai Chau: Le Phou Nhou, près de Lai Chau, 27 Dec. 1937, *Poilane* 26910 (A, P); *l. c.*, 8 Jan. 1938, *Poilane* 27098 (A, BISH, K, P). Lao Cai: km 20 de Phong Thoa ye Yen Sun, 2 Dec. 1937, *Poilane* 26707 (A, BISH, P).





A genus comprising 3 species from the Asian tropics; one species in CLV.

19. *Rivea* Choisy

Mém. Soc. Phys. Genève 6: 407 [Conv. Orient. 25] (1834); C.B.Clarke *in* J.D. Hooker, Fl. Brit. India 4: 183 (1883); Ooststr., Blumea 5: 352–355 (1943); R.R.Mill, Edinburgh J. Bot. 53: 229–246 (1996); R.R.Mill *in* D.G. Long, Fl. Bhutan 2 (2): 837 (1999); Staples, Edinburgh J. Bot. 64: 213–223 (2007), Fl. Thailand 10: 457 (2010). – Type: *Rivea hypocrateriformis* (Desr.) Choisy.

Shrubs or woody climbers; young parts shining silvery or white pubescent. Leaves petiolate, ovate to cordate, with 2 prominent, dark glands at base of midrib.

Inflorescences axillary, cymose, often bracteose. Flowers showy, nocturnal, fragrant; sepals equal to markedly unequal, persistent, subwoody, and reflexed in fruit; corolla salverform, with a long cylindrical tube and a broad limb flaring at right angles; stamens included, filaments pubescent at insertion, glabrous and free above, anthers linear-oblong; pollen spinulose; pistil included or stigmas exserted, ovary 4-locular, 4-ovuled, style filiform, stigmas 2, linear-oblong.

Fruits woody, thick-walled, circumscissile near the middle, glossy brown, apiculate by style base. Seeds 4 or fewer, embedded in mealy whitish pulp, glabrous.

Notes

Ooststroom (1943) brought *Rivea* back nearly to its original circumscription: shrubby plants with nocturnal, salverform flowers, 2 elongate (rather than biglobose) stigmas, and woody fruits that contain a dry, mealy pulp in which the 1–4 seeds are embedded. As such, the genus is entirely Asian and all American and African species are removed to other genera. Although molecular evidence suggests that *Rivea* be subsumed into *Ipomoea*, the species have an immediately recognizable aspect and it is a matter of practicality to recognize them as distinct.

1. *Rivea ornata* (Roxb.) Choisy

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Rivea ornata (Roxb.) Choisy, Mém. Soc. Phys. Genève 6: 409. t. 3 [Conv. Orient. 27] (1834); R.R.Mill in D.G. Long, Fl. Bhutan 2 (2): 837 (1999); Staples, Edinburgh J. Bot. 64: 217 (2007), Fl. Thailand 10: 459 (2010); Staples et al., Thai J. Bot. 6: 86 (2014). – *Lettsomia ornata* Roxb., Fl. Ind. 2: 86 (1824). – Type: India, cult. Calcutta Bot. Garden, Wallich Cat. 1369/2 (syn G!, G-DC!, K-W!).

Rivea clarkeana Craib, Bull. Misc. Inform. Kew 1922: 239 (1922); Kerr, Fl. Siam. 3 (2): 22. 1954. – Type: Thailand, Chiang Mai, Kerr 3383 (holo K!; iso Pl, P00391939, TCD!).

Rivea laotica Ooststr., Blumea 8: 525 (1957). – Type: Laos, Vientiane, Km 22 route to Tha Ngon, Vidal 2350 (holo TL; iso L!, L0171302, Pl, P00391932, P00391937).

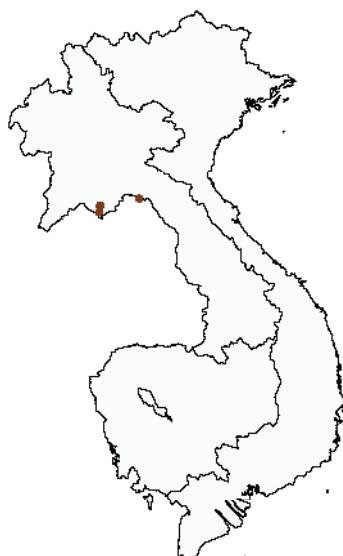
Erect or scandent shrubs from woody rootstocks; stems 1.0–2.5 m tall, indumentum whitish, tips sometimes twining. Leaves orbicular to reniform, 10–15 × 6–20 cm, base cordate, with 2 prominent, dark glands underneath, apex rounded or emarginate, upper sides glabrous, undersides densely whitish tomentose, glabrescent; secondary veins 5 or 6 either side of midvein; petiole 3.0–12.5 cm long, sericeous.

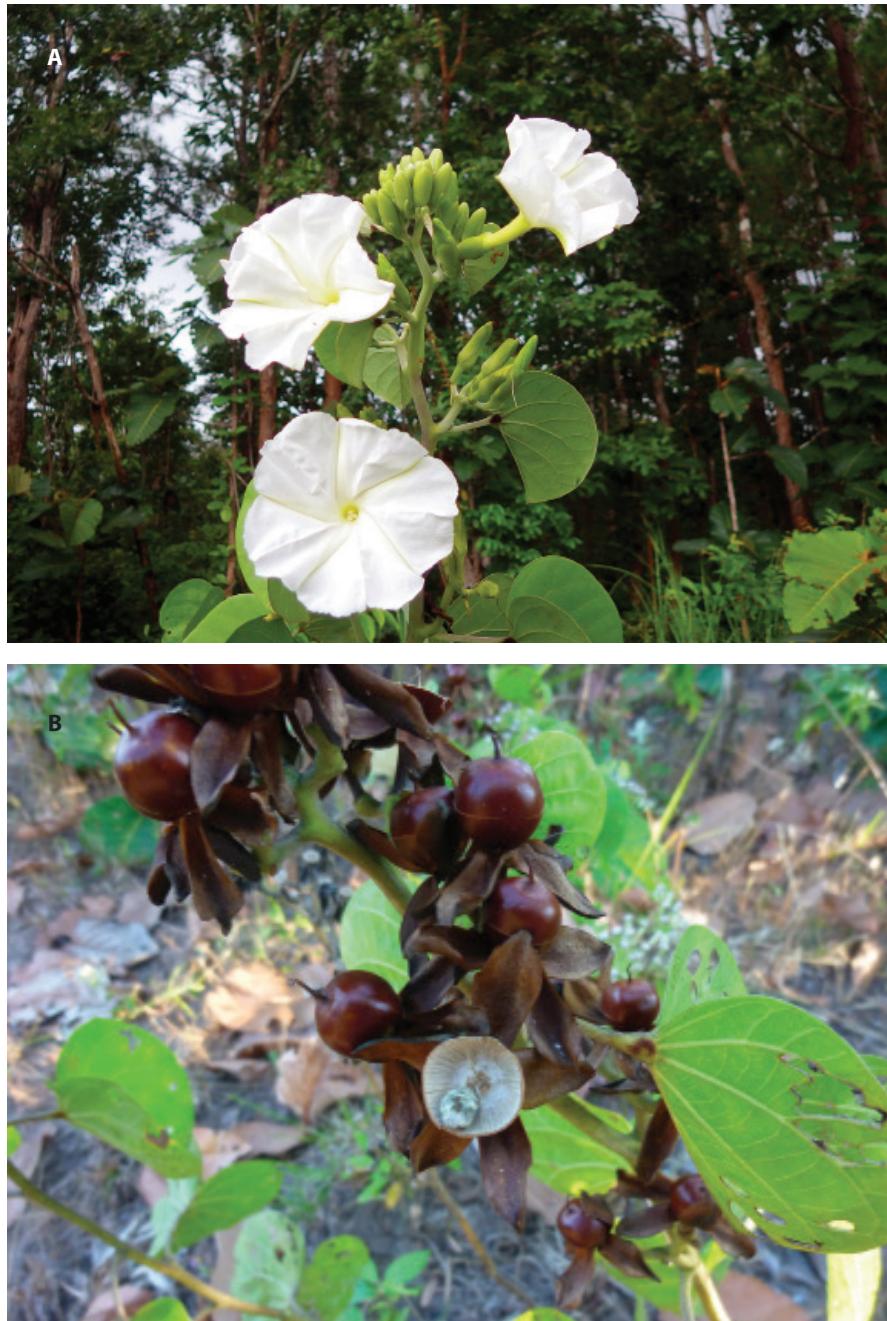
Inflorescences 3–10-flowered; bracts foliose; bracteoles linear, 4–5 mm long, deciduous. Flowers nocturnal, fragrant; sepals subequal, oblong to elliptic-oblong, 14–17 × 8–9 mm, apices obtuse, rounded, or emarginate, outer 3 sepals appressed pubescent outside, margins glabrous, inner sepals glabrous; corolla salverform, tube c. 5 cm long, limb c. 7–8 cm diam., subentire, white with 5 greenish bands, midpetaline bands pubescent outside; stamens included, filaments inserted at middle of tube or below, anthers c. 7 mm long; pistil included, disc cupular, ovary glabrous, style c. 25 mm long, stigma lobes c. 4 mm long.

Fruits depressed globose to quadrangular, c. 20–30 mm diam., glossy brown, glabrous; fruiting calyces woody, tardily reflexed. Seeds c. 7–9 mm × 4–6 mm, brown, embedded in whitish matrix that dries and crumbles.

Distribution. Laos, India, Nepal, Myanmar, Thailand.

Ecology. Open jungle, deciduous dipterocarp forest, mixed forests, on sandy loam; elevation: c. 10–500 m.





19.1. *Rivea ornata* (Roxb.) Choisy. A, flower; B, fruits, seed (credits: A, P. Rattanakrajang, Dept. of Plant Science, Fac. of Science, Mahidol Univ.; B, G. Staples; vouchers: Thailand, A, Rattanakrajang et al. 125; B, Staples et al. 1371 (QBG)).

Rivea ornata has the morphological attributes of a plant adapted to severe dry seasons or burning or both: an enlarged underground storage organ that sends up leafy shoots during the rainy season, flowering occurs at the end of the rainy season and fruits develop during the cool dry season. Nothing is reported about the pollination or fruit dispersal, which must be unique.

