

CONVOLVULACEAE<sup>1</sup> (S. J. van Ooststroom, Leyden,  
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Herbs or shrubs, sometimes parasitic, usually with twining stems, occasionally prostrate or creeping, or erect, very rarely trees, often with milky juice. *Leaves* mostly spirally arranged, in parasitic species absent or nearly so, usually petioled; petiole sometimes with extra-floral nectaries. *Stipules* absent, pseudostipules (leaves of axillary shoot) rarely present. *Inflorescences* mostly cymose, one- to many-flowered, with mostly opposite or subopposite bracts at the base of the cymes or under the solitary flowers; rarely racemose. *Flowers* generally hermaphrodite, actinomorphic, rarely slightly zygomorphic, usually 5-merous, rarely 4-merous, various in size and colour, often showy. *Sepals* usually free, imbricate, with quincuncial aestivation, often persistent, sometimes accrescent in fruit. *Corolla* sympetalous, of various shapes, often funnel-shaped or campanulate, more rarely rotate, salver-shaped or urceolate; the limb nearly entire or more or less deeply lobed, often contorted-plicate in bud, or valvate or induplicate-valvate. *Stamens* isomerous, alternating with the corolla-lobes, adnate to the corolla, with usually slender, often filiform filaments and introrse or laterally and longitudinally dehiscent anthers. Pollen smooth or spinulose. *Disk* mostly present, annular or cupular. *Ovary* superior, mostly of 2 carpels, 2- or 1-celled, sometimes 4-celled by development of accessory partitions, rarely of 3 carpels and 3-celled; ovules 2 in each carpel, sessile, erect, anatropous. *Style* 1, often filiform, simple or forked, or 2 free styles, rarely very short or absent. *Stigma* entire or 2-lobed, rarely 3-lobed, or stigmas 2-4, of various shape, globular or ellipsoid to filiform, sometimes appanate, rarely peltate, kidney-shaped, conical or funnel-shaped. *Fruit* a capsule dehiscent by valves or circumscissile or irregularly dehiscent, rarely a berry or nut-like. *Seeds* as many as ovules or fewer; endosperm cartilaginous; cotyledons generally folded, sometimes obscure or absent.

*Distr.* Ca 55 genera, with ca 1650 spp., widely distributed in the tropical, subtropical and temperate regions of both hemispheres; the greater part of the species in the tropics and subtropics of America and Asia. The larger genera *Cuscuta* (ca 165 spp.), *Convolvulus* (ca 250 spp.) and *Ipomoea* (ca 500 spp.) nearly throughout the range of the family but *Convolvulus* more in the temperate parts and *Ipomoea* more in the tropics and subtropics. Other large genera as *Evolvulus* (ca 100 spp.) and *Jacquemontia* (ca 120 spp.) nearly confined to America. *Argyreia* (ca 90 spp.) confined to tropical Asia, Malaysia, and a single sp. in Australia, and *Merremia* (ca 80 spp.) circumtropical. Several monotypic or small genera in E. Africa, Madagascar, and Australia.

*Ecol.* By far the greater part of the species are found in localities where they are fully exposed to the sunlight. As far as they do not prefer open fields and similar places, they often occur along edges of thickets and forests. In the primary forest flora representatives of the family are pretty rare.

Some *Convolvulaceae* take part in covering or entangling other vegetation either or not associated with other vines of *Cucurbitaceae*, *Vitaceae* etc. described by VAN STEENIS as 'vegetable blankets' (Trop. Natuur 28, 1939, 141-149). Typical instances of this kind are specially found in serral pioneer vegetation, or in thickets and secondary forest, e.g. *Merremia peltata* (L.) MERR., *Ipomoea gracilis* R.Br. A typical example of the luxurious festoons of the latter species is found in the fringe of beach-forest of *Casuarina equisetifolia* on the Island of Krakatao of which some crowns are spun round like cocoons (fig. 42). Practical use of this habit might be made in plantations, where some *Convolvulaceae* could be used as a cover crop. They are, however, inferior to the *Leguminosae* with similar qualities, in being devoid of rootnodules containing nitrogen-fixing bacteria.

The flowers are visited by insects and birds for the nectar excreted by the disk. Species of *Ipomoea*

(1) Treatment mostly after VAN OOSTSTROOM, The *Convolvulaceae* of Malaysia, Blumea 3<sup>1</sup> (1938) 62-94; 3<sup>2</sup> (1939) 267-371; 3<sup>3</sup> (1940) 481-582; 5<sup>2</sup> (1943) 339-411; 5<sup>3</sup> (1945) 689-691; 6<sup>2</sup> (1950) 337-348; 7<sup>1</sup> (1952) 171-178; and HOOGLAND, *ibid.* 7<sup>1</sup> (1952) 179-192; 7<sup>2</sup> (1953) 310-319.

(2) In *Argyreia* (partly) and *Erycibe*.

*sect. Calonyction* with long and narrow corolla tubes, of which several fragrant white-flowered species are nocturnal, are visited by long-tongued *Sphingidae*. The salver-shaped scarlet-coloured corolla of *sect. Quamoclit* is distinctly fit for honey-sucking colibris; in Java VAN DER PIJL observed by both species that sun-birds suck honey by perforating the basal part of the tube (Trop. Natuur 17, 1928, 187; Hong Kong Nat. 5, 1934, 178-179). In *Ipomoea pes-caprae* DOCTERS VAN LEEUWEN (Ann. Jard. Bot. Btzg 37, 1927, 19-20) found flowers visited by *Xylocopa* and other *Hymenoptera*. Flowers of *Ipomoea congesta* are at Bogor regularly visited by *Hesperidae* (VAN STEENIS). The flowers of many species remain open for one day only or for a few hours, specially in the morning.

Some species possess extra-floral nectaries, at the leaf-base, the petiole or the calyx (see NIEUWENHUIS-VON ÜXKÜLL-GÜLDENBANDT, Ann. Jard. Bot. Btzg 21, 1907, 253-256).

Cauliflory is exceptional; it is found in *Erycibe ramiflora* HALLIER *f.* and in *Argyreia nuda* OOSTSTR. *Convolvulaceae* are autotrophic with exception of the parasitic genus *Cuscuta*. *Parasitipomoea formosana* HAYATA is conspecific with *Ipomoea congesta* R. BR.

According to RIDLEY (Dispersal, etc. 1930, 302-307) the seeds of a number of species of *Convolvulaceae* are undoubtedly widely dispersed by seawater. Among these are *Ipomoea pes-caprae* (L.) SWEET, *I. stolonifera* (CYRILL.) GMEL., *I. gracilis* R. BR., *I. tuba* (SCHLECHTEND.) DON and *I. illustris* (CLARKE) PRAIN. These species are found along the coast or immediately behind it; some of them are confined to sandy beaches, very rarely they occur more inland. Of others, like *Operculina turpethum* (L.) S. MANSO, *Merremia peltata* (L.) MERR., and *Stictocardia tiliifolia* (DESR.) HALLIER *f.*, RIDLEY also assumes a dispersal by seawater. These species also occur on or near the coast, but they are often found also in more inland localities. The buoyancy of the seeds is due to an unoccupied space inside the testa.

SEVEDLIUS (Flora 96, 1906, 231-259) has described 'water-calyces' in *Stictocardia tiliifolia* (DESR.) HALLIER *f.*, *Operculina turpethum* (L.) S. MANSO, and some other species of *Convolvulaceae*.

Morph. The climbing capacity of *Convolvulaceae* is exclusively effected by the twining of the stem which is always to the right (compare p. 300, fig. 4c).

Anat. HALLIER, H., Versuch einer natürlichen Gliederung der Convolvulaceen auf morphologischer und anatomischer Grundlage (Bot. Jahrb. 16, 1893, 455-591).

The value of pollen-characters for the subdivision of the family has been described by HALLIER (*l.c.* 517-520).

Terat. Cf. COSTERUS & SMITH, Ann. Jard. Bot. Btzg 19 (1904) 159; 42 (1932) 11.

Galls. Cf. DOCTERS VAN LEEUWEN, The Zooecidia of the Netherlands Indies (1926) 472-478; *id.* Ned. Kruidk. Arch. 51 (1941) 224.

Uses. Of importance as food plants are *Ipomoea aquatica* FORSK. and *Ipomoea batatas* (L.) LAMK, both cultivated throughout the tropics, the former as a vegetable, the latter for its edible tubers (sweet potato).

Several species are used in native medicine, often on account of their purging properties, e.g. *Operculina turpethum* and species of *Merremia* and *Ipomoea*. Species of *Porana*, *Jacquemontia*, *Ipomoea*, *Mina*, and *Turbina* are grown as ornamental plants; *Ipomoea pes-caprae* is sometimes planted on sandy coasts as a sand-binder.

Notes. The family *Convolvulaceae* is subdivided into two subfamilies, viz A. *Cuscutoidae* containing as only tribe and subtribe I. *CUSCUTEAE* resp. i. *Cuscutinae* and B. *Convolvuloideae* containing two tribes, viz II. *CONVOLVULAE* (*Psiloconiae* HALLIER *f.*) with smooth pollen (subtribes ii-vii) and III. *IPOMOEAE* (*Echinoconiae* HALLIER *f.*) with spinulose pollen (subtribes viii-ix). There is only a small discrepancy in rank and circumscription between this division and that proposed by H. HALLIER (Bot. Jahrb. 16, 1893, 567, 582) who described as tribes, the taxa here accepted as subtribes (*l.c.* 567-585).

The taxa just mentioned are represented in Malaysia as follows:

Subfamily A. *Cuscutoidae*.

Tribe I. *Cuscutae*. Subtribe i. *CUSCUTINAE*: 1. *Cuscuta* L.

Subfamily B. *Convolvuloideae*.

Tribe II. *Convolvuleae*. Subtribe ii. *WILSONIINAE*: not represented in Malaysia. Subtribe iii. *DICHONDRINAE*: 2. *Dichondra* FORST.. Subtribe iv. *DICRANOSTYLINAE*: 3. *Evolvulus* L., 4. *Bonamia* THOU., 5. *Neuropeltis* WALL.. Subtribe v. *PORANINAE*: 6. *Porana* BURM. *f.*. Subtribe vi. *ERYCIBINAE*: 7. *Erycibe* ROXB.. Subtribe vii. *CONVOLVULINAE*: 8. *Jacquemontia* CHOISY, 9. *Aniseia* CHOISY, 10. *Convolvulus* L., 11. *Calystegia* R. BR., 12. *Hewittia* W. & A., 13. *Merremia* DENNST. *ex* HALLIER *f.*, 14. *Operculina* S. MANSO, 15. *Decalobanthus* OOSTSTR.

Tribe III. *Ipomoeae*. Subtribe viii. *IPOMOEINAE*: 16. *Ipomoea* L., 17. *Mina* CERV., 18. *Lepistemon* BL.. Subtribe ix. *ARGYREIINAE*: 19. *Stictocardia* HALLIER *f.*, 20. *Turbina* RAFIN., 21. *Argyreia* LOUR.

Collecting and identifying *Convolvulaceae*.—As appears from the key to the genera it is impossible to identify sterile specimens. In several cases even flowering materials are insufficient for generic identification (e.g. to discriminate between the genera *Operculina* and *Merremia* or between *Ipomoea* and *Argyreia*) and fruits are needed. This results in the disadvantage that a trustworthy key can only be framed on the basis of complete material. The use of the surface structure of the pollen, *i.e.* whether it is smooth or spinulose, could not be avoided. This looks worse than it really is, as the spinulose surface of the pollen of *Ipomoeae* can mostly be observed with a 10 times magnifying hand lens; however, in other cases a microscope is needed.

Explorers are invited to take care to collect convolvulaceous plants with both flowers and fruits, and to make good notes on the shape and colour of the flower, and also to dry the flowering specimens immediately after collecting as the corollas are in many cases liable to wilt soon.

The shape of the corolla is rather important for identification; it may be convenient to explain the shape-concepts by reference to the figures: *funnel-shaped*: fig. 10, 26, 28, *funnel-shaped to campanulate*: fig. 58, *rotate*: fig. 5, *salver-shaped*: fig. 34, 53, 54, *urceolate*: fig. 56.

## KEY TO THE GENERA

1. Leafless, parasitic plants with haustoria. Flowers small, in clusters or short racemes. Corolla mostly with 5 episepalous fimbriate scales inside (*Cuscutioideae*) . . . . . 1. *Cuscuta*
1. Non-parasitic plants with green leaves (*Convolvuloideae*).
2. Pollen not spinulose (*Convolvuleae*).
3. Ovary deeply 2-lobed; styles 2, inserted between the lobes (gynobasic). Flowers small, solitary, axillary. Corolla deeply 5-lobed. Small creeping herbs. Leaves kidney-shaped or cordate-orbicular . . . . . 2. *Dichondra*
3. Ovary not deeply 2-lobed; style(s) not gynobasic.
4. Style absent; stigma 1, conical or semiglobular, 5–10-rayed, rarely funnel-shaped in apical centre. Corolla-lobes bifid. Ovary 1-celled. Fruit fleshy or woody, indehiscent. Woody twiners or straggling shrubs, rarely small trees . . . . . 7. *Erycibe*
4. Style(s) present, sometimes very short; stigma(s) otherwise.
5. Outer 3 or all of the sepals much enlarged in fruit, patent, scarious, reticulately veined, falling off with the fruit. Flowers in racemes or panicles. Corolla-limb subentire or lobed. Style 1, entire or bifid. Woody or herbaceous twiners . . . . . 6. *Porana*
5. Sepals either enlarged in fruit or not so, remaining attached to the pedicel after dehiscence of the fruit.
6. Styles 2, free or united near the base.
7. Styles united below; stigmas globular to peltate; ovary hairy. Flowers in axillary peduncled cymes. High twiners . . . . . 4. *Bonamia*
7. Styles free.
8. Each style forked and with 2 filiform or slightly clavate stigmas. Corolla-limb nearly entire. Bracts not distinctly enlarged in fruit. Small herbaceous plants, never twining. 3. *Evolvulus*
8. Each style with a kidney-shaped lobed stigma. Corolla-limb deeply 5-lobed. Bracts much enlarged in fruit and scarious. Large woody twiners . . . . . 5. *Neuropeltis*
6. Style 1, entire, or with 2 minute branches, concealed by the stigmas. Herbaceous twiners or prostrate plants, or woody twiners.
9. Corolla salver-shaped; limb distinctly 5-lobed with bifid lobes; tube fleshy, cylindrical. Stigmas globose . . . . . 15. *Decalobanthus*
9. Corolla funnel-shaped or campanulate; limb entire or slightly lobed.
10. Sepals enclosed by two large bracts. Corolla pink, or purple. Stigmas oblong or elliptic, complanate . . . . . 11. *Calystegia*
10. Sepals not enclosed by bracts.
11. Hairs on stems and leaves stellate. Corolla blue, lilac, pink or rarely white. Stigmas elliptic, oblong or linear, rarely globose. Leaf-base cordate or truncate, never hastate or sagittate. . . . . 8. *Jacquemontia*
11. Hairs not stellate (or absent).
12. Outer sepals acute or acuminate, much longer and broader than the inner ones. Stems not winged.
13. Outer sepals decurrent on the pedicel. Corolla white. Ovary glabrous; stigmas globular to oblong. Valves of the capsule silvery white and shining inside. Leaves oblong, narrowed towards the base . . . . . 9. *Aniseia*
13. Outer sepals not decurrent on the pedicel.
14. Midpetaline bands distinctly pilose outside. Corolla white or cream-coloured, with or without a purple centre. Ovary hairy; stigmas ovate-oblong, complanate. . . . . 12. *Hewittia*
14. Corolla glabrous or nearly so, pale blue, lilac or rarely white. Ovary glabrous; stigmas elliptic or filiform . . . . . 8. *Jacquemontia*
12. Outer sepals not both distinctly longer and broader than the inner ones and acute or acuminate.
15. Stigmas filiform or elliptic.
16. Stigmas filiform. Corolla white or pink. Leaf-base mostly hastate or sagittate. . . . . 10. *Convolvulus*
16. Stigmas elliptic. Corolla blue or lilac. Leaf-base truncate, rounded or slightly cordate, not hastate or sagittate . . . . . 8. *Jacquemontia*
15. Stigmas globular.

- 17. Capsule circumscissile; upper part of the epicarp separating from the lower part and from the endocarp. Corolla white or pale yellow, without purple centre. Stems terete or winged . . . . . 14. Operculina
- 17. Capsule opening by 4 valves or more or less irregularly dehiscent. Corolla white, pale or bright yellow, sometimes with a purple centre. Stems not winged . . . . . 13. Merremia
- 2. Pollen spinulose (*Ipomoeae*).
- 18. Corolla broadly or narrowly urceolate, at the base either narrowed into a short tube, or not.
- 19. Corolla actinomorphic, urceolate, not narrowed at the base into a short tube. Stamens shorter than the corolla. Filaments dilated at their base into a concave scale, arched over the ovary. . . . . 18. Lepistemon
- 19. Corolla ± zygomorphic, narrowly urceolate, at the base narrowed into a short tube. Stamens longer than the corolla. Filaments not dilated into a concave scale . . . . . 17. Mina
- 18. Corolla tubular, campanulate, funnel-shaped or salver-shaped.
- 20. Calyx in fruit much enlarged, completely enclosing the ripe fruit. Leaf-blades with minute black dots (glands) beneath . . . . . 19. Stictocardia
- 20. Calyx enlarged or not enlarged in fruit, not completely enclosing the ripe fruit. Leaf-blades without black dots beneath.
- 21. Fruit a thin-walled capsule opening by valves or irregularly dehiscing. Herbaceous or rarely woody twining or prostrate, rarely erect plants. Corolla mostly glabrous outside 16. *Ipomoea*
- 21. Fruit indehiscent; pericarp fleshy or leathery, or more or less woody.
- 22. Fruit fleshy or leathery, purple, red or yellowish, globose or ellipsoid, not or indistinctly mucronate by the style-base. Seeds glabrous or rarely pilose at the hilum. Corolla outside mostly with hairy midpetaline bands. Woody twiners . . . . . 21. *Argyrea*
- 22. Fruit with a thin woody pericarp, ovoid-oblong, distinctly mucronate by the style-base. Seeds puberulent. Corolla glabrous, or sparsely hairy, white. Herbaceous or subwoody twiner. . . . . 20. *Turbina*

1. CUSCUTA

LINNÉ, Sp. Pl. ed. 1 (1753) 124; Gen. Pl. ed. 5 (1754) 60; YUNCKER, Mem. Torr. Bot. Club 18 (1932) 113; OOSTSTR. Blumea 3 (1938) 63.—Fig. 1-2.

Herbaceous parasites with slender, often filiform, twining, yellow or reddish stems, with haustoria. *Leaves* reduced to minute scales. *Flowers* small, mostly in cymose clusters, 5-, rarely 4- or 3-merous. *Calyx* more or less deeply lobed, or consisting of free sepals. *Corolla* tubular, urceolate, globose or campanulate; the tube with crenulate or fimbriate episepalous scales inside. *Stamens* as many as corolla-lobes, inserted on the corolla above the scales; pollen ellipsoid, smooth. *Ovary* 2-celled, each cell with 2 ovules. *Styles* 2, distinct, or 1; stigmas globose, subglobose or elongated. *Fruit* an ovoid or globose, dry or fleshy capsule, opening irregularly, circumscissile, or remaining closed. *Seeds* 4 or less, glabrous; embryo acotyledonous, filiform, enlarged at one end.

Distr. Cosmopolitan, rather large genus, estimated at ca 165 spp., centering in the Americas, few in *Malaysia*, not represented in Borneo, the Philippines, Celebes, and the Moluccas.

Vern. *Dodder*, *E. duivelsnaaigaren*, *warkruid*, *D.*

Note. Rather often confounded with the Lauraceous genus *Cassytha* which is similar in habit, but easily distinguishable by 3-merous flowers and globular berries.

KEY TO THE SPECIES

- 1. Styles 2, distinct. Stigmas depressed-globose (*Subgenus Grammica*).
- 2. Corolla-lobes obtuse; calyx-lobes not overlapping; corolla-scales short, deeply bifid, with few fimbriae . . . . . 1. *C. australis*
- 2. Corolla-lobes acute; calyx-lobes slightly overlapping at the base; corolla-scales ovate, not bifid, abundantly fimbriate . . . . . 2. *C. campestris*
- 1. Style 1, or nearly absent. Stigmas depressed-globose or elongated (*Subgenus Monogyne*).
- 3. Style longer than the depressed-globose stigmas; corolla-tube as long as the lobes; corolla-scales represented by narrow wings . . . . . 3. *C. timorensis*
- 3. Style shorter than the elongate stigmas; corolla-tube 2½-3 times as long as the lobes; corolla-scales ovate to oblong, abundantly fimbriate . . . . . 4. *C. reflexa*

1. Subgenus *Grammica*

(LOUR.) YUNCKER, Mem. Torr. Bot. Club 18 (1932) 122; OOSTSTR. Blumea 3 (1938) 64.—*Grammica* LOUR. Fl. Cochinch. 1 (1790) 170.—*Cuscuta* group *Grammica* ENGELM. Trans. Ac. Sc. St Louis 1 (1859) 459, 460.

Flowers mostly pedicelled. Styles 2; stigmas mostly globose or depressed-globose; capsule opening by circumscission, or remaining closed.

Note. YUNCKER divided this subgenus into two sections, 1. *Clistogrammica* ENGELM. em. YUNCK., with indehiscent capsules and 2. *Eugrammica* ENGELM., with circumscissile capsules. Only the first section is represented in Malaysia.

1. *Cuscuta australis* R.Br. Prod. (1810) 491; YUNCKER, Mem. Torr. Bot. Club 18 (1932) 124; OOSTSTR. Blumea 3 (1938) 66.—*C. obtusiflora* H.B.K. var. *australis* ENGELM. Trans. Ac. Sc. St Louis 1 (1859) 492.—*C. hygrophilae* PEARSON in HOOK. Ic. Pl. IV, 8 (1901) t. 2704.—*C. chinensis* (non LAMK.) KOORD. Exk. Fl. Java 3 (1912) 109.—*C. nuda* PILGER, Bot. Jahrb. 59 (1924) 84.—Fig. 1.

Stems thin, filiform, greenish yellow to orange. Flowers 2–2½ mm long, in compact clusters. Calyx about as long as corolla-tube; lobes ovate to orbicular, obtuse. Corolla white, greenish white or creamy white; lobes slightly shorter than or as long as the tube, broadly ovate or narrower, 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 shorter than the depressed-globose ovary. Capsule depressed-globose or obpyriform, 3–4 mm diam., with large interstylar opening, not circumscissile. Seeds 4–3, oval, 1½ mm long, brownish.

Distr. C., S. and E. Asia to Australia, in Malaysia: Sumatra, Malay Peninsula, Java, and New Guinea.

Ecol. According to YUNCKER often on *Polygonum* but also on many other herbaceous plants as *Artemisia*, *Dianthera*, *Genista*, *Glycine soja*, *Lespedeza*, *Pelargonium*, *Piper*, *Xanthium*, etc.

In Malaysia also on *Baccaurea*, *Codiaeum*, *Croton*, *Dianthera leptostachya* BENTH., *Hygrophila quadrivalvis* NEES, *Nothopanax scutellarium* (BURM.) MERR., *Ocimum basilicum* L., *Piper aduncum* L., *Pluchea indica* LESS., *Polyscias*, *Tecoma stans* JUSS.; 5–500 m.

According to an annotation on a field-label by MILNE, in herb. Sing., this species is regarded as a pest and is said to be liable to become dangerous (Malay Peninsula).

Use. The seeds are used in the native medicine-trade; acc. to VORDERMAN seeds are for this aim introduced from China. Softening properties are attributed to them (HEYNE).

Vern. *Djamudju*, *mamudju*, *mudju-mudju*, *tja-tjingan*, *J*, *majamuju*, *Md*, *ramat emas*, *S*.

Notes. The dimensions of the corolla-scales are rather variable; in general they are rather obvious; sometimes, however, they are very small and are easily overlooked. Concerning the form and dimensions of the calyx-lobes may be said that in many cases their length and width is rather equal, in others they can considerably vary; the corolla-lobes are, as a rule, obtuse; somewhat acute lobes also occur.

2. *Cuscuta campestris* YUNCKER, Mem. Torr. Bot. Club 18 (1932) 138; OOSTSTR. Blumea 3 (1938) 68.—*C. arvensis* BEYRICH ex ENGELM. in A. GRAY, Man. Bot. ed. 2 (1856) 336, p.p.—*C. pentagona* ENGELM. var. *calycina* ENGELM. Am. J. Sc. & Arts 45 (1845) 76.—*C. arvensis* ENGELM. var. *calycina* ENGELM. Trans. Ac. Sc. St Louis 1 (1859) 495.

Stems thin, filiform, yellowish. Flowers 2–2½ mm long, in compact clusters. Calyx about as long as the corolla-tube; lobes orbicular, rounded, slightly overlapping at the base. Corolla-lobes

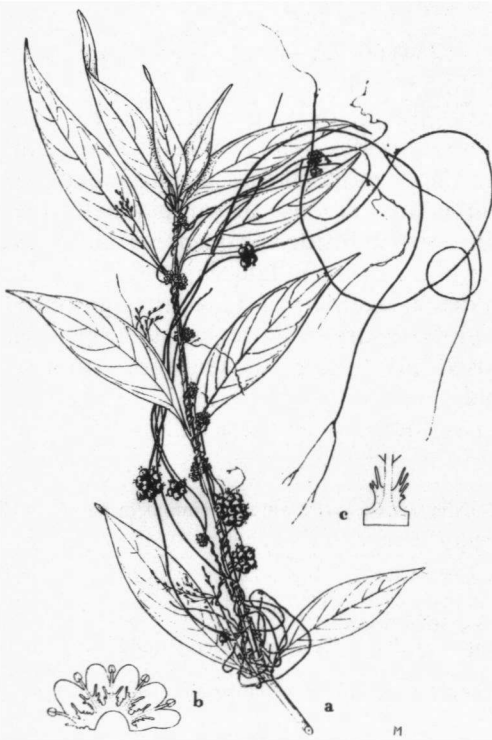


Fig. 1. *Cuscuta australis* R.Br. a. Habit,  $\times 1/2$ , b. opened corolla, from inside,  $\times 3$ , c. corolla-scale,  $\times 6$ .

about as long as the tube, broad-triangular, acute, spreading, with erect or inflexed tips. Stamens slightly shorter than the corolla-lobes; filaments as long as or longer than the anthers. Corolla-scales exerted, ovate, abundantly fimbriate. Styles about as long as the depressed-globose ovary. Capsule depressed-globose, 3 mm in diam., with interstylar opening, not circumscissile. Seeds ca 2, ovate, with one flattened side.

Distr. Native of N. America, now cosmopolitan, in *Malaysia*: W. and M. Java.

Ecol. Often on *Medicago sativa*, *Trifolium*, and *Satureja hortensis*, but also on a great number of

other herbaceous plants; acc. to YUNCKER on *Ambrosia*, *Ammi*, *Artemisia*, *Aster*, *Beta*, *Bidens*, *Callistephus*, *Capsicum*, *Cirsium*, *Dianthera*, *Ipomoea*, *Pelargonium*, *Sonchus*, *Xanthium*, etc. (see VAN OOSTSTROOM, Ned. Kruidk. Arch. 52 (1942) 166). The specimens from Java on *Cinchona*, *Cosmos*, *Crotalaria anagyroides* H.B.K., *C. usaramoensis* BAKER f., and *Gynura crepidioides* BENTH.; 1000–1600 m.

Note. Mentioned by VAN STEENIS, Trop. Natuur 29 (1940) 36 and l.c. 30 (1941) 14. The specimen in the latter paper from Tegal Pandjang (W. Java) belongs to *C. reflexa* ROXB.

## 2. Subgenus *Monogyna*

(ENGELM.) YUNCKER, Mem. Torr. Bot. Club 18 (1932) 248; OOSTSTR. Blumea 3 (1938) 69.—*Cuscuta* group *Monogyna* ENGELM. Trans. Ac. Sc. St Louis 1 (1859) 460.

Flowers sessile or shortly pedicelled. Style 1; stigmas globose, ovate, conic or flattened; capsule circumscissile.

Note. Two sections can be distinguished, viz. 1. *Monogynella* ENGELM., with the style as long as or longer than the stigmas, and 2. *Callianche* ENGELM., with the style shorter than the stigmas. To the first section belongs as only Malaysian species *C. timorensis*, to the second monotypic section *C. reflexa*.

3. *Cuscuta timorensis* DECNE ex ENGELM. Trans. Ac. Sc. St Louis 1 (1859) 514; YUNCKER, Mem. Torr. Bot. Club 18 (1932) 250; OOSTSTR. Blumea 3 (1938) 69.—*C. monogyna* (non VAHL) auctt. mal.; see Blumea l.c.

Stems coarse, up to 2 mm or more in diam., brownish- or yellowish-red. Flowers in short racemes on very short pedicels in the axils of broadly triangular obtuse bracts; the common peduncle simple or occasionally branched near the base. Calyx cupulate, persistent, lobes orbicular, broadly rounded, overlapping, with more or less unequal edges. Corolla yellowish-white, campanulate, 3–3½ mm long, remaining on the developing capsule; lobes as long as the tube, ovate, obtuse, crenulate, erect or reflexed. Stamens subsessile or filaments much shorter than the anthers, inserted at the sinus. Corolla-scales represented by narrow wings. Ovary ovate-conical. Style longer than the depressed-globose stigmas. Capsule ovate-oblong, mucronate by the style, circumscissile near the base, 5 mm high, without opening at the top; 1–2-seeded.

Distr. Central Africa (acc. to YUNCKER) and *Malaysia*: E. Java (Asembagus) and Lesser Sunda Islands (Timor, Wetar).

Ecol. On *Ficus glomerata* ROXB. and other woody plants; the only specimen from Java, at ca 10 m, in a very dry locality. Apparently confined to regions with a pronounced dry season.

Note. I did not see African specimens, but YUNCKER states that he is 'unable to distinguish between the Malayan forms of the species and those examined from Africa.'

4. *Cuscuta reflexa* ROXB. Pl. Corom. 2 (1798) 3, t. '04; YUNCKER, Mem. Torr. Bot. Club 18 (1932) 259; OOSTSTR. Blumea 3 (1938) 70.—*C. macrantha* G. DON, Gen. Syst. 4 (1838) 305.—Fig. 2.

Stems coarse, up to 2½ mm or more in diam.,

pale green or yellowish green. Flowers in small groups, or in racemes, or in racemes consisting of small flower-groups, sessile or very shortly pedicelled. Calyx cupulate, lobes orbicular, obtuse, overlapping, the back verrucose-carinate. Corolla creamy or white, campanulate-tubular, 6–10 mm long, at first remaining on the developing capsule; tube 2½–3 times as long as the lobes; lobes narrow-ovate to ovate-triangular, obtuse or subacute, crenate or entire, erect, spreading or reflexed. Filaments very short, inserted just below the sinus. Corolla-scales ovate to oblong, abundantly fimbriate. Ovary ovate-conical. Style shorter than the elongate stigmas. Capsule globose-conical, circumscissile near the base, 4- or less-seeded; seeds 3–3½ mm long, black.

Distr. From Afghanistan and Baluchistan throughout N. India to Yunnan, China, Siam, and Ceylon; in *Malaysia*: Java, in the E. half of the island, in W. Java only found once on Tegal Pandjang, Mt Papandajan (cf. sub *C. campestris*). The identification of specimens from Kedu, Madiun and Ponorogo, found between ca 800 and 1400 m, is uncertain, as they have been collected without flowers.

Ecol. On *Achyranthes*, *Adhatoda*, *Aplida*, *Aquilegia*, *Calotropis*, *Capparis*, *Carissa*, *Citrus*, *Clerodendron*, *Cocculus*, *Coffea*, *Duranta*, *Fragaria*, *Lavatera*, *Melia*, *Nerium*, *Parkinsonia*, *Peristrophe*, *Thevetia*, *Viburnum*, *Zizyphus* (YUNCKER).

In Java moreover on *Artemisia vulgaris* L., *Boehmeria clidemioides* MIQ., *Casuarina*, *Cestrum*, *Engelhardtia spicata* BL., *Euphorbia rothiana* SPR., *Fuchsia coccinea* AIT., *Justicia gendarussa* L., *Maoutia diversifolia* (BL.) WEDD., *Polygonum chinense* L., *Rubus horsfieldii* MIQ., *Stachytarpheta*; sometimes in dense masses, covering whole tree-crowns, or covering lower vegetation like a net; (1000–)1500–2700 m.

Vern. *Ulan-ulan*, J, from *ulo* = serpent.

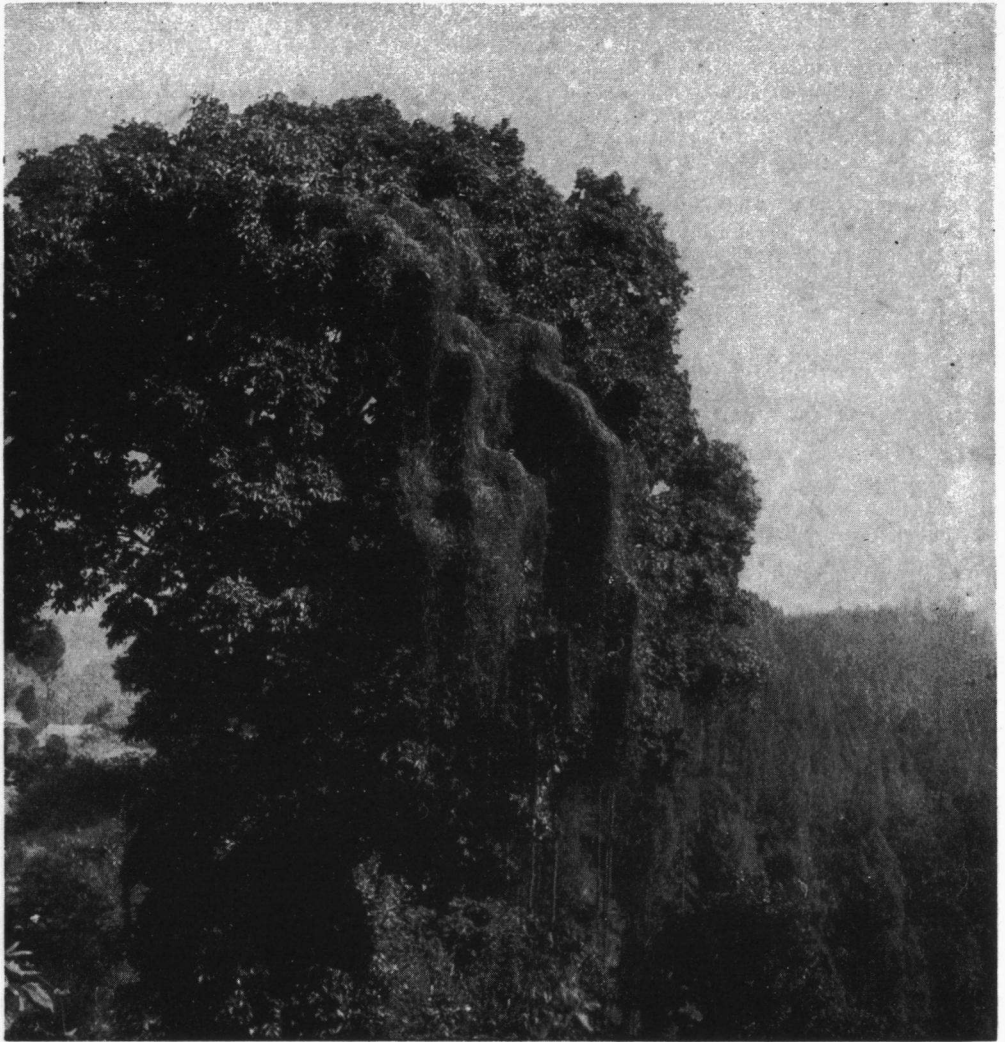


Fig. 2. *Cuscuta reflexa* ROXB. forming garlands over a large tree, near Tosari, E. Java, ca 2200 m (E. C. J. MOHR).

## 2. DICHONDRA

FORST. Char. Gen. (1776) 39, t. 20; OOSTSTR. Blumea 3 (1938) 72.—Fig. 3.

Small creeping herbs, glabrous or softly hairy. *Leaves* mostly small, petioled, kidney-shaped or orbicular-cordate, entire. *Flowers* small, solitary in the leaf-axils; bracts minute. *Sepals* 5, free, subequal, often spatulate, herbaceous. *Corolla* regular, widely campanulate, deeply 5-lobed; lobes induplicate-valvate or slightly imbricate. *Stamens* shorter than the corolla; filaments filiform; anthers small; pollen smooth. Disk small, cupular. *Ovary* deeply 2-lobed, each lobe with 2 ovules; styles 2, filiform, gynobasic (inserted between the lobes); stigmas capitate. *Capsule* 2-lobed; lobes erect, 1- or rarely 2-seeded, indehiscent or irregularly 2-valved. Seeds subglobose, smooth.

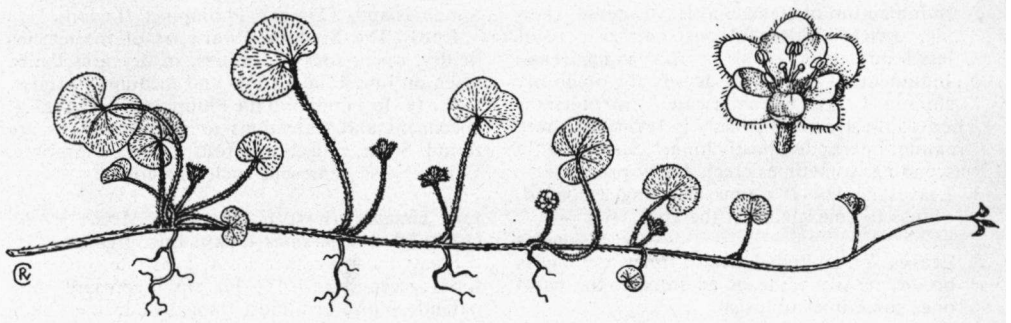


Fig. 3. *Dichondra repens* FORST. Habit, nat. size and flower,  $\times 5$ .

Distr. A small genus of 4–5 species, principally American; one species in the tropical and subtropical regions of both hemispheres.

1. *Dichondra repens* FORST. Char. Gen. (1776) 40, t. 20; OOSTSTR. Blumea 3 (1938) 73.—Fig. 3.

A small creeping, perennial herb. Stems slender, shortly hairy, rooting at the nodes. Leaves long-petioled, kidney-shaped to orbicular, 4–25 mm diam., broadly cordate at the base, broadly rounded or emarginate at the apex, appressedly hairy, especially beneath. Flowers axillary, solitary; pedicel mostly shorter than the petiole, filiform. Sepals obovate-oblong to spatulate, obtuse, ca 2–3 mm long, hairy on the back and at the margins. Corolla shorter to slightly longer than the calyx,

deeply 5-lobed, yellowish. Carpels pilose. Seeds yellow to brown, glabrous.

Distr. Ubiquitous, in the warmer regions of the globe everywhere local; in *Malaysia*: Philippines (Luzon).

Ecol. On dry slopes, ca 1300 m.

Vern. Philippines: *Lutlutud*, Bon., *napolapayag*, Ilk..

Note. The species shows a resemblance in habit with *Merremia emarginata* (BURM. f.) HALLIER f., with which it has been confounded in the herbaria.

### 3. EVOLVULUS

LINNÉ, Sp. Pl. ed. 2 (1762) 391; OOSTSTR. Mon. Evolv., Thesis, Utrecht (1934) 19; Blumea 3 (1938) 74.—Fig. 4–5.

Annual or perennial herbs, undershrubs, or shrubs; stems prostrate, ascending or erect, never twining. Leaves mostly small, entire. Flowers in axillary, mostly peduncled, one- to several-flowered cymes, or solitary, pedicelled or sessile in the leaf-axils, or aggregate in terminal spikes or heads. Sepals 5, small, equal or subequal, acuminate, acute or obtuse, not enlarged in fruit. Corolla regular, mostly small, rotate, funnel- or salver-shaped, purple, blue or white, rarely yellow; limb subentire to distinctly 5-lobed; midpetaline bands often pilose outside. Stamens 5, included or exserted; filaments adnate to the corolla-tube, filiform, glabrous, occasionally with a tooth at both sides of the base; pollen globular, smooth. Disk small, cupular, or absent. Ovary glabrous or sometimes pilose, 2-celled, each cell with 2 ovules, rarely 1-celled, 4-ovuled; styles 2, filiform, united at the base, or free, each style 2-cleft; stigmas long, terete, filiform or slightly clavate. Capsule globose or ovoid, 2–1-celled, mostly 4-valved. Seeds 4–1, smooth or minutely verrucose, glabrous.

Distr. Ca 98 spp., all in America from the S. United States to Argentina, two of these also in the Old World, of which the polymorphic *E. alsinoides* (L.) L. occurs with ca 16–17 varieties throughout the tropical and subtropical regions of the globe.

1. *Evolvulus alsinoides* (LINNÉ) LINNÉ, Sp. Pl. ed. 2 (1762) 392; OOSTSTR. Mon. Evolv. (1934) 26; Blumea 3 (1938) 74.—*Convolvulus alsinoides* LINNÉ, Sp. Pl. ed. 1 (1753) 157.—Fig. 4–5.

#### KEY TO THE VARIETIES

1. Leaves more or less distinctly in two rows, approximate; internodes up to 4 mm. Stems prostrate, rarely ascending.



2. Indumentum of stems and leaves dense, shining, sericeo-villose, fulvous. Leaves more or less imbricate . . . *var. philippinensis*
2. Indumentum much less dense, not obviously shining. Leaves not imbricate. *var. hirsutus*
1. Leaves mostly not distinctly in two rows, more remote; internodes mostly longer. Stems mostly ascending, sometimes erect, rarely prostrate.
3. Leaves *ca* 1½–2½ times as long as broad, obtuse to emarginate at the apex.
- var. alsinoides*
3. Leaves 2½ or mostly more times as long as broad, mostly acute or acuminate, the basal ones sometimes obtusish.
4. Leaves appressed-pilose mostly on both sides.
5. Peduncles shorter than the leaves. Indumentum more or less shining.
- var. javanicus*
5. Peduncles longer than the leaves. Indumentum less shining. *var. decumbens*
4. Leaves with appressed and spreading hairs, sometimes lanate . . . *var. sericeus*

*var. alsinoides*.—*E. pumilus* SPANOGHE in HOOK. Comp. Bot. Mag. 1 (1835) 348, *nom. nud.*—?*E. linifolius* (non L.) BLANCO, Fl. Filip. (1837) 221.—*E. pseudo-incanus* SPANOGHE, Linnaea 15 (1841) 341, *nom. nud.*

A perennial herb. Stems few to several, prostrate or ascending, slender, with appressed and patent hairs. Leaves oblong, elliptic or spatulate, 7–20 (–25) by 3–10 mm, rounded at the base or attenuate into the short petiole, obtuse or shallowly emarginate and mucronulate at the apex, more or less densely appressed-pilose on both sides, or sometimes glabrous above. Peduncles filiform, shorter to much longer than the leaves, hairs appressed, either mixed with patent ones or not, one- to few-flowered. Pedicels as long as or usually longer than the calyx. Bracts linear-subulate to linear-lanceolate, 1½–4 mm long. Sepals lanceolate, acute or acuminate, *ca* 3 mm long, villose. Corolla rotate, 5½–7(–10) mm diam., pale-blue or white. Ovary glabrous. Capsule globular, glabrous, 4-valved. Seeds 4 or less, black, smooth.

Distr. Tropical E. Africa, Madagascar, India, Indo-China, S. China, in *Malaysia*: Lesser

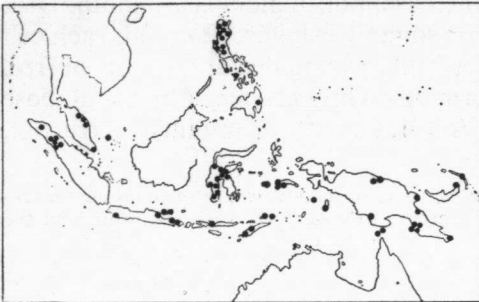


Fig. 4. *Evolvulus alsinoides* (L.) L. Distribution in Malaysia.

Sunda Islands (Timor), Philippines (Luzon).

Ecol. The Malaysian varieties of the species in dry, open, rocky localities, in dry grasslands, often on limestone, at low and medium altitudes.

Note. In Timor and the Philippines both typical specimens and transitions to *var. decumbens* are found. Some collections from E. Java (Surabaya, Grisse) also represent such transitions.

*var. hirsutus* (LAMK) OOSTSTR. Mon. Evolv. (1934) 29.—*E. hirsutus* LAMK, Enc. 3 (1789) 538.

Stems mostly rather stout, prostrate, or sometimes ascending, 7–15(–35) cm, appressed- and patently pilose or almost tomentose in the young parts with more or less ferruginous hairs. Leaves more or less distinctly in two rows, rather approximate, oblong or ovate-oblong to elliptic, 5–8 by 2½–4½ mm, rounded at the base, obtuse and mucronulate, or acutish at the apex; hairy like the stem, shortly petioled or sessile. Peduncles at most as long as the leaves, 2–5(–10) mm, hairy like the stems, 1(–2)-flowered. Bracts linear, 1½–2 mm. Pedicels shorter to longer than the calyx. Sepals lanceolate, acuminate, 2½–3 mm, pilose. Corolla 6–8(–10) mm diam.

Distr. India, *Malaysia*: Anambas Isl., Madura, Philippines (Luzon).

Note. A collection from the Anambas Isl. (HENDERSON 20340) is an intermediate between *var. hirsutus* and *var. decumbens*.

*var. philippinensis* OOSTSTR. Mon. Evolv. (1934) 30.

Much resembling *var. hirsutus* in habit, but differing by the more or less imbricate leaves and by the dense, shining, sericeo-villose, fulvous indumentum. Peduncles usually very short, rarely longer, to 8 mm. Corolla *ca* 10 mm diam.

Distr. *Malaysia*: Philippines (Luzon).

*var. decumbens* (R.Br.) OOSTSTR. Mon. Evolv. (1934) 38.—*E. decumbens* R.Br. Prod. (1810) 489.—*E. lanceaeifolius* SPANOGHE, Linnaea 15 (1841) 341, *nom. nud.*—*E. gracillimus* MIQ. Fl. Ind. Bat. 2 (1857) 629.—Fig. 5.

Stems at first erect, afterwards with ascending branches, slender, 30–45 cm, appressedly and whether or not patently pilose; internodes (5–) 10–20 mm. Leaves lanceolate to linear, 5–20(–30) by 1½–3½(–5) mm, rounded to acute at the base, acute or acuminate at the apex, appressed-pilose on both sides; basal leaves sometimes broader and obtusish. Peduncles filiform, longer than the leaves, 15–30 mm, 1–2(–3)-flowered, appressed-pilose. Pedicels mostly longer than the calyx, filiform. Bracts linear-subulate, 1½–2 mm. Sepals narrow-lanceolate, acuminate, 2½–3 mm, villose. Corolla 7–8 mm diam.

Distr. S. China and Indo-China to Australia and the Pacific Islands, in *Malaysia*: N. Sumatra, Malay Peninsula, Lesser Sunda Islands (Bali, Timor, Wetar), SW.-SE. Celebes, Moluccas, Philippines (Luzon, Mindanao), New-Guinea.

Note. Transitions to *var. alsinoides* are found in E. Java (Surabaya, Grisse). Most of the collec-

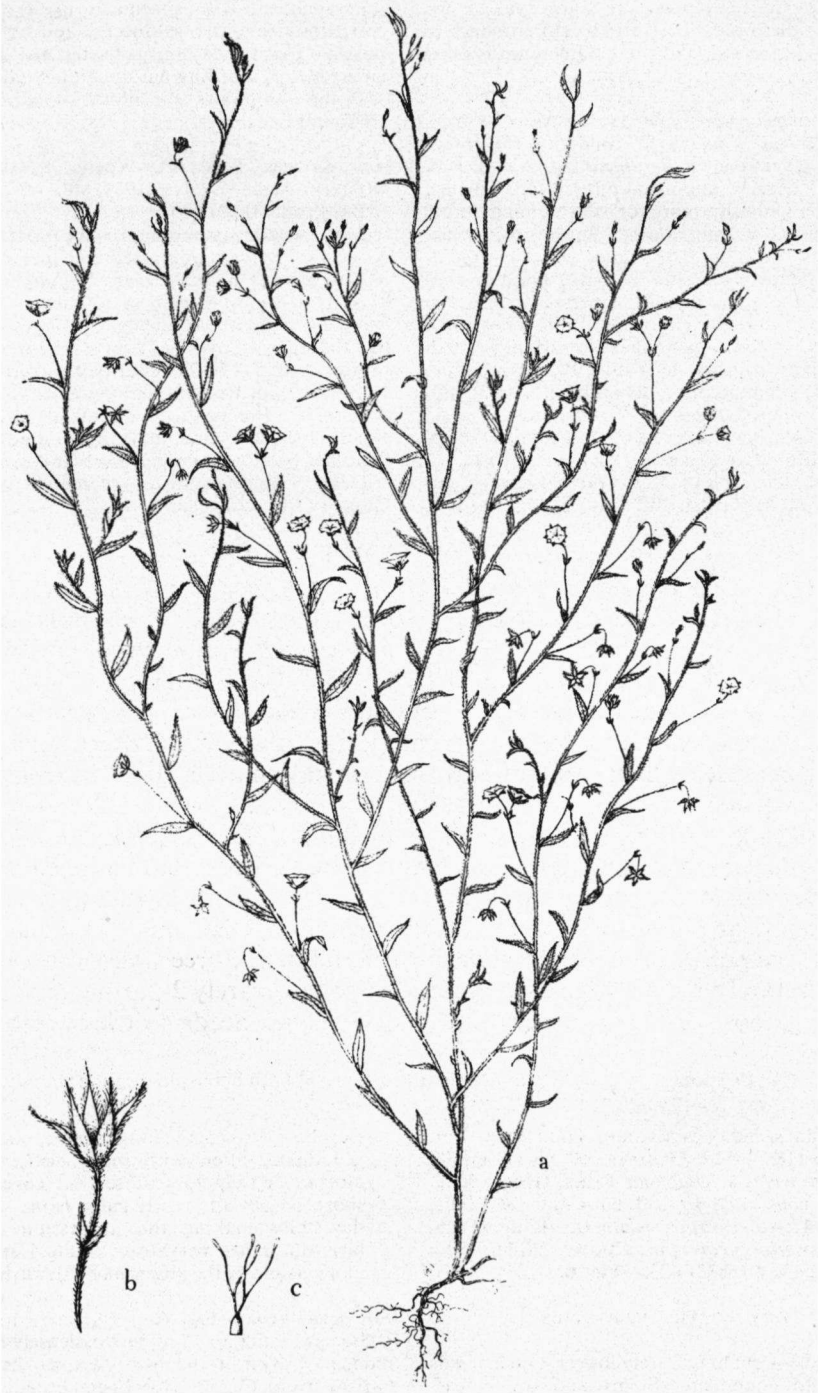


Fig. 5. *Evolvulus alsinoides* (L.) L. var. *decumbens* (R.Br.) OOSTSTR. a. Habit,  $\times \frac{1}{2}$ , b. calyx, c. pistil (b-c enlarged).

tions from the Philippines are transitions to *var. javanicus*; these plants are usually stiffer than typical *var. decumbens* and the indumentum is more shining and more or less fulvous.

*var. javanicus* (BL.) OOSTSTR. Mon. Evolv. (1934) 39.—*E. javanicus* BL. Bijdr. (1825) 724.

Stems several, erect or ascending, rather stiff, 6–20 cm, densely appressed-pilose, with fulvous, afterwards greyish, more or less shining hairs. Internodes 3–5 mm. *Leaves* linear or linear-lanceolate, 4–12 by 1–2½ mm, erect or erectopatent, attenuate towards the base, acute or acuminate at the apex, densely appressed-pilose like the stems. *Peduncles* short, 2–5 mm, pilose like the stems. *Pedicels* as long as or usually much longer than the calyx, to 7 mm. *Bracts* subulate, 1 mm. *Sepals* lanceolate, acuminate, 2½–3 mm, appressed-pilose. *Corolla* 8–9 mm diam.

Distr. *Malaysia*: Lesser Sunda Islands (Timor, Wetar), Moluccas (exact locality unknown).

Notes. The type of *E. javanicus* BL. was described from Mt Gedeh (W. Java) by BLUME. It is

fully identical with specimens of REINWARDT'S collection from the Moluccas, and as it is impossible that it has been collected on Mt Gedeh, an erroneous labelling has apparently taken place.

In the Philippines transitions to *var. decumbens* are found (see there).

*var. sericeus* BTH. Fl. Austr. 4 (1869) 438; OOSTSTR. Mon. Evolv. (1934) 40.—*E. argenteus* R.Br. Prod. (1810) 489.

Stems several, ascending, 10–20(–45) cm, densely sericeo-villose with appressed and spreading whitish or fulvous hairs. *Leaves* oblong-lanceolate, 8–20 by 3–8 mm, acutish or rounded at the base, acute or obtusish at the apex, subsessile, hairy like the stems, sometimes nearly woolly. *Peduncles* rather stout, 7–15(–25) mm, hairy like the stems, 1(–2)-flowered. *Pedicels* as long as or longer than the calyx. *Bracts* linear-subulate, 1½–2 mm. *Sepals* lanceolate, acuminate, 2½–3 mm, hairy like the other parts of the plant. *Corolla* 8–9 mm diam.

Distr. Queensland, in *Malaysia*: NE. New Guinea (once collected).

4. BONAMIA

THOU. Hist. Vég. Isl. France, etc. 1 (1804) 33, t. 8, *nom. cons.*; in Dict. Sc. Nat. 5 (1805–6) 145; *non Bonamia* NECK. 1790; HALLIER f. Bull. Herb. Boiss. 5 (1897) 804, 996; OOSTSTR. Blumea 3 (1938) 75.—*Breweria* R.Br. Prod. (1810) 487.—*Trichantha* KARST. & TRIANA, Linnæa 28 (1856) 437, *non* HOOK. 1844.—Fig. 6.

Herbaceous or woody twiners, or erect undershrubs. *Leaves* petioled, lanceolate, ovate or elliptic, entire, herbaceous or rarely subcoriaceous. *Flowers* axillary, solitary, or in cymes which sometimes form terminal panicles. *Bracts* mostly small. *Sepals* 5, equal or subequal, rarely very unequal, orbicular to lanceolate, coriaceous or herbaceous. *Corolla* regular, small or medium-sized, campanulate or funnel-shaped, blue or white, with hairy midpetaline bands outside; limb 5-lobed. *Stamens* and styles included, very rarely slightly exerted; filaments adnate to the corollatube, glandular-pilose, or glabrous; pollen smooth. Disk small or none. *Ovary* 2-celled, each cell with 2 ovules; style filiform, bifid, or 2 free styles, often unequal in length, rarely 1 style; stigmas 2, globose or peltate, rarely 2-partite, or stigmas 4. *Capsule* globose or ovoid, 2-celled, 2-, 4- or 8-valved. Seeds 4 or less, glabrous or pilose.

Distr. *Ca* 40 species, widely distributed in the tropics of both hemispheres, in *Malaysia* only one species.

1. *Bonamia semidigyna* (ROXB.) HALLIER f. Bot. Jahrb. 16 (1893) 528; OOSTSTR. Blumea 3 (1938) 76.—*Convolvulus semidigynus* ROXB. (Hort. Beng. 1814, 13, *nom. nud.*) Fl. Ind. ed. CAREY & WALL. 2 (1824) 47.—*Breweria cordata* BL. Bijdr. (1825) 722.—*Breweria roxburghii* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 493.—Fig. 6.

1. *Corolla* 4½–5 cm long. Outer sepals less acuminate, often with more distinct nerves. Not so densely tomentose, but covered with short closely appressed paler hairs, especially the stems making the impression of being farinose. Finer nervation of the leaves often more visible by the absence of a dense haircloth.

*var. farinacea*

*var. semidigyna*.—Fig. 6.

Stems twining, to 15 m, terete, densely brown or reddish brown tomentose. *Leaves* broad- to narrow-ovate, 6½–15 by 4–10 cm, broadly cordate or rarely truncate at the base, shortly acuminate to cuspidate at the apex, with an acute or obtusish, mucronulate acumen, tomentose on both sides,

KEY TO THE VARIETIES

1. *Corolla* 3–4 cm long, rarely longer. Outer sepals acute to acuminate. Stems and lower leaf-surface with a dense brown or reddish brown tomentum. Finer nervation of the leaves indistinct . . . . . *var. semidigyna*

below more densely and more softly than above, the upper surface glabrescent, at last sometimes glabrous; lateral nerves 5-6 on either side of the midrib; petiole 18-35(-60) mm, tomentose like the stem. *Peduncles* axillary, terete or more or less applanate at the apex, variable in length, 4-14 cm, tomentose. *Flowers* in a 2-5-flowered umbelliform cyme. *Pedicels* variable in length,

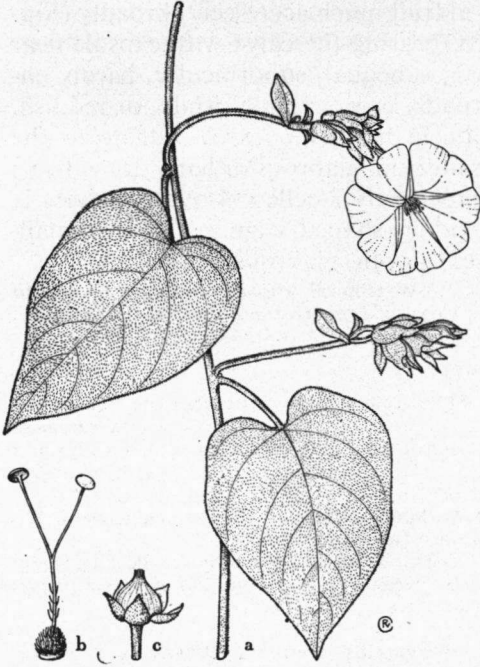


Fig. 6. *Bonamia semidigyna* (ROXB.) HALLIER f. a. Flowering branch of *var. semidigyna*,  $\times 1/2$ , b. pistil,  $\times 1 1/2$ , c. capsule,  $\times 1/2$ .

4-15 mm, short-tomentose. Bracts at the base of the primary branches of the cyme small, or larger and leaf-like, and then to 2 cm long. *Sepals* about equal in length or the inner ones a little shorter, 8-14 mm long, short-tomentose; two outer sepals ovate or ovate-oblong, mostly with a waved or reflexed margin; three inner ones broadly ovate, all acute to acuminate, herbaceous, the inner ones with narrow scarious margins. *Corolla* campanulate to funnel-shaped, 3-4(-5) cm long, white, often bluish in dry specimens, midpetaline bands pilose outside, otherwise glabrous, inside glabrous or with a few hairs below the base of the filaments. Filaments sparsely pilose near the base; anthers directed downwards. Ovary hairy; style bifid, with a few hairs near the base; stigmas globose-peltate. *Capsule* broad-ovoid to subglobose, ca 12 mm high, hairy at the apex, 2-celled, 4-valved; the valves longitudinally splitting into several narrow segments, which are often connate at the top. Seeds 4, glabrous, black, 5 1/2-6 mm long, with 1 convex and 2 plane sides.

Distr. Madagascar, India, Indo-China, Siam,

in *Malaysia*: ?Sumatra, Malay Peninsula, W. Java, Borneo (Sarawak), SW. Celebes, Philippines (Culion).

Ecol. Edges of secondary forests, thickets, hedges, waysides, riverbanks, from sea-level to ca 250 m, rarely up to 600 m.

Vern. *Aroj balu*, S.

Note. The location of the two specimens collected by KORTHALS in Sumatra appears doubtful.

Besides the typical form HALLIER f. distinguished two varieties, *var. farinacea* and *var. ambigua*, mainly on account of differences in the indumentum. Full descriptions of these varieties, drafted by HALLIER after living materials in the Botanic Garden at Bogor, Java, may be found in Bull. Herb. Boiss. 5(1897) 817-818.

*var. farinacea* HALLIER f. Versl. 's Lands Pl.-tuin Btzg 1895 (1896) 125; Bull. Herb. Boiss. 5 (1897) 818, 1013; OOSTSTR. Blumea 3 (1938) 79.—*Lettosomia bancana* MIQ. Fl. Ind. Bat. Suppl. (1861) 561.

Not so densely tomentose as *var. semidigyna*, but covered with short closely appressed hairs of a paler colour, changing from brown into grey; especially the stems making the impression of being farinose. Finer nervation of the sometimes narrower leaves often much more visible by the absence of a dense haircloth. *Sepals* often somewhat shorter than in *var. semidigyna*, less acuminate, often with more distinct nerves. *Corolla* longer, 4 1/2-5 cm.

Distr. *Malaysia*: Banka, SW. Celebes, Moluccas (Ceram), S. Neth. New Guinea (Merauke).

Ecol. In thickets on the beach and on rocks, in marshy but also in very dry localities, between sea-level and 75 m.

Vern. *Akar lambai putih*, Lepar Isl., *tamber kaleleng*, Celebes, *weawè*, New Guinea.

Note. The only specimen collected in Ceram, KORNASSI (exp. RUTTEN) 1274, in Herb. Bogor, Leiden & Utrecht, and a specimen from Celebes, Bonto Parang, RACHMAT (exp. VAN VUUREN) 4, in Herb. Bogor & Leiden, are more or less aberrant; the Ceram plant is characterized by its long pedicels (to 20, or occasionally to 30 mm long), much longer than is generally found; the RACHMAT specimen has the sepals of an aberrant shape; they are not at all acuminate, but are elliptic and obtuse. These plants might be of importance systematically and phytogeographically when more materials should be available and when the aberrant characters should prove to be constant.

*var. ambigua* HALLIER f. Bull. Herb. Boiss. 5 (1897) 817; OOSTSTR. Blumea 3 (1938) 80.

Concerning this variety can be stated, that the specimens of it in the Leiden herbarium, all collected by HALLIER in the Botanical Garden of Bogor from one plant, fully agree with HALLIER's fine description. It is, however, more difficult to draw a satisfactory line between *var. semidigyna* and this variety, than with *var. farinacea*. It is not impossible that HALLIER is right that we have here a hybrid before us.

## 5. NEUROPELTIS

WALL. in ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 43; OOSTSTR. Blumea 3 (1938) 80; *ibid.* 5 (1942) 268.—Fig. 7.

Large woody twiners. *Leaves* petioled, elliptic, ovate or oblong, penninerved, entire, chartaceous or coriaceous. *Flowers* small, in rusty brown tomentose racemes, the racemes axillary or subpaniculate towards the ends of the branches. Bracts initially small, adnate to the pedicel, in fruit much accrescent, broadly elliptic to orbicular, scarious, reticulately nerved, bearing the calyx with capsule near its centre. Bracteoles minute, hairy. *Sepals* 5, subequal, suborbicular, hardly enlarged in fruit. *Corolla* regular, rotate to broadly campanulate, white, or reddish, deeply 5-lobed, the lobes induplicate-valvate in bud. *Stamens* 5, adnate to the corolla-tube, exserted or included; filaments filiform, glabrous or hairy at the base; pollen smooth. *Ovary* hairy, perfectly or imperfectly 2-celled, 4-ovuled; styles 2, free, short, each with a peltate, lobed or kidney-shaped stigma. *Capsule* small, glabrous, 1-celled, 4-valved. Seed 1, globose, smooth, glabrous, dull black.

Distr. A small genus of ca 11 species, ca 7 of which in W. tropical Africa from Upper Guinea to Portuguese Congo; and 4 in tropical Asia on the West Coast of India (Kanara, Malabar), and in SE. Asia from Siam, Tenasserim, Indo-China, and Hainan to *Malaysia*: Malay Peninsula, Borneo.

## KEY TO THE SPECIES

1. Corolla-tube inside hairy at the base of the filaments. Styles as long as or shorter than the breadth of a stigma . . . . . 1. *N. racemosa*  
 1. Corolla-tube inside glabrous at the base of the filaments. Styles much longer than the breadth of a stigma . . . . . 2. *N. maingayi*

1. *Neuropeltis racemosa* WALL. in ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 44; OOSTSTR. Blumea 3 (1938) 81; *ibid.* 5 (1942) 269, f. 1-2, a-b.—Fig. 7 a-c.

A large woody twiner. Young branches more or less tomentellous with rusty brown hairs, the adult ones glabrous. *Leaves* elliptic or narrow-elliptic, sometimes elliptic-oblong, 6-12 by 2-7 cm, acute at the base or shortly attenuate into the petiole, acute or shortly acuminate at the apex, with a blunt, mucronulate top, coriaceous, glabrous above and beneath, or with a few scattered appressed hairs; lateral nerves 7-10 on either side of the midrib, finer reticulate nervation distinctly visible above; petiole ca 10-15 mm long or slightly longer. *Inflorescences* from the leaf-axils or from defoliate branches, racemose, solitary or 2-4 together, brown-tomentose, shorter than the leaves, 3-6 cm long or slightly longer; pedicels 2-2½ mm. Bract immediately below the sepals, ovate to ovate-lanceolate, with a distinct mucro, 2-3 mm long, in fruit broad-elliptic to orbicular, slightly emarginate and mucronulate at the apex, slightly emarginate or obtuse at the base, glabrous, except along the pedicel and sometimes along the nerves, 3-4½(-6) cm long. Two outer *sepals* orbicular or slightly broader than long, 2-2¼ mm long, three inner ones broader than long, 1¾-2 mm long. *Corolla* broadly campanulate, ca 5 mm long, deeply 5-lobed, lobes longer than the tube, with incurved, obtuse top, pilose outside. *Ovary* ovate; stigmas ca 1 mm broad. *Capsule* subglobose, ca 3½-5 mm high.

Distr. Hainan, Siam, Tenasserim, in *Malaysia*:

NW. Malay Peninsula (P. Penang, Kedah), SE. Borneo (once collected).

Vern. *Akar semting semang*, Penang, *perot ayam*, Kedah, *akar oran merah*, *akar china putih*, Mal. Pen.

2. *Neuropeltis maingayi* PETER ex OOSTSTR. Blumea 3 (1938) 83; OOSTSTR. *ibid.* 5 (1942) 270, f. 1-2, c-d.—Fig. 7 d-f.

A large, woody twiner, to 9 m high. Young branches rusty-tomentellous, the adult ones glabrous. *Leaves* elliptic to narrow-elliptic, 6-13 by 2½-7 cm, acute or obtuse at the base, short- to long acuminate at the apex with an acute or obtusish, mucronate to subulate top, coriaceous, sometimes more or less bullate, glabrous or nearly so above, and with few scattered appressed hairs beneath, glabrescent, or tomentose (in *var. tomentosa*). Lateral nerves 6-9 on either side of the midrib, the finer nervation not so distinctly visible above as in *N. racemosa*; petiole 10-13(-22) mm long. *Inflorescences* from the leaf-axils, one or few from an axil, racemose, or sometimes ramified and then paniculate, brown-tomentose, 3-13 cm long. Pedicels to 3 mm. Bract immediately below the sepals, ovate to ovate-lanceolate, with a distinct mucro, ca 3-4½ mm long, in fruit broad-elliptic, obtuse or emarginate and mucronulate at the apex, slightly cordate at the base; ca 4-4½ cm long. *Sepals* 2-2½ mm long; 2 outer ones orbicular, the 3 inner broader than long. *Corolla* broadly campanulate to rotate, ca 5-6½ mm long, red, white with a red tinge, or white, deeply 5-lobed, lobes longer than the tube, with more or less



Fig. 7. a-c. *Neuropeltis racemosa* WALL. a. Flowering branch,  $\times \frac{2}{3}$ , b. corolla-lobes from inside,  $\times 4$ , c. pistil,  $\times 4$ .—d-f. *N. maingayi* PETER ex OOSTSTR. d. corolla-lobes from inside,  $\times 4$ , e. pistil,  $\times 4$ , f. capsule with bract,  $\times \frac{2}{3}$ .

incurved, obtuse top, pilose outside. Ovary globose; styles ca 1<sup>1</sup>/<sub>4</sub> mm long, stigmas 1<sup>1</sup>/<sub>2</sub>-3<sup>1</sup>/<sub>4</sub> mm wide. *Capsule* ovoid, ca 6 mm high.