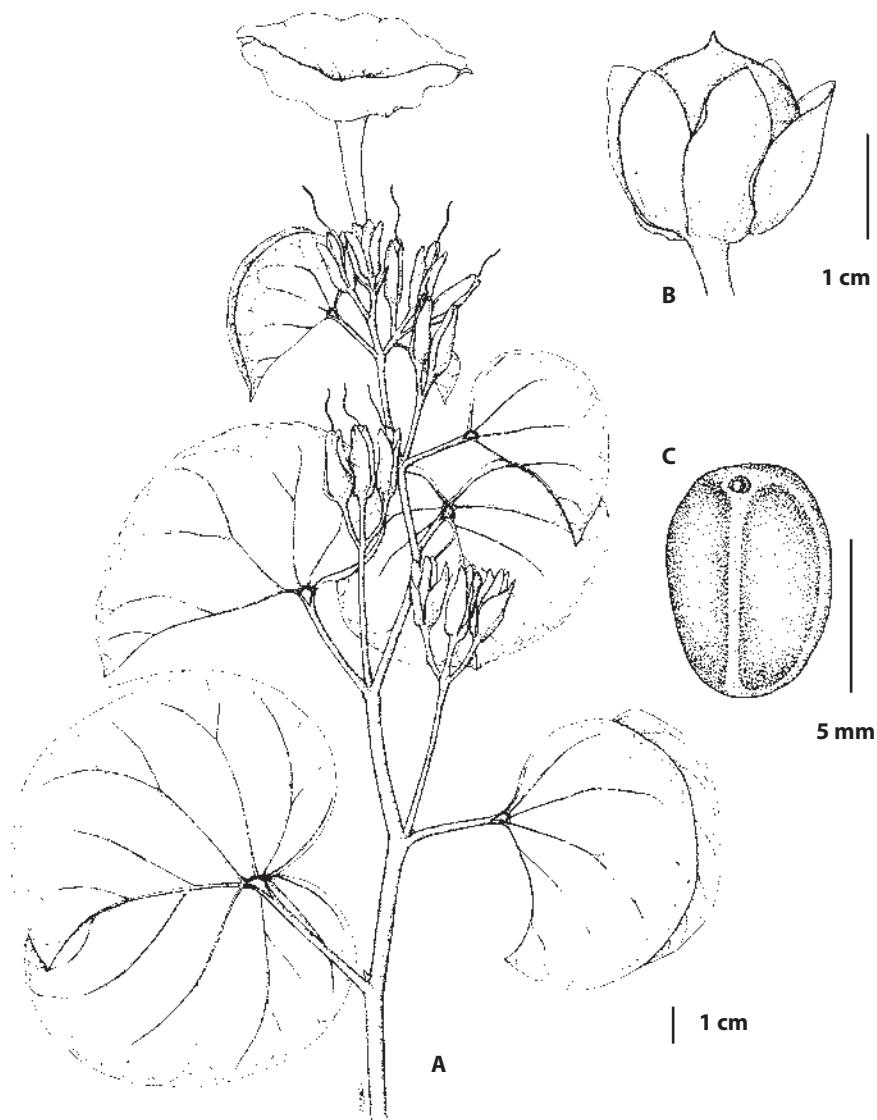
Usage. The roots are prepared in compresses and applied to wounds (*Vidal 1120B*).

Vernacular names

Laos. kok phi yik (*Vidal 1120B*), phi yik (*Vidal 1953*).

Material studied

Laos. Vientiane: Vientiane vic., 8 Oct. 1952, *Vidal 1120* (L); km 10 env. Vientiane, 9 Oct. 1955, *Tixer 55-13* (P); km 17 route de Tha Ngon, 13 Nov. 1949, *Vidal 1120B* (P); km 20, route de Tha Ngon, 8 Oct. 1952, *Vidal 1953* (P); km 22 route de Paksan, 2 Feb. 1965, *Vidal 4413* (P).



19.2. *Rivea ornata* (Roxb.) Choisy. A, habit; B, fruit; C, seed. Drawn by P. Inthachub (From Staples 2010).



Stictocardia beraviensis (Vatke) Hallier f., habit, flowers (credit: G. Staples; voucher: cultivated, not collected)

Twelve species distributed in Africa, Madagascar, and Asia; one species is native in Southeast Asia, a second is cultivated there as an ornamental. *Stictocardia beraviensis* (Vatke) Hallier f. (photo above) is native in tropical Africa and Madagascar and is now grown world-wide as a flowering ornamental climber. It is included in the following key to enable its identification.

20. *Stictocardia* Hallier f.

Bot. Jahrb. Syst. 18: 159 (1893 t.p. 1894); Ooststr., Blumea 5: 346 (1943), Fl. Males., Ser. I, Spermat. 4: 491 (1953); Kerr, Fl. Siam. 3 (2): 23 (1954); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 186 (1990); R.C.Fang & Staples, Fl. China 16: 321 (1995); D.F.Austin & Sebsebe, Kew Bull. 52: 161–169 (1997); D.F.Austin & Eich, Willdenowia 31: 79–85 (2001); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 180 (2005); Staples, Fl. Thailand 10: 459 (2010). – Type: *Stictocardia tiliifolia* (Desr.) Hallier f.

Twiners, woody or herbaceous. Leaves petiolate, ovate to circular, undersides dotted with minute glands, seen as black dots in dried specimens, bases usually cordate, margins entire.

Inflorescences axillary, cymose, 1- to many flowered, peduncled; bracts early deciduous, small. Flowers showy; sepals ovate to elliptic or circular, equal or slightly unequal, much enlarged in fruit, subcoriaceous, abaxial surfaces glandular punctate, margins membranous, apices obtuse to emarginate; corolla funnelform, midpetaline bands pilose and with minute glands; stamens included, filaments filiform, inserted near corolla base; pollen globular, pantoporate, finely spiny; pistil included, disc annular, ovary glabrous, 4-locular, 4-ovuled, style 1, stigma 2-globular.

Fruits enclosed by enlarged calyx, dehiscent; pericarp dry, eroding irregularly between septa until 4 holes appear in the pericarp. Seeds 4 or fewer, pubescent.

Key to the species

1. Corolla 8–10 cm long, pinkish-purple, the tube darker; stamens unequal, anther tips not tufted; fruit 20–35 mm diam. **1. *S. tiliifolia***
1. Corolla c. 6 cm long, salmon-orange with yellow inside at tube base; stamens equal, each anther tip tufted; fruit c. 13 mm diam. ***S. beraviensis***

1. *Stictocardia tiliifolia* (Desr.) Hallier f.



Stictocardia tiliifolia (Desr.) Hallier f., Bot. Jahrb. Syst. 18: 159 (1893); Ooststr., Blumea 5: 346 (1943), Fl. Males., Ser. I, Spermat. 4: 491 (1953); Kerr, Fl. Siam. 3 (2): 23 (1954); D.F.Austin et al., Brittonia 30: 195–198 (1978); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 186 (1990); P.H.Hô, Cáycô Việtnam 2 (2): 998 (1993); R.C.Fang & Staples, Fl. China 16: 321 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 180 (2005); Staples, Fl. Thailand 10: 461 (2010). – *Convolvulus tiliaceifolius* Desr. in Lam., Encycl. 3: 544 (1791). – *Ipomoea tiliifolia* (Desr.) Roem. & Schult., Syst. Veg. 4: 229 (1819). – *Rivea tiliifolia* (Desr.) Choisy, Mém. Soc. Phys. Genève 6: 407 [Conv. Orient. 25] (1834). – *Argyreia tiliaceifolia* (Desr.) Wight, Icon. Pl. Ind. Orient. t. 1358 (1850); Gagnep. & Courchet, Fl. Indo-Chine 4: 274 (1915). – Type: Île de France [=Mauritius], without locality, *Commerson s.n.* (lecto P-JU 6775, designated by J.Bosser & H.Heine, Fl. Mascareignes 127: 22 (2000); isolecto Cl, G-DC!, P-LA, P).

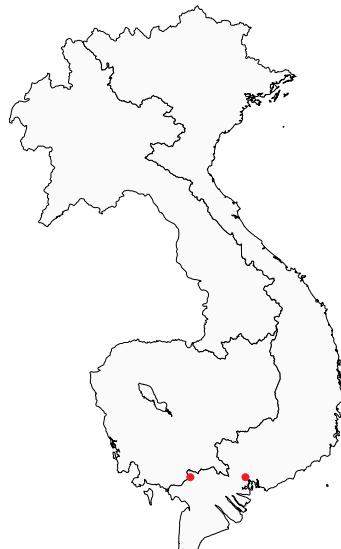
Stictocardia campanulata auctt. non L.: Merr., Philipp. J. Sci. 9: 133 (1914); Gunn, Brittonia 24: 169 (1972).

Lianas; stems 3–15 m long, innovations pubescent, later glabrescent. Leaves broadly ovate or circular, 6–20 × 5–20 cm, herbaceous, both sides shortly pubescent or subglabrous, undersides minutely black-dotted, base cordate, apex abruptly acuminate, mucronulate; secondary veins 7 or 8 either side of midvein; petiole 3–14 cm.

Inflorescences 1–3-flowered cymes; peduncles 1.5–7.5 cm; bracts deciduous, minute; pedicels 20–35 mm. Flowers diurnal; sepals circular, nearly equal or inner sepals shorter, 10–18 mm, pubescent or glabrous outside, minutely black glandular punctate, apices rounded or emarginate; corolla funnelform, 8–10 cm, pinkish purple, centre darker, limb 8–10 cm diam., midpetaline bands glandular punctate outside, sometimes pilose; stamens included, unequal, filaments pubescent basally, anthers lanceolate, c. 5 mm; pistil included, style filiform.

Fruits ± globose, 2.0–3.5 cm diam., tightly enfolded in 4–5 cm long calyx. Seeds 4 or fewer, 8–9 mm, dark brown, pubescent.

Distribution. From tropical Africa, Madagascar, and the Indian Ocean islands through Vietnam, India, Sri Lanka,





20.1. *Stictocardia tiliifolia* (Desr.) Hallier f. A, flowers; B, fruits in different stages (credit: G. Staples; voucher: U.S.A., Hawaii, Staples 1564 (BKF)).

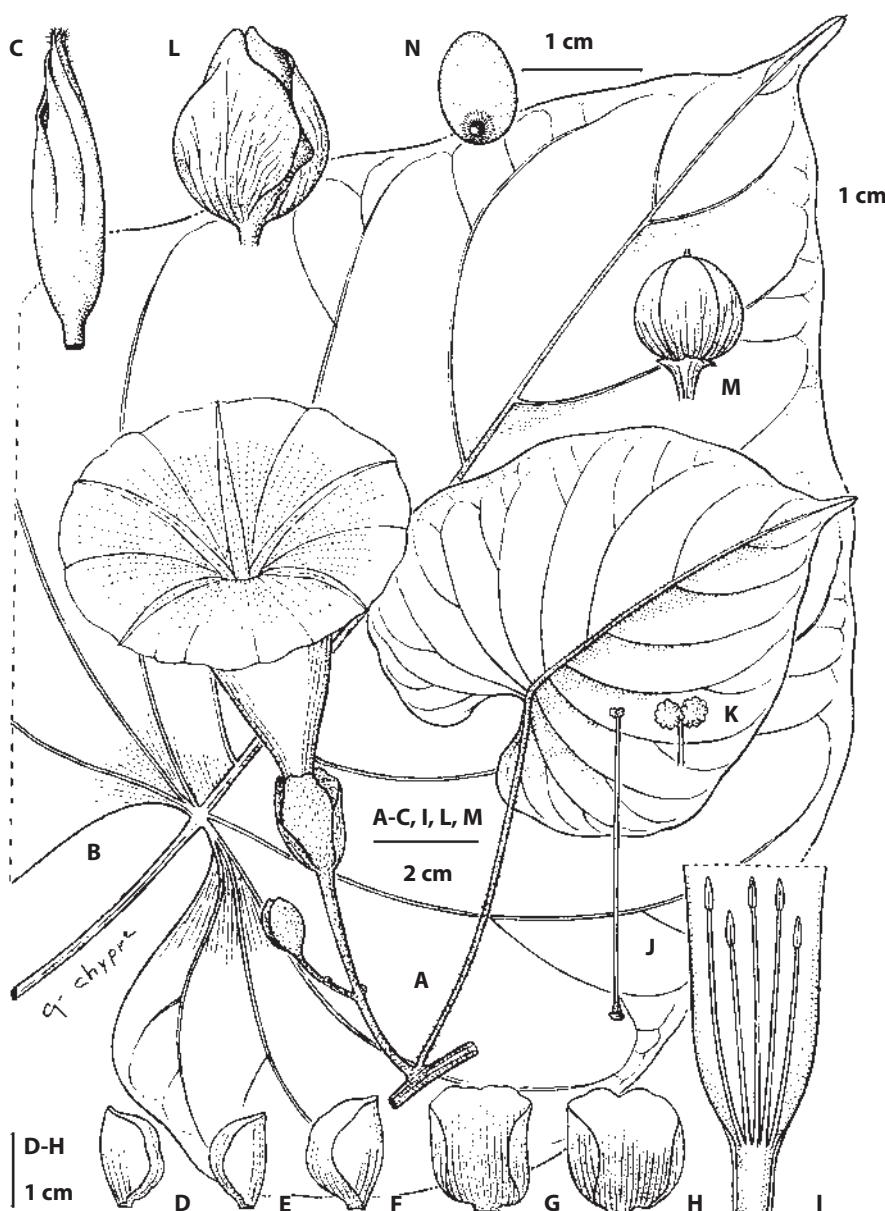
Bangladesh, Myanmar, China, Thailand, Malaysia, Indonesia, the Philippines, New Guinea, New Caledonia, N Australia, and the Pacific Islands; now also widely naturalized in tropical America. Almost certainly present in coastal Cambodia; doubtfully present in land-locked Laos.