Distr. *Malaysia*: Malay Peninsula (Perak, Selangor, Malacca).

Ecol. In forests, from 30 to 240 m.

Vern. *Bungah jonkal, akar oran merah, Malacca.*

Note. The corolla is dark red or white with a

red tinge in typical specimens; in a specimen of *var. tomentosa* it is mentioned as white.

*var. tomentosa* OOSTSTR. *Blumea* 3 (1938) 85; *ibid.* 5 (1942) 270.

Leaves densely rufous or ferruginous-tomentose beneath.

Distr. *Malaysia*: Malay Peninsula (Malacca, Pahang).

## 6. PORANA

BURM. *f.* Fl. Ind. (1768) 51, t. 21\*, f. 1; OOSTSTR. *Blumea* 3 (1938) 85.—Fig. 8-10.

Large woody or herbaceous twiners. *Leaves* petioled, ovate, mostly cordate at the base and palmately nerved, rarely penninerved, entire, herbaceous. *Inflorescences* racemose or paniculate, rarely flowers solitary. Bracts leaf-like, or minute and subulate, or none. *Sepals* 5, small in flower, the 3 outer ones or all in fruit much accrescent, scarious, reticulately veined, spreading, often spatulate, falling off with the fruit. *Corolla* regular, white, small, campanulate or funnel-shaped, rarely larger and funnel- or salver-shaped; limb subentire or 5-lobed. Stamens and style included, rarely exserted. *Stamens* 5; filaments adnate to the corolla, filiform, glabrous, or glandular or pubescent at the base; pollen smooth. Disk annular or none. *Ovary* mostly glabrous, 1-celled, 2-ovuled, or 1-2-celled, 4-ovuled; style 1, simple, or bifid with unequal branches; stigma globose or 2-lobed, solitary, or one on each branch. *Capsule* small, subglobose to oblong, 2-valved, or indehiscent. Seed usually 1, glabrous.

Distr. More than 20  *spp.*, for the greater part in tropical and subtropical Asia, ca 3  *spp.* in Africa and adjacent islands, one in Australia, and perhaps one in America.

Note. PETER subdivided the genus into three sections.

1. *Euporana* PETER (in E. & P. Nat. Pfl. Fam. 4, 3a, 1891, 24) with a bifid style, a 5-lobed funnel-shaped or campanulate corolla and the flowers in panicles; this section is represented in Malaysia by *P. volubilis* BURM. *f.*

2. *Duperreya* (GAUD.) PETER *l.c.* 24, with an entire style, solitary funnel-shaped or campanulate flowers and narrow leaves; not in Malaysia.

3. *Dinetus* (BUCH.-HAM.) PETER *l.c.* 25, with an entire style, funnel- or salver-shaped flowers, several-flowered inflorescences and cordate leaves; represented in Malaysia by *P. racemosa* ROXB., the often cultivated *P. paniculata* ROXB. and by *P. spectabilis* KURZ.

### KEY TO THE SPECIES

- |  |                          |
|--|--------------------------|
| 1. Corolla ca 2 <sup>1</sup> / <sub>2</sub> cm long . . . . .  | 4. <i>P. spectabilis</i> |
| 1. Corolla up to 1 cm long.  |                          |
| 2. Style bifid to about the middle. Stamens exserted. All sepals enlarged in fruit . . . . .   | 1. <i>P. volubilis</i>   |
| 2. Style entire. Stamens included. All sepals or only 3 enlarged in fruit.   |                          |
| 3. Style very short, as long as or shorter than the ovary. Corolla shallowly lobed or subentire. Stamens inserted in the corolla-tube at about the same height. Three sepals enlarged in fruit . . . . . | 3. <i>P. paniculata</i>  |
| 3. Style longer than the ovary. Corolla deeply 5-lobed. Stamens inserted at different height in the corolla-tube. All sepals enlarged in fruit . . . . .   | 2. <i>P. racemosa</i>    |

1. *Porana volubilis* BURM. *f.* Fl. Ind. (1768) 51, t. 21\*, f. 1; OOSTSTR. *Blumea* 3 (1938) 87.—*P. volubilis* BURM. *f. var. burmanniana* BL. Bijdr. (1825) 723.—*P. volubilis* BURM. *f. var. microcarpa* ENGL. Bot. Jahrb. 7 (1886) 472.—Fig. 8-9.

A large woody twiner, up to 20 m high; stems to 1 or 2 cm thick; adult branches pale brown or grey, often minutely verrucose; young parts pilose. *Leaves* ovate, 3-9 by 2-6 cm, mostly broadly rounded or slightly cordate at the base, acuminate at the apex, with an obtuse, or slightly

emarginate acumen; glabrous or sparsely hairy, often shining above, pinnately nerved, with 5-7 nerves on either side of the midrib; petiole much shorter than the blade, 1-3 cm, glabrous or hairy. *Flowers* fragrant, often in dense lateral and terminal inflorescences, forming large, broad panicles, which are leafy below. Peduncles and pedicels pilose; pedicels ca 3-5 mm. *Sepals* oblong to obovate, obtuse, ca 4-5 mm long, glabrous except apex and base, or sparsely pilose on the whole surface, all enlarged in fruit, oblong to spathu-



Fig. 8. *Porana volubilis* BURM. f. Cultivated at Bogor.

late, or obovate, 7–10 mm long, with 7–8 stronger longitudinal nerves. *Corolla* deeply 5-lobed, 8–10 mm long, white, glabrous or short-pilose; lobes obtuse, spreading. Stamens exserted, very unequal; filaments much longer than the anthers, inserted near the corolla-base. Ovary glabrous; style bifid with unequal branches; stigmas globose. *Capsule* broad-ovoid to globose, 3–4 mm long, mucronulate, glabrous. Seed 1, ovoid, ca 2–2½ mm long, purple-brown or black, minutely verrucose.

Distr. Burma and Indo-China to *Malaysia*: N. Sumatra, Java, Kangean Islands, Lesser Sunda Islands (Bali, Lombok, Sumbawa, Timor), Borneo, Celebes, Philippines (Luzon), Moluccas (Ambon), probably cultivated in the Bismarck Archipelago; also cultivated in India and Siam, the Malay Peninsula and elsewhere in Malaysia.

Ecol. Thickets, edges of forests, teak-forests, from sea-level to ca 200 m, occasionally higher, in Timor up to 750 m. In Java mainly in parts with a pronounced dry season.

Uses. Cultivated in gardens for ornamental purposes. A decoction of the plant is used in stimulating the afterbirth. The leaves represent one of the ingredients used in pressing *djambu hagolan* in the Principalities where they are also eaten to remove a nasty taste from the mouth.

Vern. *Kembang pêngantén*, M, *widosari*, *bidasari*, *widasantun*, *plilitan*, *angkeb*, *arus arusan*, J, *bidhasarè*, Md, *widosari*, *bila sarè*, Kangean, *bunga nasi*, Ambon, *nuit* or *nuif*, Timor, *akar lapat*, N. Borneo; Philippines: *kalabonog*, *kamuras*, Ilk.; *bridal wreath*, *white corallina*, E., *schildersverdriet*, *bruidsbloemen*, *witte bruidstranen*, D.

2. *Porana racemosa* ROXB. (Hort. Beng. 1814, 13, *nom. nud.*) Fl. Ind. ed. CAREY & WALL. 2 (1824) 41; OOSTSTR. *Blumea* 3 (1938) 91.—*P. elegans* ZOLL. Nat. Geneesk. Arch. 2 (1845) 571.

Stems twining, herbaceous, up to 10 m high, terete, in youth more or less hirsute, afterwards minutely verrucose, or glabrous. *Leaves* ovate, 2½–10 by 2½–7 cm, deeply cordate at the base, acuminate to caudate at the apex, with a blunt or acute acumen; appressed-pilose on both sides, beneath more densely than above; rarely pubescent to tomentose; palmately nerved with 7(–9) nerves from the base; petiole shorter than or as long as the blade, pilose to glabrous. *Inflorescences* paniculate, axillary, more or less widely branched, few- or many-flowered. Lower bracts leaf-like, sessile or shortly petioled, stem-clasping, glabrous or pilose; upper bracts subulate. Pedicels much longer than the sepals, 3–6, later to 10 mm long, glabrous or pilose. *Sepals* equal, linear-lanceolate, 1½–2½ mm long, sparsely pilose, all enlarged in fruit, linear-oblancoelate, obtuse and mucronulate at the apex, attenuate towards the base, up to 18 mm long, but often shorter, with 3 stronger longitudinal nerves, sparsely pilose, especially near the base. *Corolla* 5-lobed to the middle, ca 1 cm long, white with yellowish tube, glabrous; lobes spreading, rounded. Stamens included; filaments shorter than the anthers, inserted at different height in the corolla-tube. Ovary glabrous; style 1, entire, longer than the ovary; stigma clavate, 2-lobed. *Capsule* ovoid, 7–8 mm high,



Fig. 9. *Porana volubilis* BURM. f. a. Fruiting branch, × ½; b. fruit with sepals, nat. size, c. pistil.



mucronate, glabrous. Seed 1, ovoid, to 6 mm long, brownish-black to black, smooth.

Distr. SE. Asia to S. China, and *Malaysia*: Malay Peninsula (only cultivated), Java, Lesser Sunda Islands (Bali, Lombok, Sumbawa, Timor), SW. Celebes.

Ecol. Thickets, edges of secondary forests, waysides, from 400 to 1800 m, both in regions with and without a dry season.

Vern. *Tjunglar, tjunlar, tjunlu, rendeng, srintil, J, kioke, Md, snow-creeper, E, molentjes, D.*

**3. *Porana paniculata* Roxb. Pl. Corom. 3 (1819) 31; OOSTRUP. Blumea 3 (1938) 93.—Fig. 10.**

A large woody twiner with greyish tomentellous, almost downy stems. *Leaves* ovate, 4–9 by 2½–6 cm, cordate at the base, obtuse, acute, acuminate or shortly cuspidate at the apex, hairy on both surfaces, palmately nerved with 5–7 nerves from the base; nerves prominent beneath; petiole ½–2½ cm. *Inflorescences* lateral or terminal, paniculate. Flowers smaller than in the preceding species, numerous. *Sepals* linear, ca 1–1½ mm long, densely tomentellous; three of them much enlarged in fruit. *Corolla* funnel-shaped, 5–6 mm long, white, the limb shallowly lobed to crenate. Stamens included; filaments about equal in length, as long as the anthers or a little shorter, inserted near the corolla-base at about the same height. Style 1, entire, as long as or shorter than the ovary; stigma globose, lobed. Capsule ovoid-globular, ca 5 mm diam.

Distr. N. India to Upper Burma; cultivated as an ornamental in *Malaysia* and elsewhere in the tropics, occasionally run wild.

Uses. Commonly cultivated in gardens for its dense masses of white flowers; never fruiting in *Malaysia*.

Vern. *Kembang garen, M, bridal creeper, E, schildersverdriet, D.*

**4. *Porana spectabilis* KURZ, J. Bot. 11 (1873) 136; For. Fl. Burma 2 (1877) 221; CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 221; KERR, Fl. Siam. En. 3, 1 (1951) 92.**

A large woody twiner; branches fulvous-tomentose. *Leaves* ovate-oblong, up to 10 by 4½–5 cm, rounded or shallowly cordate at the base, acute or obtusish at the apex, densely puberulous, especially beneath; petiole ½–2½ cm. *Flowers* in lax racemes terminating axillary rather short branchlets. Pedicels ca 5–7 mm. *Sepals* linear-oblong, ca 5 mm long, fulvous-tomentose; 3 of them enlarged in fruit, 3½–4 cm long, oblong, obtuse, puberulous, 5-nerved at the base. *Corolla* widely funnel-shaped, nearly 2½ cm long, white, puberulous outside; limb subentire. Style entire, long,

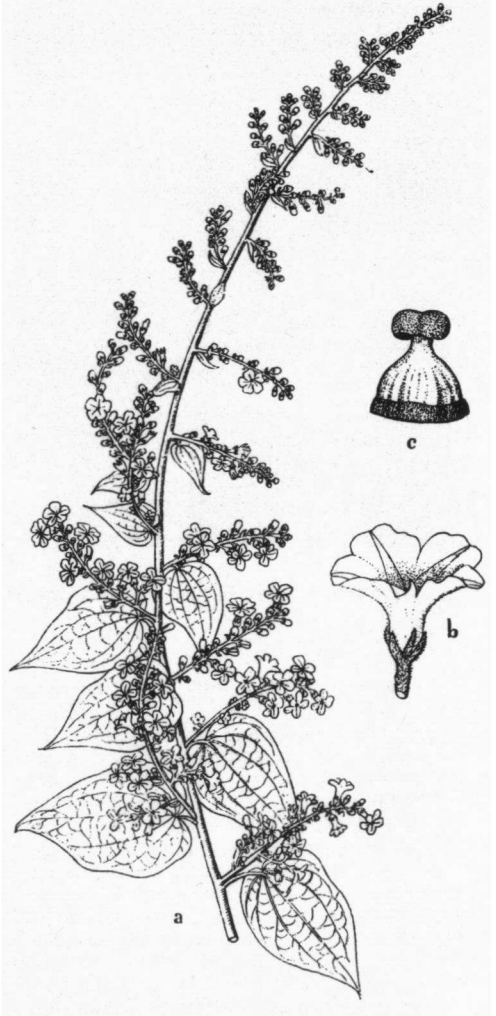


Fig. 10. *Porana paniculata* ROXB. a. Flowering branch,  $\times 1/3$ , b. flower,  $\times 3$ , c. pistil.

filiform; stigma subcapitate. *Capsule* subglobose, ca ½ cm diam.

Distr. Assam, Burma, Indo-China, and *Malaysia*: Malay Peninsula (Perak), once collected.

Note. The above description is for a considerable part derived from the literature, as the only Malaysian specimen (CURTIS *s.n.* in herb. Sing.) unfortunately is no longer at hand.

## 7. ERYCIBE<sup>1</sup>

ROXB. Pl. Corom. 2 (1798) 31, t. 159; CHOISY, Ann. Sc. Nat. II, 1 (1834) 220; G. DON, Gen. Syst. 4 (1838) 392; DC. Prod. 9 (1845) 463; B. & H. Gen. Pl. 2

(1) By R. D. HOOGLAND.

(1876) 868; CLARKE in HOOK. *f.* Fl. Br. Ind. 4 (1883) 180; PRAIN, J. As. Soc. Beng. 63,2 (1894) 83; *ibid.* 65,2 (1896) 536; HALLIER *f.* Bull. Herb. Boiss. 5 (1897) 736; PRAIN, J. As. Soc. Beng. 73,2 (1904) 14; *ibid.* 74,2 (1906) 287. — *Fissipetalum* MERR. J. Str. Br. R. As. Soc. 85 (1922) 168; SLEUM. Pfl. Fam. ed. 2, 16b (1935) 32; *ibid.* 20b (1942) 392; AIRY SHAW, Kew Bull. (1947) 22.—Fig. 11–18.

Woody climbers or creepers, sometimes straggling shrubs, rarely small trees. Older branches with orbicular to oval lenticels or with longitudinal cork-ridges. *Leaves* simple, entire, often more or less acuminate at apex; midrib distinctly prominent beneath, nerves and venation otherwise variable. Petiole short, channelled above, usually with some low longitudinal ridges and many small rather sharp transverse ridges. *Inflorescences* terminal or axillary, paniculate, rarely flowers solitary. Bracts usually minute, caducous. *Flowers* fragrant. Pedicel usually with 2, sometimes fewer or more, minute caducous bracteoles. *Sepals* 5, free, usually hairy outside except along in bud covered margins which are glabrous or at least distinctly less hairy for some breadth, allways glabrous inside, 2 outer sepals generally different in shape from 2 inner ones, third sepal for one side agreeing with 2 outer ones, for other side with 2 inner ones. *Corolla* deeply 5-lobed, tube glabrous outside, each lobe (petal) with about triangular, outside hairy, midpetaline field, and 2 lateral lobules, glabrous, rather thin, with distinct, mainly longitudinal venation, to rather thick, with indistinct venation (in dried specimens), rarely club-shaped; corolla glabrous inside except in 2. *E. praecipua*. *Stamens* 5, inserted slightly above corolla-base, with short, about triangular or laterally concave filament; anther usually obtuse to acuminate at apex, cordate at base, sometimes truncate to retuse at both ends. Pollen smooth. *Ovary* about ellipsoid, glabrous or partly to completely hairy, 1-celled, with 4 (rarely in a casual flower 5) basal ovules; stigma usually about conical, attached to the ovary in the centre for small diameter, usually with 5 or 10 longitudinal, straight, or slightly contorted ridges, rarely crown-like, funnel-shaped in centre above, attached to the ovary for nearly the whole diameter of the latter. *Fruit* a berry, generally little fleshy, ellipsoid or, rarely, obpyriform, glabrous, smooth or scurfy, or hairy; one-seeded; seed with plain or strongly folded cotyledons.

Distr. S. Japan (Yakushima), Riu-kiu Islands, Formosa, S. China, Indo-China, Siam, Burma, India, Ceylon, throughout *Malaysia*, and N. Queensland; in New Caledonia probably only introduced; erroneously reported from Micronesia. Fig. 17.

Ecol. In scrub or forests, from low altitude up to ca 1300 m altitude.

An ecologically interesting species of this genus is 12. *E. stenophylla* which belongs to the rheophytes, i.e. plants which are confined to (mostly) gravelly or rocky beds of streams subject to sudden floods. The narrow, often falcate, leaf-shape of the species confined to this remarkable ecological niche is characteristic and *E. stenophylla* perfectly fits into this group.

Another ecologically interesting species is the cauli- and ramiflorous 7. *E. ramiflora*, the single species of the genus showing this feature.

Uses. The branches are sometimes used for binding purposes; medicinal use is unimportant.

Notes. HALLIER *f.* (1897) subdivided the genus into 2 series, *Rimosae* and *Tereticaules*, mainly on account of the structure of the bark (with longitudinal cork-ridges in *Rimosae*, with lenticels in *Tereticaules*). In a great number of the species this character is clear and constant, in some species, however, it is difficult to decide to which of the two groups they belong; where necessary these species have been inserted in the key twice. In some species the bark is not known from branches of sufficient age. It is possible that an extensive anatomical analysis will provide a more reliable basis for these two groups. A remarkable feature is that the species in *Rimosae* are consistently hairy or glabrous as regards the ovary, whereas this character is not constant in several of the species belonging to the *Tereticaules*.

The *Tereticaules* are subdivided by HALLIER *f.* into 2 groups on account of the venation on the lower surface of the leaves. In the *Venulosae* the leaves are reticulately veined beneath, in the *Fibrosae* they

are rugulose by sclerotic fibres, rarely remotely reticulately veined beneath. The venation may, indeed, be a reliable character for identification, though not in *Tereticuales* only.

A character which I have used but which has not been used previously for specific distinction in *Erycibe* is the structure of the hairs, particularly those from the calyx and the midpetaline fields. The indumentum of the vegetative parts agrees with that of the calyx, though the dimensions may be slightly different. The two main types distinguished are 1) 2-branched hairs, and 2) 3- to many-branched hairs (stellate hairs). In the species with 2-branched hairs a 3-branched one may be found incidentally, similarly a 2-branched hair in some species with stellate hairs. There may be a short common trunk, which is, however, found only in few species with 2-branched hairs. Among the stellate hairs again 2 types can be distinguished: all branches may be of about the same length, or there may be one branch which is distinctly longer and stronger than the others. In some species with hairs of the latter type the difference between the branches is only slight; if necessary these species have been inserted twice in the key. If hairs of the type with one stronger branch are found on the midpetaline field, there is always a rather small number of hairs with subequal branches, mainly along the lateral margins of this field.

Most species are fairly constant in their general features, others are extremely variable (e.g. 45. *E. malaccensis* and 20. *E. terminaliflora*). Though in some cases the characters used in the key may hardly seem to warrant specific distinction of separate species, the accepted species have often a marked and constant habit by which they are easily distinguished in the herbarium, though it is extremely difficult to describe this habit clearly.

*Erycibe paniculata* ROXB. has been reported from many parts of the area of the genus. The genuine *E. paniculata* is found only in India.

#### KEY TO THE SPECIES<sup>1</sup>

1. Anthers truncate or retuse at the apex; greatest breadth of anther at or above the middle.
2. Stigma funnel-shaped in the centre above, 5-lobed at the margin, attached to the ovary for nearly the whole diameter of the latter.
3. Corolla glabrous inside. Lateral nerves and venation distinctly prominent on both sides. Anthers about as long as broad . . . . . 1. *E. sapotacea*
3. Corolla locally hirsute inside. Lateral nerves and venation hardly distinct to slightly sunken on both sides. Anthers longer than broad, at the base narrower than at the apex 2. *E. praecipua*
2. Stigma more or less conical or low-cylindric, flat or conical at the apex, often with 5 or 10 longitudinal ridges, narrowly attached to the ovary in the centre.
4. Sepals sparsely strigose outside. Pedicel *ca* 7–15 mm long, with bracteoles inserted in the lower part. Venation invisible or faintly distinct on both sides . . . . . 3. *E. pedicellata*
4. Sepals densely strigose or hirsute outside. Pedicel up to *ca* 7 mm long; bracteoles inserted immediately below the flower. Venation generally distinct on both sides.
5. Sepals outside with about equal numbers of 2- and 3-branched, up to 700  $\mu$  long hairs. Midpetaline field with 2–5-branched, up to 900  $\mu$  long hairs. Corolla *ca* 7 mm long . . . . . 4. *E. griffithii*
5. Sepals outside with predominantly 2-branched, up to 400  $\mu$  long hairs. Midpetaline field with 2- (and few 3-) branched, up to 600  $\mu$  long hairs. Corolla *ca* 5 $\frac{1}{2}$ –6 mm long. . . . . 5. *E. micrantha*
1. Anthers acute to obtuse, rarely slightly truncate at apex; greatest breadth of the anther always distinctly below the middle.
6. Lobules of the corolla club-shaped, *ca* 1 mm thick (cf. fig. 15).
7. Sepals *ca* 5–6 mm long, outside with up to 1500  $\mu$  long hairs. Ovary densely hirsute. Leaves 12–15-nerved, elliptic to obovate, bullate, glabrous above, rather densely villose-hirsute beneath. . . . . 6. *E. magnifica*
7. Sepals *ca* 2 $\frac{1}{2}$ –3 mm long, outside with up to 350  $\mu$  long stellate hairs. Ovary nearly glabrous. Leaves 4–8-nerved, obovate-oblong to oblong, more densely hairy above than beneath. . . . . 7. *E. ramiflora*
6. Lobules of the corolla membranous or fleshy, much thinner.
8. Sepals completely glabrous outside.
9. Lobules of the corolla about as long as broad or slightly longer, without distinct venation.
10. Ovary completely glabrous. Leaves 5–8-nerved, purplish when dry. Pedicel 2 $\frac{1}{2}$ –4 mm long. Midpetaline field with 2- and 3-branched hairs, branches up to 150, rarely 250  $\mu$  long. . . . . 8. *E. sargentii*
10. Ovary hirsute in upper part. Leaves 4–6-nerved, dark brown when dry. Pedicel 7–10 mm long. Midpetaline field with 2-branched hairs, branches up to 450  $\mu$  long . . . . . 9. *E. sumatrensis*
9. Lobules of corolla twice as long as broad, with distinct, mainly longitudinal venation.
11. Younger branches strigose (with 2-branched hairs), very soon glabrescent. Midpetaline field with generally 2-, few 3-branched hairs . . . . . 10. *E. albida*
11. Younger branches short-hirsute (with 3–9-branched, stellate hairs), very soon glabrescent. Midpetaline field with 3–9-branched hairs.

(1) Flowers of 51. *E. impressa* from Borneo, 52. *E. induta*, and 53. *E. zippelii* both from New Guinea, are unknown.

- 12. Hairs of midpetaline field 4-9-branched with subequal, up to 250  $\mu$  long branches. 30. *E. crassipes*
- 12. Hairs of midpetaline field 3-8-branched, partly with subequal, up to 250  $\mu$  long branches, for the greater part with one stronger, up to 500  $\mu$  long branch . . . . . 36. *E. borneensis*
- 8. Sepals sparsely to densely strigose or stellate-hirsute outside.
- 13. Flowers all solitary, axillary. Leaves ovate to lanceolate, *ca* 1 $\frac{1}{2}$ -5 $\frac{1}{2}$  by 1-2 cm. 11. *E. leucoxyloides*
- 13. Flowers in terminal and/or axillary panicles, rarely an incidental solitary flower. Leaves larger.
- 14. Leaves linear-lanceolate, about 8-10  $\times$  as long as broad . . . . . 12. *E. stenophylla*
- 14. Leaves broader, up to at most 4  $\times$  as long as broad.
- 15. Sepals outside with predominantly or exclusively 2-branched hairs.
- 16. Leaves rather sparsely to densely appressed-hairy beneath on intervenium, nerves, and midrib; indumentum long-persistent.
- 17. Inflorescences *ca* 6-10-flowered, with *ca* 1 $\frac{1}{2}$ -1 cm long axis. Leaves densely sericeous beneath . . . . . 13. *E. sericea*
- 17. Inflorescences many- (10-80)-flowered, with *ca* 2-20 cm long axis.
- 18. Leaves rather sparsely long and thinly strigose beneath . . . . . 14. *E. strigosa*
- 18. Leaves densely short-strigose beneath with subsistent indumentum 15. *E. subsericea*
- 16. Leaves glabrous beneath or at most with rather sparse (rarely rather dense) soon caducous indumentum mainly on midrib and nerves.
- 19. Midpetaline field with predominantly 3-branched, few 2- and 4-branched hairs.
- 20. Anthers obtuse, slightly truncate at apex. Hairs of calyx up to 900  $\mu$  long, generally with distinct basal trunk,  $\pm$  distant, indumentum thereby hirsutish . . . . . 16. *E. kinabaluensis*
- 20. Anthers acuminate at apex. Hairs of calyx up to 450  $\mu$  long, without distinct basal trunk, appressed, indumentum thereby strigose . . . . . 17. *E. maingayi*
- 19. Midpetaline field with predominantly 2-branched hairs, very few or no 3-branched ones.
- 21. Ovary hirsute, at least partly.
- 22. Older branches terete, with orbicular lenticels.
- 23. Intervenum rugulose, venation generally indistinct beneath. Inflorescences axillary, rather short (up to 5 cm, up to 50-flowered) . . . . . 18. *E. coriacea*
- 23. Intervenum smooth, venation generally more or less prominent beneath.
- 24. Inflorescences axillary, short (up to 5 cm, up to 15-flowered) . . . . . 19. *E. festiva*
- 24. Inflorescences terminal and axillary, longer (*ca* 4-25 cm, 10-125-flowered).
- 25. Leaves 8-12-nerved, about 4 $\frac{1}{2}$ -10 by 2-4 $\frac{1}{2}$  cm . . . . . 20. *E. terminaliflora*
- 25. Leaves 5-7-nerved, about 9-15 by 5 $\frac{1}{2}$ -9 cm . . . . . 15. *E. subsericea*
- 22. Older branches with distinct longitudinal cork-ridges.
- 26. Ovary glabrous in the lower, hairy in the upper part. Lobules of corolla about as long as broad . . . . . 21. *E. hollrungii*
- 26. Ovary hairy over the whole surface. Lobules of corolla distinctly longer than broad. 22. *E. ramosii*
- 21. Ovary glabrous.
- 27. Older branches terete, with orbicular lenticels.
- 28. Inflorescences axillary and terminal, (2 $\frac{1}{2}$ -)4-25 cm, 10-125-flowered. Lobules of the corolla not or hardly longer than broad. . . . . 20. *E. terminaliflora*
- 28. Inflorescences axillary, up to 1 $\frac{1}{2}$  cm (casually up to 3 cm), (1-2)-10-flowered. Lobules of the corolla distinctly longer than broad . . . . . 23. *E. glomerata*
- 27. Older branches with distinct longitudinal cork-ridges.
- 29. Inflorescences axillary, up to 1 $\frac{1}{2}$ , rarely an incidental one up to 3 cm long, (1-2)-10-flowered . . . . . 23. *E. glomerata*
- 29. Inflorescences axillary, sometimes also terminal, (1 $\frac{1}{2}$ -)3-25 cm long, (5-15)-125-flowered.
- 30. Nerves and venation faintly to distinctly sunken above; nerves faintly prominent to faintly sunken, venation sunken beneath. Intervenum rugulose beneath. Leaves thick-coriaceous . . . . . 24. *E. elliptilimba*
- 30. Nerves and venation faintly to distinctly prominent on both sides, rarely nerves faintly sunken above.
- 31. Axillary inflorescences 30-100-flowered, (3-8)-18 cm. Leaves *ca* 12-19 by 5-10 cm. Corolla 5 $\frac{1}{2}$ -6 mm long . . . . . 25. *E. floribunda*
- 31. Axillary inflorescences (5-10)-30-flowered, (1 $\frac{1}{2}$ -)3-8 cm. Leaves *ca* 7-12 by 3-6 cm. Corolla 6-9 $\frac{1}{2}$  mm long . . . . . 26. *E. forbesii*
- 15. Sepals outside with 3-12-branched hairs, at most with a small percentage of 2-branched ones.
- 32. Hairs of midpetaline field with subequal branches, or with some larger and some smaller branches, at most a casual hair with a single stronger and longer branch.
- 33. Venation sunken beneath. Inflorescences *ca* 20-200-flowered . . . . . 27. *E. grandifolia*
- 33. Venation more or less prominent, rarely indistinct (then inflorescences few-flowered) beneath.

34. Leaves rather densely hairy with long-persistent indumentum on whole surface beneath; leaves up to *ca* 8 by 3<sup>1</sup>/<sub>2</sub> cm . . . . . 28. *E. carrii*
34. Leaves glabrous beneath or with soon caducous indumentum; if the indumentum is rather long persistent, the leaves are much larger or the indumentum is persistent along the midrib and nerves only.
35. Ovary completely glabrous.
36. Leaves elliptic-oblong to oblong (*ca* 2–2<sup>1</sup>/<sub>2</sub> × as long as broad), bullate, when young densely hirsute along the midrib and nerves beneath. Hairs of the calyx and corolla with 250–500 μ long branches . . . . . 29. *E. bullata*
36. Leaves oblong to lanceolate-oblong (*ca* 2<sup>1</sup>/<sub>2</sub>–4 × as long as broad), flat, practically glabrous beneath. Hairs of calyx and corolla with 150–250 μ long branches 30. *E. crassipes*
35. Ovary hirsute, at least the extreme apical part, usually for the upper <sup>1</sup>/<sub>3</sub> part to the whole surface.
37. Ovary hirsute for the whole surface. . . . . 31. *E. nitidula*
37. Ovary hirsute for the upper part only, glabrous for the lower part.
38. Hairs of the midpetaline field 2–5-branched, the 2-branched ones well represented, up to 1000 μ long . . . . . 32. *E. papuana*
38. Hairs of the midpetaline field 4–8-branched, 2-branched ones completely absent.
39. Leaves rather large, *ca* 6<sup>1</sup>/<sub>2</sub>–15 by 2<sup>1</sup>/<sub>2</sub>–6 cm, more or less bullate. Species from the Malay Peninsula . . . . . 33. *E. stapfiana*
39. Leaves rather small, *ca* 4–8 by 1<sup>1</sup>/<sub>2</sub>–4<sup>1</sup>/<sub>2</sub> cm, flat. Species from E. Malaysia.
40. Anthers obtuse at apex. Indumentum beneath soon caducous. 34. *E. hellwigii*
40. Anthers acute at apex. Indumentum beneath rather long persistent along midrib and nerves . . . . . 35. *E. timorensis*
32. Hairs of the midpetaline field for an important (usually by far the greater) part with one branch distinctly longer (*ca* 1<sup>1</sup>/<sub>2</sub> × or more) and, usually, stronger than the others.
41. Older branches terete, smooth or with about orbicular lenticels, at most with very low, not-fissured, longitudinal ridges.
42. Lobules of the corolla about 1<sup>1</sup>/<sub>2</sub>–2 × as long as broad . . . . . 36. *E. borneensis*
42. Lobules of the corolla at most about as long as broad.
43. Venation distinctly impressed beneath. Midpetaline field in upper part with hairs of which one branch is stronger, in lower part only with hairs with subequal branches. . . . . 37. *E. aenea*
43. Venation slightly to distinctly prominent beneath. Hairs with one stronger branch equally distributed over the midpetaline field.
44. All sepals glabrous along their margins outside, ciliate along the whole margin. . . . . 38. *E. macrophylla*
44. Sepals glabrous outside only along in bud covered margins; ciliate only along glabrous margins.
45. Calyx outside with hairs with one distinctly stronger (*ca* 500–750 μ long) branch; indumentum yellowish- to orange-brown. Inflorescences axillary, 2–20-flowered, <sup>1</sup>/<sub>2</sub>–4 cm long. Leaves often more or less hirsute beneath. Nerves usually more or less impressed above . . . . . 39. *E. citriniflora*
45. Calyx outside with equal-branched hairs (branches up to *ca* 250 μ long); indumentum purplish-brown. Inflorescences terminal or axillary, 5–200-flowered, 1–23 cm long. Leaves (except when very young) glabrous beneath. Nerves roundly raised above. . . . . 40. *E. rheedii*
41. Older branches with distinct longitudinal cork-ridges, usually with longitudinal fissures along them.
46. Ovary glabrous.
47. Leaves 3–4-nerved (rarely a casual 5-nerved leaf). Sepals up to 3 mm long. Inflorescences terminal, many-flowered . . . . . 41. *E. expansa*
47. Leaves 5–10-nerved, if few 4-nerved leaves present then sepals 3.8–5 mm long. Inflorescences usually axillary, rather few-flowered.
48. Lobules of corolla about 1<sup>1</sup>/<sub>2</sub>–2 times as long as broad. Two outer sepals up to 2<sup>1</sup>/<sub>2</sub> mm long. Inflorescences clustered, without a distinct central axis . . . . . 36. *E. borneensis*
48. Lobules of corolla at most slightly longer than broad. Two outer sepals 2<sup>1</sup>/<sub>2</sub>–5 mm long. Inflorescences, though often short, with a distinct central axis.
49. Sepals sparsely hirsute outside; indumentum distinctly red-tinged (in dried state). Lobules of corolla coherent above the midpetaline field for 1–1<sup>1</sup>/<sub>2</sub> mm. 42. *E. tomentosa*
49. Sepals densely hirsute outside; indumentum generally yellowish to, rarely, brownish, never red-tinged (in dried state). Lobules of corolla not or hardly coherent above midpetaline field.
50. Stigma strongly warty. Two outer sepals 3.8–5 mm long. Indumentum on lower side of leaves often rather long persistent . . . . . 43. *E. grandiflora*

- 50. Stigma smooth or only slightly warty (only with 5 or 10 round longitudinal ridges). Two outer sepals 2 1/2-4 mm long. Indumentum on lower side of leaves soon caducous.
- 51. Leaves 8-10-nerved. 2 outer sepals 2.5-2.6 mm long. Inflorescences short, 1-2 cm long. Indumentum of sepals brownish (in dried state). Anthers 2.2-2.3 mm long. 44. *E. beccariana*
- 51. Leaves 4-6(-7)-nerved. Two outer sepals 3-4 mm long. Inflorescences generally longer, 1 1/2-10(-16) cm long. Indumentum of the sepals yellowish (in dried state). Anthers 1.3-1.8 mm long . . . . . 45. *E. malaccensis*
- 46. Ovary hirsute, at least for extreme apical part, usually for the upper 1/3 part to the whole surface.
- 52. Stamens acute to obtuse at apex, without distinct sterile acumen.
- 53. Two outer sepals oval, 2 inner ones about orbicular to transverse-oval 34. *E. hellwigii*
- 53. All sepals broader than long, often the 2 outer ones more so than the 2 inner.
- 54. Leaves distinctly glossy above. Nerves and venation generally sunken above. 46. *E. clemensae*
- 54. Leaves dull, glaucous above. Nerves and venation generally prominent above. 35. *E. timorensis*
- 52. Stamens acuminate at apex, with distinct 0.3-0.7 mm long sterile acumen.
- 55. Ovary hairy for whole surface. Part of bracts leaf-like, up to 12 mm long 47. *E. schlechteri*
- 55. Ovary hairy in the upper, glabrous in the lower part. Bracts minute, up to ca 3 mm long.
- 56. Indumentum on lower side of leaves long-persistent along the midrib 48. *E. puberula*
- 56. Indumentum on lower side of leaves soon caducous.
- 57. Inflorescences rather many (up to ca 50)-flowered. Corolla ca 5 1/2 mm long. 32. *E. papuana*
- 57. Inflorescences few (up to ca 12)-flowered. Corolla ca 8 mm long.
- 58. Larger hairs of midpetaline field mainly 2-branched, few of them 3-branched. 49. *E. brassii*
- 58. Larger hairs of midpetaline field (3-)-4-6-branched . . . . . 50. *E. subglabra*

1. *Erycibe sapotacea* HALLIER f. & PRAIN ex PRAIN, J. As. Soc. Beng. 73, 2 (1904) 16; *ibid.* 74, 2 (1906) 293; RIDL. Fl. Mal. Pen. 2 (1923) 447.—Fig. 11.