Ecology. A littoral plant typically found in forests or coastal scrub near tropical ocean beaches; elevation: 0–100 m.

Notes. The epithet *campanulata* has been misunderstood by several authors who wrongly applied it in *Argyreia*, *Rivea* and *Stictocardia*. See Austin *et al.* (1978) for an explanation of the nomenclature involved. *Ipomoea campanulata* L., as typified by the plate illustrating *Adamboe* in Rheede's *Hortus Malabaricus*, is a different plant, recognized in this flora as a distinct species in *Ipomoea*.

Material studied

Vietnam. An Giang: Chau Doc, Dec. 1867, Pierre 308 (E, K, P). Ho Chi Minh Ville: cult. Hort. Bot. Saigon, May 1869, Pierre s.n. (E, G, P).



20.2. *Stictocardia tiliifolia* (Desr.) Hallier f. A, flowering stem; B, large leaf; C, flower bud; D–H, sepals, outermost (right) to innermost (left); I, lower corolla, opened, showing androecium; J, pistil; K, stigmas; L, fruiting calyx; M, capsule; N, seed (From Heine 1984).



Four species distributed in Asia; all four occur in CLV. There has been confusion in the past about species delimitation and some names have been wrongly used in the literature.

21. *Tridynamia* Gagnep.

Notul. Syst. (Paris) 14: 26 (1950); Ooststr., Blumea 12: 39-40 (1963); Staples, Novon 3: 33 (1993); R.C.Fang & Staples, Fl. China 16: 281 (1995); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 180 (2005); Staples, Blumea 51: 467 (2006), Fl. Thailand 10: 462 (2010). – Type: *Tridynamia eberhardtii* Gagnep.

Porana auctt. non Burm. f.: Gagnep. & Courchet, Fl. Indo-Chine 4: 293 (1915), p.p.; Kerr, Fl. Siam. 3 (1): 91 (1951), p.p.; Ooststr., Blumea 3: 85 (1938), p.p., Fl. Males., Ser. I, Spermat. 4: 402 (1953), p.p., Blumea 12: 40 (1963); R.C.Fang & S.H.Huang, Fl. Reipubl. Popularis Sin. 64 (1): 140 (1979), p.p.; T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 186 (1990); T.N.Nguyễn & Đ.H.Dùóng, Checkl. Pl. Sp. Vietnam 3: 179 (2005), p.p.

Lianas, tomentose-villous, glabrate. Leaves simple, petiolate, cordate, rigidly papery or subcoriaceous, abaxial surfaces densely pubescent or glabrous; venation pedate basally, alternate above.

Inflorescences axillary (or terminal), bracteose, racemes or panicles; bracteoles 3, sepal-like, forming a calycle basal to calyx. Flowers showy, fascicled; sepals free, quincuncial, in fruit unequally enlarged, papery, with usually 9 (7-11) longitudinal veins basally, veins prominent abaxially; outer 2 or 3 sepals greatly enlarged; inner sepals slightly so; corolla white, pale yellowish, or blue-violet, campanulate to broadly funnelform, 1-3.5(-5.5) cm; limb obscurely 5-lobed, outside pubescent apically, inside glabrous; stamens included or exserted; filaments basally pilose or glabrous; anthers sagittate, versatile; pollen 3-colporate, not spiny; pistil included or exserted, disc 5-lobulate or absent. Pistil included or exserted; ovary unilocular, ovules 4; style 1, thread-like; stigma 2-lobed, wrinkled.

Fruits indehiscent utricles, papery, apiculate, tightly enclosed in accrescent calyx. Seed 1, glabrous.

Key to the species

1. Outer 2 sepals longer than inner 3, greatly elongate in fruit **2**
—. Outer 3 sepals longer than inner 2, greatly elongate in fruit **3**
2. Corolla white, to 1.1 cm diam.; all stamens included **1. *T. bialata***
—. Corolla blue or violet, (1.0-)1.6-3.0 cm diam.; some or all stamens exserted **3. *T. sinensis***
3. Corolla narrowly funnelform, tube widening gradually from base upward; fruiting sepals narrowly obovate to spatulate **4. *T. spectabilis***
—. Corolla campanulate to broadly funnelform, tube flaring abruptly above a narrow base; fruiting sepals oblong **2. *T. megalantha***

1. *Tridynamia bialata* (Kerr) Staples

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Tridynamia bialata (Kerr) Staples, Thai Forest Bull., Bot. 32: 149 (2004), Blumea 51: 470 (2006), Fl. Thailand 10: 463 (2010). – *Porana bialata* Kerr, Bull. Misc. Inform. 1941: 19 (1941), Fl. Siam. 3 (1): 91 (1951). – Type: Thailand, Prachuap Khiri Khan, Hui Yang, Put 3166 (lecto BM!, BM000885066, designated by Staples (2006); isolecto A!, A00054702, ABD!, BK!, E!, K!, K000852416, L!, L0004245, TCD!).

Lianas; stems 2–20 m long, puberulent at first, indumentum yellowish-rusty, later glabrate. Leaves broadly ovate to cordate, 5.5–10.2 × 4.5–7.8 cm, upper sides pilose or subglabrous, undersides velutinous, base cordate; petiole 1.4–4.5 cm long.

Inflorescence: lower bracts foliaceous, ovate to lanceolate, 2.4–3.5 cm, upper bracts lanceolate-subulate, 1–3 mm long; pedicels 4–8 mm; bracteoles linear-filiform, 3–4 mm long, persistent. Flowers upward facing; sepals unequal, outer 2 elliptic-oblong, 3–4 mm long, puberulent, inner sepals ovate-lanceolate, ≤ 1 mm; corolla funneliform, 0.8–1.5 cm long, white, limb 0.7–1.1 cm diam., margins ragged, tube base pale yellowish; stamens included, unequal, 3–6 mm long; pistil included, 6–8 mm long, ovary ovoid-globose, style glabrous.

Utricles ovoid-conical, 6–10 × 3–4 mm, apiculate, thinly chartaceous, glabrous; fruiting sepals tightly surrounding utricles, 3.5–5.4 cm long, constricted medially, flaring above, stiffly chartaceous, subglabrous. Seed 4–5 mm long, reddish brown to black, smooth.

Distribution. Vietnam, Thailand, surely in intervening Laos and Cambodia as well.

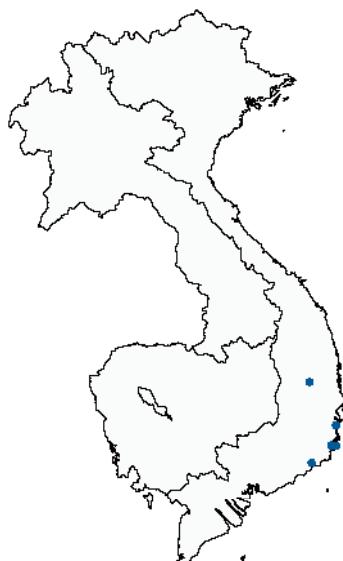
Ecology. Twining in thickets of secondary growth that replace cleared forest, reported on rocky-clay soil; elevation: 100–200 m.

Vernacular names

Vietnam. bönga yang hröi (Jörai, Dournes s.n.), hré bönga (Jörai, Dournes s.n.).

Material studied

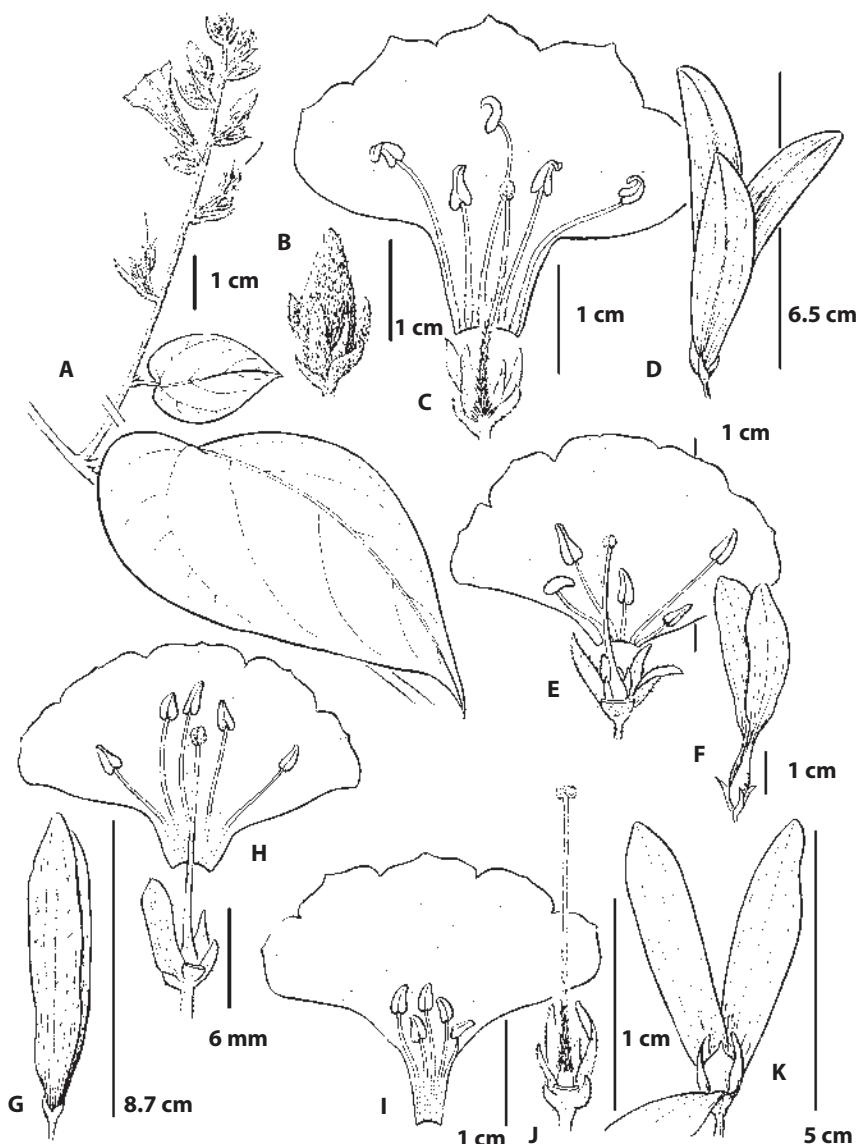
Vietnam. Dac Lac: Hau Bôn (Cheo Reo), Dournes s.n. (P); prairie près du village Coroh Pönam, Dournes s.n. (P). Khanh Hoa: Île Tré, près de Nha Trang, 15 Apr. 1922, Poilane 3053 (A, P); Thu Hu, entre Nha Trang et Ninh Hoa, 19 Jan. 1923, Poilane 5336 (P); km 25 route de Nha Trang à Ninh Hoa, 26 Oct. 1923, Poilane 8417 (P). Ninh Thuan: Ba Rau prope Phan Rang, 28 Feb. 1924,





21.1. *Tridynamia bialata* (Kerr) Staples. A, habit, flowers; B, fruit (credits: A, Preecha Karaket, BKF; B, Rachun Pooma, BKF; voucher: Thailand, not collected).

Poilane 9797 (P); Ouest de la gare de Song Mao, 26 Sep. 1940, *Poilane* 30549 (P); Nui Chua National Park, 8 Jan. 2010, Soejarto et al. DDS-14536 (P).



21.2. *Tridynamia* species. A–D, *T. megalantha* (Merr.) Staples. A, flowering stem habit; B, flower bud with calycle; C, flower, corolla openend, showing hairy style base and sagittate anthers; D, fruiting calyx; E, F, *T. bialata* (Kerr) Staples. E, flower, corolla opened; F, fruiting calyx with prominent calycle; G, H, *T. sinensis* var. *sinensis* (Hemsl.) Staples. G, fruiting calyx; H, flower, corolla opened, 1 sepal removed; I–K, *T. spectabilis* (Kurz) Parmar. I, corolla opened; J, flowering calyx, 1 sepal removed, calycle, and gynoecium; K, fruiting calyx, 1 sepal deflexed to expose utricle. Drawn by Anna Stone (Vouchers: A, D, from photo of Staples & Wongprasert 140; B, C, Poilane 28095; E, Poilane 3053; F, Put 2326; G, Huang 40898; H, Handel-Mazetti 108277; I, J, Koyama et al. T-49020; K, from photo of Kurz 1083).

2. *Tridynamia megalantha* (Merr.) Staples

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Tridynamia megalantha (Merr.) Staples, Novon 3: 201 (1993); R.C.Fang & Staples, Fl. China 16: 282 (1995); Staples, Blumea 51: 472 (2006), Fl. Thailand 10: 463 (2010); Staples *et al.*, Thai J. Bot. 6: 86 (2014). – *Porana megalantha* Merr., Lingnan Sci. J. 14: 53 (1935); P.H.Hô, Cây cỏ Việt Nam 2 (2): 973 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 179 (2005). – Type: China, Hainan, Ch'iu Sam Ts'uen, S.K. Lau 373 (holo NY!; iso A!, B!, BM!, E!, Gl!, Kl!, MICH!, MO!, Pl!, P00608610, PE!, UCI!, US!, W!).

Porana sutepensis Kerr, Bull. Misc. Inform. Kew 1941: 20 (1941); Fl. Siam. 3 (1): 93 (1951). – Type: Thailand, Chiang Mai, Doi Sutep, Kerr 2605 (lecto BM!, BM000885072, designated by Staples (2006); isolecto A!, A00054703, Kl!, L!, L0004248).

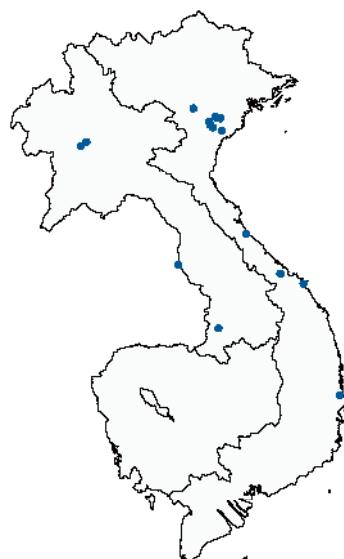
Tridynamia eberhardtii Gagnep., Notul. Syst. (Paris) 14: 26 (1950); P.H.Hô, Cây cỏ Việt Nam 2 (2): 974 (1993); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 180 (2005). – Type: Vietnam, Thua Thiênn, haute vallée du Sông Thuy-Cam, Eberhardt 3132 (holo Pl!, P030206; iso Pl!, P00608609).

Porana spectabilis auctt. non Kurz: Gagnep. & Courchet, Fl. Indo-Chine 4: 293 (1915), p.p.; H.S.Kiu, Fl. hainanica 3: 475 (1974), p.p.; R.C.Fang & S.H.Huang, Flora yunnanica 2: 629 (1979) & Fl. Reipubl. Popularis Sin. 64: 32 (1979), p.p.

Lianas; stems 6–15 m, tomentose, indumentum whitish to yellowish, later glabrescent. Leaves ovate, elliptic, or subcircular, 7.8–17.0 × 5.0–10.0 cm, upper sides subglabrous to tomentose, undersides tomentose, base cordate; petiole 1.2–4.0(–7.0) cm.

Inflorescence bracts ovate; bracteoles unequal; pedicels 7–10 mm. Sepals unequal, narrowly oblong to linear, outer 3 sepals 7–8 mm, tomentose, inner sepals smaller; corolla broadly funnelform, 3.0–4.5 cm long, white, limb 2.7–4.6 cm diam., shallowly 5-lobed; stamens included, unequal, 11–17 mm; pistil included, 19–20 mm, ovary ovoid, glabrous, style pilose basally.

Utricles narrowly obovoid-ellipsoid, c. 10 × 6 mm, pilose; outer 3 fruiting sepals oblong, 5.5–7.5 cm long, tan, coarsely reticulate, bases tightly clasping and thickened, distally flat, wing-like. Seed 8–10 mm, dark brown, wrinkled.





21.3. *Tridynamia megalantha* (Merr.) Staples. Flower (credit: Paweena Traiperm, Mahidol University; voucher: Laos, Staples et al. 1523 (HNL)).

Distribution. Laos, Vietnam, NE India, S China, Myanmar, Thailand, Malaysia.

Ecology. In grassy savannas, evergreen forest margins, thickets, on sandy or rocky soils; elevation: 600 m.

Vernacular name

Laos. khúa đở traảng (*Poilane* 2420).

Material studied

Laos. Champassak: Bassac, 1866–1868, *Thorel* 2690 (P). Louang Prabang: Phu Souang mountain, near Kokngiew village, 3 Nov. 2012, Staples et al. 1500 (SING); valley behind Longlao Mai village (Hmong), 5 Nov. 2012, Staples et al. 1523 (SING). Savannakhet: Kilo 22 route de Savannakhet à Quang Tri, 30 Jan. 1925, *Poilane* 11866 (P); Km 20 de la Route Coloniale No. 9, 18 Oct. 1938, *Poilane* 28095 (P). Xieng Khouang: entre Cha muong et Ta do, 23 Nov. 1920, *Poilane* 2420 (A, P).

Vietnam. s. loc.: Nong Van Tiep 2454 (HN). Bac Ninh: Lac Tho, May–June 1891, *Bon* s.n. (P). Da Nang: Ba Na, près Tourane, 7 Mar. 1939, *Poilane* 29288 (A, P). Ha Nam: Kien Khe, in montibus Dong Ham, 31 May 1884, *Bon* 2634 (P). Ha Noi: Vo Xa vic., 9 July 1891, *Bon* s.n. (K, P). Hoa Binh: Cho-Bo, *Colani* 3233 (BM); Apr. 1926, *Pételot* 3233 (P); Lac Thuy distr., N of Co Nghia, 26 June 1965, *Van* et al. s.n. (HNU). Lang Son: Van Linh, *Eberhardt* 3357 (P). Ninh Binh: Cho Ganh, June 1923, *Pételot* 956 (HN, HNU, P); l. c., July 1923, *Pételot* 875 (P); Cuc Phuong National Park, Site CP54, 29 June 1999, *Cuong* 211 (L); l. c., site CP215, 14 Aug. 2000, *Cuong* et al. M.V. 972 (L). Phu Yen: in rupibus montium Hanh Lâm, 17 June 1884, *Bon* 2690 (P).

3. *Tridynamia sinensis* (Hemsl.) Staples



J F M A M J J A S O N D



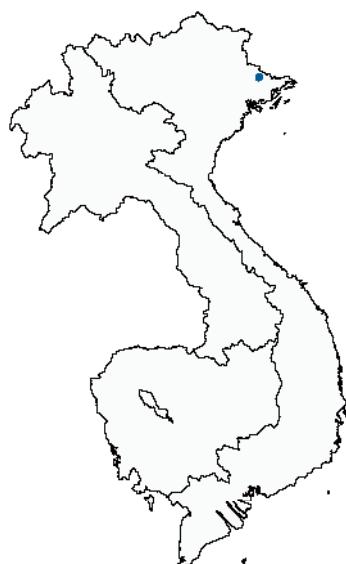
J F M A M J J A S O N D

Tridynamia sinensis (Hemsl.) Staples, Novon 3: 201 (1993); R.C.Fang & Staples, Fl. China 16: 282 (1995); Staples, Blumea 51: 474 (2006).
– *Porana sinensis* Hemsl., J. Linn. Soc., Bot. 26: 197 (1890); P.H.Hö, Cây cỏ Việt Nam 2 (2): 972 (1993) sphalm. ‘*Porana chinensis*’. – Type: China, Guangdong, Ford 290 (holo K!, K000852432; iso IBSC!, Pl, P00608627).

Climbers; stems glabrous, young parts velutinous, indumentum reddish or dull yellow. Leaves ovate to nearly circular, (4.4–)8.5–13.2 × (1.9–)6.1–10.0 cm, undersides velutinous or glabrous, upper sides nearly glabrous; petiole 2.7–6.2 cm.

Inflorescences axillary; bracts ovate-lanceolate, bracteoles unequal, persistent but not enlarging; pedicels 1.0–1.6 cm. Flowers erect; sepals unequal, oblong, outer 2 sepals 4–5 mm, ± velutinous, inner 3 sepals smaller, curved around ovary; corolla blue-violet, pale blue, rose to white, bowl-shaped, outside velutinous, tube 8–10 mm long, limb (1.0–)1.6–2.3(–3.0) cm in diam., ± 5-lobed, lobes reflexed; stamens equal or unequal, (7–)11–12 mm, filaments not collared basally; pistil exserted, disc 5-lobulate or absent, ovary ovoid-conical, velutinous apically, style (5–)9–11 mm, pubescent basally, stigma 2-globose.

Fruiting calyces tan to pale brown, sepals oblong to spatulate, outer 2 sepals 65–78 × 9–14(–18) mm, sparsely velutinous, bases tightly clasping, thickened, apices flat, wing-like. Utricles dark brown, reddish apically, ellipsoid-obovoid, 10–11 × 6–8 mm, ruminate, pilose, glabrous basally. Seed dark brown to black, 9–10 × 6–8 mm, smooth or faintly striate.