Scandent shrub, younger branches strigose, older ones with longitudinal cork-ridges. *Leaves* coriaceous, elliptic-oblong, 7-20 by 3 1/2-10 cm, 6-10-nerved; obtuse to rounded, often short-acuminate at the apex, obtuse to rounded at the base; glabrous on both sides; with slightly sunken midrib and slightly prominent nerves above; with prominent nerves and venation beneath. Petiole 8-14 mm. *Inflorescences* axillary, up to 1 1/2 cm, up to 10-flowered. Flowers known only from buds. Pedicel 1-2 mm. *Sepals* 1 & 2 broad-ovate, 2.7 by 3 mm, 4 & 5 transverse-oval, distinctly retuse at apex, 2.5 by 3.2 mm; rather densely strigose outside (hairs 2-branched, up to 400 μ total length). *Corolla* 7 1/2 mm, tube 2 1/2 mm; midpetaline field 3 1/2 by ca 2 mm, densely hirsute (hairs (2-)-3(-4)-branched, up to 500 μ total length); lobules 2 by 2 mm, rather thick, without distinct venation. *Stamens* inserted 0.7 mm above the corolla-base; filament 1.3 mm long, 0.5 mm broad at base; anther 0.7 mm long, 0.7 mm broad, 0.5 mm thick, truncate at apex and base. *Ovary* 2.8 by 1.7 mm, glabrous; stigma funnel-shaped, not sharply separated from the ovary, 5-lobed at the margin, the lobes decurrent as longitudinal ridges on the ovary. *Fruits* 1 or 2 together, axillary, on strongly thickened, up to 1 1/2 cm long, 3-5 mm thick stalk which is partly pedicel, partly peduncle; fruit ovoid, 45 by 22 mm, acutish at the apex, rounded at the base, probably little fleshy. Cotyledons strongly folded.

Distr. *Malaysia*: Malay Peninsula (Penang Island).

Ecol. At 350 m altitude; *fl.* March, *fr.* March, July, and Aug.

2. *Erycibe praecipua* PRAIN, J. As. Soc. Beng. 63, 2 (1894) 86; *ibid.* 74, 2 (1906) 294; RIDL. Fl. Mal. Pen. 2 (1923) 447.—Fig. 12.

KEY TO THE SUBSPECIES

- 1. Leaves (3-)-5-11 by (1 1/2-)-2 1/2-5 cm, 4-5-nerved. Petiole 5-10 mm. Inflorescences up to 2 cm long. Pedicel 2-5 mm . . . *ssp. praecipua*
- 1. Leaves 10-15 by 4 1/2-7 1/2 cm, 5-7-nerved. Petiole 9-15 mm. Inflorescences up to 5 cm long. Pedicel 5-15 mm . . . *ssp. borneensis*

*ssp. praecipua*.—Fig. 12a-b.

Large climbing shrub, younger branches rather sparsely strigose, older ones with longitudinal cork-ridges. *Leaves* coriaceous, elliptic-oblong, (3-)-5-11 by (1 1/2-)-2 1/2-5 cm, 4-5-nerved; obtuse to rounded, often slightly acuminate at the apex, obtuse at the base; glabrous, with slightly sunken midrib and faintly prominent nerves and venation above; glabrous, with slightly prominent nerves and faintly prominent venation beneath. Petiole 5-10 mm. *Inflorescences* axillary, up to 2 cm, (1-)-2-9-flowered. Pedicel 2-5 mm. *Sepals* subequal, broadly ovate or orbicular to transverse-oval, 1.8-2 by 1.9-2.5 mm, sparsely strigose outside (hairs with 2 branches, up to 300 μ total length). *Corolla* 7 mm, tube 1.7-2 mm; midpetaline field 3.5-3.8 by 1.6-2.2 mm, rather densely hirsute outside (hairs with 2(-4) branches, up to 400 μ total length); lobules 1.8 by 1.5 mm, with not or slightly visible venation, entire; coherent above midpetaline field for 1-1.5 mm; shortly villose-hirsute inside from 1.5 to 4 mm above the corolla-base. *Stamens* inserted

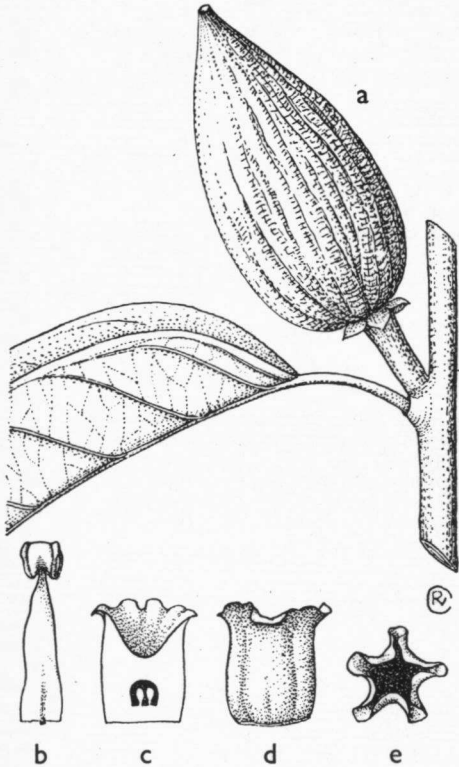


Fig. 11. *Erycibe sapotacea* HALLIER f. & PRAIN ex PRAIN. *a.* Fruit, nat. size, *b.* stamen,  $\times 10$ , *c.* ovary, longitudinal section,  $\times 5$ , *d.* ovary, lateral view,  $\times 5$ , *e.* stigma, from above,  $\times 5$ .

0.7–1.2 mm above the corolla-base; filament 0.3–0.4 mm long, 0.2 mm broad at the base; anther 0.7–0.8 mm long, 0.6–0.7 mm broad near the apex, 0.4–0.5 mm near the base, 0.4–0.5 mm thick, truncate at both ends. *Ovary* 1–1.2 by 0.9–1.2 mm, glabrous; stigma crown-like with 5- or 10-lobed margin, funnel-shaped in centre above, with 5 or 10 longitudinal ridges. *Fruit* ellipsoid, 18 by 12 mm, glabrous, smooth. Cotyledons strongly folded.

*Distr. Malaysia:* Malay Peninsula (Penang, Perak), at 150–600 m.

*ssp. borneensis* HOOGL. Blumea 7 (1953) 315.— Fig. 12c.

Differs from *ssp. praecipua* by the following characters: Liana, 30 m long; older branches at first with sharp longitudinal ridges, later on with lenticels on these ridges. *Leaves* 10–15 by 4½–7½ cm, 5–7-nerved. *Petiole* 9–15 mm. *Inflorescences* up to 5 cm long. *Pedicel* 5–15 mm. *Sepals* 1 & 2 measure 2.8–3 by 2.8–3, sepals 4 & 5 are 2.7–2.8 by 2.8–3.3 mm. *Corolla* 8 mm; midpetaline field 4.5 by 2.8 mm, densely stellate-hirsute outside (hairs with 3–7 subequal up to 250  $\mu$  long branches); lobules 2–2.5 by 1.5–2 mm. *Stamens* in-

serted 1.5 mm above the corolla-base; filament 0.5 mm long, 0.3 mm broad at the base; anther 1.2 mm long. *Ovary* 1.5 mm through.

*Distr. Malaysia:* Borneo (Kinabalu), once collected, at 1200 m.

### 3. *Erycibe pedicellata* RIDL. ex HOOGL. Blumea 7 (1953) 315.

Scandent shrub, younger branches sparsely strigose, older ones with distinct longitudinal cork-ridges. *Leaves* coriaceous, oblong, 6–12 by 2–4½ cm, 4–6-nerved; obtuse to rounded, often slightly acuminate at the apex, obtuse at the base; glabrous except very sparsely strigose, soon glabrescent midrib on both sides; with slightly sunken midrib, faintly prominent nerves and hardly distinct venation above; with faintly prominent nerves and hardly distinct venation beneath. *Petiole* 7–12 mm. *Inflorescences* axillary, about fasciculate, up to 2½ cm, (1–)2–5-flowered. Flowers known only from buds. *Pedicel* 7–15 mm. *Sepals* transverse-oval, 2 by 2½ mm, sparsely strigose outside (hairs with 2 branches, up to 500  $\mu$  total length). *Corolla* 6 mm, tube 2 mm; midpetaline field 2.6 by 1.8 mm, rather densely appressed-hairy (hairs with 2–4 subequal up to 450  $\mu$  long branches); lobules 2 by 1.3 mm, without distinct venation, entire. *Stamens* inserted 1.3 mm above the corolla-base; filament 0.3 mm long, ca 0.3 mm broad at the base; anther 0.5 mm long, 0.8 mm broad, 0.4 mm thick, truncate, slightly retuse at apex and base. *Ovary* 1.6 by 1 mm, glabrous; stigma conical, with 5 faint longitudinal ridges. *Fruit* unknown.

*Distr. Malaysia:* Borneo (Sarawak), once collected.

*Note.* The species resembles *E. praecipua* PRAIN *ssp. borneensis* HOOGL., from which it differs by the glabrous inner side of the corolla, the shape of the anthers (broader than long), and the conical (not funnel-shaped) stigma.

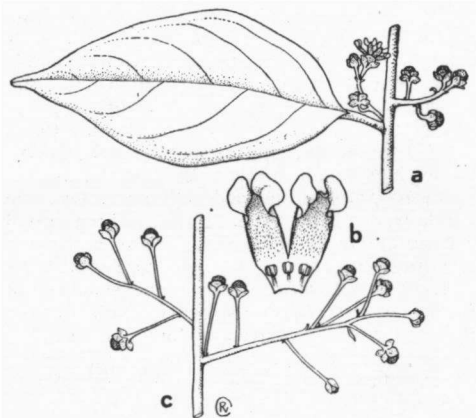


Fig. 12. *Erycibe praecipua* PRAIN. *a.* Flowering branch of *ssp. praecipua*,  $\times 2/3$ , *b.* 2 corolla-lobes from inside,  $\times 2$ , *c.* inflorescences of *ssp. borneensis* HOOGL.  $\times 2/3$ .

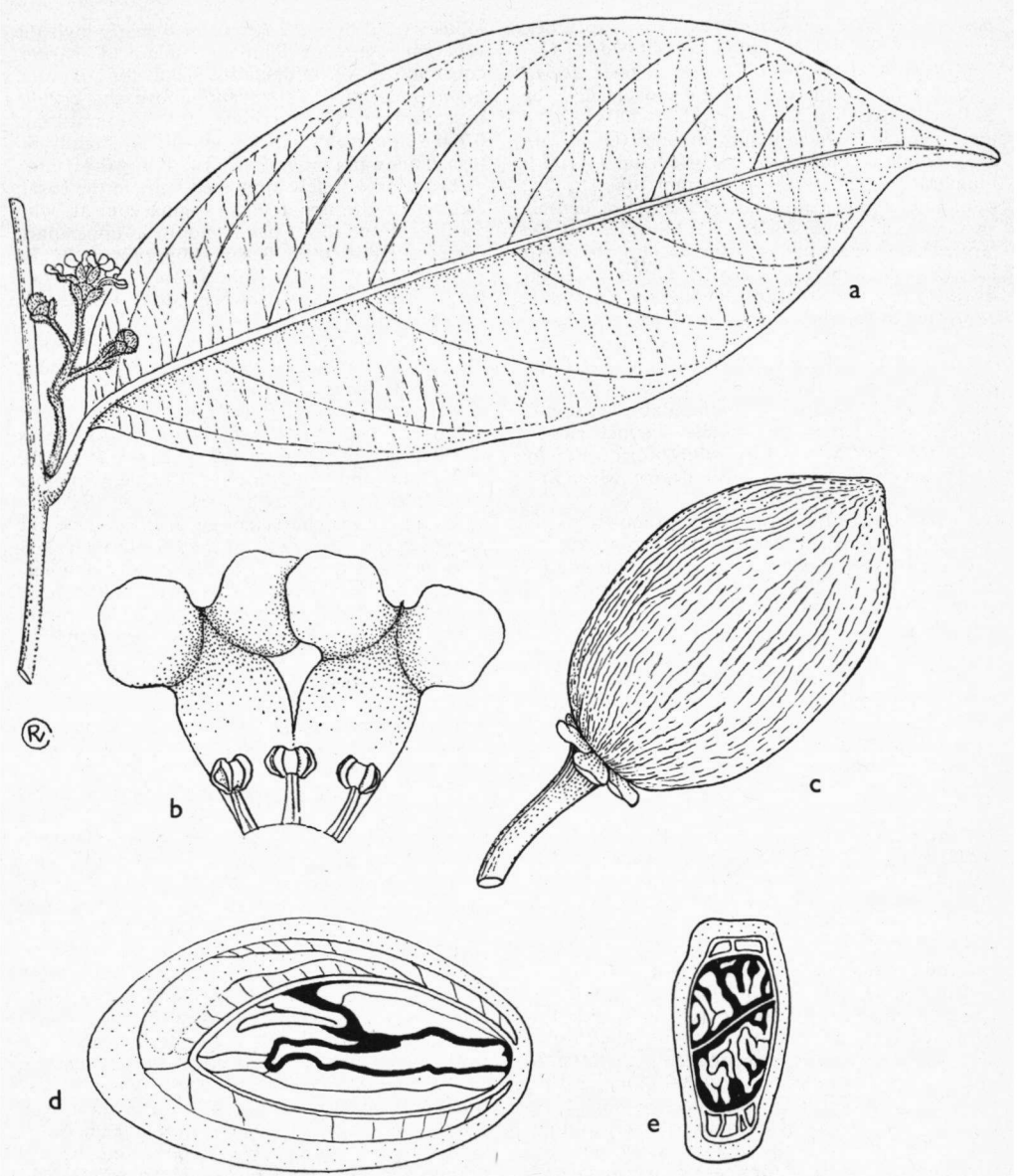


Fig. 13. *Erycibe griffithii* CLARKE. a. Flowering branch, nat. size, b. corolla-lobes from inside,  $\times 5$ , c. fruit,  $\times 1\frac{1}{2}$ , d. fruit in longitudinal, e. in transverse section,  $\times 2$ .

4. *Erycibe griffithii* CLARKE in HOOK. f. Fl.Br. Ind. 4 (1883) 182; PRAIN, J. As. Soc. Beng. 63, 2 (1894) 85; *ibid.* 74, 2 (1906) 295 p.p.; RIDL. Fl. Mal. Pen. 2 (1923) 447 p.p.; KERR, Fl. Siam. En. 3 (1951) 96.—*E. cupreum* GAGNEP. Not. Syst. 14 (1950) 27.—Fig. 13.

Scandent shrub (rarely tree?), up to 30 m long, 15 cm diam., younger branches stellate-hirsute, older ones with longitudinal ridges, often together

with small lenticels. *Leaves* coriaceous, elliptic to oblong, ovate-oblong, or obovate-oblong, 7–14 by  $2\frac{1}{2}$ –8 cm, 5–8-nerved; acuminate at the apex, acute to obtuse or rounded at the base; glabrous, with slightly to faintly prominent midrib, nerves, and venation above; glabrous (or sparsely stellate-hirsute near petiole, glabrescent), with distinctly prominent nerves and distinct, but usually hardly raised venation beneath. *Petiole* 7–14 mm. *In-*



*Inflorescences* axillary, sometimes 2 or 3 together, up to 3½ cm, (1–)3–±10-flowered. Pedicel (2–) 3–6(–7) mm, distinctly thickened in fruit. *Sepals* 1 & 2 broad-ovate or triangular-ovate, 2–3 by 2–3 mm, 4 & 5 transverse-oval, 2–2.8 by 2.7–4 mm, densely stellate-hirsute outside (hairs with 2–3, generally more or less curled, up to 600 µ long branches). *Corolla* white, 7 mm, tube 1½–2½ mm; midpetaline field 3½–4 by 2–2½ mm, densely stellate-hirsute (hairs with 2–5 branches, in the larger hairs generally one longer, up to 600 µ long branch); lobules 2–2.8 by 2–2.5 mm, without distinct venation, entire or slightly crenulate, coherent above midpetaline field for ½–1 mm. *Stamens* inserted 1–1½ mm above the corolla-base; anther sessile, 0.4–0.5 mm long, 0.7–0.8 mm broad, 0.5 mm thick, slightly retuse at apex and base. *Ovary* 1½–2 by 1–1½ mm, glabrous; stigma conical, with 10 more or less distinct ridges. *Fruit* probably little fleshy, obpyriform, 3½ by 2 cm, scurfy outside, greyish brown when dry. Cotyledons strongly folded.

*Distr.* Lower Burma (Mergui), Indo-China, in *Malaysia*: Peninsular Siam, Malay Peninsula.

*Ecol.* In (primary?) forests at low altitude (in *Malaysia* up to 200 m), in Indo-China up to 1000 m alt. *Fl.* (Malay Peninsula) Feb.–Apr., fr. June–Oct.

*Notes.* *Erycibe maingayi* CLARKE was reduced to the present species by PRAIN and RIDLEY. It is, however, specifically distinct, though habitually resembling the present species.

The species is closely related to *E. micrantha* HALLIER *f.*, which has also been reduced to it in recent times; *cf.* under that species.

5. *Erycibe micrantha* HALLIER *f.* Bot. Jahrb. 16 (1893) 524.—*E. griffithii* (non CLARKE) MERR. En. Philip. 3 (1923) 358.—*E. lateraliflora* ELM. Leaf. Philip. Bot. 5 (1913) 1767; MERR. Philip. J.Sc. Bot. 11 (1917) 309.—*E. javanica* K. & V. Bijdr. Booms. Java 13 (1914) 37; OOSTSTR. in BACK. Bekn. Fl. Java (em. ed.) 8 (1949) fam. 191, 9.

Climber, up to 16 m high, 10 cm diam., younger branches densely strigose, older ones with low cork-ridges, sometimes together with small orbicular lenticels. *Leaves* subcoriaceous, elliptic to oblong, ovate-oblong, or obovate-oblong, 7–12½ (–20) by 2½–6(–10) cm, 6–9-nerved; slightly to distinctly acuminate at the apex, obtuse to rounded at the base; sparsely strigose, very soon glabrescent, with slightly prominent midrib and nerves and faintly raised venation above; sparsely strigose, very soon glabrescent, with prominent nerves and faintly prominent venation beneath. Petiole 7–10(–14) mm. *Inflorescences* axillary, sometimes 2 together, 2–4 cm, 5–10(–15)-flowered. Pedicel 2–7 mm, thickened in fruit. *Sepals* 1 & 2 broadly ovate or triangular-ovate, 1.7–2.2 by 1.8–1.9 mm, 4 & 5 transverse-oval, 1.6–2 by 2.4–3 mm, rather densely strigose outside (hairs with 2 branches, up to 450 µ total length). *Corolla* 5½–6 mm, tube 1½ mm; midpetaline field 2.5–3 by 1.7–2 mm, densely appressed-hairy (hairs mainly with 2, few with 3–4 branches, up to 750 µ total length);

lobules 1.5–2 by 1.7–2.2 mm, with nearly invisible venation, entire or faintly crenulate at margin, coherent above midpetaline field for ½ mm. *Stamens* inserted 1–1½ mm above the corolla base; anther nearly sessile, 0.4–0.5 mm long, 0.7–0.8 mm broad, 0.5–0.6 mm thick, slightly retuse at apex and base. *Ovary* 1.2–1.5 by 0.8–1 mm, glabrous or with few appressed hairs in the basal, central, or the upper part; stigma conical, with 5 ridges in the lower part, smooth in upper part. *Fruit* probably little fleshy, obpyriform, 22 by 14 mm, scurfy outside, yellow (once noted) when fresh, greyish brown when dry. Cotyledons strongly folded.

*Distr. Malaysia*: Sumatra, Java, Borneo, Philippines, Moluccas (local in all these islands).

*Ecol.* In forests up to 800 m.

*Vern. Alor ilisawali* (Simalur).

*Notes.* The ovary is hairy except in ELMER 12750 (type of *E. lateraliflora* ELM.) from the Philippines and DIEPENHORST 3692 from Sumatra which possess glabrous ovaries.

Except by the characters given in the key, the present species differs from the closely related *E. griffithii* CLARKE in the generally laxer inflorescences and the flowers, which are smaller in all parts. The differences are slight, but in view of the general constancy of the characters of the hairs on calyx and corolla it is for the present retained as a species.

6. *Erycibe magnifica* PRAIN, J. As. Soc. Beng. 73, 2 (1904) 18; *ibid.* 74, 2 (1906) 289; RIDL. Fl. Mal. Pen. 2 (1923) 445.

Strong and slender creeper or climber, up to 35 m long, stem up to 7½ cm diam., younger branches densely stellate-hirsute, older ones with low cork-ridges and without or with few oval lenticels. *Leaves* rigidly coriaceous, elliptic to obovate, 9–23 by 5–12½ cm, 12–15-nerved; rounded at the apex, obtuse to rounded, somewhat cordate at the base, with recurved margin; glabrous, with sunken midrib, nerves, and venation above; rather densely villose-hirsute, with slightly raised nerves and slightly sunken to faintly raised venation beneath. Petiole 7–12 mm. *Inflorescences* axillary, sometimes 2–4 together, up to 4 cm, up to 12-flowered. Pedicel 3–5 mm. *Sepals* 1 & 2 broadly ovate, 6 by 6½ mm, 4 & 5 transverse-oval, 5 by 6 mm; densely stellate-hirsute outside (hairs with long and strong, up to 1500 µ long, central branch and 2–5 small, up to 100 µ long, basal branches). *Corolla* dark yellow, 10 mm, tube 4 mm; midpetaline field 6 by 4 mm, densely appressed-hairy (hairs with long and strong, up to 2000 µ long, central branch and 1–3 small, up to 50 µ long, basal branches). Lobules club-shaped, 2½ by 2 mm, near the apex 1.4 mm broad and 1 mm thick. *Stamens* inserted 2½ mm above the corolla-base; filament ½ mm long, 0.8 mm broad at the base; anther 0.8 mm long, 0.9 mm broad, 0.5 mm thick, obtuse at the apex, slightly cordate at the base. *Ovary* 1 by 1½ mm, densely hirsute; stigma conical, warty over the whole surface, with 5 faint ridges. *Fruit* flattened-ellipsoid, 29 by 24 by 19

mm, densely hirsute with up to 2 mm long hairs. Cotyledons plain.

Distr. *Malaysia*: Malay Peninsula (Perak), rare.

Ecol. In open or dense jungle at 250 m.

7. *Erycibe ramiflora* HALLIER f. Ann. Jard. Bot. Btzig 14 (1897) 352, *nomen semi-nudum*; Bull. Herb. Boiss. 5 (1897) 743.—*E. cauliflora* HALLIER f. ex COSTERUS & J. J. S. Ann. Jard. Bot. Btzig 19 (1904) 160, t. 23 f. 68 (teratology), *sphalm.*—Fig. 14–15.

Subarborescent, trunk up to 12 cm diam., younger branches stellate-hirsute, older ones with large transverse lenticels. *Leaves* thick, rigidly coriaceous, obovate-oblong to oblong, 6–14 by 3–6 cm, 4–8-nerved; slightly acuminate at the apex, acute to obtuse (or rounded) at the base; densely stellate-hirsute, soon glabrescent, with slightly prominent midrib and nerves and faintly prominent to indistinct venation above; less densely stellate-hirsute, soon glabrescent, with slightly prominent nerves and faintly prominent to indistinct venation beneath. Petiole 3–5 mm. *Inflorescences*

terminal, in basal part leafy, axillary, or cauline. Pedicel 2–4 mm; bracteoles up to 3 mm long. *Sepals* 1 & 2 broadly ovate, 2.3–2.5 by 3.2–3.3 mm, 4 & 5 transverse-oval, 2.5–2.8 by 3–3.5 mm, stellate-hirsute outside (hairs with 3–5 subequal, up to 350  $\mu$  long branches). *Corolla* pale yellowish, 7½–8 mm, tube 2 mm; midpetaline field 5 by 3 mm, densely appressed-hairy (hairs with strong, up to 1000  $\mu$  long central branch and 1–3 small, up to 150  $\mu$  long basal branches); lobules club-shaped, 2.5 by 1.7 mm, near the apex 1 mm broad and thick. *Stamens* inserted 1 mm above the corolla-base; filament 0.3 mm long, 0.6 mm broad at the base; anther 1 mm long, 0.7 mm broad, 0.4 mm thick, acuminate (sterile acumen 0.3 mm) at the apex, slightly cordate at the base. *Ovary* 1.2 by 0.7 mm, glabrous except few hairs immediately below the stigma; stigma conical, warty, without distinct ridges. *Fruit* unknown.

Distr. *Malaysia*: Sumatra (E. Coast), known only from a TEYSMANN-collection, since cultivated at Bogor.

Note. The species is strongly characterized by the shape and peculiar position of the lobules of the corolla, which are found also in *E. magnifica* PRÄHN. The present species is the only one in the genus from which typically cauline inflorescences are known.



Fig. 14. *Erycibe ramiflora* HALLIER f. Cultivated specimen in the Botanic Gardens, Bogor (H. HALLIER).

8. *Erycibe sargentii* MERR. Philip. J.Sc. Bot. 13 (1918) 56; En. Philip. 3 (1923) 359.

Large scandent shrub, branches glabrous, older ones with many lenticels. *Leaves* coriaceous, oblong, 6–18 by 2½–8 cm, 5–8-nerved; acute to acuminate at the apex, acute to obtuse or rounded at the base; glabrous on both sides; with slightly sunken midrib, slightly prominent to faintly sunken nerves, and faintly prominent to indistinct venation above; with slightly prominent nerves, faintly prominent to indistinct venation beneath. Petiole 8–14 mm. *Inflorescences* terminal, in basal part sometimes with some leaves, or axillary, 2½–10 cm, 10–100-flowered. Pedicel 2½–4 mm. *Sepals* 1 & 2 orbicular, 3 by 3 mm, 4 & 5 transverse-oval, 2.7–2.8 by 3.2–3.9 mm, glabrous outside. *Corolla* white or pale yellowish, 12–12.5 mm, tube 2–3 mm; midpetaline field 7–7.5 by 3.5–3.8 mm, densely appressed-hairy (hairs with 2–3(4) subequal up to 250  $\mu$  long branches); lobules 5–6.5 by 5–6 mm, without distinct venation, entire or slightly undulate at margin. *Stamens* inserted 1–1.5 mm above the corolla-base; filament 0.8–1 mm long, 0.8–0.9 mm broad at the base; anther 2.5–2.8 mm long, 0.9–1 mm broad, 0.5–0.6 mm thick, acuminate (sterile acumen 1 mm) at the apex, cordate at the base. *Ovary* 2–2.5 by 1.6–1.8 mm, glabrous; stigma conical, with 10 distinct ridges. *Fruit* ellipsoid, 2 by 1.5 cm, glabrous, smooth.

Distr. *Malaysia*: Philippines (Luzon, Panay, and Mindanao).

Ecol. On forested slopes at low altitude; fl. Feb.–May.

Note. Practically glabrous; few short (up to 200  $\mu$  long) 2-branched hairs are found on the

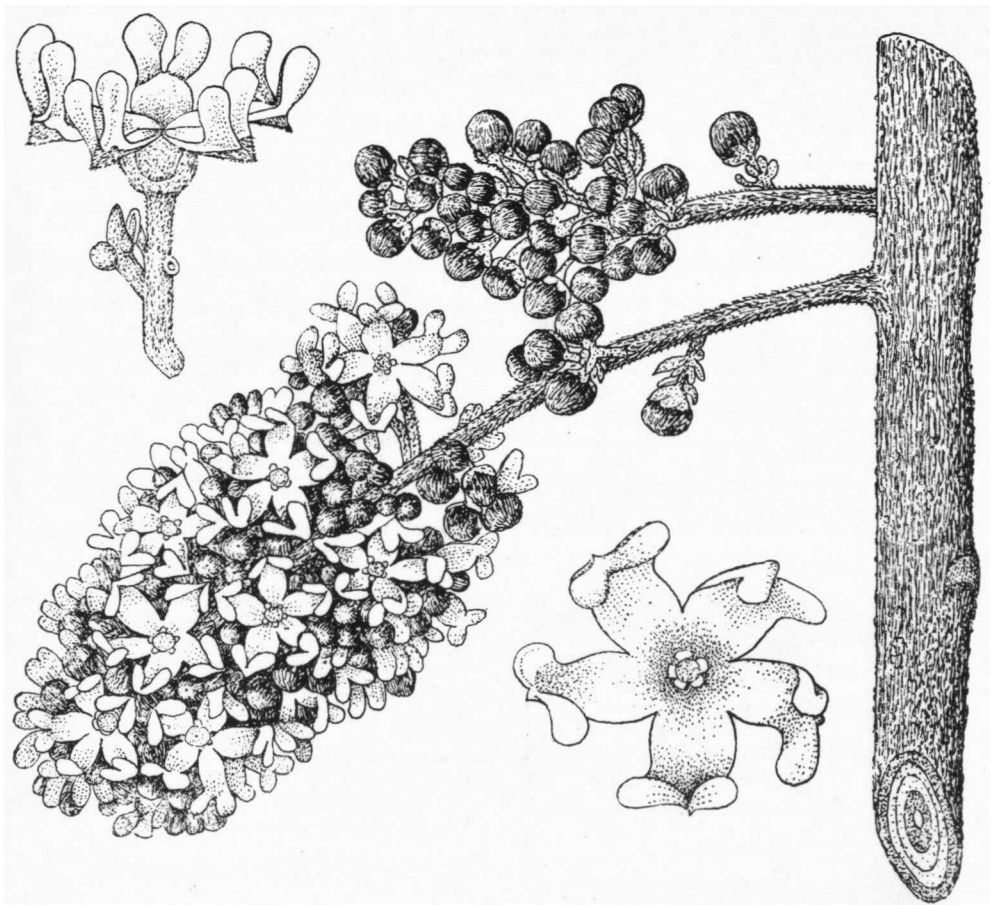


Fig. 15. *Erycibe ramiflora* HALLIER f. Cauline inflorescences and lateral and apical view of flowers, resp.  $\times 1\frac{1}{2}$  and  $\times 3$ .

branches of the inflorescences and on the basal part of the pedicels only. The indumentum of the midpetaline field is, however, rather dense.

9. *Erycibe sumatrensis* MERR. Pap. Mich. Acad. Sc. 19 (1934) 190.