Distribution. Once collected in Vietnam, and in China.

Ecology. In forests; elevation not recorded.

Notes. The single Vietnamese collection is referable to *T. sinensis* var. *sinensis*.

Material studied

Vietnam. Lang Son: Dong Mo, 4 July 1941, Pételet 6910 (A, P).

4. *Tridynamia spectabilis* (Kurz) Parmar

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Tridynamia spectabilis (Kurz) Parmar, J. Econ. Tax. Bot. 18 (2): 251 (1994); Staples, Blumea 51: 478 (2006), Fl. Thailand 10: 464 (2010). – *Porana spectabilis* Kurz, J. Bot. 11: 136 (1873), Forest Fl. Burma 2: 221 (1877); C.B.Clarke in J.D. Hooker, Fl. Brit. India 4: 221 (1883); Gagnep. & Courchet, Fl. Indo-Chine 4: 293 (1915), p.p.; Kerr, Fl. Siam. 3 (1): 92 (1951); Ooststr., Fl. Males., Ser. I, Spermat. 4: 404 (1953); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 186 (1990), p.p.; P.H.Hô, Cây cỏ Việt Nam 2 (2): 974 (1993); T.N.Nguyễn & Đ.H.Dương, Checkl. Pl. Sp. Vietnam 3: 180 (2005). – Type: Myanmar, Pegu, Nakawa, Kurz 1083 (lecto CALI, designated by Staples (2006); isolecto CALI, K!, K000852426).

Lianas; indumentum tawny-brownish; stems 6(–10) m long, sparsely tomentellous to glabrous. Leaves ovate or suborbicular, 7.1–19.5 × 4.0–18.0 cm, upper sides subglabrous, undersides yellowish-tomentellous, base emarginate to cordate; petiole 1.6–7.0 cm long, coarsely wrinkled.

Inflorescence bracts ovate; bracteoles unequal; pedicels 8–10 mm. Flowers fragrant; sepals unequal, outer 3 ovate-oblong, 3–4 × 1 mm, longitudinally ridged, tomentose; inner 2 ovate-lanceolate, smaller, margins glabrous; corolla narrowly funnelform, 1.9–3.0 cm long, white, limb 1.7–2.3(–2.7) cm diam., obtusely 5-lobed; stamens included, unequal, 8–12 mm; pistil included, 11–13 mm long, disc absent, ovary ovoid, glabrous, style basally pilose.

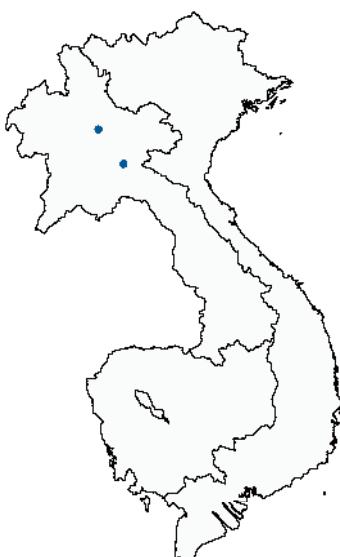
Utricles (immature) obovoid, c. 6 × 5 mm, yellowish tomentose; outer 3 fruiting sepals (immature) narrowly obovate-spathulate, flat, 4.9–5.5 cm long, bases thickened, keeled, and clasping fruit, distally flaring, flat, chartaceous. Seed (immature) c. 5 mm long, dark brown to blackish, glabrous.

Distribution. Laos, Myanmar, Thailand.

Ecology. Often (always?) on limestone substrates, in forest; elevation: 400 m.

Material studied

Laos. Louang Prabang: PK-10, route de Ban Khi Mot, 14 Feb. 1969, Pedrono 41 (P). Xieng Khouang: Spire 724 (P).





21.4. *Tridynamia spectabilis* (Kurz) Parmar. Flowers (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).



Two species: distributed in tropical regions of Asia, Africa, Australia and the Pacific; one widespread species occurs in Southeast Asia and throughout CLV.

22. *Xenostegia* D.F.Austin & Staples

Brittonia 32: 533 (1980); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 77 (1993); R.C.Fang & Staples, Fl. China 16: 300 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 181 (2005); Staples, Fl. Thailand 10: 464 (2010). – Type: *Xenostegia tridentata* (L.) D.F.Austin & Staples.

Merremia section *Halliera* O'Donell, Lilloa 6: 472 (1941).

Perennial herbs; stems prostrate, tips twining. Leaves petiolate, linear, oblong-linear, lanceolate-elliptic, or oblanceolate to spatulate, base hastate; basal lobes clasping stem, dentate or entire, apices acute to emarginate, mucronate, or tridentate.

Inflorescences axillary, cymose, 1- or 2-(or 3-)flowered. Sepals oblong or oblong-ovate, subequal to unequal, acute or obtuse; inner 3 sepals narrower, apically tapering into slender points, all enlarged in fruit; corolla pale yellowish or whitish, often with a purplish centre, broadly funnelform or campanulate; stamens included, anthers not twisted at dehiscence; pollen globose, pantoporate, not spiny; pistil included, ovary 2-locular, 4-ovuled, style 1, filiform, stigmas subglobular.

Fruits capsules, 4-valved, glabrous or pubescent apically. Seeds 1–4, ovoid-trigonous, brownish to black.

1. *Xenostegia tridentata* (L.) D.F.Austin & Staples

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
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Xenostegia tridentata (L.) D.F.Austin & Staples, Brittonia 32: 533 (1980); P.H.Hô, Cây cỏ Việt Nam 2 (2): 985 (1993); Na Songkhla & Khunwasi, Thai Forest Bull., Bot. 20: 77 (1993); R.C.Fang & Staples, Fl. China 16: 300 (1995); T.N.Nguyễn & Đ.H.Dùòng, Checkl. Pl. Sp. Vietnam 3: 181 (2005); Staples, Fl. Thailand 10: 467 (2010); D.F.Austin, Ethnobotany Res. Appl. 12: 433 (2014); Staples *et al.*, Thai J. Bot. 6: 86 (2014). – *Convolvulus tridentatus* L., Sp. Pl. 1: 157 (1753). – *Ipomoea tridentata* (L.) Roth in Roem., Arch. Bot. 1, 2: 38 (1798); Gagnep. & Courchet, Fl. Indo-Chine 4: 265 (1915). – *Merremia tridentata* (L.) Hallier f., Bot. Jahrb. Syst. 16: 552 (1893); Ooststr., Blumea 3: 315 (1939), Fl. Males., Ser. I, Spermat. 4: 445 (1953); T.N.Nguyễn in Averyanov *et al.*, Materialy po flore i rastitelnosti ostrovogno V'etnama 43 (1988); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 184 (1990). – Type: [icon] "Sendera-Clandi" in Rheede, Hort. Malab. 11: 133. t. 65 (1692) (lecto, designated by Verdc., Fl. Trop. E. Africa, Convolvul. 51 (1963)).
Convolvulus hastatus Desr. in Lam., Encycl. 3: 542 (1789), nom. illeg. – *Merremia hastata* Hallier f., Bot. Jahrb. Syst. 16: 552 (1893); Kerr, Fl. Siam. 3 (2): 3 (1954). – *Merremia tridentata* subsp. *hastata* Ooststr., Fl. Males., Ser. I, Spermat. 6: 939 (1972), Blumea 3: 317 (1939), Fl. Males., Ser. I, Spermat. 4: 445 (1953). – Type: 'Indes Orientale' without locality, Sonnerat s.n. (holo P-LA).
Ipomoea angustifolia Jacq., Collectanea 2: 367 (1788); Gagnep. & Courchet, Fl. Indo-Chine 4: 265 (1915). – Type: [icon] 'I. angustifolia' in Jacq., Icon. Pl. Rar. 2: 10, t. 317 (1789) (lecto, designated by Verdc. in Fl. Tropical E. Africa, Convolvul. 51 (1963)).

Herbs, creeping or twining, with stout roots; stems wiry, to 4 m, angulate to narrowly winged, glabrous. Leaves narrowly oblong, linear-oblong, to linear, widened toward base, 2.5–8.0 × 0.4–1.5 cm, nearly glabrous, base hastate, usually clasping stem, basal lobes dentate, blade gradually attenuate to acute or obtuse apex, mucronulate; petiole 0.1–0.3 cm or absent.

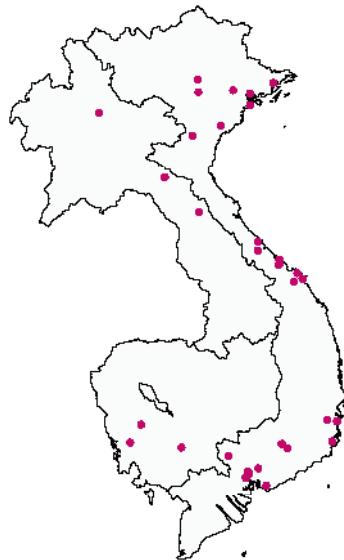
Inflorescences 1–3-flowered cymes; peduncles (1–)5–6 cm, slender; bracts minute, subulate; pedicels 6–8 mm. Sepals ovate-lanceolate, equal or outer 2 sepals shorter, 6–8 mm, glabrous, apices attenuate-acuminate forming a sharp point; corolla funnellform, c. 1.6 cm long, pale yellowish or white, sometimes tube inside at base maroon to brown, glabrous outside; stamens included, subequal, filaments sparsely pubescent basally, anthers ellipsoid-sagittate; ovary glabrous.

Capsules globose or ovoid, papery. Seeds 3–4 mm, blackish, glabrous, apex acute.

Distribution. Cambodia, Laos, Vietnam, and India, Sri Lanka, Bangladesh, Myanmar, China, Thailand, Malaysia, Singapore, Indonesia, the Philippines, New Guinea, Australia; also in tropical Africa, Madagascar, and naturalized in Micronesia and tropical America.

Ecology. Open sunny places: roadsides, lawns, pastures, fields, stream banks, forest edges and clearings, sea beaches, often on sandy soils or lateritic ones, seemingly always on nutrient-poor substrates; elevation: sea level to 350(–800) m.

Usage. In Laos, the leaves and stems are boiled and the liquid drunk as a cure for stomachache (*Newman et al. LAO-628*); in Cambodia, the entire plant is medicinal (*Martin 311*); and in Vietnam, it is used to treat colic in cattle (*Chevalier 40637*).



Vernacular names

Cambodia. voa trôpôt chnieng (*Martin 311*).

Laos. 'khi² kăduah liem¹ (*Pottier 485*).

Vietnam. dây lù ráng (Annamite, *Poilane 2614*), dây lù đóng (Annamite, *Chevalier 40637*), glau la (*Poilane 2614*), re canh (*Poilane 9702*).

Material studied

Cambodia. Koh Kong: Massif des Cardamones, 1 Mar. 1966, *Martin 311* (P); track between Tmor Baing and Tatey Leu, 16 Nov. 2009, *Simões et al. 41* (BM, SING). Phnom Penh: ad Pnom penh, Jan. 1870, *Pierre 1* (P).

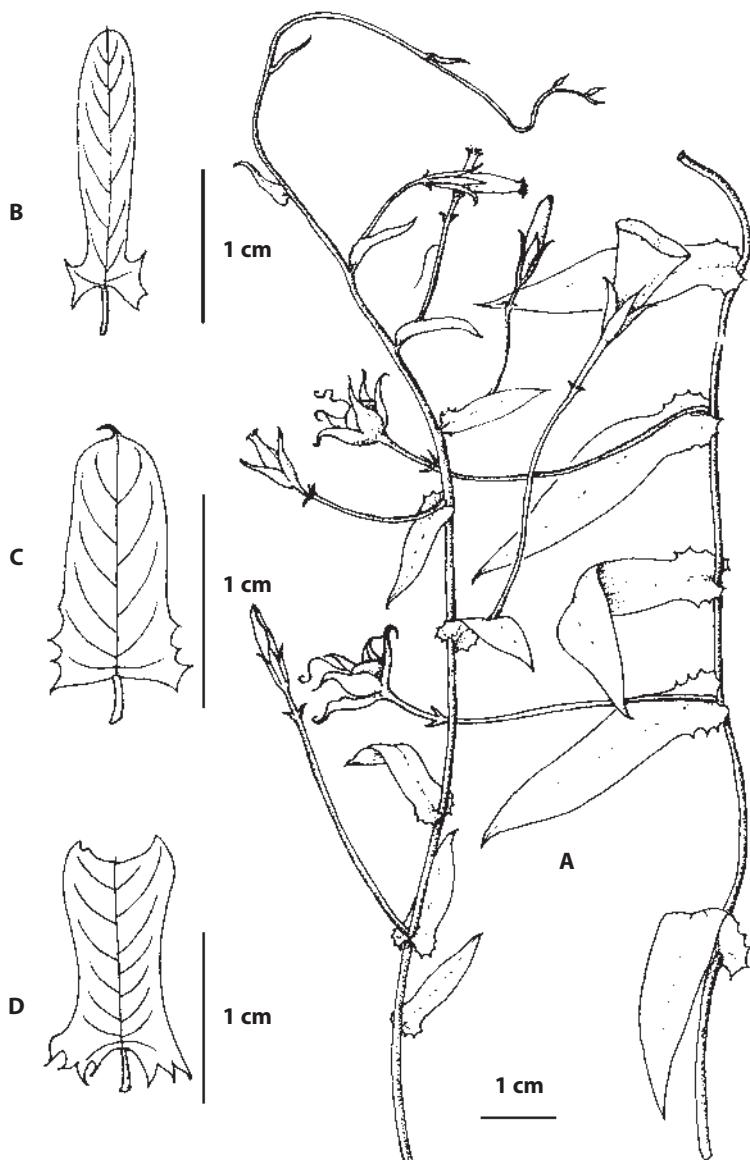
Laos. Khammouane: Houay Mai Kuang edge of fields, 29 Oct. 2005, *Newman et al. LAO-628* (BISH, E, FOF, HNL, P). Louang Prabang: bord de fleuve, 5 July 1969, *Pottier 240* (P); s. loc., 27 Aug. 1969, *Pottier 485* (P).

Vietnam. s. loc.: Bon 5786 (P); "Cochinchine", 1862–1866, *Thorel 38* (E, NY, P); Quan Ne, 25 Aug. 1892, Bon 5659 (P, SING); "Tonkin Occidental", Bon 6393 (NY). Ba Ria-Vung Tau: cap Baudoin, Baria, Aug. 1867, *Talmy 123* (P). Binh Duong: Lai Thieu, Thu Dau Mot, 21 Apr. 1919, *Chevalier [Poilane legit] 40637* (P); route de Phu Cuong, 25 May 1967, Vu Van Cuong 499 (P). Da Nang: entre le pied de la montagne de Ba Na et Tourane, 10 Mar. 1939, *Poilane 29341* (P, SING); Lien chieu, près de Tourane, 25 Aug. 1923, *Poilane 7798* (P); Tourane, Jan. 1837, *Gaudichaud 143* (P); l. c., 18 Feb. 1939, *Poilane 28893* (P, SING); Tourane vic., on coast ca. 100 km S of Hue, May 1927, *Clemens & Clemens 3186* (NY, P); l. c., *Lecomte & Finet 1067* (P, SING), 1099 (P). Hai Duong: Sept Pagodes, Aug. 1906, *Mouret 196* (P). Hai Phong: colline du Do Son, Aug. 1912, *Lemarié 11* (P). Ha Noi: Poste de Bat Bac, 17 Dec. 1888, *Balansa 3529* (P); Tu Phap, Jan. 1888, *Balansa*



22.1. *Xenostegia tridentata* (L.) D.F. Austin & Staples. A, habit, uniformly colored corolla, fruit; B, bicolored corolla (credit: Preecha Karaket, BKF; voucher: Thailand, not collected).

3528 (P); env. Tu Phap, Aug. 1887, *Balansa* 3531 (P). Hoa Binh: Phuong Lam, 10 Nov. 1887, *Balansa* 3530 (P). Ho Chi Minh Ville: Cholon, 14 Mar. 1919, *Chevalier [Poilane legit]* 40088 (P); Saigon, 1902, *Debeaux s.n.* (P); Saigon vic., *Pham Hoang Ho* 5107 (P); Aug. 1867, *Pierre* 226 (P). Khanh Hoa: Giang Che, 8 Feb. 1922, *Poilane* 2614 (P); Nha Trang vic., 11–26 Mar. 1911, *Robinson BS1525* (NY, P); *Robinson BS1438* (NY, P). Lam Dong: Blao, l'École de Blao, 28 July 1961, *Schmid s.n.* (P, SING); "Donnai", *Schmid s.n.* (P). Nghe An: limestone hill, Pu Mat, 7 Nov. 2011, *Wang 5350* (HITBC). Ninh Binh: Cho Ganh, Apr. 1923, *Pételet* 1367 (P). Ninh Thuan: Ba Rau, "prov. Phanrang", 21 Feb. 1924, *Poilane* 9702 (P). Phu Tho: Phu Lo, 25 Dec. 1902, *Bois* 518 (P). Quang Ninh: Kau Nga Shan vic., Tien Yen, along Kwangtung–Tonkin border, 23–29 Dec. 1936, *Tsang* 27458 (E, P); *l. c.*, 23 Sep.–7 Oct. 1940, *Tsang* 30567 (E, P, SING); Ouonbi, 4 Nov. 1885, *Balansa* 804 (P). Quang Tri: ca. 18 min. inland from Dong Ha, 15 Oct. 1967, *Richards B. MacB.-55* (MO); Salung, 25 Dec. 1940, *Poilane* 31222 (P, SING). Tay Ninh: près de Saigon, 12 Sept. 1920, *Evrard* 19 (P). Thua Thien-Hue: haut cours de Bo Giang, *Eberhardt* 2897 (P,



22.2. *Xenostegia tridentata* (L.) D.F. Austin & Staples. A, habit; B-D, leaf variations (From Staples 2010, originally from Ooststroom & Hoogland 1953).

SING); env. Hue, Eberhardt 1261 (P); Lang Co, Eberhardt 1647 (P, SING); South River, low hills, 12 Mar. 1927, Squires 192 (NY, P)

Dubious species cited in literature that are not in CLV

The floristic literature for the CLV region records a number of names in Convolvulaceae that can definitely be excluded or are doubtful, no specimens having been seen to document their presence. They are listed here in alphabetical order, citing the source(s) where the name is found, with the correct taxonomic disposition when known or an indication why the species is not likely to be present in the CLV region.

Argyreia arborea Lour., Fl. Cochinch. 135 (1790) [cited by Gagnep. & Courchet, Fl. Indo-Chine 4: 283 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 174 (1990); T.N.Nguyễn & Đ.H.Dùòng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005)] = *Cordia myxa* L. (Cordiaceae / Boraginaceae) reduced by Hallier f. in Bull. Herb. Boissier 6: 111–112 (1898).

Argyreia atropurpurea (Wall.) Raiz. [cited by P.H.Hồ, Cây cỏ Việt Nam 2 (2): 999 (1993); T.N.Nguyễn & Đ.H.Dùòng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005)] is a sub-Himalayan species (India, Nepal, Bhutan) not known to be present anywhere in Southeast Asia.

Argyreia malabarica "(Roem. & Schult.) Arn. ex Choisy" [cited by P.H.Hồ, Cây cỏ Việt Nam 2 (2): 1001 (1993); T.N.Nguyễn & Đ.H.Dùòng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005)] = *Hewittia malabarica*, as to the type of the basionym: *Convolvulus malabaricus* L.

The epithet *malabarica* has been frequently misapplied in the genus *Argyreia*; what species the Vietnamese authors had before them is unknown. It is impossible to ascertain what species is being referred to in Vietnam without recourse to the specimens.

Argyreia nasirii D.F.Austin [cited by P.H.Hồ, Cây cỏ Việt Nam 2 (2): 1003 (1993); T.N.Nguyễn & Đ.H.Dùòng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005)] is a superfluous name for *Argyreia thomsonii* (C.B.Clarke) Babu.

This sub-Himalayan species is widespread from Pakistan eastwards to Sikkim but is not known to be present in Southeast Asia.

Argyreia nellygherya Choisy [cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 174 (1990); T.N.Nguyễn & Đ.H.Dùòng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005)] is a southern Indian species, not known to be present in Southeast Asia.

Argyreia rubicunda Choisy [cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990); T.N.Nguyễn & Đ.H.Dùòng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005)] is a Myanmar-peninsular Malaysian species, not known to be present in CLV.

Argyreia setosa Choisy [cited by Gagnep. & Courchet, Fl. Indo-Chine 4: 282 (1915); T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 175 (1990); P.H.Hồ, Cây cỏ Việt Nam 2 (2): 1003 (1993)] = *Argyreia capitiformis*, as to

type. What species the Vietnamese authors had before them is unknown. The *Hosseus* specimen from Thailand cited by Gagnepain and Courchet = *Argyreia confusa* Prain, which has not been found in CLV.

Blinkworthia lycioides Choisy [cited by Gagnep. & Courchet, Fl. Indo-Chine 4: 272 (1915)] occurs in SW China and northern Thailand and is anticipated to be present in Laos and perhaps Vietnam but has still not been documented there a century after the Fl. Indo-Chine included it. A full description and illustrations are to be found in the Convolvulaceae account for *Flora of Thailand* 10(3): 372–374 (2010).

Ipomoea longanensis P.H.Hô, Cây cỏ Việt Nam 2 (2): 998 (1993) is evidently an invalid name, as no Latin description was published nor was a type specimen designated. I do not know what species this could be.

Ipomoea siamensis Craib [cited by Gagnep. & Courchet, Fl. Indo-Chine 4: 271 (1915)] = *Argyreia siamensis* (Craib) Staples. A century after it was included in Fl. Indo-Chine, no collections have been seen from the CLV area. This species appears to be endemic to Thailand; a description and key for identification are found in the Flora of Thailand 10 (3): 365 (2010).

Jacquemontia tomentella (Miq.) Hallier f. [cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 181 (1990)] is endemic to Borneo and Sumatra and is not known to be present in continental Southeast Asia.

Operculina brownii Ooststr. [cited by T.N.Nguyễn, Vasc. Pl. Syn. Vietnamese Fl. 1: 185 (1990); T.N.Nguyễn & Đ.H.Dùòng, Convolvulaceae in Checkl. Pl. Sp. Vietnam 3: 157–182 (2005)] is a species known from Australia, possibly New Guinea, and the Pacific Islands, that is not known to be present in Southeast Asia. See Staples in Pacific Science 61: 588 (2007) for details.