Scandent shrub, branches sparsely strigose, older ones terete, with many lenticels. *Leaves* subcoriaceous, oblong, 8–12½ by 2½–5 cm, 4–6-nerved; acuminate at the apex, acute (to obtuse) at the base; glabrous, with slightly sunken midrib, slightly prominent nerves, and faintly prominent venation above; glabrous, with slightly prominent nerves, and faintly prominent venation beneath. Petiole 10–20 mm. *Inflorescences* axillary, 3–9 cm, 3–25-flowered. Flowers fragrant. Pedicel 7–10 mm. *Sepals* 1 & 2 broad-ovate, 3 by 3.2–3.5 mm, 4 & 5 transverse-oval, 3 by 3.8–4 mm, glabrous outside. *Corolla* white, 12–14 mm, tube 3 mm; midpetaline field 6–8 by 3–4 mm, densely appressed-hairy (hairs 2-branched, up to 600  $\mu$  total length); lobules 5–6 by 4–5 mm, rather

thick, without distinct venation, slightly crenate at margin. *Stamens* inserted 1.7 mm above the corolla-base; filament 0.7 mm long, 0.5 mm broad at the base; anther 1.6 mm long, 0.8–0.9 mm broad, 0.6 mm thick, acuminate (sterile acumen 0.6 mm) at the apex, slightly cordate at the base. *Ovary* 1.4 by 0.8–1.3 mm, glabrous in the lower 0.8 mm, hairy in the upper part; stigma conical, with 5 distinct ridges. Fruit unknown.

*Distr.* *Malaysia*: Sumatra (Asahan), once collected.

*Ecol.* Edge of swamp forest.

10. *Erycibe albida* PRAIN, J. As. Soc. Beng. 63, 2 (1894) 87.—*E. glomerata* (non BL.) PRAIN, J. As. Soc. Beng. 74, 2 (1906) 294; RIDL. Fl. Mal. Pen. 2 (1923) 447; KERR, Fl. Siam. En. 3 (1951) 94.—*E. glomerata* var. *typica* PRAIN, J. As. Soc. Beng. 74, 2 (1906) 294.—*E. glomerata* var. *longifolia* (non BL.) PRAIN, J. As. Soc. Beng. 74, 2 (1906) 295; RIDL. Fl. Mal. Pen. 2 (1923) 448.

Shrub or small tree, up to 6 m by 7½ cm.

Branches strigose, older ones with faint longitudinal ridges and few oval lenticels. *Leaves* subcoriaceous, narrowly oblong to oblong or oblanceolate, (9-)14-22(-40) by (3-)4 $\frac{1}{2}$ -8(-12 $\frac{1}{2}$ ) cm, 8-12 (-16)-nerved; acute, generally slightly acuminate at the apex, obtuse to broadly acute at the base; glabrous, with sunken midrib, faintly prominent nerves and major venation, and indistinct minor venation above; glabrous with slightly prominent nerves and indistinct venation beneath. Petiole (5-)10-15(-20) mm. *Inflorescences* axillary, up to 1 cm long, (1-)2-4(-10)-flowered. Pedicel 1-3 mm, with rather broad bracteoles. *Sepals* 1 & 2 orbicular, 2-3 $\frac{1}{2}$  by 2-3 $\frac{1}{2}$  mm., 4 & 5 transverse-oval, 2.2-3 $\frac{1}{2}$  by 2 $\frac{1}{2}$ -4 mm, glabrous outside. *Corolla* white, 12-14 mm, tube 2-4.5 mm; mid-petaline field 4.5-5 by 1.8-2 mm, rather densely appressed-hairy (hairs 2-, few 3-branched, up to 600  $\mu$  total length); lobules 5 $\frac{1}{2}$ -6 by 3-3 $\frac{1}{2}$  mm, rather thin, with distinct venation, entire or minutely crenate-serrate at the margin, coherent above the midpetaline field for  $\frac{1}{2}$  mm. *Stamens* inserted 0.7-2 mm above the corolla-base; filament 1.5-1.7 mm long, 0.4-0.6 mm broad at base; anther 1.5-1.8 mm long, 0.5-0.9 mm broad, 0.4-0.6 mm thick, broadly acute at the apex, cordate at the base. *Ovary* 1.8-2.2 by 0.8-0.9 mm, glabrous; stigma conical, with 5 faint to distinct ridges. Fruit unknown.

*Distr. Malaysia:* Peninsular Siam, Malay Peninsula.

*Ecol.* In forests, up to 900 m alt., *fl.* Sept.-March.

*Note.* Closely related to *E. glomerata* BL., differing primarily by the completely glabrous (except the ciliate margins) sepals.

11. *Erycibe leucoxyloides* KING ex PRAIN, J. As. Soc. Beng. 73, 2 (1904) 16; *ibid.* 74, 2 (1906) 292; RIDL. Fl. Mal. Pen. 2 (1923) 446.

Slender low bushy climber, younger branches stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* rather thick, ovate to lanceolate, 16-55 by 10-20 mm, 3-5-nerved; rounded-obtuse to acuminate at the apex, rounded to slightly cordate at the base; stellate-hirsute, soon glabrescent, with slightly sunken midrib and indistinct nerves and venation above; stellate-hirsute, soon glabrescent, with faintly prominent to indistinct nerves and indistinct venation beneath. Petiole 1 $\frac{1}{2}$ -6 mm. *Flowers* solitary, axillary. Pedicel 2-4 mm with ca 5-10 bracteoles; bracteoles oval (upper ones), 2 $\frac{1}{2}$  by 2 mm, to lanceolate (lower ones), 2 $\frac{1}{2}$  by 0.8 mm. *Sepals* subequal, broadly ovate to orbicular, 3 by 3.3 mm, rather thin, sparsely stellate-hirsute (hairs with 4-5 subequal up to 250  $\mu$  long branches), glabrous along all margins outside. *Corolla* 8 mm, tube 3 mm; midpetaline field 3 by 1 $\frac{1}{2}$  mm, rather densely appressed-hairy (hairs with (2-)3-5(-6) branches, one stronger and longer up to 1000  $\mu$  long); lobules 3 $\frac{1}{2}$  by 3 mm, rather thin, with distinct venation, entire. *Stamens* inserted 0.3 mm above the corolla-base; filament 0.7 mm long, 0.3 mm broad at the base; anther 1.2 mm long, 0.5 mm

broad, 0.3 mm thick, acuminate (sterile acumen 0.2 mm) at the apex, slightly cordate at the base. *Ovary* 0.9 by 0.7 mm, glabrous; stigma conical, with 5 longitudinal ridges. *Fruit* ellipsoid, 1 $\frac{1}{2}$  by 1 cm, glabrous, smooth, green. Cotyledons plain.

*Distr. Malaysia:* Malay Peninsula.

*Ecol.* Open country, often forming large clumps; up to 1300 m alt.; *fl.* July-Jan., *fr.* until Feb.

12. *Erycibe stenophylla* HOOGL. Blumea 7 (1953) 317.—*E. longifolia* BECC. Nelle Foreste di Borneo (1902) 403, 524, f. 65, *nomen* (non *E. glomerata* var. *longifolia* BL.).—Fig. 16.

Large shrub, branches stellate-hirsute, older ones with low longitudinal cork-ridges. *Leaves* subcoriaceous, linear-lanceolate, slightly falcate, 7-12 by 0.7-1.3 cm, 6-8-nerved; long-acuminate at the apex, acute at the base; glabrous, with

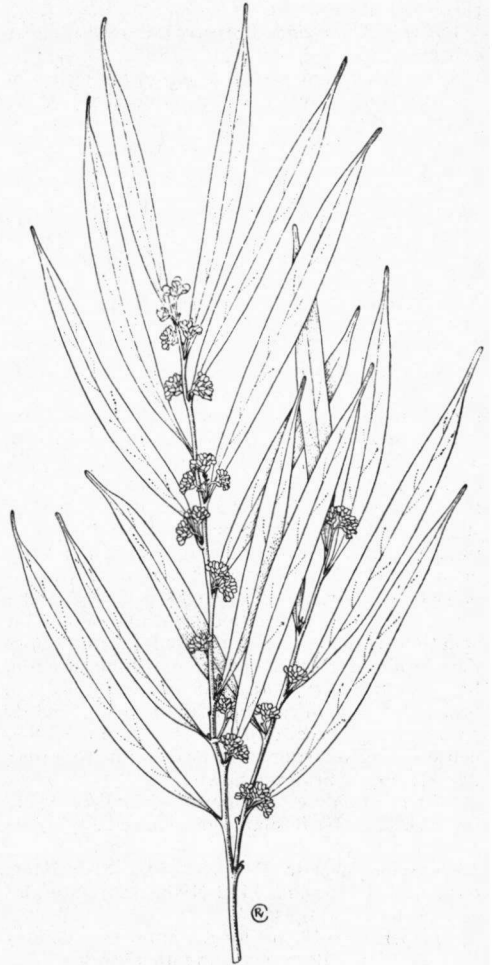


Fig. 16. *Erycibe stenophylla* HOOGL. Flowering branch,  $\times \frac{1}{2}$ .

slightly prominent midrib and nerves and faintly prominent venation above; sparsely stellate-hirsute, soon glabrescent, with slightly prominent nerves and faintly prominent venation beneath. Petiole 4–7 mm. *Inflorescences* axillary or terminal, up to 1 cm, (1–)2–3(–4)-flowered. Pedicel 1–2 mm. *Sepals* 1 & 2 oval, 2.4–3 by 2–2.2 mm, 4 & 5 transverse-oval, 2.3–2.5 by 3.4–3.5 mm; sparsely stellate-hirsute outside (hairs with 3–5 subequal up to 200  $\mu$  long branches). *Corolla* 8–9 mm, tube 2–2½ mm; midpetaline field 3–3.2 by 1.7–1.8 mm, rather densely hairy (hairs 5–7-branched, one stronger up to 350  $\mu$  long branch); lobules 3–3½ by 2–2½ mm, rather thin, with rather distinct venation, entire. *Stamens* inserted 0.7 mm above the corolla-base; filament 0.6 mm long, 0.4 mm broad at the base; anther 1 mm long, 0.7 mm broad, 0.5 mm thick, obtuse at the apex, slightly cordate at the base. *Ovary* 1.2 by 0.7 mm, glabrous; stigma conical, with 5 rather distinct ridges. Fruit unknown.

Distr. *Malaysia*: Borneo (Sarawak), once collected.

Ecol. The plant was collected in the rapids of the Redjang River; it is a typical rheophyte (narrow, slightly falcate leaves). The species is probably most closely related to *E. borneensis* (MERR.) HOOGL.

**13. *Erycibe sericea* HOOGL. Blumea 7 (1953) 317.**

Woody twiner, younger branches rather densely sericeous, older ones with orbicular or oval lenticels. *Leaves* oblong or ovate-oblong, 8–10½ by 3½–5 cm, 6–8-nerved; obtuse, short-acuminate at the apex, obtuse to rounded at the base; glabrous, with sunken midrib, faintly prominent nerves, and nearly indistinct venation above; densely sericeous over the whole surface, with prominent nerves and slightly prominent venation beneath. Petiole ca 1 cm. *Inflorescences* axillary, 5–10 mm, 6–10-flowered. Pedicel 2–3 mm. *Sepals* 1 & 2 orbicular to broad-ovate, 2.4 by 2.6 mm, 4 & 5 transverse-oval, 2.4 by 3.5 mm, rather densely strigose outside (hairs 2-branched, up to 250  $\mu$  total length). *Corolla* 10½ mm, tube 2 mm; midpetaline field 6½ by 3 mm, densely appressed-hairy (hairs 2-branched, up to 500  $\mu$  long); lobules 5 by 4–4½ mm, rather thick, with faintly visible venation, entire. *Stamens* inserted 1.2 mm above the corolla-base; filament 0.7 mm long, 0.3 mm broad at the base; anther 1.8 mm long, 0.7 mm broad, 0.5 mm thick, acute at the apex, slightly cordate at the base. *Ovary* 0.9 by 1.6 mm, rather densely hirsute; stigma conical, with 10 rather distinct ridges. Fruit unknown.

Distr. *Malaysia*: Philippines (Island of Malauui close to N. Basilan, once collected.)

**14. *Erycibe strigosa* PRAIN, J. As. Soc. Beng. 65, 2 (1896) 536; *ibid.* 74, 2 (1906) 288; RIDL. Fl. Mal. Pen. 2 (1923) 445.**

Creeper, 12–18 m long, branches densely thin-strigose, older ones with rather low longitudinal cork-ridges. *Leaves* elliptic-oblong, 7–14 by 3½–6½ cm, 6–8-nerved; obtuse and distinctly

acuminate at the apex, obtuse and slightly decurrent at the base; densely long-strigose, soon glabrescent, with sunken midrib and nerves and faintly prominent venation above; densely long-strigose in young leaves, rather sparsely so in full-grown ones, indumentum long-persistent, with prominent nerves and slightly prominent venation beneath. Petiole 12–20 mm. *Inflorescences* axillary, sometimes 2 or 3 together, the longer ones sometimes with some small leaves in the basal part, 2–12 cm, 20–60-flowered; bracts rather large, up to 5 mm long. *Flowers* known only in bud. Pedicel 1–2 mm. *Sepals* 1 & 2 oval, 2½ by 2 mm, 4 & 5 transverse-oval, 2 by 2½ mm, rather densely thin-strigose outside (hairs 2-branched, up to 900  $\mu$  total length). *Corolla* only slightly developed; midpetaline field with 2-branched, up to 1200  $\mu$  long hairs. *Anthers* acuminate at the apex. *Ovary* glabrous; stigma conical. Fruit unknown.

Distr. *Malaysia*: Malay Peninsula (Perak), once collected.

Ecol. In dense jungle, ca 150–240 m altitude, clinging to trees.

**15. *Erycibe subsericea* HOOGL. Blumea 7 (1953) 318.**

Climber, branches densely short-sericeous, older ones subterete, with rather many orbicular lenticels. *Leaves* coriaceous ovate to elliptic, 9–15 by 5½–9 cm, 5–7-nerved; obtuse, short-acuminate at the apex, obtuse at the base; densely short-sericeous, soon glabrescent, with slightly sunken midrib and nerves and faintly sunken to indistinct venation above; densely short-sericeous (indumentum late caducous), with slightly prominent nerves and faintly to slightly prominent venation beneath. Petiole 15–25 mm. *Inflorescences* axillary, towards the apex of the branches passing into terminal, (2½)–4–25 cm, 10–80-flowered. Pedicel 2–3 mm. *Sepals* 1 & 2 broad-ovate, 4.3 by 3.8 mm, 4 & 5 transverse-oval, 3.4 by 4.2 mm, rather densely strigose outside (hairs 2-branched, up to 250  $\mu$  total length). *Corolla* white, 9 mm, tube 3 mm; midpetaline field 5 by 2.8 mm, densely strigose (hairs 2-branched, up to 900  $\mu$  total length); lobules 3–3.5 by 1.8–2 mm, rather thick, without distinct venation, slightly crenate at the margin. *Stamens* inserted ca 1.4 mm above the corolla-base; filament 0.5 mm long, 0.4 mm broad at base; anther 1.8 mm long, 0.9 mm broad, 0.7 mm thick, acute at the apex, slightly cordate at the base. *Ovary* 1.7 by 1.3 mm, rather densely strigose; stigma conical, with 5 distinct ridges. Fruit unknown.

Distr. *Malaysia*: Borneo (E. Kutei, once collected).

Ecol. In forest along river at low altitude.

**16. *Erycibe kinabaluensis* HOOGL. Blumea 7 (1953) 315.**

A woody twiner, younger branches strigose-hirsute, older ones with rather many oval lenticels. *Leaves* subcoriaceous, oblong, 4½–8½ by 1.8–2½ cm, 7–8-nerved; acuminate at the apex, acute to obtuse at the base; glabrous, with slightly sunken midrib, slightly prominent nerves and venation

above; glabrous (except the sparsely villose, soon glabrescent basal part of midrib), with prominent nerves and venation beneath. Petiole 5–9 mm. *Inflorescences* axillary, sometimes 2 or 3 together, 3–40 mm, (1–)3–20-flowered. Pedicel 2–5 mm. *Sepals* transverse-oval, 1 & 2 1.8 by 2.2 mm, 4 & 5 2 by 2.5–2.7 mm; densely hirsute outside (hairs with 2 branches, rarely a small third branch, up to 900  $\mu$  total length). *Corolla* pale yellow-green, 5½ mm, tube 0.8 mm; midpetaline field 3.2 by 2 mm, densely hirsute (hairs with (2–)3(–4), generally curled, up to 700  $\mu$  long branches); lobules 2 by 2 mm, rather thick, without distinct venation, entire. *Stamens* inserted 0.8 mm above the corolla-base; filament 0.5 mm long, 0.3 mm broad at the base; anther 1.2 mm long, 0.9 mm broad, 0.7 mm thick, obtuse, slightly truncate at the apex, slightly cordate at the base. *Ovary* 0.9 by 1 mm, glabrous; stigma conical, with 5 rather distinct ridges. Fruit unknown.

Distr. *Malaysia*: Br. N. Borneo (Kinabalu), once collected at 1200 m.

17. *Erycibe maingayi* CLARKE in HOOK f. Fl. Br. Ind. 4 (1883) 182.—*E. griffithii* (non CLARKE) PRAIN, J. As. Soc. Beng. 74, 2 (1906) 295, p.p.; RIDL. Fl. Mal. Pen. 2 (1923) 447, p. p.

Scandent shrub or liana, younger branches densely strigose, older ones with longitudinal cork-ridges and rather many oval lenticels. *Leaves* subcoriaceous, ovate-oblong to elliptic-oblong, 4½–13 by 2–6½ cm, 4–7-nerved; rounded to acute, usually more or less acuminate at the apex, obtuse to rounded at the base; glabrous, with slightly sunken midrib and slightly prominent nerves and venation above; glabrous, with distinctly prominent nerves and slightly prominent to indistinct venation beneath. Petiole 8–12 mm. *Inflorescences* axillary, ½–3 cm, (1–)2–14-flowered. Pedicel 1½–4 mm. *Sepals* 1 & 2 broadly ovate, 2–3 by 2½–3 mm, 4 & 5 transverse-oval, 2½ by 3 mm; shortly strigose outside (hairs with 2 branches, up to 600  $\mu$  total length). *Corolla* cream-coloured, 8–9 mm, tube 2½–3½ mm; midpetaline field 2.7–3.8 by 1.7–2 mm, densely appressed-hairy (hairs with (2–)3(–4) up to 800  $\mu$  long branches); lobules 3.5–4 by 2.7–4 mm, rather thick, with not or only faintly visible venation, entire. *Stamens* inserted 0.5–0.8 mm above the corolla-base; filament 0.6–0.9 mm long, 0.3–0.5 mm broad at the base; anther 1.1–1.3 mm long, 0.6 mm broad, 0.3–0.4 mm thick, acuminate (sterile acumen 0.5–0.6 mm) at the apex, cordate at the base. *Ovary* 0.8–1.2 by 0.8–1.1 mm, glabrous; stigma conical, somewhat warty, with 5 distinct ridges. Fruit ellipsoid, 22 by 14 mm, glabrous, smooth. Cotyledons plain.

Distr. *Malaysia*: Sumatra, Malay Peninsula, Br. N. Borneo (Kinabalu).

Ecol. In forests at low alt., in Borneo at 1200 m. Vern. *Akar kajas*, Palembang, *kaju telor ketam*, Johore.

Notes. The specimens from Sumatra are distinctly larger in many parts than most specimens from the Malay Peninsula. I do not think,

however, that the differences justify the distinction of 2 *taxa*.

The only specimen known from Borneo (CLEMENS 31860) is a rather poor one with poor inflorescences. Otherwise it fits in perfectly with the small Peninsular specimens.

PRAIN (1906) and RIDLEY (1923) reduced the species to *E. griffithii* CLARKE. The most striking differences between the two species are the shape of the stamens and the fruit. Both species have in the herbarium a dark brown, often purple-tinged colour.

18. *Erycibe coriacea* WALL. [Cat. (1828) no 1337, *nomen*] ex CHOISY, Ann. Sc. Nat. II, 1 (1834) 224; DC. Prod. 9 (1845) 465; CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 182; PRAIN, J. As. Soc. Beng. 65, 2 (1896) 536; KERR, Fl. Siam. En. 3 (1951) 95.—*E. fragrans* WALL. [Cat. (1828) no 1336, *nomen*] ex G. DON, Gen. Syst. 4 (1838) 392.—*E. coriacea* var. *pauciflora* DC. Prod. 9 (1845) 465.—*E. coriacea* var. *fragrans* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 182.

Woody climber or small tree, branches sparsely strigose, older ones terete with rather many orbicular lenticels. *Leaves* coriaceous, elliptic-oblong, 8–18 by 4–8½ cm, 7–9-nerved; acuminate from an obtuse to rounded apex, rounded to broadly acute at the base; glabrous, with slightly to distinctly sunken midrib, faintly sunken nerves, and faintly sunken to faintly prominent venation above; glabrous, with faintly prominent nerves and faintly prominent to indistinct venation beneath. Petiole 9–18 mm. *Inflorescences* axillary, 1–5 cm, 6–50-flowered. Flowers fragrant. Pedicel 2–5 mm. *Sepals* 1 & 2 oval to orbicular, 2.3–2.5 by 2.2–2.7 mm, 4 & 5 orbicular to transverse-oval, 2.3–2.5 by 2.7–3.3 mm, rather sparsely to rather densely strigose outside (hairs 2-branched, up to 400  $\mu$  total length). *Corolla* white, 8½–9 mm, tube 2–3 mm; midpetaline field 4 by 2.2–2.8 mm, rather densely appressed-hairy (hairs 2-branched, up to 800  $\mu$  total length); lobules 3½–4½ by 3½–4½ mm, with not too distinct venation, entire, coherent above the midpetaline field for up to 0.4 mm. *Stamens* inserted 0.8–1.5 mm above corolla-base; filament 0.7–1.2 mm long, 0.4–0.6 mm broad at the base; anther 2 mm long, 0.8–0.9 mm broad, 0.5–0.6 mm thick, acute at the apex, cordate at the base. *Ovary* 1.2–1.7 by 1.5–1.7 mm, rather densely appressed-hairy; stigma conical, with 10 rather low ridges. Fruit ellipsoid, 30 by 18 mm, glabrous, smooth, orange. Cotyledons plain.

Distr. Chittagong, S. Burma, S. Siam, in *Malaysia*: only found in Peninsular Siam.

Ecol. In evergreen forest, up to 200 m.

19. *Erycibe festiva* PRAIN, J. As. Soc. Beng. 58, 2 (1894) 87; *ibid.* 65, 2 (1896) 536; *ibid.* 74, 2 (1906) 292; RIDL. Fl. Mal. Pen. 2 (1923) 447.

Creeper, up to 20 m long, 7½ cm diam., younger branches strigose, older ones terete with rather many orbicular lenticels. *Leaves* subcoriaceous, elliptic-oblong to oblong or ovate-oblong, 7–14 by

3-7 cm, 7-9-nerved; acute to obtuse, slightly acuminate at the apex; obtuse to acute at the base; glabrous, with slightly sunken midrib, faintly prominent nerves, and indistinct to faintly prominent venation above; glabrous, with slightly prominent nerves and faintly prominent venation beneath. Petiole 8-12 mm. *Inflorescences* axillary, up to 1½ cm, (3)-6-12(-15)-flowered. Pedicel 1½-4 mm. *Sepals* 1 & 2 broad-ovate to orbicular or transverse-oval, 2-2.5 by 2.2-2.8 mm, 4 & 5 transverse-oval, 2-2.2 by 3-3.5 mm, rather densely to densely strigose outside (hairs 2-branched, up to 350 μ total length). *Corolla* pale greenish white, 7-9½ mm, tube 1½-3 mm; midpetaline field 3-4 by 2.2-3 mm, densely appressed-hairy (hairs 2-branched, up to 600 μ total length); lobules 3½-4½ by 3-3½ mm, rather thin, with faintly distinct to distinct venation, slightly crenate at margin, coherent above the midpetaline field for 1 mm. *Stamens* inserted 0.8-1.2 mm above the corolla-base; filament 0.7-1 mm long, 0.4-0.6 mm broad at the base; anther 1-1.9 mm long, 0.6-0.8 mm broad, 0.4-0.5 mm thick, acute at the apex, cordate at the base. *Ovary* 1-1.5 by 1.3-1.7 mm, rather densely appressed-hairy for whole surface or the upper part only; stigma conical, with 10 rather distinct ridges. Fruit unknown.

Distr. *Malaysia*: Malay Peninsula, Banka, W. Java, at low altitudes.

Vern. *Akar pusak blanak, akar surawan jantan*, Mal. Pen., *aroy mugmal*, S.

Note. The inflorescence was originally described as many-flowered; PRAIN corrected this later (1896) to 7-12-flowered.

20. *Erycibe terminaliflora* ELM. Leaf. Philip. Bot. 5 (1913) 1768; MERR. En. Philip. 3 (1923) 359.—*E. hallieriana* ELM. *ibid.* 7 (1915) 2603.—*E. pararan* ELM. *ibid.* 7 (1915) 2603.—*E. copelandii* ELM. *ibid.* 8 (1919) 3077.—*E. rheeditii* (non BL.) MERR. En. Philip. 3 (1923) 358, *p. p.*

Large climber, branches rather densely to densely strigose-hirsute, older ones subterete, with rather many orbicular to oval lenticels. *Leaves* coriaceous, ovate to ovate-oblong or elliptic-oblong, 4½-10(-14) by 2-4½(-6) cm, 8-12-nerved; obtuse, short-acuminate at the apex, obtuse at the base; glabrous, shining, with slightly sunken midrib, slightly prominent nerves and major venation, and faintly prominent or indistinct minor venation above; rather sparsely hirsute, glabrescent, with slightly prominent nerves and venation beneath. Petiole 9-14 mm. *Inflorescences* axillary, towards the apex of the branches passing into terminal, then usually with some small leaves in the basal part, (2½)-4-25 cm, 10-125-flowered, terminal ones up to 250-flowered. Pedicel 3-5 mm. *Sepals* 1 & 2 broad-ovate or orbicular to transverse-oval, 2.4-3.6 by 2.6-4.2 mm, 4 & 5 transverse-oval, 2.1-3 by 2.8-4 mm, sparsely to densely strigose outside (hairs 2-branched, up to 500 μ total length). *Corolla* white or yellowish white, 6½-9½ mm, tube 2-2½ mm; midpetaline field 3-4.8 by 1.8-3.3 mm, rather densely to densely strigose (hairs 2-

branched, up to 900 μ long); lobules 3-4 by 2½-4 mm, rather thin to rather thick, with no or only faintly distinct venation, slightly crenate, or undulate, or entire at the margin, sometimes coherent above the midpetaline field for up to 0.8 mm. *Stamens* inserted 0.7-1.5 mm above the corolla-base; filament 0.5-1.3 mm long, 0.2-0.6 mm broad at the base; anther 1.3-2 mm long, 0.5-0.7 mm broad, 0.5-0.7 mm thick, acute to acuminate at the apex (sterile acumen up to 0.2 mm), cordate at the base. *Ovary* 1-1.8 by 1-1.7 mm, glabrous, or rather sparsely hairy in the upper, glabrous in the lower part, or rather sparsely hairy over the whole surface; stigma conical, with 5 or 10 faint to distinct ridges. *Fruit* ellipsoid, 8 by 5 mm, light green, glabrous, smooth, or (at least in young stages) with dense appressed indumentum. Cotyledons plain.

Distr. *Malaysia*: Philippines.

Ecol. In forests, from low altitude to 1200 m.

Vern. *Pararan, salibútbut*, Bag.

Note. The type represents a relatively hirsute form, all other specimens are distinctly less hairy. The species is rather variable, but there is no good character on which it can be divided into more taxa.

21. *Erycibe hollrungii* HOOGL. *Blumea* 7 (1953) 314.—*E. paniculata* (non ROXB.) K. SCHUM. & HOLLR. Fl. Kais. Wilh. Land (1889) 114.—*E. hellwigii* (non PRAIN) K. SCHUM. & LAUT. Fl. Deut. Schutzgeb. Südsee (1901) 518, *p. p.*

Scandent shrub, younger branches densely strigose, older ones with distinct longitudinal cork-ridges. *Leaves* ovate-oblong, (6-)10-14 by (2½-4)4½-6½ cm, 5-7-nerved; obtuse, often slightly acuminate at the apex, obtuse to rounded at the base; sparsely strigose, soon glabrescent, with slightly sunken midrib, faintly prominent nerves, and indistinct or very faintly prominent venation above; rather sparsely short-strigose, soon glabrescent, with prominent nerves and indistinct venation, or at most major venation faintly prominent or minor venation faintly sunken. Petiole 5-12 mm. *Inflorescences* axillary, towards the end of the branches passing into terminal, 3-10 cm, 25-75-flowered, with minute and few larger (up to 12 by 3½ mm) bracts. Pedicel 1½-4 mm. *Sepals* transverse-oval, 1 & 2 2.2 by 2.5 mm, 4 & 5 2 by 3 mm, rather densely short-strigose outside (hairs 2-branched, up to 450 μ total length). *Corolla* 7 mm, tube 2 mm; midpetaline field 4 by 2 mm, rather densely hairy (hairs mainly 2-branched, up to 1250 μ total length); lobules 3 by 2½-3 mm, without distinct venation, entire. *Stamens* inserted 0.6 mm above the corolla-base; filament 0.8 mm long, 0.4 mm broad at the base; anther 1.5 mm long, 0.7 mm broad, 0.5 mm thick, acuminate (sterile acumen 0.2 mm) at the apex, cordate at the base. *Ovary* 0.9 by 0.9 mm, glabrous in the lower 0.3 mm, densely hairy in the upper part; stigma conical, with 5 rather distinct ridges. Fruit unknown.

Distr. *Malaysia*: N. E. New Guinea, once collected.

**22. *Erycibe ramosii* HOOGL.** *Blumea* 7 (1953) 316.

Scandent, younger branches densely strigose-hirsute, older ones with distinct longitudinal cork-ridges. *Leaves* elliptic-oblong to oblong, 5–10 by 1<sup>3</sup>/<sub>4</sub>–4 cm, 7–10-nerved; shortly to long acuminate from an obtuse to acute apex, obtuse to acute at the base; densely strigose-hirsute, soon glabrescent, with slightly sunken midrib and slightly prominent nerves and venation above; densely strigose-hirsute, soon glabrescent, with slightly prominent nerves and major venation, and faintly prominent to indistinct minor venation beneath. *Petiole* 10–16 mm. *Inflorescences* terminal or axillary, 2–6 cm, 10–60-flowered. *Pedicle* 2–3 mm. *Sepals* 1 & 2 orbicular, 2.3 by 2.3 mm, 4 & 5 transverse-oval, 2.2 by 3 mm, rather densely appressed-hairy outside (hairs 2-branched, up to 400 μ total length). *Corolla* 7<sup>1</sup>/<sub>2</sub> mm, tube 2 mm; midpetaline field 3.5 by 2.1 mm, rather densely appressed-hairy (hairs 2-branched, up to 700 μ total length); lobules 2<sup>1</sup>/<sub>2</sub> by 1<sup>1</sup>/<sub>2</sub> mm, without distinct venation, slightly crenulate at margin. *Stamens* inserted 1.2 mm above the corolla-base; filament 1 mm long, 0.6 mm broad at the base; anther 1.2 mm long, 0.7 mm broad, 0.4 mm thick, acute at the apex, cordate at the base. *Ovary* 1.4 by 1.5 mm, appressed-hairy over the whole surface; stigma conical, with 5 faint ridges. *Fruit* ellipsoid, 20 by 12 mm, glabrous except few hairs near the apex, smooth. *Cotyledons* plain.

*Distr. Malaysia:* Philippines (Luzon, Leyte).

**23. *Erycibe glomerata* BL.** *Bijdr.* 16 (1826) 1047; G. DON, *Gen. Syst.* 4 (1838) 392; MIQ. *Fl. Ind. Bat.* 2 (1859) 1033; KOORD. *Exk. Fl. Java* 3 (1912) 115; OOSTSTR. in BACK. *Bekn. Fl. Java* (em. ed.) 8 (1949) fam. 191, 8.—*E. glomerata* var. *longifolia* BL. *Bijdr.* 16 (1826) 1047; MERR. *En. Born.* (1921) 507.—*E. angustifolia* HALLIER *f. Bot. Jahrb.* 16 (1893) 524.

KEY TO THE SUBSPECIES

- 1. Sepals sparsely appressed-hairy outside in central part only; longest hairs ca 700 μ long  
*ssp. glomerata*
- 1. Sepals densely appressed-hairy outside, the 2 outer ones for the whole surface; longest hairs ca 1250–1500 μ long  
*ssp. angustifolia*

*ssp. glomerata*.—*E. glomerata* BL. 1826.—*E. glomerata* var. *longifolia* BL. 1826.

Liana, branches sparsely appressed-hairy, older ones subterete or with low longitudinal ridges. *Leaves* subcoriaceous, elliptic-oblong to narrowly oblong, 8–18 by 3<sup>1</sup>/<sub>2</sub>–7<sup>1</sup>/<sub>2</sub> cm, 6–9-nerved; acuminate from an obtuse to acute apex, obtuse to acute at the base; rather sparsely appressed-hairy, soon glabrescent, with faintly prominent to slightly sunken midrib, faintly prominent nerves, and faintly prominent to indistinct venation above; rather sparsely appressed-hairy, soon glabrescent, with faintly prominent nerves and faintly prominent to indistinct venation, silvery shining beneath. *Petiole* 1/2–1 cm. *Inflorescences* axillary, up to

1<sup>1</sup>/<sub>2</sub> cm, (1)–2–15-flowered, forming a dense cluster. *Pedicle* 1–3 mm, with 2–5 oval or ovate, up to 3 mm long bracts and bracteoles. *Sepals* subequal, oval to transverse-oval, 3.2–3.8 by 2.7–4.2 mm, sparsely appressed-hairy in the central part outside (hairs 2-branched, up to 700 μ total length). *Corolla* white, 13–13<sup>1</sup>/<sub>2</sub> mm, tube 3 mm; midpetaline field 4–4.5 by 1.8–2.3 mm, rather densely appressed-hairy (hairs 2-branched, up to 1250 μ total length); lobules 7<sup>1</sup>/<sub>2</sub> by 3–3<sup>1</sup>/<sub>2</sub> mm, rather thin, with rather distinct venation, entire or slightly crenate at the margin. *Stamens* inserted 0.7 mm above the corolla-base; filament 1–1.6 mm long, 0.5–0.6 mm broad at the base; anther 1.1–1.2 mm long, 0.7–0.8 mm broad, 0.5 mm thick, acute to obtuse at the apex, cordate at the base. *Ovary* 1–1.1 by 1.3–1.7 mm, glabrous; stigma conical, with 5 or 10 ridges. *Fruit* unknown.