List of specimens examined

The specimens are cited by collector, alphabetically. The numbers between brackets refer to the genus-species numbers, as listed in the number key below.

Type specimens from outside the CLV region are not included in this index.

	1. Aniseia		6. Dichondra
1.1	<i>Aniseia martinicensis</i>	6.1	<i>Dichondra micrantha</i>
	2. Argyreia		7. Dinetus
2.1	<i>Argyreia aff. akoensis</i>	7.1	<i>Dinetus racemosus</i>
2.2	<i>Argyreia breviscapa</i>	7.2	<i>Dinetus truncatus</i>
2.3	<i>Argyreia capitiformis</i>		8. Erycibe
2.4	<i>Argyreia collinsae</i>	8.1	<i>Erycibe cochinchinensis</i>
2.5	<i>Argyreia fulvocymosa</i>	8.2	<i>Erycibe crassiuscula</i>
2.6	<i>Argyreia lanceolata</i>	8.3	<i>Erycibe elliptilimba</i>
2.7	<i>Argyreia laotica</i>	8.4	<i>Erycibe griffithii</i>
2.8	<i>Argyreia longipes</i>	8.5	<i>Erycibe hainanensis</i>
2.9	<i>Argyreia marliopensis</i>	8.6	<i>Erycibe obtusifolia</i>
2.10	<i>Argyreia mekongensis</i>	8.7	<i>Erycibe oligantha</i>
2.11	<i>Argyreia mollis</i>	8.8	<i>Erycibe schmidtii</i>
2.12	<i>Argyreia monglaensis</i>	8.9	<i>Erycibe subspicata</i>
2.13	<i>Argyreia monosperma</i>	8.10	<i>Erycibe tixieri</i>
2.14	<i>Argyreia obtusifolia</i>		9. Evolvulus
2.15	<i>Argyreia osyrensis</i>	9.1	<i>Evolvulus alsinoides</i>
2.16	<i>Argyreia pierreana</i>	9.2	<i>Evolvulus nummularius</i>
2.17	<i>Argyreia stenophylla</i>		10. Hewittia
2.18	<i>Argyreia strigillosa</i>	10.1	<i>Hewittia malabarica</i>
2.19	<i>Argyreia thorelli</i>		11. Ipomoea
	3. Bonamia		
3.1	<i>Bonamia semidigyna</i>	11.1	<i>Ipomoea aculeata</i> var. <i>mollissima</i>
	4. Cordisepalum	11.2	<i>Ipomoea alba</i>
4.1	<i>Cordisepalum thorelli</i>	11.3	<i>Ipomoea aquatica</i>
	5. Cuscuta	11.4	<i>Ipomoea asarifolia</i>
5.1	<i>Cuscuta australis</i>	11.5	<i>Ipomoea batatas</i>
5.2	<i>Cuscuta campestris</i>	11.6	<i>Ipomoea biflora</i>
5.3	<i>Cuscuta chinensis</i>	11.7	<i>Ipomoea cairica</i>
5.4	<i>Cuscuta japonica</i>	11.8	<i>Ipomoea cambodiensis</i>
5.5	<i>Cuscuta reflexa</i>	11.9	<i>Ipomoea campanulata</i>

11.10	<i>Ipomoea carnea</i> ssp. <i>fistulosa</i>	14.9	<i>Merremia kingii</i>
11.11	<i>Ipomoea eriocarpa</i>	14.10	<i>Merremia mammosa</i>
11.12	<i>Ipomoea harmandii</i>	14.11	<i>Merremia poranoides</i>
11.13	<i>Ipomoea hederifolia</i>	14.12	<i>Merremia quinata</i>
11.14	<i>Ipomoea imperati</i>	14.13	<i>Merremia quinquefolia</i>
11.15	<i>Ipomoea indica</i>	14.14	<i>Merremia sagittoides</i>
11.16	<i>Ipomoea littoralis</i>	14.15	<i>Merremia subsessilis</i>
11.17	<i>Ipomoea mauritiana</i>	14.16	<i>Merremia thorelii</i>
11.18	<i>Ipomoea nil</i>	14.17	<i>Merremia umbellata</i>
11.19	<i>Ipomoea obscura</i>	14.17a	<i>Merremia umbellata</i> ssp. <i>umbellata</i>
11.20	<i>Ipomoea pes-caprae</i>	14.17b	<i>Merremia umbellata</i> ssp. <i>orientalis</i>
11.21	<i>Ipomoea pes-tigridis</i>	14.18	<i>Merremia verruculosa</i>
11.22	<i>Ipomoea pierrei</i>	14.19	<i>Merremia vitifolia</i>
11.23	<i>Ipomoea pileata</i>		15. <i>Neuropeltis</i>
11.24	<i>Ipomoea polymorpha</i>	15.1	<i>Neuropeltis indochinensis</i>
11.25	<i>Ipomoea quamoclit</i>	15.2	<i>Neuropeltis racemosa</i>
11.26	<i>Ipomoea rubens</i>		16. <i>Operculina</i>
11.27	<i>Ipomoea sagittifolia</i>	16.1	<i>Operculina petaloidea</i>
11.28	<i>Ipomoea sumatrana</i>	16.2	<i>Operculina turpethum</i>
11.29	<i>Ipomoea triloba</i>		17. <i>Porana</i>
11.30	<i>Ipomoea violacea</i>	17.1	<i>Porana volubilis</i>
	12. <i>Jacquemontia</i>		18. <i>Poranopsis</i>
12.1	<i>Jacquemontia paniculata</i>	18.1	<i>Poranopsis discifera</i>
12.1b	<i>Jacquemontia paniculata</i> var. <i>grandiflora</i>	18.2	<i>Poranopsis paniculata</i>
	13. <i>Lepistemon</i>		19. <i>Rivea</i>
13.1	<i>Lepistemon binectarifer</i>	18.1	<i>Rivea ornata</i>
13.1b	<i>Lepistemon binectarifer</i> var. <i>glabrum</i>	19.1	
13.1c	<i>Lepistemon binectarifer</i> var. <i>taynguyenense</i>		20. <i>Stictocardia</i>
13.1d	<i>Lepistemon binectariferum</i> var. <i>eymae</i>	20.1	<i>Stictocardia tiliifolia</i>
13.2	<i>Lepistemon intermedium</i>		21. <i>Tridynamia</i>
	14. <i>Merremia</i>	21.1	<i>Tridynamia bialata</i>
14.1	<i>Merremia bambusetorum</i>	21.2	<i>Tridynamia megalantha</i>
14.2	<i>Merremia bimbim</i>	21.3	<i>Tridynamia sinensis</i>
14.3	<i>Merremia boisiana</i>	21.4	<i>Tridynamia spectabilis</i>
14.3b	<i>Merremia boisiana</i> var. <i>fulvopilosa</i>		22. <i>Xenostegia</i>
14.4	<i>Merremia eberhardtii</i>	22.1	<i>Xenostegia tridentata</i>
14.5	<i>Merremia gemella</i>		
14.6	<i>Merremia hainanensis</i>		
14.7	<i>Merremia hederacea</i>		
14.8	<i>Merremia hirta</i>		

A

Aat & Tam FLHN4-80 (10.1).
Abbe E.C. et al. 9654A (8.3).
d'Alleizette s.n. (15.2), s.n. (11.6), s.n. (3.1), s.n. (17.1), s.n. (18.2), s.n. (7.1), s.n. (14.9), s.n. (11.7), s.n. (11.10), s.n. (11.17), s.n. (11.18), s.n. (5.3), s.n. (*Argyreia nervosa*), 6 (10.1), 131 (2.14), 187 (14.15), 189 T (11.6), 432 (14.7), 479 (10.1), 510 (2.14).
Allorge L. 1041 (11.10), 1043 (11.19).
Averyanov L. et al. CBL 419 (7.1); HAL 2690 (8.5), HAL 2728 (8.3), HAL 2782 (2.0), HAL 3196 (2.16), HAL 6372 (2.14); VH 670 (13.1b), VH 830 (14.9), VH 1012 (14.17b), VH 1063 (14.3), VH 1103 (2.5), VH 1380 (14.3), VH 1510 (11.23), VH 1838 (2.3), VH 1991 (2.15), VH 2002 (11.28), VH 2048 (11.2), VH 2071 (13.1), VH 2108 (2.5), VH 2118 (7.1), VH 2136 (12.1).
Averyanov L. & Vinh N.T. HLF- 1323 (9.1).

B

Balansa B. 801 (11.23), 802 (14.9), 803 (14.12), 804 (22.1), 804 bis (22.1), 805 (2.3), 806 (14.7), 807 (14.7), 808 (14.7), 809 (14.7), 810 (16.2), 811 (14.15), 812 (14.15), 813 (14.15), 814 (10.1), 815 (10.1), 816 (13.1), 817 (11.7), 818 (11.3), 819 (2.14), 820 (2.16), 821 (2.14), 822 (2.14), 823 (14.9), 824 (14.19), 825 (14.17b), 3525 (2.14), 3526 (2.14), 3527 (11.23), 3528 (22.1), 3529 (22.1), 3530 (22.1), 3531 (22.1), 3532 (9.1), 3533 (9.1), 3534 (9.1), 3535 (14.17b), 3536 (14.7), 3537 (14.9), 3538 (14.9), 3539 (12.1b), 3540 (14.5), 3541 p.p. (14.8), 3542 (14.8), 3543 (11.6), 3544 (13.1), 3545 (13.1), 3546 (10.1), 3547 (10.1), 3548 (11.17), 3549 (16.2), 3550 (14.19), 3551 (14.19), 3552 (11.2), 3553 (11.2), 3554 (2.3), 3555 (2.3), 3556 (5.3), 4067 (8.9), 4068 (15.1), 4434 (7.1), 4459 (14.11), 4482 (2.16), 4483 (2.3), 4550 (14.5), 4601 (14.17b), 4647 (11.19), 4661 (11.18), 4895 (11.3), 4896 (10.1).

Ban N.T. 474 (7.1).

Bansok R. 83 (8.3).

Bauche J. 12 (11.19), 28 (11.19), 92 (9.1), 104 (9.1), 105 (11.20), 127 (11.3).

Baudouin s.n. (11.15), s.n. (11.24), 173 (11.17), 355 (11.24).

Bejaud M. 23 (14.19).

Bois D. 59 (10.1), 106 (2.16), 138 (14.3), 323 (2.16), 403 (14.7), 518 (22.1).

Bon H.F. s.n. (21.2), s.n. (21.2), 17 (11.17), 39 (14.7), 76 (11.18),

84 (11.3), 116 (2.14), 184 (14.7), 275 (9.1), 518 (9.1), 526 (11.17), 534 (11.21), 591 (2.14), 619 (2.14), 759 bis (11.19), 858 (11.25), 1009 (2.14), 1052 (11.21), 1112 (11.5), 1350 (11.15), 1449 (11.5), 1718 (16.2), 1791 (14.7), 1841 (16.2), 1926 (13.1), 1958 (14.19), 1965 (14.7), 2070 (13.1), 2082 (9.1), 2108 (12.1), 2127 (5.1), 2304 (14.5), 2305 (12.1), 2313 (12.1), 2376 (13.1), 2425 (14.14), 2634 (21.2), 2690 (21.2), 2700 (14.2), 2746 (2.3), 2772 (10.1), 2786 (12.1), 2796 (5.1), 2813 (14.9), 2816 (11.26), 3129 (12.1), 3332 (2.3), 3336 (13.1), 3547 (14.5), 3576 (8.6), 4104 (14.19), 4233 (11.26), 4236 (2.14), 4239 (2.14), 4333 (8.6), 4516 (2.14), 4801 (14.3b), 5197 (11.20), 5216 (14.14), 5265 (16.2), 5569 (8.2), 5659 (22.1), 5665 (11.7), 5683 (11.14), 5717 (10.1), 5725 (11.26), 5731 (11.18), 5755 (14.8), 5786 (22.1), 6116 (14.9), 6393 (22.1).

Broussmiche s.n. (2.14), s.n. (10.1), s.n. (14.5), 314 (9.1).

Bu Duc Binh B 320 (13.1), *B* 1139 (13.1b), *Bui Duc Binh* s.n. (7.1), s.n. (7.1), 101 (7.1).

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C.Bg. 17.III. 93 (11.17).
Carpenter R. 329 (12.1).
Cheng C.K. et al. CL 628 (11.19), CL 753 (2.5), CL 770 (2.3), CL 802 (14.12), CL 842 (2.10).
Cheng K.C. & Leti M. CL 876 (2.3), CL 885 (16.2).
Cheng S.K. CL 560 (14.1).
Cheng S.K. et al. CL 719 (11.23), CL 798 (11.11), CL 1075 (16.1), CL 1094 (16.2), CL 1136 (2.11), CL 1148 (14.18), CL 1161 (14.8), CL 1162 (3.1), CL 1164 (11.17).
Cheralin A. 30524 (17.1).
Chevalier A. (*Trò legit*) s.n. (11.19), 50 (16.2), (*legit Poilane*) 1233 (14.19), 2375 (7.1), 29063 (14.5), 29311 (7.1), 29329 (7.1), 29565 (11.19), 29803 (11.10), 29821 (2.3), (*legit A. Fleury*) 30239 (14.16), 30266 (11.3), 30325 (16.2), 30439 (12.1), 30976 (4.1), 30977 (14.17b), 30986 (2.15), 31863 (12.1), 32471 (14.3), 36787 (8.1), (*Miéville legit*) 37118 (2.16), 37246 (11.6), 38525 (2.15), (*F. Fleury legit*) 39088 (2.4), 39508 (11.3), 39827 (11.10), 39828 (17.1), 39848 (11.10), 39850 (14.17a), 39866 (14.17b), 39868 (11.1), 39960 (2.14), (*Poilane legit*) 40012 (11.27), (*Poilane legit*) 40088 (22.1), 40533 (14.19), (*Poilane legit*) 40637 (22.1).
Chevalier A. & Nguyen Tuöng Du 39755 (11.3), 39757 (11.19), 39772 (11.18), 40231 (11.18).
China-Vietnam Inspection team 997 (13.1).

- Clemens J. & M.S.* 3121 (14.8), 3153 (12.1), 3163 (11.7), 3186 (22.1), 3238 (14.3), 3803 (11.3), 3807 (2.14), 4003 (10.1), 4046 (11.20), 4086 (11.19), 4087 (1.1), 4091 (14.4), 4175 (15.1), 4390 (5.2), 4489 (9.1).
Colani E. 3233 (21.2), 4024 (7.1).
Collard 3 (11.3), 7 (14.7).
Condominas 44 (2.2).
Couderc P.s.n. (11.6), s.n. (11.20), s.n. (11.20), s.n. (9.1), s.n. (10.1), s.n. (11.19).
Counillon s.n. (9.1).
Cuong N.M. 127 (14.3), 211 (21.2).
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In 2015 I was able to spend 4 months working at the MNHN, Paris, with support from the Fondation Franklinia through a visiting researcher award arranged by Dr Thomas Haevermans. Serge Muller, Scientific Head of the collections, and Marc Jeanson, Collections Manager, graciously permitted me to work in the herbarium with full access to collections and library. I am very grateful for their support. The staff and volunteers in the Paris herbarium were most welcoming and hospitable and made my long-stay with them a pleasure; I thank in particular Nathalie Allain, Cécile Aupic, Thierry Deroïn, Jacques Florence, Didier Geffard-Kuriyama, Sovanmoly Hul, Marc Jeanson, Pete Phillipson, Odile Poncy, Germinal Rouhan, Élodie Lerat, and Anne-Elisabeth Wolf. Loans to Paris of some type specimens and other critical collections for study were coordinated by David Harris, Edinburgh, and Serena Lee, Singapore.

Early in 2016 a draft manuscript was completed with editorial guidance from Dr Mark Newman, Royal Botanic Garden, Edinburgh, regarding format and style. Reviews by members of the 'Comité Flores': Drs Germinal Rouhan, Porter P. Lowry, Sovanmoly Hul, and Mark Newman provided valuable feedback for improving the draft and finalizing the flora account. Nomenclatural advice provided by Drs Rafaël Govaerts, Jefferson Prado, and Kanchi Gandhi settled some vexing problems with names. Benoît Carré helped me solve some puzzles with the E. Poilane collections. Thomas Haevermans produced the distribution maps for publication. My sincere thanks to all for helping me get the content correct and accurate.

In the final stages of manuscript preparation, more than 20 colleagues and friends around the world graciously shared their colour photographs of living Convolvulaceae for the FCLV account. Their contributions are acknowledged individually on their photos and I am deeply grateful for their generosity. This flora is much enlivened by their images for these beautiful and fascinating plants.

I want to particularly thank Dr Odile Poncy for her invaluable help in assisting "on the ground" in Paris after my visit ended to locate specimens, prepare dissections, interpret morphological structures for

students, create scale bars for recycled illustrations, correct proofs and otherwise provide scientific coordination in many ways large and small—all vitally necessary tasks that cannot be performed by an author that is far away.

During the production stage I wish to thank Laurence Bénichou, Head, Publications scientifiques du Muséum, and Odile in her role as Scientific Editor, for their invaluable help in turning the manuscript and many separate files into a finished product. I could not have navigated the labyrinth without their guidance and problem-solving skills. The new design and layout for the FCLV, created by Laurence, make this flora account an attractive and engaging reference work, a great improvement from the information-dense, but inelegant and drab, floras of the twentieth century.

Finally, there are a host of people, far too numerous to name them all, who have helped me over the sixteen-year span of this research effort in the field, in herbaria, and in libraries, to find information in many obscure places so that the flora account could be written. I thank them all and end with the standard author's caveat that any errors of fact or interpretation found here are the sole responsibility of the author and not of those who assisted him.

Illustrations Credits

The author is fortunate to have the assistance of a team of professional and gifted botanical artists to prepare the illustrations for the Convolvulaceae account. A brief mention of their names and credit is due. Additional drawings have been reused, with permission, from previously published floras.

Firstly, in the course of studying the specimens conserved in the MNHN herbarium, a trove of beautiful drawings was found pinned on herbarium specimen sheets. Some of them were drawn by Lucien Courchet (1851–1924), co-author, with François Gagnepain (1866–1952), of the Convolvulaceae account for the *Flore générale de l'Indochine*. Courchet's illustrations appear to be his working drafts for preparing the family account.

Other drawings are extremely detailed pencil sketches made by E. Delpy, a skilled military draftsman assigned to work with the botanist Louis Pierre (1833–1905) in the Jardin Botanique de Saigon. None of these Courchet and Delpy drawings appears to have been published previously and it is a pleasure to include them here.

In order to meet the goal of illustrating each genus, illustrations have been prepared by MNHN artists and students, Atelier Iconographie scientifique / UMS 2700 MNHN CNRS, to fill gaps in coverage for specific genera/species, as follows: Bernard Duhem (1964–2016) prepared the drawings for *Erycibe crassiuscula*, *Ipomoea harmandii*, and *Merremia eberhardtii*. These are the last drawings Bernard prepared before his untimely death in December 2016 and they are a fitting testament to his artistic skill. An accomplished artist with zoological material, these three drawings are some of Bernard's only botanical subjects. Agathe Haevermans prepared the drawings for *Neuropeltis indochinensis*.

Three students supervised by Didier Geffard-Kuriyama, prepared one illustration each as part of their hands-on skills training. The author wishes to thank Didier for his kind assistance in supervising and guiding the students to prepare their contributions : Aurélia Dumas drew the illustration for *Merremia kingii*; Héloïse Krob drew the illustration for *Ipomoea pierrei*; Ludivine Longou drew the illustration for *Argyreia pierreana*. In addition, L. Longou assisted D. Geffard-Kuriyama with digitally cleaning the images scanned from the Delpy and Courchet drawings; the originals are faded pencil or ink drawings on yellowed, acidic paper. The digital image files have been restored line by line without being otherwise modified. The author wishes to thank everyone in the Atelier for their efforts.

The other illustrations included in the Convolvulaceae account are recycled from previously published floras and scientific articles; the author thanks Odile Poncy and the editors and publishers that granted permission to include selected illustrations from: *Blumea*; *Flore de la Nouvelle Calédonie et Dépendances*; *Flore de Mascareignes*; *Flora of Taiwan*, edition one; *Flora Malesiana*; *Flora of Thailand*. The source for each illustration is credited in the figure caption.

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This volume on Convolvulaceae is the 36th issue of the *Flora of Cambodia, Laos and Vietnam* and the first to integrate *Tropical Fauna and Flora* series. So far, thirty-five fascicles have been published on families of angiosperms and Gnetaceae.

The family Convolvulaceae comprises about 1,900 species distributed worldwide in the tropical and warm temperate regions. This new account of the Convolvulaceae in Cambodia, Laos, and Vietnam includes 22 genera, 108 species, and 10 infraspecific taxa, with brief mention of another 13 cultivated species. The indigenous species richness for Convolvulaceae is quite high in this area, particularly for the genera *Argyreia*, *Cordisepalum*, *Dinetus*, *Erycibe*, *Ipomoea*, *Lepistemon*, *Merremia*, *Neuropeltis*, *Porana*, *Rivea*, and *Tridynamia*.

A general introduction to the family is followed by technical descriptions for each genus, species, and infraspecific taxon, keys for identification, and concise summaries of what is known about the ecology, phenology, the distribution globally and mapped, any uses, vernacular names in languages spoken in the area, and pertinent notes concerning taxonomy or other topics. The flora is profusely illustrated with historical and modern botanical illustrations (line drawings, watercolours) and colour photos of living plants in the field. Voucher specimens are cited to document all information presented in the book. A bibliography of cited references where more detailed information may be found is included and three indexes conclude the flora.

American botanist, now retired, **George Staples** has worked in the tropics throughout his research career. From 1988–2006, he was botanist at the Bishop Museum, Honolulu, U.S.A., where he specialized in the taxonomy of tropical garden plants, leading to publication of a major reference book on the cultivated plants of the Hawaiian Islands (*A Tropical Garden Flora*, 2005). From 2007–2013, he was Senior Researcher at the Singapore Botanic Gardens, where he focussed on the plant family Convolvulaceae in the Asia/Pacific region. He authored the *Flora of Thailand* (2010), *Flora of Peninsular Malaysia* (2015), and coordinated the Convolvulaceae information for the *World Checklist of Selected Plant Families* (online from 2015). From 2013–2017, he conducted researches and performed special curatorial projects in Brazil, France, Singapore, Thailand, and the U.K.

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