*Distr. Malaysia:* Sumatra, W. Java.

*Vern. Kisimut, S.*

*ssp. angustifolia* (HALLIER *f.*) HOOGL. *stat. nov.*—*E. angustifolia* HALLIER *f.* 1893.

Differs from *ssp. glomerata* by the following characters:

*Leaves* generally slightly narrower. *Inflorescences* rarely up to 3 cm long. *Sepals* 1 & 2 orbicular to transverse-oval, 2.5–3 by 2.5–3.8 mm, 4 & 5 transverse-oval, 2.5–2.8 by 3–3.7 mm, densely appressed-hairy outside (hairs 2-branched, up to 1500 μ total length). *Corolla* 8–10<sup>1</sup>/<sub>2</sub> mm, tube 2–3 mm; midpetaline field 2.8–4 by 1.7–2.3 mm (hairs up to 1500 μ total length); lobules 4–5<sup>1</sup>/<sub>2</sub> by 3–3<sup>1</sup>/<sub>2</sub> mm. *Stamens* inserted 0.6–0.8 mm above the corolla-base; anther 1.5–1.7 mm long, 0.5–0.9 mm broad, 0.5 mm thick.

*Distr. Malaysia:* Borneo.

*Notes.* The differences between the subspecies are slight, but sharp as far as I can judge from the available material. Of *ssp. glomerata* only rather old Javanese material is available; this subspecies has not been recollected in recent times. The same subspecies is known from Sumatra by a single, unlocalized collection (KORTHALS).

A closely related species is *E. albida* PRAIN from the Malay Peninsula.

**24. *Erycibe elliptilimba* MERR. & CHUN,** *Sunyatsenia* 2 (1934) 45; HOW, *ibid.* 6 (1946) 227.—*E. paniculata* (non ROXB.) GAGNEP. & COURCH. *Fl. Gén. I. C.* 4 (1915) 305.—*E. fecunda* KERR, *Kew Bull.* (1941) 10; *Fl. Siam. En.* 3 (1951) 96.—*E. noi* KERR, *Kew Bull.* (1941) 11; *Fl. Siam. En.* 3 (1951) 97.—*E. rabillii* KERR, *Kew Bull.* (1941) 12; *Fl. Siam. En.* 3 (1951) 97.—*E. poilanei* GAGNEP. *Not. Syst.* 14 (1950) 28.

Liana, up to 20 m by 8 cm, younger branches rather densely strigose-hirsute, older ones with distinct longitudinal cork-ridges. *Leaves* subcoriaceous, oval to oblong, (5)–7–12(–16) by (2)–3–6<sup>1</sup>/<sub>2</sub>(–9<sup>1</sup>/<sub>2</sub>) cm, 5–7(–8)-nerved; rounded to broad-acute, usually short-acuminate at the apex, rounded to broad-acute at the base; glabrous, with distinctly sunken midrib and distinctly to faintly sunken nerves and venation above; glabrous, with



faintly prominent to faintly sunken nerves and faintly to distinctly sunken venation beneath. *Inflorescences* axillary, sometimes 2 or 3 together, (1½–3–8(–11) cm, (5–)15–40(–60)-flowered. Pedicel 1½–4 mm. *Sepals* orbicular to transverse-oval, 1 & 2 2–3.5 by 2.5–3.7 mm, 4 & 5 2.5–3 by 2.5–4 mm, rather sparsely to rather densely appressed-hairy outside (hairs 2-branched, up to 800 μ total length). *Corolla* 6½–10½ mm, tube 2–2½ mm; midpetaline field 3.2–5.2 by 2–2.6 mm, rather densely appressed-hairy (hairs 2-branched, up to 1400 μ total length); lobules 3.5–5 by 3–4.2 mm, with no or only slightly distinct venation, grossly dentate at the margin. *Stamens* inserted 0.5–1 mm above the corolla-base; filament 0.7–1.7 mm long, 0.3–0.6 mm broad at the base; anther 1.3–2.0 mm long, 0.5–0.8 mm broad, 0.4–0.5 mm thick, acute-acuminate at the apex, cordate at the base. *Ovary* 1.3–1.6 by 1.2–1.6 mm, glabrous; stigma conical, with 5 rather distinct ridges. *Fruit* ellipsoid, 2 by 1½ cm, glabrous, smooth. Cotyledons strongly folded.

Distr. S. China (Hainan), Indo-China, Siam, in *Malaysia*: Peninsular Siam.

Ecol. In forests, from low altitude up to 1200 m (Indo-China).

Vern. *Changsan sapman, hora* (Siamese).

25. *Erycibe floribunda* PILGER, Bot. Jahrb. 59 (1924) 84; OOSTSTR. J. Arn. Arb. 29 (1948) 416.

Scandent shrub or liana, younger branches rather sparsely strigose, older ones with longitudinal cork-ridges. *Leaves* ovate to ovate-oblong, (8–)12–19 by (3½–)5–10 cm, 5–8-nerved; obtuse to acute, often more or less acuminate at the apex, acute to, usually, obtuse at the base; glabrous, with slightly sunken midrib and prominent nerves and venation above; glabrous, with prominent nerves and slightly prominent venation beneath. Petiole 5–15 mm. *Inflorescences* axillary, sometimes 2 or 3 together, or terminal, (3–)8–18 cm, 30–100- or more-flowered. Pedicel 1–2½ mm. *Sepals* 1 & 2 oval, 2–2.2 by 1.7–2 mm, 4 & 5 transverse-oval, 1.8–2 by 2.5 mm, rather densely strigose outside (hairs 2-branched, up to 600 μ total length). *Corolla* white, yellowish white, or yellow, 5½–6 mm, tube 1½–2 mm; midpetaline field 2.4–2.8 by 1.8 mm, rather sparsely appressed-hairy (hairs mainly 2-branched, up to 800 μ total length); lobules 1.8–2.3 by 2–2.5 mm, without distinct venation, entire. *Stamens* inserted ½ mm above the corolla-base; filament 0.8–1 mm long, 0.4–0.5 mm broad at the base; anther 1.1–1.2 mm long, 0.7–0.8 mm broad, 0.4–0.5 mm thick, obtuse to acuminate at the apex (sterile acumen 0.1–0.4 mm), rounded to slightly cordate at the base. *Ovary* 0.8–1.3 by 0.7–0.9 mm, glabrous; stigma conical, with 10 rather distinct ridges. *Fruit* ellipsoid, 13 by 8 mm, glabrous, red or orange-brown. Cotyledons plain.

Distr. *Malaysia*: W. New Guinea (not yet found in the Vogelkop).

Ecol. In fringing forest, up to 300 m altitude.

26. *Erycibe forbesii* PRAIN, J. As. Soc. Beng. 73, 2 (1904) 15.

Liana, younger branches rather densely appressed-hairy, older ones with distinct, generally broad, longitudinal cork-ridges. *Leaves* ovate or obovate to oblong, (5–)7–12(–15) by (2¼–)3–6(–7½) cm, (4–)5–8-nerved; rather sparsely appressed-hairy, soon glabrescent, with slightly sunken midrib, faintly prominent to faintly sunken nerves, and faintly prominent to indistinct venation above; rather sparsely appressed-hairy, soon glabrescent, with slightly to faintly prominent nerves and venation beneath. Petiole 8–17 mm. *Inflorescences* terminal, downward passing into axillary, sometimes 2 together, (1½–)3–8(–12) cm, (5–)10–30(–100)-flowered. Pedicel 1½–4 mm. *Sepals* 1 & 2 oval to orbicular, 2–4 by 2–3.2 mm, 4 & 5 transverse-oval, 1.8–3.2 by 2.2–4 mm, rather densely appressed-hairy outside (hairs 2-branched, up to 900 μ total length). *Corolla* white, 6–9½ mm, tube 2–3 mm; midpetaline field 1.8–4 by 1.3–2.8 mm, rather densely appressed-hairy (hairs 2-branched, up to 1400 μ total length); lobules 2½–4½ by 1½–3 mm, rather thick, with faintly visible venation, entire to irregularly crenulate at margin, coherent above the midpetaline field for up to 1 mm. *Stamens* inserted ½–1 mm above the corolla-base; filament 1.5–1.8 mm long, 0.3–0.7 mm broad at the base; anther 1–2 mm long, 0.4–0.8 mm broad, 0.4–0.6 mm thick, acuminate (sterile acumen 0.3–0.7 mm) at apex, cordate at base. *Ovary* 0.8–1.7 by 0.8–1.5 mm, glabrous; stigma conical, with 5 distinct ridges. *Fruit* ellipsoid, 18 by 15 mm, glabrous, smooth in the lower, scurfy in the upper part, or scurfy over the whole surface. Cotyledons strongly folded.

Distr. *Malaysia*: Sumatra (Lampungs), Java (W. & E.), Kangazan Archipelago, Borneo (Balikpapan), and Philippines.

Ecol. In primary forest, at low altitude (up to 600 m).

Vern. *Kisemut, S.*

Note. In the Philippine specimens the fruits are scurfy over the whole surface, in the Javanese ones the lower part is smooth. (The Bornean collection is in flower.) What the taxonomic value of this character is can not yet be decided because of the small number of available specimens, particularly in the intermediate area.

27. *Erycibe grandifolia* MERR. ex HOOGL. *Blumea* 7 (1953) 313.—*E. angulata* (non PRAIN) MERR. J. Mal. Br. R. As. Soc. 1 (1923) 29; Univ. Calif. Publ. Bot. 15 (1929) 259.—*E. rheedii* (non BL.) MERR. Philip. J. Sc. 29 (1926) 413.

Liana, up to 6 cm thick, younger branches stellate-hirsute with very short dark rufous hairs, older ones with very few orbicular lenticels. *Leaves* coriaceous, shining deep green above, much paler beneath, elliptic-oblong to oblong, ovate-oblong, or obovate-oblong, 7–23 by 3½–12½ cm, 7–10-nerved; rather shortly acuminate from an obtuse apex, (acute to) obtuse to rounded, sometimes slightly cordate at the base; glabrous, with slightly sunken to slightly raised midrib and nerves

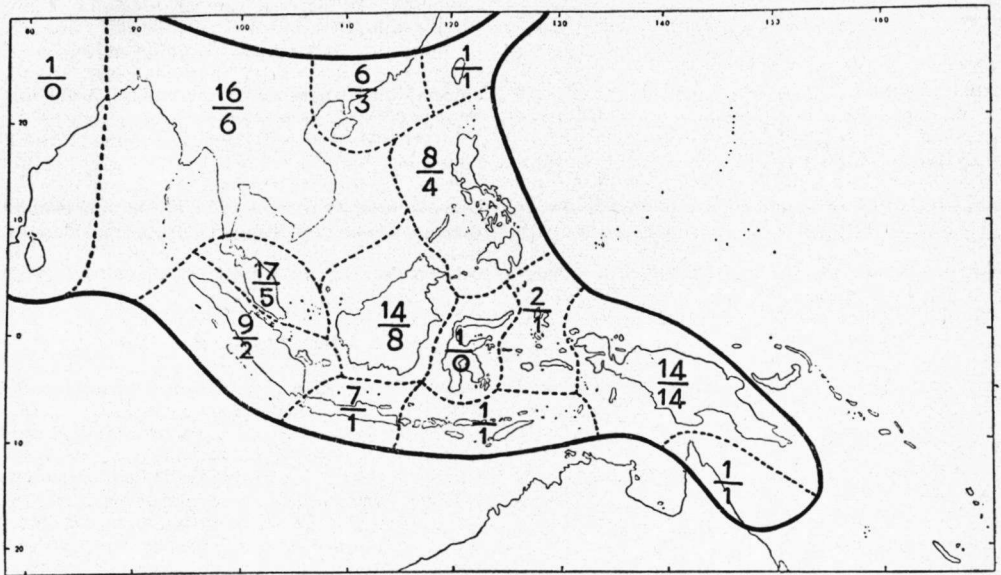


Fig. 17. Distribution of the genus *Erycibe* in which are indicated for each sub-area the total number of species (above the line) and the number of endemic species (under the line). The genus comprises 66 spp. In India the area extends W to the Bombay Province and N to the Upper Gangetic Plain and the Sikkim Himalaya. The Formosan area extends over the Riu-Kiu Islands to Yakushima (S. Japan). The numbers in Borneo should be read  $16/5$  and in Sumatra  $10/2$ .

and faintly sunken to faintly raised venation above; densely stellate-hirsute, very soon glabrescent, with faintly raised to slightly sunken nerves and distinctly sunken venation beneath; margin often slightly recurved. Petiole 10–22 mm. *Inflorescences* terminal, often with some leaves in basal part, or axillary, 2–20 cm, 20–200-flowered. Pedicel 1–2½ mm. *Sepals* 1 & 2 broadly ovate, 1.6–2.5 by 1.5–2 mm, 4 & 5 transverse-oval, 1.3–1.9 by 2.2–2.6 mm; rather densely stellate-hirsute outside (hairs with 5–11 subequal, up to 250  $\mu$  long branches). *Corolla* pale yellow or yellow, 6–7 mm, tube 1½–2 mm; midpetaline field 3.2–3.7 by 1.7–2 mm, densely stellate-hirsute (hairs with 6–12 subequal, up to 250  $\mu$  long branches); lobules 2 by 2½ mm, without distinct venation, entire. *Stamens* inserted 0.5–0.9 mm above the corolla-base; filament 0.5–0.7 mm long, 0.3–0.5 mm broad at the base; anther 1.2 mm long, 0.4–0.6 mm broad, 0.3–0.4 mm thick, acute at the apex, slightly cordate at the base. *Ovary* 1 by 0.8–1.2 mm, glabrous in the lower 0.2–0.4 mm, stellate-hirsute in the upper part; stigma conical, with 10 low ridges. *Fruit* ellipsoid, 20 by 14 mm, dark brown, yellow, or aurantiaceous, with a dense indumentum of very short stellate hairs. Cotyledons plain.

*Distr. Malaysia:* Borneo (Br. N. Borneo and E. Indonesian Borneo).

*Ecol.* In primary and secondary forests at low altitude.

*Vern.* *Tikbol*, Sandakan.

28. *Erycibe carrii* HOOG. *Blumea* 7 (1953) 312.

Liana, young branches stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* subcoriaceous, ovate to ovate-oblong, (2.7–)4.5–8 by (0.9–)1.6–3.5 cm, 6–8-nerved; obtuse to acute or slightly acuminate at the apex, obtuse to rounded at the base; stellate-hirsute, glabrescent, with slightly sunken midrib and slightly prominent nerves and venation above; stellate-hirsute, indumentum long persistent, with slightly prominent nerves and venation beneath. Petiole 6–10 mm. *Inflorescences* axillary, sometimes 2 or 3 together, (1–)3–10 cm, (3–)7–50-flowered. Flowers fragrant. Pedicel 2–4 mm. *Sepals* 1 & 2 oval, 2–2.2 by 1.6–1.9 mm, 4 & 5 transverse-oval, 2–2.2 by 2.5–2.8 mm, rather densely stellate-hirsute (hairs with (2–)4–9(–11) subequal, up to 350  $\mu$  long branches). *Corolla* white, 6½–7 mm, tube 2 mm; midpetaline field 3 by 1.8 mm, rather densely appressed-hairy (hairs with (2–)3–6 subequal, up to 750  $\mu$  long branches); lobules 2.5–3 by 2.8–3 mm, without distinct venation, slightly undulate at the margin. *Stamens* inserted ½ mm above the corolla-base; filament 0.5–0.6 mm long, 0.3 mm broad at the base; anther 1.2–1.4 mm long, 0.8 mm broad, 0.5–0.6 mm thick, acuminate (sterile acumen 0.3–0.5 mm long) at the apex, subcordate at the base. *Ovary* 0.9–1.0 by 0.8 mm, glabrous for the lower 0.3–0.6 mm, sparsely stellate-hirsute for the upper part; stigma conical, with 5 distinct ridges. *Fruit* unknown.

Distr. *Malaysia*: E. New Guinea.  
Ecol. In forests at ca 1250 m.

29. *Erycibe bullata* RIDL. ex HOOGL. *Blumea* 7 (1953) 311.

Young branches stellate-hirsute, older ones probably with longitudinal cork-ridges. *Leaves* subcoriaceous, oblong, ovate-oblong, or obovate-oblong, 18–25 by 7½–11 cm, 9–12-nerved; shortly acuminate at the apex, acute to obtuse at the base; stellate-hirsute, soon glabrescent, with midrib, nerves, and main venation sunken between the bullate intervenium above; stellate-hirsute, hairs rather long persistent, with prominent nerves and main venation, and invisible minor venation beneath; margin recurved. Petiole 6–16 mm. *Inflorescences* axillary, up to 2 cm, 1–±15-flowered, forming a dense cluster; bracts lanceolate, 3 mm long. Pedicel 3–4 mm; bracteoles lanceolate, 2–2½ mm long. *Sepals* 1 & 2 broadly ovate, 2 by 2.2 mm, 4 & 5 transverse-oval, 1.9 by 2.2 mm, stellate-hirsute outside (hairs (2–)3–5-branched, branches subequal or one branch somewhat longer, up to 500 µ long). *Corolla* 8 mm, tube 2 mm; midpetaline field 3.5 by 1.8 mm, rather sparsely stellate-hirsute (hairs with 3–6 subequal, up to 400 µ long branches); lobules 2.8 by 2 mm, rather thin, with distinct venation, entire. *Stamens* inserted 1 mm above the corolla-base; filament 1 mm long, 0.4 mm broad at the base; anther 1 mm long, 0.5 mm broad, 0.3 mm thick, acute at the apex, cordate at the base. *Ovary* 1.5 by 0.7 mm, glabrous; stigma conical, with 5 rather sharp ridges. *Fruit* ellipsoid, 20 by 12 mm, glabrous, white. Cotyledons plain.

Distr. *Malaysia*: Borneo (Sarawak).

30. *Erycibe crassipes* RIDL. ex HOOGL. *Blumea* 7 (1953) 312.

Climbing shrub, 3 m high, younger branches stellate-hirsute, soon glabrescent, older ones with longitudinal cork-ridges. *Leaves* subcoriaceous, oblong to lanceolate-oblong, 16–37 by 6½–9 cm, 8–12(–15)-nerved; (obtuse to) acute, usually acuminate at the apex, obtuse to acute, slightly decurrent at the base; densely stellate-hirsute, soon glabrescent, with slightly sunken midrib, faintly prominent nerves, and indistinct venation above; densely stellate-hirsute, very soon glabrescent, with prominent nerves and faintly prominent to indistinct venation beneath. Petiole 8–15 mm. *Inflorescences* axillary (often on older defoliate branches), (1–)3–±10-flowered, forming a dense cluster. Pedicel 1–3 mm. *Sepals* 1 & 2 oval to orbicular, 2.6–3 by 2.3–2.8 mm, 4 & 5 orbicular to transverse-oval, 2.7–2.8 by 2.8–3.5 mm, sparsely stellate-hirsute outside (hairs with 4–8 subequal, up to 150 µ long branches), or glabrous (*f. glabra* HOOGL.) outside. *Corolla* white, 10½–11 mm, tube 2–2¾ mm; midpetaline field 3–4 by 1½–2 mm, rather densely stellate-hirsute (hairs with 4–9 subequal, up to 200 µ long branches); lobules 4.3–6 by 2–3 mm, rather thin, with distinct venation, entire. *Stamens* inserted at 0.8–1.4 mm above the corolla-base; filament 1–1.3 mm long, 0.4–0.6

mm broad at the base; anther 1–1.2 mm long, 0.5–0.7 mm broad, 0.4–0.5 mm thick, broadly acute at the apex, slightly cordate at the base. *Ovary* 1–1.5 by 0.9–1.2 mm, glabrous; stigma conical, with 10 rather distinct ridges. Fruit unknown.

Distr. *Malaysia*: Borneo (Kuching, Natuna Islands).

Ecol. In primary forests.

Note. In the collection from the Natuna Islands the sepals are completely glabrous outside, the pedicel is stellate-hirsute under the calyx like in the other collections. I do not think this difference to be of great value in this case.

31. *Erycibe nitidula* PILGER, Bot. Jahrb. 59 (1924) 85.

Scandent, younger branches stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* elliptic-oblong, 8–12 by 3½–5½ cm, 5–7-nerved, obtuse to rounded, short-acuminate at the apex, obtuse at the base; glabrous, with sunken midrib and slightly prominent nerves and venation above; rather sparsely, along midrib densely stellate-hirsute, glabrescent, with prominent nerves and slightly prominent venation beneath. Petiole 6–10 mm. *Inflorescences* terminal, downward passing into axillary, 3–20, axillary ones –9 cm, 10–40-flowered. Pedicel 1½–4 mm. *Sepals* 1 & 2 orbicular, 2.4 by 2.4 mm, 4 & 5 transverse-oval, 2.4 by 3.2 mm, densely stellate-hirsute outside (hairs with 4–7 subequal, up to 150 µ long branches). *Corolla* 7½ mm, tube 2 mm; midpetaline field 4 by 2.2 mm, densely stellate-hirsute (hairs with unequal, up to 500 µ long branches); lobules 3 by 3.2 mm, with hardly visible venation, entire. *Stamens* inserted 0.7 mm above the corolla-base; filament 1 mm long, 0.6 mm broad at the base; anther 1.5 mm long, 0.8 mm broad, 0.7 mm thick, acuminate (sterile apex 0.6 mm) at the apex, cordate at the base. *Ovary* 1 by 1.2 mm, rather densely stellate-hirsute; stigma conical, with 10 rather distinct ridges. Fruit unknown.

Distr. *Malaysia*: E. New Guinea (Panebo near Bulu), once collected.

Ecol. In forests at 450 m.

32. *Erycibe papuana* WERNH. Trans. Linn. Soc. Bot. 9 (1916) 118.

Scandent, younger branches stellate-hirsute, older ones with distinct longitudinal cork-ridges. *Leaves* narrowly ovate, up to 14 by 6½ cm, 5–7-nerved; obtuse, very slightly acuminate at the apex, obtuse, slightly decurrent at the base; glabrous, with slightly sunken midrib and slightly prominent nerves and venation above; glabrous, with slightly prominent nerves and venation beneath. Petiole up to 10 mm. *Inflorescences* axillary, up to 10 cm, up to 50-flowered. Pedicel 1–3 mm. *Sepals* 1 & 2 oval, 2.7 by 2.3 mm, 4 & 5 transverse-oval, 2 by 2.5 mm, rather sparsely stellate-hirsute outside (hairs with (2–)3–4 subequal, up to 250 µ long branches). *Corolla* pale yellow, 5½ mm, tube 1½ mm; midpetaline field 2 by 1.6 mm, rather densely hairy (hairs 2–5-branched, branches sub-

equal or one slightly longer and stronger than the others; total length up to 1000  $\mu$ ; lobules 2 by 2.4 mm, without distinct venation, entire. *Stamens* inserted 0.5 mm above the corolla-base; filament 1.5 mm long, 0.3 mm broad at the base; anther 1.4 mm long, 0.8 mm broad, 0.7 mm thick, acuminate (sterile acumen 0.4 mm) at the apex, cordate at the base. *Ovary* 1.3 by 1 mm, glabrous except few hairs at apex; stigma conical, with 5 distinct ridges. Fruit unknown.

Distr. *Malaysia*: SW. New Guinea (Utakwa River), once collected at ca 45 m.

33. *Erycibe stapfiana* PRAIN, J. As. Soc. Beng. 58, 2 (1894) 87; *ibid.* 74, 2 (1906) 293; RIDL. Fl. Mal. Pen. 2 (1923) 448.

Creeper or climber, up to 30 m long, younger branches densely stellate-hirsute, older ones with small orbicular lenticels. *Leaves* coriaceous, elliptic-oblong to oblong, (5-)6 $\frac{1}{2}$ -15(-17) by (1.8-) 2.5-6(-7 $\frac{1}{2}$ ) cm, 4-6(-7)-nerved; acuminate from an obtuse apex, obtuse to rounded, sometimes minutely cordate at the base; densely stellate-hirsute, soon glabrescent, with slightly sunken to prominent midrib, slightly sunken nerves, and faintly prominent venation above; densely stellate-hirsute, soon glabrescent, with prominent nerves and venation beneath. Petiole 3-7 mm. *Inflorescences* axillary, often 2-4 together, 1-4 (in fruit up to 7) cm, 4-25-flowered. Pedicel 1 $\frac{1}{2}$ -3 mm. *Sepals* 1 & 2 oval to orbicular, 2-2.5 by 1.6-2.3 mm, 4 & 5 orbicular to transverse-oval, 1.8-2.2 by 1.8-2.5 mm; rather sparsely stellate-hirsute outside (hairs with 5-8 subequal, up to 300  $\mu$  long branches). *Corolla* pale waxy white, 6 $\frac{1}{2}$ -8 mm, tube 1 $\frac{1}{2}$ -2 mm; midpetaline field 2.6-4 by 1.6-1.8 mm, rather densely stellate-hirsute (hairs with 5-8 subequal, up to 350  $\mu$  long branches); lobules 2 $\frac{1}{2}$ -3 $\frac{1}{2}$  by 2-2 $\frac{1}{2}$  mm, with rather distinct venation, entire or slightly crenate at the margin. *Stamens* inserted 0.7-1.2 mm above the corolla-base; filament 0.7-1 mm long, 0.4 mm broad at the base; anther 1.3-1.6 mm long, 0.7-0.8 mm broad, 0.5-0.6 mm thick, acuminate (sterile acumen 0.3 mm) at the apex, cordate at the base. *Ovary* 0.7-1.2 by 0.8-1.3 mm, densely short-stellate-hirsute for the upper part, glabrous for lower 0.2-0.7 mm; stigma conical, with 5 distinct ridges. *Fruit* obpyriform, 38 by 22 mm, dark brown or dark reddish brown, with dense very short indumentum. Cotyledons plain.

Distr. Peninsular Burma, *Malaysia*: Malay Peninsula (Perak, Pahang).

Ecol. In dense jungle up to 1200 m.

34. *Erycibe hellwigii* PRAIN, J. As. Soc. Beng. 63, 2 (1894) 84, in note; SCHUM. & LAUT. Fl. Deut. Schutzgeb. Südsee (1901) 518, p. p.—*E. paniculata* (non ROXB.) WARB. Bot. Jahrb. 13 (1891) 413, p. p.

Scandent shrub or large liana, younger branches stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* subcoriaceous, elliptic to ovate or oblong, (2 $\frac{1}{2}$ -)4-8(-11) by (1-)2-4 $\frac{1}{2}$  (-6 $\frac{1}{2}$ ) cm, 5-7-nerved, rounded to obtuse, rarely to acuminate at the apex, obtuse to rounded,

sometimes slightly cordate at the base; rather densely stellate-hirsute, soon glabrescent, with sunken midrib, faintly sunken to faintly raised nerves, and indistinct to faintly raised nerves above; densely stellate-hirsute, soon glabrescent, with faintly sunken to slightly raised nerves and venation beneath. Petiole 4-10 mm. *Inflorescences* axillary, sometimes 2 together, 1 $\frac{1}{2}$ -12 $\frac{1}{2}$  cm, 10-50-flowered. Pedicel 1 $\frac{1}{2}$ -4 mm. *Sepals* 1 & 2 oval to orbicular, 1.7-1.8 by 1.7 mm, 4 & 5 orbicular, 1.6 by 1.6 mm, to transverse-oval, 1.5-1.6 by 2-2.2 mm, densely stellate-hirsute outside (hairs with 4-7 subequal, up to 300  $\mu$  long branches). *Corolla* 5-6 mm, tube 1.2-2 mm; midpetaline field 2.5 by 1.8-2 mm, rather densely stellate-hirsute (hairs with 4-8 unequal branches, the largest up to 700  $\mu$  long); lobules 1.7-2.8 by 1.6-2 mm, without distinct venation, entire, sometimes coherent above the midpetaline field for up to 1 mm. *Stamens* inserted 0.7 mm above the corolla-base; filament 0.6 mm long, 0.3 mm broad at the base; anther 0.7-0.9 mm long, 0.5 mm broad, 0.4 mm thick, obtuse at the apex, cordate at the base. *Ovary* 0.9 by 0.7 mm, glabrous in the lower 0.4-0.6 mm, stellate-hirsute for upper part; stigma conical, with 5 distinct and 5 lower ridges. *Fruit* ovoid, 15 by 13 mm, orange-red or bronze-yellow. Cotyledons plain.

Distr. *Malaysia*: E. New Guinea.

Ecol. In forests from sea-level up to 700 m.

35. *Erycibe timorensis* HALLIER f. ex HOOGL. Blumea 7 (1953) 318.—*E. rheedii* (non BL.) SPANOGHE, Linnaea 15 (1841) 325.

Woody climber, younger branches densely stellate-hirsute, older ones with distinct longitudinal cork-ridges. *Leaves* elliptic-oblong to oblong or ovate-oblong, 4-10 $\frac{1}{2}$  by 1.8-3.6 cm, 6-8-nerved; acuminate from an obtuse to acute apex, obtuse to rounded at the base; densely stellate-hirsute, soon glabrescent, with slightly sunken midrib and faintly to distinctly prominent nerves and venation above; densely stellate-hirsute, glabrescent (indumentum rather long persistent along midrib and nerves), with prominent nerves and venation beneath. Petiole 5-7 mm. *Inflorescences* axillary, 2-12 cm, 5-25-flowered. Pedicel 1-2 mm. *Sepals* transverse-oval, 1 & 2 2-2.3 by 2.4-2.5 mm, 4 & 5 1.9-2 by 2.3 mm, densely stellate-hirsute outside (hairs with 4-7 subequal, up to 250  $\mu$  long branches). *Corolla* 6 $\frac{1}{2}$  mm, tube 2 mm; midpetaline field 3 $\frac{1}{2}$  by 2 mm, rather densely appressed-hairy (hairs 4-6-branched, branches subequal or one faintly longer and stronger, up to 550  $\mu$  long); lobules 2.5 by 2.7 mm, rather thin, with faintly distinct venation, faintly crenulate at margin, coherent above midpetaline field for 0.8 mm. *Stamens* inserted 0.6 mm above the corolla-base; filament 1.2 mm long, 0.4 mm broad at the base; anther 1 mm long, 0.5 mm broad, 0.4 mm thick, acute at the apex, faintly cordate at the base. *Ovary* 1.2 by 0.9 mm, glabrous for the lower 0.8 mm, stellate-hirsute for the upper part; stigma conical, with 10 distinct ridges. Fruit unknown.

Distr. *Malaysia*: Lesser Sunda Islands (Timor).  
Ecol. In the mountains.

36. *Erycibe borneensis* (MERR.) HOOGL. *Blumea* 7 (1953) 310.—*Fissipetalum borneense* MERR. J. Str. Br. R. As. Soc. 85 (1922) 168; Pl. Elm. Born. (1929) 58.

KEY TO THE VARIETIES

1. Leaves 9–22 by 3<sup>1</sup>/<sub>2</sub>–9 cm. Sepals very sparsely stellate-hirsute outside (branches of the hairs up to 200  $\mu$  long) . . . . . var. *borneensis*  
1. Leaves 8–12 by 2<sup>1</sup>/<sub>2</sub>–5 cm. Sepals rather densely stellate-hirsute outside (branches of the hairs up to 500  $\mu$  long) . . . . . var. *collina*

var. *borneensis*.

Shrub or small tree, up to 5 m by 7<sup>1</sup>/<sub>2</sub> cm, younger branches densely stellate-hirsute, older ones terete, with very few orbicular lenticels, sometimes with some longitudinal slightly corky ridges. *Leaves* subcoriaceous, oblong, 9–22 by 3<sup>1</sup>/<sub>2</sub>–9 cm, 6–8-nerved; acuminate from an obtuse apex, obtuse to acutish at the base; rather sparsely stellate-hirsute, soon glabrescent, with slightly sunken midrib, faintly sunken nerves, and indistinct venation above; rather densely stellate-hirsute, glabrescent, with slightly prominent nerves and faintly prominent to indistinct venation beneath. Petiole 5–10 mm. *Inflorescences* axillary, up to 2 cm, (1–)2–12-flowered. Pedicel 1–2 mm. *Sepals* 1 & 2 orbicular, 2.2–2.3 by 2.2–2.3 mm, 4 & 5 transverse-oval, 2.2–2.3 by 2.6–2.8 mm, 1 & 2 very sparsely stellate-hirsute (hairs with 3–6 subequal, up to 200  $\mu$  long branches), 4 & 5 glabrous outside. *Corolla* 8–8<sup>1</sup>/<sub>2</sub> mm, tube 2 mm; midpetaline field 3.2–4 by 1.6–1.9 mm, rather sparsely stellate-hirsute, in the lower part (1–2 mm) only along the margin (hairs (3–)4–7(–8)-branched, branches subequal or, usually, one stronger and longer, up to 500  $\mu$  long); lobules 3.2–4 by 2–2.5 mm, rather thin, with slightly distinct venation, entire. *Stamens* inserted 0.8–1 mm above the corolla-base; filament 1–1.2 mm long, 0.4–0.5 mm broad at the base; anther 1–1.3 mm long, 0.6–0.8 mm broad, 0.5 mm thick, acute to obtuse at the apex, slightly cordate at the base. *Ovary* ovoid, 1.1–1.7 by 1–1.7 mm, glabrous; stigma conical, with 5 distinct and 5 rather low ridges. Fruit unknown.

Distr. *Malaysia*: Borneo (mainly collected in Br. N. Borneo).

Ecol. In lowland forest.

var. *collina* HOOGL. *Blumea* 7 (1953) 310.

Shrub-like tree, up to 12 m by 30 cm. Leaves 8–12 by 2<sup>1</sup>/<sub>2</sub>–5 cm. Sepals rather densely stellate-hirsute outside (branches up to 500  $\mu$  long).

Distr. *Malaysia*: Borneo (Mt Kinabalu in Br. N. Borneo and Mt Irekan in Sarawak).

Ecol. In forests from 600 to 1200 m.

Note. *Var. collina* differs slightly from *var. borneensis* by the characters given above. The leaves are usually rather silvery shining (like in *E. glomerata* BL.) in *var. collina*. A single inter-

mediate not localized Bornean collection - is MOTLEY 6.

37. *Erycibe aenea* PRAIN, J. As. Soc. Beng. 58, 2 (1894) 85; *ibid.* 74, 2 (1906) 295; RIDL., Fl. Mal. Pen. 2 (1923) 446; BURK. Dict. (1935) 943.

Liana, up to 50 m by 10 cm, young branches stellate-hirsute, older ones rather smooth with few to many orbicular lenticels. *Leaves* coriaceous, elliptic-oblong to oblong, ca 6–15 by 2<sup>1</sup>/<sub>2</sub>–7 cm, 4–6(–7)-nerved; acuminate at the apex, obtuse to rounded at the base; glabrous, with slightly sunken midrib, nerves, and major venation, usually indistinct minor venation above; glabrous, with slightly sunken to slightly prominent nerves and distinctly sunken venation beneath; margin slightly recurved. Petiole 5–8 mm. *Inflorescences* axillary, 1–4 cm, (1–)2–5(–10)-flowered. Flowers very fragrant. Pedicel 1 mm. *Sepals* 1 & 2 about orbicular to transverse-oval, 2–2.3 by 2.5–2.8 mm, 4 & 5 transverse-oval, 2–2.5 by 3–3.5 mm, densely stellate-hirsute outside (hairs with 5–11 subequal, up to 300  $\mu$  long branches, pale brown when dry). *Corolla* light or bright yellow, 7–8<sup>1</sup>/<sub>2</sub> mm, tube 2–2<sup>1</sup>/<sub>2</sub> mm; midpetaline field 3.3–4 by 2.3–2.4 mm, lower part stellate-hirsute (hairs with 5–10 subequal, up to ca 250  $\mu$  long branches), upper part appressed-hairy (hairs with 4–8 branches, one distinctly longer and stronger, up to 750  $\mu$  long); lobules 3–4 by 2.8–3.5 mm, entire, coherent above the midpetaline field for 1<sup>1</sup>/<sub>2</sub> mm. *Stamens* inserted 0.7–0.8 mm above the corolla-base; filament 0.6–0.7 mm long, 0.5–0.7 mm broad at base; anther 0.8–1 mm long, 0.6–0.8 mm broad, 0.4 mm thick, acuminate (sterile acumen 0.2 mm) at the apex, slightly cordate at the base. *Ovary* 1 by 1–1.3 mm, glabrous or shortly hirsute at the extreme apex; stigma conical, with 10 ridges. *Fruit* ellipsoid or obpyriform with rounded apex and base, 24 by 17 mm, with scurvy surface. Cotyledons plain.

Distr. *Malaysia*: Sumatra and Malay Peninsula.

Ecol. In open jungle up to 750 m.

Vern. *Langsat hutan*, Pahang (= woodland *Lansium*).

Uses. Medicinal use is unimportant (cf. BURKILL, l.c.).

38. *Erycibe macrophylla* HALLIER f. Bull. Herb. Boiss. 5 (1897) 741; KOORD. Exk. Fl. Java 3 (1912) 115.

Climbing shrub, younger branches stellate-hirsute, older ones with few orbicular lenticels. *Leaves* coriaceous, ovate-oblong to obovate-oblong, (10–)14–20 by 6–9 cm, 6–7(–8)-nerved, obtuse to acute, short-acuminate at the apex, rounded to obtuse, rarely acute at the base; rather densely stellate-hirsute, soon glabrescent, with slightly prominent midrib, nerves, and venation above; rather densely stellate-hirsute, glabrescent, with prominent nerves and faintly prominent to indistinct venation beneath. Petiole (6–)10–16 mm. *Inflorescences* terminal or axillary, 1<sup>1</sup>/<sub>2</sub>–12 cm, 5–50-flowered. Pedicel 1<sup>1</sup>/<sub>2</sub>–5 mm. *Sepals* trans-

verse-oval, 1 & 2 2-2.3 by 3-3.5 mm, 4 & 5 2.3-2.8 by 3.5-4.8 mm, rather sparsely stellate-hirsute (hairs with 4-8 subequal, up to 300  $\mu$  long branches) in basal part outside, all glabrous along margins. *Corolla* 9-11 mm, tube 2 $\frac{1}{2}$ -3 mm; midpetaline field 5-6 by 2.6-3.7 mm, densely appressed-hirsute (hairs with 4-8 branches, one distinctly stronger and longer, up to 600  $\mu$  long); lobules 4-4 $\frac{1}{2}$  by 4-5 mm, rather thin, with rather distinct venation, crenulate at margin. *Stamens* inserted 1-1 $\frac{1}{2}$  mm above the corolla-base; filament 0.8-1 mm long, 0.5-0.7 mm broad at base; anther 1.7-2.1 mm long, 0.4-0.6 mm broad, 0.4-0.5 mm thick, acute at the apex, cordate at the base. *Ovary* 1.5-2 by 1.3-1.6 mm, glabrous; stigma conical, with 5 low ridges. Fruit unknown.

Distr. *Malaysia*: Central Java (Mt Ungaran, coll. JUNGHUHN).

Ecol. In forests.

Note. The species is closely related to *E. rheedii* BL., from which it differs, besides by the indumentum on the outer side of the calyx, by the larger corolla with particularly larger lobules and the thinner lobules in which the venation is distinct. The indumentum on the lower side of the leaves is longer persistent.

39. *Erycibe citriniflora* GRIFF. Not. 4 (1854) 284; PRAIN, J. As. Soc. Beng. 73, 2 (1904) 17; RIDL. Fl. Mal. Pen. 2 (1923) 445; KERR, Fl. Siam. En. 3 (1951) 94.—*E. glomerata* WALL. [Cat. (1828) no 1338, *nomen*] ex CHOISY, Ann. Sc. Nat. II, 1 (1834) 224; DC. Prod. 9 (1845) 465; CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 85, *non* BL. 1826.—*E. wallichii* PRAIN & HALLIER f. ex HALLIER f. Bull. Herb. Boiss. 5 (1897) 382, 738; PRAIN, J. As. Soc. Beng. 73, 2 (1904) 17.—*E. holobolula* KERR, Kew Bull. 1941, 11; Fl. Siam. En. 3 (1951) 96.

Woody climber or scrambling shrub, younger branches stellate-hirsute, older ones with rather many orbicular to oval lenticels. *Leaves* coriaceous, oblong or elliptic-oblong to obovate-oblong or obovate, 8-23(-30) by 3 $\frac{1}{2}$ -9(-11) cm, 8-12-nerved; obtuse to rounded, usually short-acuminate at the apex, acute to obtuse to rounded, sometimes minutely cordate at the base; sparsely stellate-hirsute, soon glabrescent, with faintly prominent to distinctly sunken midrib, nerves, and venation above; densely stellate-hirsute, glabrescent or not, with prominent nerves and venation beneath. Petiole 7-15 mm. *Inflorescences* axillary, sometimes 2 together,  $\frac{1}{2}$ -4 cm, 2-20-flowered. Flowers fragrant. Pedicel 1 $\frac{1}{2}$ -3 mm. *Sepals* 1 & 2 oval to orbicular, 2.5-3.7 by 2.5-3.7 mm, 4 & 5 transverse-oval, 2.5-3.7 by 3-5 mm, stellate-hirsute outside (hairs with 3-7 branches, one distinctly longer and stronger, up to ca 750  $\mu$  long). *Corolla* yellow or cream-coloured, 7 $\frac{1}{2}$ -9 mm, tube 2 $\frac{1}{2}$ -4 mm; midpetaline field 3.5-5 by 2.3-2.8 mm, rather densely appressed-hairy (hairs with 3-8 branches, one distinctly longer and stronger, up to 800  $\mu$  long); lobules 2 $\frac{1}{2}$ -4 by 3-4 mm, rather thick, without or with faintly visible venation, entire, sometimes coherent above the

midpetaline field for up to 0.7 mm. *Stamens* inserted 0.7-1.5 mm above the corolla-base; filament 0.3-0.7 mm long, 0.6-0.8 mm broad at base; anther 1.7-2 mm long, 0.6-1 mm broad, 0.4-0.5 mm thick, acute to acuminate at the apex (sterile part 0.3-0.6 mm), cordate at the base. *Ovary* 1-1.5 by 1.2-1.8 mm, glabrous or densely short-hirsute; stigma conical, with 10 distinct ridges. *Fruit* ellipsoid, 22 by 14 mm, glabrous or rather sparsely short-appressed-hairy. Cotyledons plain.

Distr. Lower Burma, S. Siam, in *Malaysia*: Malay Peninsula (Kedah, Penang).

Ecol. At low altitudes up to 300 m.

Vern. *Kion, kakit*, Peninsular Siam.

40. *Erycibe rheedii* BL. Bijdr. 16 (1826) 1047; G. DON. Gen. Syst. 4 (1838) 392; KOORD. Exk. Fl. Java 3 (1912) 115; K. & V. Bijdr. 13 Booms. Java (1914) 33; OOSTSTR. in BACK. Bekn. Fl. Java (em. ed.) 8 (1949) fam. 191, 9.—*E. paniculata* (*non* ROXB.) MIQ. Fl. Ind. Bat. 2 (1856) 1032.—*E. angulata* PRAIN, J. As. Soc. Beng. 63, 2 (1894) 84; *ibid.* 74, 2 (1906) 291; RIDL. Fl. Mal. Pen. 2 (1923) 448; BURK. Dict. (1935) 943.

Large climber or creeper, up to 20 m long, rarely a small, crooked tree, younger branches stellate-hirsute, older ones with few orbicular lenticels. *Leaves* thick subcoriaceous, elliptic-oblong to oblong or obovate-oblong, (7 $\frac{1}{2}$ -)12-24(-30) by (3 $\frac{1}{2}$ -)5 $\frac{1}{2}$ -10(-14) cm, (5-)-7-11-nerved; rather shortly acuminate from an obtuse apex, obtuse to rounded or slightly cordate at the base; glabrous, with faintly prominent midrib, nerves, and venation above; sparsely stellate-hirsute, soon glabrescent, with prominent nerves and slightly prominent venation beneath. Petiole 8-15 mm. *Inflorescences* terminal, often with some leaves in basal part, downward passing into axillary. 1-23 cm, 5-200-flowered. Pedicel 1 $\frac{1}{2}$ -5 mm. *Sepals* 1 & 2 broadly ovate to orbicular or transverse-oval, 2.3-3.2 by 2-4.2 mm, 4 & 5 transverse-oval, 1.8-3.1 by 2.5-4.5 mm, rather densely stellate-hirsute outside (hairs with (3-)-4-6(-8) subequal, up to 250  $\mu$  long branches). *Corolla* white or cream-coloured, 7-9 mm, tube 2-3 mm; midpetaline field 3-4 by 1.8-2.8 mm, rather densely stellate-hirsute (hairs with (3-)-4-6(-8) branches, subequal, up to 200  $\mu$  long, or one stronger branch up to 400  $\mu$  long); lobules 2.2-3.5 by 2.2-3.5 mm, rather thick, without distinct venation, slightly crenate at margin. *Stamens* inserted 0.8-1.2 mm above the corolla-base; filament 0.7-1 mm long, 0.5-0.8 mm broad at the base; anther 1.9-2.5 mm long, 0.7-0.9 mm broad, 0.5-0.6 mm thick, acuminate (sterile acumen 0.3-0.8 mm) at the apex, cordate at the base. *Ovary* 1-2 by 0.8-2 mm, glabrous or lower part glabrous, upper part stellate-hirsute; stigma conical, with 10 distinct ridges. *Fruit* ellipsoid, 20 by 12 mm, dirty yellow-brownish or blue, glabrous or with some stellate hairs near apex. Cotyledons plain.

Distr. *Malaysia*: Sumatra, Malay Peninsula, W. Java, and Br. N. Borneo.

Ecol. In scrub, young forest, or swampy forest at low altitudes (100-250 m).

Vern. *Olor bahai*, Simalur, *panawar ganggang*, Palembang, *akar tampang ari, tampang ari, tampang ular ari, rumput ular ari*, Mal. Pen.

Uses. Medicinal use is unimportant (cf. BURKILL).

Note. *E. macrophylla* HALLIER f. is a closely related species; cf. under that species.

41. *Erycibe expansa* WALL. [Cat. (1828) no 1331, *nomen*] ex G. DON, Gen. Syst. 4 (1837) 392; CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 181; PRAIN, J. As. Soc. Beng. 63, 2 (1894) 84; *ibid.* 74, 2 (1906) 289; RIDL. Fl. Mal. Pen. 2 (1923) 445; KERR, Fl. Siam. En. 3 (1951) 95.—*E. paniculata* var. *expansa* CHOISY in DC. Prod. 9 (1845) 464; MIQ. Fl. Ind. Bat. 2 (1859) 1032.—*E. ferruginosa* GRIFF. Not. 4 (1854) 283.

Woody climber, younger branches stellate-hirsute, older ones with distinct longitudinal cork-ridges. Leaves oval to elliptic-ovate, 2<sup>1</sup>/<sub>2</sub>–8 by 1<sup>1</sup>/<sub>2</sub>–5 cm, 3–4(–5)-nerved; obtuse to acute, often slightly acuminate at the apex, obtuse to rounded, sometimes minutely cordate at the base; rather sparsely stellate-hirsute, glabrescent, with slightly sunken midrib and slightly raised nerves and venation above; stellate-hirsute, indumentum rather long persistent, with slightly prominent nerves and venation beneath. Petiole 3–7 mm. *Inflorescences* terminal, usually with some leaves in the basal part, upward often with reduced leaves along the axis, 4–30 by 1<sup>1</sup>/<sub>2</sub>–10 cm, 10–250-flowered. Flowers fragrant. Pedicel 1–2 mm. *Sepals* oval, 2.6–3 by 2.2–2.5 mm, densely stellate-hirsute outside (hairs with 3–5 branches, subequal or one longer up to 500  $\mu$  long). *Corolla* white, 7<sup>1</sup>/<sub>2</sub>–9<sup>1</sup>/<sub>2</sub> mm, tube 2<sup>1</sup>/<sub>2</sub> mm; midpetaline field 3.5–4.5 by 2–2.4 mm, densely appressed-hairy (hairs mainly 3-branched, few with 2 or more branches, generally one stronger, up to 900  $\mu$  long branch); lobules 2.8–4 by 2.5–3.5 mm, rather thick, without distinct venation, entire. *Stamens* inserted 1 mm above the corolla-base; filament 0.7–0.8 mm long, 0.3–0.4 mm broad at the base; anther 1.5–1.7 mm long, 0.8 mm broad, 0.7 mm thick, acuminate at the apex (sterile acumen 0.6–0.7 mm), slightly cordate at the base. *Ovary* 0.8 by 1 mm, glabrous; stigma conical, with 5 distinct ridges. *Fruit* ellipsoid, 12 by 6 mm, glabrous. Cotyledons plain.

Distr. Lower Burma (from Moulmein S. wards), Peninsular Siam, ?Nicobar Islands, in *Malaysia*: Malay Peninsula (N. part, S. to Penang).

Ecol. In scrub at low altitude.

Vern. *Lin sua, sai ma, yan pao kân*, Peninsular Siam.

Uses. The stems are used by fishermen for ropes (Tavoy).

Note. A closely related species, not found in Malaysia, is *E. peguensis* (CLARKE) PRAIN from Northern Burma (Chittagong to Moulmein), Northern Siam, and the Andaman and Nicobar Islands. The only record of the present species from the Nicobar Islands is a badly labelled old fragmentary specimen.

42. *Erycibe tomentosa* BL. Bijdr. 16 (1826) 1048; DC. Prod. 9 (1845) 464; MIQ. Fl. Ind. Bat. 2 (1859) 1033; KOORD. Exk. Fl. Java 3 (1912) 115; OOSTSTR. in BACK. Bekn. Fl. Java (em. ed.) 8 (1949) fam. 191, 8.—*E. princii* WALL. [Cat. (1828) no 1335, '*princei*', *nomen*] ex CHOISY, Ann. Sc. Nat. II, 1 (1834) 223; DC. Prod. 9 (1845) 464; MIQ. Fl. Ind. Bat. 2 (1859) 1033; CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 182; PRAIN, J. As. Soc. Beng. 63, 2 (1894) 85; *ibid.* 74, 2 (1906) 290; MERR. En. Born. (1921) 508; En. Philip. 3 (1923) 358; RIDL. Fl. Mal. Pen. 2 (1923) 446; BURK. Dict. (1935) 944; HENDERS. Mal. Wild Flowers 2 (1950) 313, f. 295.—*E. camptobotrya* MIQ. Fl. Ind. Bat. Suppl. (1861) 248, 578.—*E. parvifolia* HALLIER f. Bull. Herb. Boiss. 5 (1897) 738, 739.—*E. hirsuta* HALLIER f. Bot. Jahrb. 49 (1913) 376; MERR. En. Born. (1921) 508.—*E. dolichotricha* MERR. Pap. Mich. Acad. Sc. Arts & Lett. 19 (1934) 189.—Fig. 18.

#### KEY TO THE VARIETIES

1. Leaves ovate-, elliptic-, or obovate-oblong, 5–14(–18) by 2<sup>1</sup>/<sub>2</sub>–5<sup>1</sup>/<sub>2</sub>(–8<sup>1</sup>/<sub>2</sub>) cm, 5–8-nerved. Sepals outside with 2–5-branched hairs with subequal, up to 500  $\mu$  long branches. Midpetaline field with hairs with one stronger, up to 1500  $\mu$  long branch . . . var. *tomentosa*
1. Leaves ovate or ovate-oblong, 4–9 by 1<sup>1</sup>/<sub>2</sub>–4 cm, 5–6-nerved. Sepals outside with 2–4-branched hairs with one stronger, up to 1000  $\mu$  long branch. Stronger branch of hairs of midpetaline field up to 2000  $\mu$  long . . . var. *hirsuta*

var. *tomentosa*.—*E. tomentosa* BL. 1826.—*E. princii* WALL. ex CHOISY 1834.—*E. camptobotrya* MIQ. 1861.—*E. parvifolia* HALLIER f. 1897.—Fig. 18.

Creepers, climber, up to 25 m long, or shrub, up to 3 m high, younger branches densely stellate-hirsute, glabrescent, older ones with distinct longitudinal cork-ridges. Leaves ovate-oblong, elliptic-oblong, or obovate-oblong to oblong, 5–14(–18) by 2<sup>1</sup>/<sub>2</sub>–5<sup>1</sup>/<sub>2</sub>(–8<sup>1</sup>/<sub>2</sub>) cm, 5–8-nerved; broad-acute to rounded, usually distinctly acuminate at the apex, obtuse to rounded, usually slightly cordate at the base; densely stellate-hirsute, soon glabrescent, with slightly sunken midrib and faintly prominent to, rarely, slightly sunken nerves and venation above; densely stellate-hirsute, glabrescent, with slightly prominent nerves and slightly to faintly prominent venation beneath. Petiole 3–5(–6) mm. *Inflorescences* axillary, near the apex of the branches passing into terminal, 1–4, terminal ones up to 7 cm long, 3–15(–25)-flowered. Pedicel 1<sup>1</sup>/<sub>2</sub>–3 mm, with small rather broad caducous bracteoles. *Sepals* 1 & 2 orbicular to transverse-oval, 3.5–4.8 by 3.7–5 mm, 4 & 5 transverse-oval, 3.5–4 by 4.2–5 mm, rather sparsely stellate-hirsute outside (hairs with 2–5 subequal, up to 500  $\mu$  long branches). *Corolla* white, 7–9 mm, tube 2<sup>1</sup>/<sub>2</sub>–3 mm; midpetal-

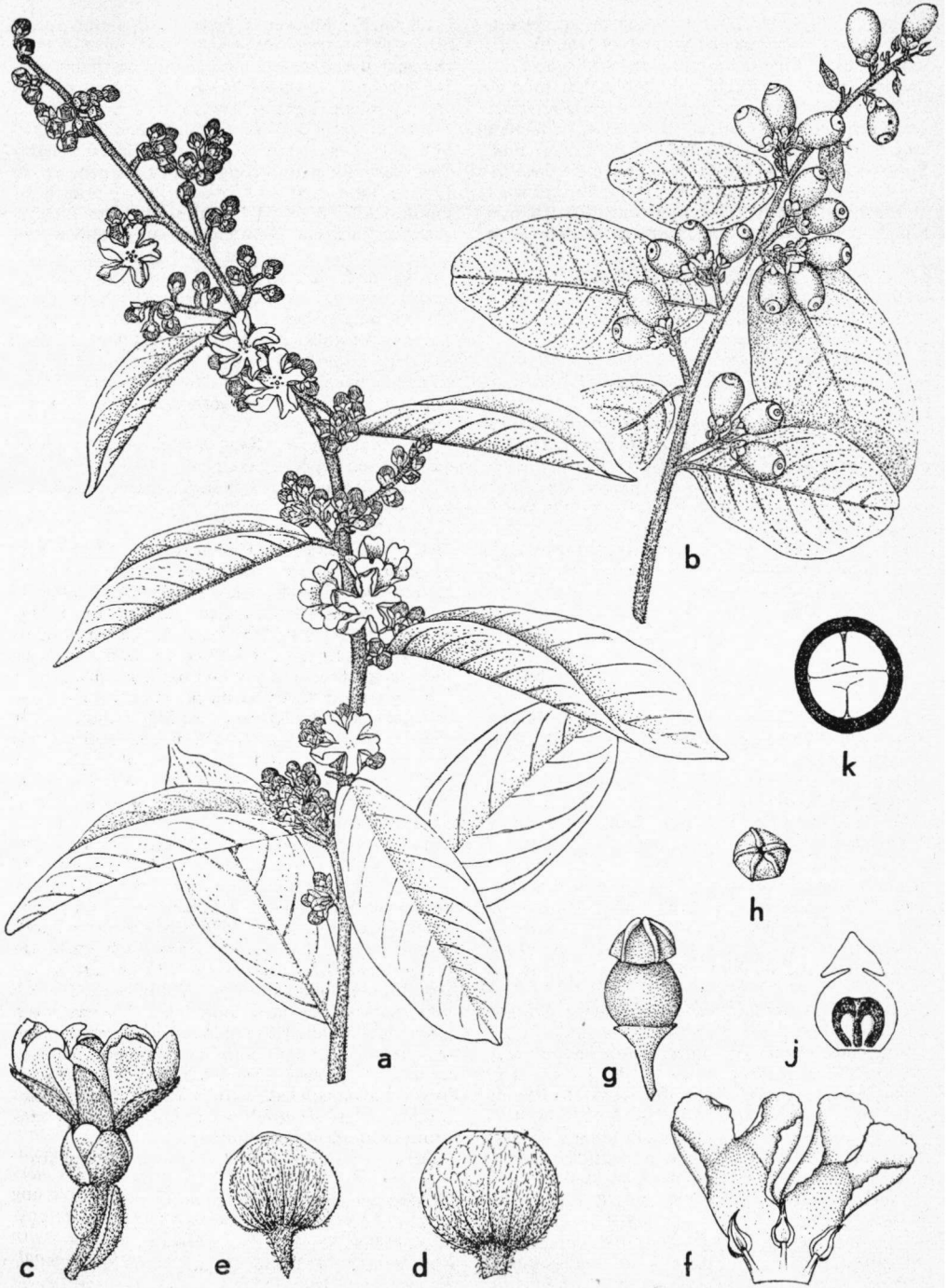


Fig. 18. *Erycibe tomentosa* BL. var. *tomentosa*.—a. Flowering branch,  $\times \frac{3}{4}$ , b. fruiting branch,  $\times \frac{3}{4}$ , c. flower from aside,  $\times 2$ , d. one of two outer, e. one of two inner sepals,  $\times 4$ , f. corolla-lobes from inside,  $\times 3$ , g. ovary, lateral view,  $\times 7\frac{1}{2}$ , h. stigma, apical view,  $\times 7\frac{1}{2}$ , j. ovary, longitudinal section,  $\times 7\frac{1}{2}$ , k. fruit, transverse section,  $\times 2$ .



ine field 3.7–4.3 by 2.2–2.8 mm, densely appressed-hairy (hairs 2–4-branched with one stronger and longer, up to 1500  $\mu$  long branch) with generally (in dry state)  $\pm$  orange coloured hairs; lobules 2.7–3.2 by 3–4 mm, rather thick, without distinct venation, slightly crenate at margin, coherent above the midpetaline field for 1–1½ mm. *Stamens* inserted at 0.8–1.2 mm above the corolla-base; filament 1–1.4 mm long, 0.4–0.5 mm broad at the base; anther 1.3–2 mm long, 0.6–0.8 mm broad, 0.4–0.5 mm thick, acute to acuminate at the apex, cordate at the base. *Ovary* 1–1.2 by 1.3–1.5 mm, glabrous; stigma conical, with 5 distinct ridges. *Fruit* ellipsoid to ovoid, 12 by 7 mm, glabrous, smooth, orange to red, at maturity black. Cotyledons plain.

Distr. *Malaysia*: Sumatra, Malay Peninsula, W. Java, Madura, Kangean Islands, Borneo, Philippines (Leyte).

Ecol. In scrub or forest, up to 1200 m altitude.

Vern. *Akar kait kait*, *akar téklibang*, Banka, *akar pèrut kijang*, *akar sèkiang*, *akar pèlandok*, *akar pèrut kèrbau*, *akar ulan jantan*, *jambul siul*, Mal. Pen., *areuy muhmal*, *rhabet kèmpir*, *aroy kikoning*, S. *tuba tuba*, *akar pulut*, Borneo.

Uses. The long slender stems are strong enough to be used for binding fences.

*var. hirsuta* (HALLIER *f.*) HOOGL. *stat. nov.*—*E. hirsuta* HALLIER *f.* 1913.—*E. dolichotricha* MERR. 1934.

Differs from *var. tomentosa* by the following characters:

*Leaves* smaller, ovate-oblong or ovate, 4–9 by 1½–4 cm, 5–6-nerved. *Sepals* outside with 2–4-branched hairs, with one stronger up to 1000  $\mu$  long branch. Stronger branch of hairs of midpetaline field up to 2000  $\mu$  long.

Distr. *Malaysia*: Sumatra (E. Coast), Malay Peninsula (Singapore), Borneo, up to 1000 m.

Note. The two varieties have often a marked different habit. The hairs of the younger branches agree with those of the outer side of the sepals, and give in *var. hirsuta* the branches a strongly hirsute appearance. A few collections are more or less intermediate between the two varieties.

43. *Erycibe grandiflora* ADELB. in HOOGL. *Blumea* 7 (1953) 313.

Scandent shrub or liana. Branches densely stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* subcoriaceous, ovate to ovate-oblong to oblong, 5–18 by 1½–7 cm, 4–7-nerved; obtuse to acute, usually more or less acuminate at the apex, obtuse to rounded, sometimes slightly cordate at the base; sparsely stellate-hirsute to nearly glabrous, glabrescent, with slightly sunken midrib and slightly prominent nerves and venation above; stellate-hirsute on the intervenium, rather densely so on the midrib and nerves, rather soon glabrescent, with slightly prominent nerves and venation beneath. Petiole 5–7 mm. *Inflorescences* axillary, near the end of the branches sometimes passing into terminal, then often with some leaves in basal part, 1½–4

(–10) cm, 8–50-flowered. Pedicel 1½–4 mm. *Sepals* orbicular to transverse-oval, 3.8–5 by 4–5 mm, rather densely stellate-hirsute outside (hairs with 3–6 subequal, up to 500  $\mu$  long branches). *Corolla* creamy white, light yellowish, or light greenish, 9–10 mm, tube 3–4 mm; midpetaline field 4.3–5 by 2.8–3.2 mm, rather densely appressed-hairy (hairs usually with strong central branch, up to 1300  $\mu$  long, and 1–3 smaller basal branches); lobules 3.2–3.5 by 2.5–4 mm, without distinct venation, slightly crenulate or undulate at the margin. *Stamens* inserted 0.8–1.2 mm above the corolla-base; filament 0.8–1 mm long, 0.5–0.6 mm broad at the base; anther 1.6 mm long, 0.6–0.8 mm broad, 0.5–0.7 mm thick, narrowly acute at the apex (sterile for 0.2–0.6 mm), cordate at base. *Ovary* 0.8–1 by 1.7–1.8 mm, glabrous; stigma conical, with 5 densely warty ridges. *Fruit* ovoid, 1½ by 1 cm, glabrous, smooth, bright red. Cotyledons plain.

Distr. *Malaysia*: New Guinea (Biak, Hollandia, and the Sepik region).

Ecol. In second growth scrub vegetation (Biak), at low altitude.

44. *Erycibe beccariana* HOOGL. *Blumea* 7 (1953) 310.

Liana, younger branches rather sparsely stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* subcoriaceous, elliptic to elliptic-oblong, 9–15 by 4–7½ cm, 8–10-nerved; slightly acuminate at the apex, obtuse to rounded, sometimes slightly cordate at the base; glabrous, with slightly sunken midrib and prominent nerves and venation above; sparsely stellate-hirsute, soon glabrescent, with prominent nerves and slightly prominent venation beneath. Petiole 8–13 mm. *Inflorescences* axillary, 1–2 cm, 6–12-flowered. Pedicel 2–4 mm. *Sepals* transverse-oval, 1 & 2 ca 2.5 by 3–3.2 mm, 4 & 5 2.7–2.8 by 4.5–5 mm, stellate-hirsute outside (hairs with 3–5 subequal, up to 400  $\mu$  long branches). *Corolla* 8½ mm, tube 2½ mm; midpetaline field 4 by 3 mm, densely appressed-hairy (hairs 4–6-branched, often one branch stronger, up to 700  $\mu$  long); lobules 3.6 by 3 mm, without distinct venation, undulate at the margin. *Stamens* inserted 1–1.2 mm above the corolla-base; filament 1.5–1.7 mm long, 0.5–0.6 mm broad at the base; anther 2.2–2.3 mm long, 0.9–1 mm broad, 0.8 mm thick, acuminate (sterile acumen 0.5–0.6 mm) at the apex, slightly cordate at the base. *Ovary* 1–1.1 by 1.8 mm, glabrous; stigma conical, with 5 rather distinct and 5 faint ridges. *Fruit* ellipsoid, 22 by 9 mm, glabrous, smooth. Cotyledons plain.

Distr. *Malaysia*: W. New Guinea (Vogelkop).

45. *Erycibe malaccensis* CLARKE in HOOK. *f.* Fl. Br. Ind. 4 (1883) 182; PRAIN, J. As. Soc. Beng. 63, 2 (1894) 85; *ibid.* 74, 2 (1906) 291; RIDL. Fl. Mal. Pen. 2 (1923) 446; BURK. Dict. (1935) 944.—*E. paniculata* (non ROXB.) VIDAL, Rev. Pl. Vasc. Filip. (1886) 195.—*E. dubia* ELM. Leaf. Philip. Bot. 2 (1909) 589; MERR. En. Philip. 3 (1923) 358.—*E. celebica* HALLIER *f.* in ELBERT, Sunda-Exped. (1912) 286, *nomen*.

Creepers or climber, up to 30 m, or scandent shrub, up to 3 m, younger branches densely stellate-hirsute, older ones with distinct longitudinal cork-ridges. *Leaves* ovate to elliptic or oblong, 5–16 by 2½–6½ cm, 4–6(–7)-nerved; obtuse to rounded, generally distinctly acuminate at the apex, obtuse to rounded, sometimes slightly cordate at the base; densely stellate-hirsute, soon glabrescent, with slightly sunken midrib and slightly prominent nerves and venation above; densely stellate-hirsute, soon glabrescent, with prominent nerves and venation beneath. Petiole 5–10 mm. *Inflorescences* axillary, near the apex of the branches passing into terminal, 1½–10(–16) cm, 3–15(–20)-flowered. Pedicel 3–10 mm. *Sepals* 1 & 2 orbicular to transverse-oval, 3–4 by 3.2–5 mm, 4 & 5 transverse-oval, 2.7–3.7 by 3.2–5 mm, densely stellate-hirsute outside (hairs with (3–) 4–8 subequal, up to 350 μ long branches). *Corolla* white, 7–11 mm, tube 2–4 mm; midpetaline field 2.5–6 by 2.4–3.5 mm, rather densely appressed-hairy (hairs (2–)3–5(–7)-branched with generally one distinctly longer and stronger, up to 1400 μ long branch); lobules 2½–4½ by 3½–5½ mm, with invisible to rather distinct venation, entire. *Stamens* inserted 0.8–1.5 mm above the corolla-base; filament 0.8–1.5 mm long, 0.3–0.9 mm broad at base; anther 1.3–1.8 mm long, 0.3–0.9 mm broad, 0.3–0.6 mm thick, acuminate (sterile acumen 0.3–0.7 mm) at the apex, cordate at the base. *Ovary* 0.7–1.5 by 1.2–1.7 mm, glabrous; stigma conical, with 5 distinct and, sometimes, 5 low ridges. *Fruit* ellipsoid, 16 by 14 mm, glabrous, smooth, red. Cotyledons plain.

Distr. *Malaysia*: Malay Peninsula, Philippines, Celebes, and ?W. Java (ZOLLINGER).

Ecol. In open jungle or in primary forest, from low altitude up to 500 m.

Vern. *Akar perut kijang jantan*, *akar sèkiang*, *akar sèrawan jantan*, Malay Peninsula; Philippines: *balisaog*, *malutai*, Tag., *saladai*, Bis.; *kakuwasa*, *tjapungongo*, Celebes.

Uses. Medicinal use unimportant (cf. BURKILL).

Note. The species is extremely variable as to size and form of the leaves. The specimens from the Malay Peninsula have generally rather small leaves, those from Celebes rather large leaves, while both small- and large-leaved specimens are found in the Philippines. The species is strongly characterized in the herbarium by the yellowish colour of the indumentum and the distinct venation of the lower surface of the leaves.

46. *Erycibe clemensae* OOSTSTR. J. Arn. Arb. 29 (1948) 416, f. 1 & pl. 1.

Shrub or liana, younger branches stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* subcoriaceous, ovate or elliptic to oblong or ovate-oblong, 5–12 by (1½–)2–5½ cm, 5–8-nerved; obtuse or slightly acuminate at the apex, obtuse, sometimes minutely cordate at the base; rather sparsely stellate-hirsute, soon glabrescent, rather glossy, with sunken midrib and faintly prominent to slightly sunken nerves and venation above;

densely stellate-hirsute, rather soon glabrescent, with prominent nerves and venation beneath. Petiole 5–10 mm. *Inflorescences* axillary, sometimes 2 together, 3–9 cm, 10–40-flowered. Pedicel 1½–4 mm. *Sepals* transverse-oval, 1 & 2 2–2.5 by 2.3–3.2 mm, 4 & 5 1.8–2.3 by 2.1–3 mm, rather densely stellate-hirsute outside (hairs with 3–8 subequal, up to 300 μ long branches). *Corolla* cream-yellowish, 6½–8½ mm, tube 1½–2 mm; midpetaline field 3–5 by 2–2.8 mm, rather densely stellate-hirsute (hairs with 4–8 branches, usually one stronger and longer, up to 850 μ long); lobules 2.3–3.5 by 2.4–3 mm, with rather distinct venation, entire. *Stamens* inserted 0.7–0.8 mm above the corolla-base; filament 0.7–1.2 mm long, 0.3–0.5 mm broad at the base; anther 0.8–1 mm long, 0.5–0.7 mm broad, 0.3–0.5 mm thick, obtuse at the apex, slightly cordate at the base. *Ovary* 0.7–1.3 by 0.8–1 mm, glabrous for lower 0.5–0.7 mm. short-hirsute in the upper part; stigma conical, with 5 ridges. Fruit unknown.

Distr. *Malaysia*: E. New Guinea.

Ecol. In forest at 600 m (once noted).

47. *Erycibe schlechteri* PILGER, Bot. Jahrb. 59 (1924) 85.

Scandent, younger branches densely stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* ovate-oblong to oblong, 5–9 by 2.4–3.3 cm, 4–6-nerved, obtuse to acute, slightly acuminate at the apex, obtuse to rounded at the base; rather densely stellate-hirsute, soon glabrescent, with very slightly sunken midrib and indistinct to faintly prominent nerves and venation above; densely stellate-hirsute, rather late glabrescent, with prominent nerves and slightly prominent venation beneath. Petiole 4–6 mm. *Inflorescences* crowded near the end of the branches, about 3 in the axil of each of the one or two upper leaves. 4–8 cm, 20–40-flowered, with small leafy bracts up to 12 by 5 mm along the main branch. Flowers known only in old bud stage. Pedicel 1–3 mm. *Sepals* 1 & 2 obovate, 3 by 2.7 mm, 4 & 5 transverse-oval, 2.6 by 3.2 mm, densely stellate-hirsute outside (hairs 4–6(–7)-branched, branches subequal, sometimes one stronger, up to 700 μ long branch). *Corolla* (not fully expanded) 6 mm, tube 1½ mm; midpetaline field 2.5 by 1.8 mm, densely appressed-hairy (hairs with 3–4 branches, generally one branch distinctly longer and stronger, up to 1250 μ long); lobules 2.2 by 2 mm, without distinct venation, entire. *Stamens* inserted 0.5 mm above the corolla-base; filament 0.3 mm long, 0.5 mm broad at the base; anther 1.5 mm long, 0.6 mm broad, 0.4 mm thick, acuminate (sterile acumen 0.3 mm) at the apex, cordate at the base. *Ovary* 0.8 by 1.3 mm, densely stellate-hirsute over the whole surface; stigma conical, with 5 ridges. Fruit unknown.

Distr. *Malaysia*: NE. New Guinea.

48. *Erycibe puberula* HOOGL. Blumea 7 (1953) 316.

Liana, younger branches stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* elliptic-oblong to oblong, 6–14 by 3–8 cm, 6–7-nerved.

obtuse, often slightly acuminate at the apex, obtuse at the base; glabrous, with slightly prominent midrib and faintly prominent nerves and venation above; densely stellate-hirsute on midrib and nerves, glabrescent on nerves, glabrous on the intervenium, with sharply prominent nerves and slightly prominent venation beneath. Petiole 8–15 mm. *Inflorescences* axillary, near the end of the branches sometimes passing into terminal, (2½–)4–10 cm, (10–)25–80-flowered. Pedicel 1–4 mm. *Sepals* 1 & 2 orbicular, 2.5 by 2.5 mm, 4 & 5 transverse-oval, 2.2 by 2.7 mm, densely stellate-hirsute outside (hairs with 5–8 subequal, up to 200 μ long branches). *Corolla* 6 mm, tube 2 mm; midpetaline field 2.5 by 1.8 mm, rather densely stellate-hirsute (hairs with 3–5 branches, usually one stronger and longer, up to 450 μ long); lobules 2 by 2½–3 mm, without distinct venation, crenulate at the margin. *Stamens* inserted ½ mm above the corolla-base; filament 0.8 mm long, 0.4 mm broad at the base; anther 1.2 mm long, 0.7 mm broad, 0.4 mm thick, acuminate (sterile acumen 0.5 mm) at the apex, cordate at the base. *Ovary* 0.7 by 1.2 mm, lower half glabrous, upper half slightly stellate-hirsute; stigma conical, with 5 more or less distinct ridges. *Fruit* ellipsoid, 18 by 10 mm, glabrous except few hairs near the apex. Cotyledons plain.

Distr. *Malaysia*: NW. New Guinea (twice collected near Bernhard bivouac).

Ecol. In forest, 50 and 1200 m altitude.

49. *Erycibe brassii* HOOGL. *Blumea* 7 (1953) 311.

Liana, young branches stellate-hirsute, older ones with distinct longitudinal cork-ridges. *Leaves* rather thin, elliptic-oblong to ovate-oblong, 7½–16 by 4–6½ cm, 4–7-nerved; obtuse at the base, slightly acuminate at the apex; stellate-hirsute, soon glabrescent, with sunken midrib and slightly prominent nerves and venation above; stellate-hirsute, soon glabrescent, with prominent nerves and venation beneath. Petiole 7–11 mm. *Inflorescences* axillary, 1–2½ cm, 8–12-flowered. Pedicel 2½–4 mm long. *Sepals* subequal, transverse-oval, 2.7 by 3.5 mm, stellate-hirsute outside (hairs with 3–5 subequal, up to 400 μ long branches). *Corolla* waxy yellow, 8 mm, tube 2½ mm; midpetaline field 4 by 2 mm, densely appressed-hairy (hairs mainly 2-, few 3-branched, up to ca 1250 μ total length); lobules 3.8 by 3 mm, without distinct venation, entire. *Stamens* inserted 0.8 mm above the corolla-base; filament 1 mm long, 0.6 mm broad at the base; anther 1.8 mm long, 1 mm broad, 0.7 mm thick, acuminate (sterile acumen 0.5 mm) at the apex, cordate at the base. *Ovary* 1.4 by 1.1 mm, lower 0.8 mm glabrous, upper 0.6 mm stellate-hirsute; stigma conical, with 10 ridges. *Fruit* unknown.

Distr. *Malaysia*: SE. New Guinea (Lower Fly River), once collected.

Ecol. Liana in canopy layer of rain-forest at low altitude.

50. *Erycibe subglabra* SCHEFF. ex HOOGL. *Blumea* 7 (1953) 317.

Scandent shrub, younger branches rather densely stellate-hirsute, soon glabrescent, older ones with distinct longitudinal cork-ridges. *Leaves* elliptic to oblong, 6–13 by 2½–6½ cm, 5–7-nerved; obtuse to acute, usually slightly acuminate at the apex, obtuse to rounded, sometimes slightly cordate at the base; glabrous on both sides; with slightly sunken midrib and slightly prominent nerves and venation above; with prominent nerves and venation beneath. Petiole 6–12 mm. *Inflorescences* axillary, sometimes 2(–3) together, 1½–6 cm, 5–50-flowered. Pedicel 2–4 mm. *Sepals* 1 & 2 orbicular to transverse-oval, 3–3½ by 3–4 mm, 4 & 5 transverse-oval, 3–3.2 by 4–4.2 mm, rather sparsely to rather densely stellate-hirsute outside (hairs with 3–8 subequal, up to 500 μ long branches). *Corolla* yellow, 8 mm, tube 2–3 mm; midpetaline field 2.8–3.5 by 2.5 mm, densely appressed-hairy (hairs (2–)3–6(–9)-branched with generally one stronger, up to 1000 μ long branch); lobules 3–3½ by 3 mm, rather thick, without distinct venation, faintly crenulate at margin. *Stamens* inserted 0.8–1.3 mm above the corolla-base; filament 0.7–1 mm long, 0.8 mm broad at the base; anther 1.9–2 mm long, 0.8–1 mm broad, 0.5–0.6 mm thick, acuminate at the apex (sterile acumen 0.5–0.6 mm), cordate at the base. *Ovary* ellipsoid, 1.2 by 1.7–2.2 mm, glabrous for the lower 0.3–0.4 mm, appressed-hairy for the upper part; stigma conical, with 5 distinct and 5 faint ridges. *Fruit* ellipsoid, 1.7 by 1.1 mm, glabrous except for some hairs at the extreme apex, smooth. Cotyledons plain.

Distr. *Malaysia*: Moluccas (Ceram, Ambon).

Ecol. Seashore (once noted).

51. *Erycibe impressa* HOOGL. *Blumea* 7 (1953) 314.

Liana, up to 45 m long, older branches with distinct longitudinal cork-ridges. *Leaves* coriaceous, elliptic-oblong, 7–12 by 3–5 cm; acuminate from an obtuse to broad-acute apex, obtuse at the base; glabrous on both sides; with slightly sunken midrib, nerves, and venation above; with slightly sunken nerves and venation beneath. Petiole 7–14 mm. *Inflorescences* axillary, few-flowered (1–3-fruited), up to 1½ cm long. Flowers unknown. Fruiting pedicel 6–10 mm. *Sepals* (in fruit) transverse-oval, 4 by 5 mm, sparsely strigose outside (hairs 2-branched, up to 400 μ total length). *Fruit* ellipsoid, 17 by 12 mm, glabrous, lower ½–2/3 part smooth, upper 2/3–1/3 part scurfy. Cotyledons plain.

Distr. *Malaysia*: Br. N. Borneo (Mt Kinabalu), once collected.

Ecol. On edge of jungle at ca 1000 m altitude.

52. *Erycibe induta* PILGER, *Bot. Jahrb.* 59 (1924) 86.

Large liana, younger branches stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* elliptic-oblong, 6–12 by 3–5½ cm, 4–5-nerved, obtuse to subacute, slightly acuminate at the apex, obtuse at the base; rather densely stellate-hirsute, soon glabrescent, with slightly sunken midrib, faintly sunken nerves, and indistinct venation

above; densely stellate-hirsute, later on floccosely glabrescent; indumentum long-persistent along the midrib and nerves, with prominent nerves, faintly prominent major venation, indistinct minor venation beneath. Petiole 5–12 mm. *Infructescences* axillary or terminal, 4–15 cm, 5–40-flowered. Flowers unknown. *Sepals* (in fruit) 1 & 2 orbicular to transverse-oval, 2.3–2.5 by 2.5–2.8 mm, 4 & 5 transverse-oval, 2.1–2.3 by 3 mm, densely stellate-hirsute outside (hairs with 5–8 subequal, up to 200  $\mu$  long branches). *Fruit* ellipsoid, 10 by 7 mm, brown-red, glabrous except some short stellate hairs on the apical part. Cotyledons plain.

Distr. *Malaysia*: E. New Guinea (Sepik region), once collected.

Ecol. In dense forest at low altitude.

53. *Erycibe zippellii* HOOGL. *Blumea* 7 (1953) 319.

Scandent, younger branches rather densely stellate-hirsute, older ones with longitudinal cork-ridges. *Leaves* subcoriaceous, elliptic-oblong, 5–8½ by 2–4½ cm, 4–5-nerved, rounded to obtuse, slightly acuminate at the apex, obtuse at the base; glabrous, with sunken midrib and prominent nerves and venation above; minutely stellate-hirsute, soon glabrescent, with prominent nerves

and indistinct venation beneath. Petiole 6–10 mm. *Infructescences* axillary, sometimes 2 together, up to 6 cm, ca 10(?)-flowered. Flowers unknown. Pedicel (in fruit) 4–6 mm. *Sepals* (in fruit) transverse-oval, 1 & 2 2–2.5 by 3–3.2 mm, 4 & 5 2.2–2.5 by 3–3.7 mm, rather densely stellate-hirsute (hairs with 3–5 subequal, up to 250  $\mu$  long branches). *Fruit* ovoid, 7 by 5 mm, glabrous except for some short stellate hairs near the apex.

Distr. *Malaysia*: W. New Guinea (Triton Bay).

Excluded

*E. paniculata* ROXB. has been reported from *Malaysia* several times. This species, however, is restricted to India and close surroundings and has never been collected in *Malaysia*. All records of it appear to refer to other species.

*E. paniculata* var. *coccinea* F. M. BAIL. [*E. coccinea* (F. M. BAIL.) HOOGL.] is endemic in Northern Queensland. It is recorded from New Guinea (Queensl. Agric. J. 23, 1909, 219). I have not seen the specimen on which this record has been based, but I doubt whether it belongs to *E. coccinea*.

## 8. JACQUEMONTIA

CHOISY, Mém. Soc. Phys. Genève 6 (1833) 476; OOSTSTR. *Blumea* 3 (1939) 267.—Fig. 19–20.

Herbaceous or woody twiners, rarely erect, generally hairy with stellate hairs, very rarely glabrous. *Leaves* mostly petioled, variable in size and shape, often cordate, entire, rarely dentate or lobed. *Flowers* in axillary, mostly peduncled, umbelliform or capitate cymes, with or without an involucre, rarely in scorpioid cymes, or solitary, or in dense terminal spikes or heads. Bracts small, linear to lanceolate, or larger and foliaceous. *Sepals* 5, equal, or more or less unequal, often with larger outer ones. *Corolla* regular, medium-sized or small, funnel-shaped or campanulate, blue, lilac, pink, or rarely white, with 5 distinctly marked midpetaline bands, limb 5-toothed or nearly entire, rarely 5-lobed. Stamens and style included. Stamens 5, filaments adnate to the corolla, filiform. Pollen smooth. Disk small or none. Ovary 2-celled, each cell with 2 ovules; style 1, simple, filiform; stigmas 2, mostly elliptic or oblong and complanate, rarely linear or globose. *Capsule* globose, 2-celled, 4- or usually 8-valved. *Seeds* 4 or less, smooth or minutely papillose, glabrous or velutinous, the dorsal edges often with a narrow scarious wing.

Distr. *Ca* 120 spp., the greater part of which in tropical and subtropical America; a few spp. also in the tropical and subtropical parts of the Old World.

Note. The genus can be subdivided into 4 sections, of which the *Cymosae* MEISSN. (Fl. Bras. 7, 1869, 292, 294) are represented in *Malaysia*.

### KEY TO THE SPECIES

1. Leaves oblong or lanceolate, narrowed at the base, shortly petioled . . . . . 4. *J. browniana*
1. Leaves ovate, cordate, broadly rounded or truncate at the base; petiole well-developed, slender.
2. Outer sepals longer than inner ones, attenuate or acuminate towards the acute apex (in one variety subobtuse).
3. Stigmas filiform. Bracts small to minute, 5 mm long or less. Corolla *ca* 1 cm long.

4. Two outer sepals ovate-lanceolate to ovate, attenuate to the base, acuminate at the apex (in *var. philippinensis* the outer sepals subobtusate, cuspidate or mucronulate, not distinctly acuminate).
  1. *J. paniculata*
4. Two outer sepals broadly ovate, cordate or rounded at the base, acute to short-acuminate at the apex
  2. *J. zollingeri*
3. Stigmas elliptic. Bracts longer, linear, to 10 mm long. Corolla 1½–2 cm long
  5. *J. pentantha*
2. Outer sepals shorter than inner ones, or sepals subequal in length, obtuse.
  3. *J. tomentella*
5. Sepals subequal in length, densely stellately puberulent. Ovary pilose. Stigmas subglobular.
  6. *J. blanchetii*

1. *Jacquemontia paniculata* (BURM. f.) HALLIER f. Bot. Jahrb. 16 (1893) 541; OOSTSTR. Blumea 3 (1939) 269.—*Ipomoea paniculata* BURM. f. Fl. Ind. (1768) 50, t. 21, f. 3.—*Convolvulus parviflorus* VAHL, Symb. Bot. 3 (1794) 29, non DESR. 1789, nec SALISB. 1796.—*Convolvulus multivalvis* R. BR. Prod. (1810) 483 *var. β.*—*J. umbellata* BOJ. Hort. Maurit. (1837) 229; CHOISY in DC. Prod. 9 (1845) 397.—*Convolvulus valerianooides* BLANCO<sup>1</sup>, Fl. Filip. (1837) 90.—*Convolvulus boerhaavioides* BLANCO<sup>1</sup>, l.c. ed. 2 (1845) 67.—*Breweria valerianooides* F.-VILL<sup>1</sup>. Nov. App. (1880) 143.—*Convolvulus parviflorus* VAHL *var. naumannii* ENGL. Bot. Jahrb. 7 (1886) 472.—*Convolvulus paniculatus* O.K. Rev. Gen. Pl. (1891) 440.—Fig. 19.

## KEY TO THE VARIETIES

1. Three outer sepals elliptic to elliptic-oblong, obtusish, cuspidate to mucronulate, not distinctly acuminate at the apex.
    1. Three outer sepals ovate-lanceolate to ovate, acuminate at the apex. *var. philippinensis*
    2. Leaves glabrous, or short-pilose and glabrescent above and beneath. *var. paniculata*
    2. Leaves mostly densely tomentose, finally glabrescent. *var. tomentosa*
- var. paniculata*.—Fig. 19.

A herbaceous twiner, 1¼–2 m; young specimens erect or decumbent. Stems terete, slender, young parts mostly hairy, and mostly glabrescent. Leaves ovate or ovate-oblong, 2–8 by 1½–5 cm, more or less cordate or rounded to truncate at the base, mostly acuminate and mucronulate at the apex, or sometimes acute to obtuse, glabrous or shortly pilose and glabrescent above and beneath; lateral nerves 5–8 on either side of the midrib, arcuately connected near the margin; petiole slender, 1–6 cm long, finely pilose. Peduncles variable in length, a few mm to several cm, more or less pubescent. Flowers in a loose to very dense few-to many-flowered umbelliform cyme. Pedicels filiform, pubescent, 3–6 mm, or longer in fruit. Bracts small, subulate. Sepals pilose or nearly glabrous, unequal; 3 outer ones, of which the third is often more or less oblique, ovate-lanceolate to ovate, 5–7 mm long, attenuate towards the

base, acuminate to long-acuminate at the apex, with a more or less waved acumen, herbaceous, or the third one with a scarious margin at one side; 2 inner ones shorter, 3–4½ mm long, with a broad-ovate to orbicular basal part with scarious margins, acuminate at the apex. Corolla funnel-shaped, 8–10 mm long, lilac, pale blue, pale pink, often paler to white at the base, or entirely white, 5-lobed, glabrous, or with a few hairs at the mucronulate top of the lobes. Filaments subequal, pubescent at their broadened base. Ovary glabrous. Stigmas filiform. Capsule 3–4 mm in diam., brown, 8-valved, the valves lanceolate, acute. Seeds 4 or less, 1½–2 mm long, brownish yellow to purplish black, minutely verrucose, glabrous, the angles with a very narrow scarious wing.

Distr. Tropical East Africa, Madagascar and adjacent islands to SE. Asia, tropical Australia, and New Caledonia; throughout *Malaysia* (not yet collected in Borneo).

Ecol. Thickets, secondary forests, teak-forests, grassy places, along-fields, hedges, waysides, often on dry soil, from sea-level to ca 600(—880) m.

Vern. *Aroj djotang lembut*, *araj pondolandak*, *S, kapiratu, rawatan, lawatan, J, siembukan, Md, himag, P. Bis.*

Notes. The degree of pubescence is markedly variable; the indument of the inflorescences is often denser than that of the other parts. The sepals are slightly unequal in length; the three outer ones, of which the third one is often oblique at the base, are ovate-lanceolate to ovate, acuminate at the apex and attenuate towards the base. In some specimens from E. Java, and the Kangean Islands, the outer sepals are broader than is commonly found; such specimens closely resemble *J. zollingeri*.

A specimen from the island of Salajar (S. of Celebes, TEYSMANN 13885) has an erect habit; it is in the fruiting stage, flowers and leaves are lacking; the younger branches seem to have been densely tomentose. It might represent a distinct variety, as has been supposed already by HALLIER; until more complete material is available a definite opinion is postponed.

*var. tomentosa* (WARB.) OOSTSTR. *comb. nov.*—*Convolvulus multivalvis* R. BR. Prod. (1810) 483 *var. α.*—*Convolvulus parviflorus* VAHL *var. tomentosus* WARB. Bot. Jahrb. 18 (1894) 207.—*J. multivalvis* HALLIER f. Jahrb. Hamb. Wiss. Anst.

(1) According to MERRILL, Sp. Blanc. (1918) 326.

15 (1898) 42.—*J. paniculata* (BURM. f.) HALLIER f. *var. multivalvis* OOSTSTR. *Blumea* 3 (1939) 274.

Much like *var. paniculata* but the whole plant covered with a dense yellowish brown tomentum, finally glabrescent.

Distr. N. Australia and Queensland, in *Malaysia*: Lesser Sunda Islands (Sumba, Timor),

sepals which are elliptic to elliptic-oblong, obtusish, cuspidate to mucronulate, not distinctly acuminate at the apex, herbaceous; two inner sepals slightly broader, with scarious margins; peduncles filiform and mostly thinner than in *var. paniculata*.

Distr. *Malaysia*: Philippines (Luzon).

Note. This variety varies from short-tomentose to nearly glabrous.

2. *Jacquemontia zollingeri* (CHOISY) HALLIER f. *Bot. Jahrb.* 16 (1893) 543; OOSTSTR. *Blumea* 3 (1939) 275.—*Convolvulus zollingeri* CHOISY in ZOLL. *Syst. Verz.* 2 (1854) 130, 132.

KEY TO THE VARIETIES

- 1. Stems, leaves and inflorescences pubescent to tomentose . . . . . *var. zollingeri*
- 1. Stems and leaves sparsely pilose to glabrescent; inflorescences densely tomentose. *var. jonkeri*

*var. zollingeri*.

A herbaceous twiner, lignescent in the basal parts, pubescent to short-tomentose. Stems terete, glabrescent. *Leaves* ovate, 3–5½ by 2–3½ cm, cordate at the base, acute or short-acuminate at the apex, pubescent to short-tomentose; lateral nerves 7–8 on either side of the midrib; petiole 1–1½ cm. *Peduncles* axillary, rather short, 2–15 mm, pubescent to short-tomentose, cymosely branched, few- to several-flowered. Bracts subulate, the lower to 5 mm long, the upper much shorter. *Sepals* very unequal, the two outer ones broad-ovate, 7 mm long, cordate or rounded at the base, acute to short-acuminate at the apex, herbaceous, pubescent to tomentose; sepal 3 semi-ovate, 6½ mm long, acute, partly herbaceous, partly scarious, two inner sepals lanceolate, 4½ mm long, acute, hairy near the apex, for the rest glabrous. *Corolla* funnel-shaped, 9–11 mm long, pale lilac, shallowly 5-lobed, glabrous. Filaments pubescent at their insertion. Stigmas filiform. *Capsule* 8-valved. Seeds 4, ca 2 mm long, black, minutely verrucose, glabrous, the angles with a very narrow scarious wing.

Distr. *Malaysia*: E. Java (Mt Baluran in Besuki), Lesser Sunda Islands (Bali, Sumbawa, Timor).

Ecol. Thickets, from sea-level to ca 30 m.

Note. This species is closely related to *J. paniculata*; it might possibly be better to consider it merely as a variety of that species. Both show a great resemblance in habit as well as in the shape and size of the leaves and inflorescences. The main difference is found in the shape of the sepals. Typical *J. zollingeri* has the same short and dense tomentum as *J. paniculata var. tomentosa*.

*var. jonkeri* OOSTSTR. *Blumea* 3 (1939) 276.

Stems, leaf-blades and petioles sparsely pilose to glabrescent; peduncles, pedicels and sepals densely tomentose. Peduncles 2–5 mm long. Corolla white.

Distr. *Malaysia*: Lesser Sunda Islands (Timor).

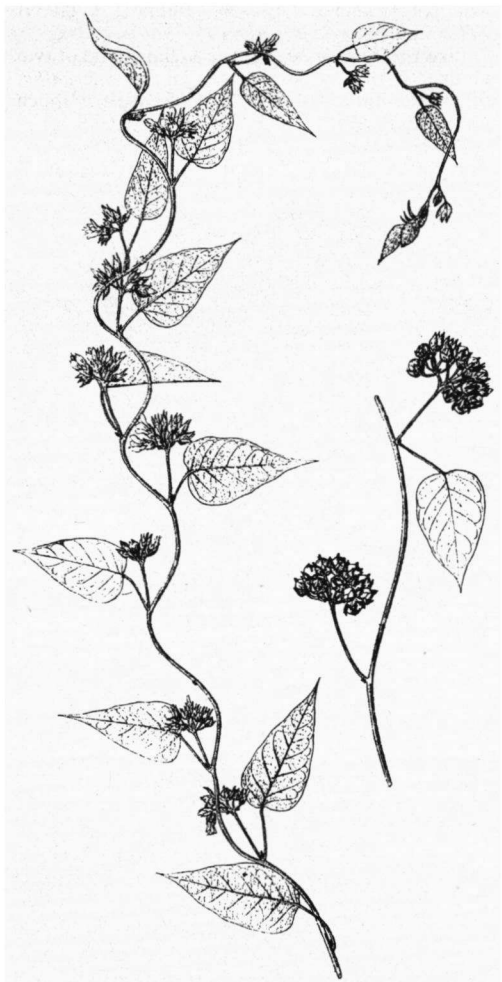


Fig. 19. *Jacquemontia paniculata* (BURM. f.) HALLIER f. *var. paniculata*. Left: flowering specimen; right: fruiting branch, × 1/3.

E. New Guinea, Philippines (Apo Island in Mindoro Strait).

Ecol. In grass-fields, on rocks, from sea-level to ca 1200 m.

*var. philippinensis* OOSTSTR. *Blumea* 3 (1939) 274.

Differs from *var. paniculata* by the three outer

3. *Jacquemontia tomentella* (MIQ.) HALLIER f. *Verst. 's Lands Pl.-tuin Btzg* 1895 (1896) 126; OOSTSTR. *Blumea* 3 (1939) 276.—*Lettsomia tomentella* MIQ. *Fl. Ind. Bat. Suppl.* (1861) 560.—Fig. 20.

## KEY TO THE VARIETIES

1. Sepals 5–6 mm long. Corolla ca 15 mm long. Hairs minute, with 7–13 rays. *var. tomentella*
1. Sepals 3–4 mm long. Corolla 8–10 mm long.
2. Hairs of two kinds, for the greater part with 7–13 rays like in *var. tomentella*, the others with 8–10 rays, one of which is much longer and erect. *var. heteroradiata*
2. All hairs of the same kind.
3. Hairs with 7–13 rays. *var. micrantha*
3. Hairs with 3–4(–5) rays. *var. tomentosa*

*var. tomentella.*

A large, woody twiner to 12 m high. Stems terete, angular upwards, the younger parts densely puberulent with minute stellate (7–13-rayed) pale yellowish brown hairs, making the impression of being farinose, adult parts glabrescent, fistulose. *Leaves* ovate, 6–14 by 4–10 cm, rounded or slightly cordate at the base, acuminate at the apex, stellately puberulent like the stems, paler beneath than above, glabrescent above; lateral nerves 6–7 on either side of the midrib, prominent beneath; secondary nerves parallel; petiole 2–4½ cm, puberulent like the stems, longitudinally grooved above. *Peduncles* axillary, puberulent like the stems, shorter or longer than the leaves, corymbosely branched above; flowers in dense umbelliform inflorescences, forming large, more or less unilateral panicles at the end of the branches. *Pedicels* 3–6 mm. Lower bracts sometimes foliaceous, upper ones much smaller. *Sepals* about equal in length, 5–6 mm; two outer ones ovate, obtuse, three inner ones broad-ovate to orbicular, concave, all puberulent outside and with minute glandular dots, glabrous inside. *Corolla* funnel-shaped, 14–15 mm long or more, pink or white, with 5 densely pilose midpetaline bands. Filaments with dilated, pilose base. Ovary pilose; style pilose near the base; stigmatic lobes thick, nearly globular, wrinkled. Capsule unknown.

Distr. *Malaysia*: Sumatra (W. Coast, Djambi), W. Borneo.

Vern. *Akar kumiet*, Sum. W. Coast, *lehu-lehu*, Djambi.

Note. All parts of the plant are covered with a dense pubescence consisting of very small scale-like stellate hairs, with 7–13 short rays.

*var. micrantha* HALLIER f. *Bot. Jahrb.* 49 (1913) 377; OOSTSTR. *Blumea* 3 (1939) 277.—Fig. 20.

Stellate hairs similar to those in *var. tomentella*, but of a more silvery greyish colour. Flowers smaller. Sepals 3–4 mm long. Corolla 8–10 mm long, red-purple, rose-pink, or white. Capsule ovoid, mucronate, ca 8 mm high, brown; valves 4, lanceolate, acute, hairy at the top. Seeds 4, or often less, brownish black, glabrous.

Distr. *Malaysia*: Sumatra (E. Coast), Borneo. Ecol. Edges of secondary forests; forming dense masses over exposed low undergrowth; below 300 m.

Vern. *Akar guluan*, Sum. E. Coast, *ampur*, W. Borneo, *djelaang*, SE. Borneo, *pangubao*, Br. N. Borneo.

*var. heteroradiata* OOSTSTR. *Blumea* 3 (1939) 277.

Like *var. micrantha*, but the stellate hairs of two kinds, for the greater part as in *var. micrantha*, otherwise with 8–10 rays, one of which is much longer and erect.

Distr. *Malaysia*: SE. Borneo.



Fig. 20. *Jacquemontia tomentella* (MIQ.) HALLIER f. *var. micrantha* HALLIER f. Flowering branch,  $\times 1/3$ .

*var. tomentosa* OOSTSTR. *Blumea* 3 (1939) 278.

Like *var. micrantha*, but the stellate hairs with 3–4, occasionally with 5 rays; rays longer than in *var. micrantha*; hairs often differing in size, often larger ones mixed with smaller. The indument on the lower surface of the leaves is often much denser than on the upper surface; sometimes the upper surface is nearly glabrous.

Distr. *Malaysia*: Borneo (Sarawak).

4. *Jacquemontia browniana* OOSTSTR. *nom. nov.*—*Ipomoea erecta* R.Br. *Prod.* (1810) 487; BTH. *Fl. Austr.* 4 (1869) 427; F.V.M. *Descr. Notes Pap.* Pl. 6 (1885) 15; BAILEY, *Queensl. Fl.* 4 (1901) 1067; *non J. erecta* CHOISY, 1845.

Stems erect or ascending, simple or slightly branched, softly tomentose or villose, with rust-coloured hairs, as well as the foliage and inflorescences. *Leaves* oblong or lanceolate, 2½–5 by ½–1 cm, or the upper ones smaller, narrowed at the base, obtuse or acute at the apex; petiole very short. *Peduncles* mostly shorter than the leaves, 1–3-flowered. Pedicels short, 1–4 mm. Bracts minute, subulate. Outer *sepals* ovate-lanceolate, ca 7–10 mm long, rather acute, softly villose or nearly glabrous; inner ones a little shorter. *Corolla* campanulate, ca 2 cm long, pink. Stigmatic lobes broadly ovate, recurved. *Capsule* 6–8-valved. Seeds glabrous. (Description partly after BROWN, BENTHAM and BAILEY, *ll.cc.*)

Distr. N. Australia, Queensland, Jervis Island (Torres Straits), not yet found in New Guinea proper.

5. *Jacquemontia pentantha* (JACQ.) G. DON, Gen. Syst. 4 (1838) 283; OOSTSTR. *Blumea* 3 (1939) 278. —*Convolvulus pentanthus* JACQ. Coll. 4 (1790) 210.

A glabrous or sparsely hairy twiner. *Leaves* ovate to broad-ovate, 2½–9 by 2–7 cm, cordate to truncate at the base, acuminate at the apex; petiole 1½–4 cm. *Peduncles* long and slender. *Flowers* in a few- to many-flowered umbelliform cyme. Bracts much longer than in *J. paniculata*,

linear, lower ones 5–10 mm. Two outer *sepals* ovate, 7–10 mm long, long-acuminate; third sepal oblique, semi-ovate; two inner sepals much shorter, ovate to lanceolate, acuminate. *Corolla* blue or blue-purple, white at the base, rarely entirely white, mostly larger than in *J. paniculata*, 1½–2 cm long, limb ca 2 cm broad. Stigmas elliptic.

Distr. Subtropical and tropical America; elsewhere, incl. *Malaysia*, cultivated in the tropics as an ornamental.

6. *Jacquemontia blanchetii* MORIC. Pl. Nouv. Am. (1833–46) 41, t. 27; OOSTSTR. *Blumea* 3 (1939) 278.

A glabrous or sparsely hairy twiner, adult stems lignescent, 1½–3 m. *Leaves* ovate or ovate-oblong, 4–8 by 2–4 cm, cordate at the base, acuminate at the apex; petiole 1–3 cm. *Peduncles* long and slender, 5–10 cm. *Flowers* in 3–12-flowered umbelliform cymes. Bracts minute. *Sepals* glabrous; two outer ones ovate to elliptic, 4–6 mm long, obtuse; three inner ones longer, more oblong, 5–7½ mm long, obtuse. *Corolla* blue or violet, the midpetaline bands paler outside, ca 2½–3 cm long. Stigmas broadly elliptic to orbicular.

Distr. Tropical S. America, in *Malaysia* cultivated as an ornamental.

Note. Sometimes cultivated under the erroneous name *J. martii* CHOISY.

## 9. ANISEIA

CHOISY, Mém. Soc. Phys. Genève 6 (1833) 481; 8 (1838) 65; OOSTSTR. *Blumea* 3 (1939) 279.—*Ipomoea* subg. *Aniseia* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 200.—*Ipomoea* § *Aniseia* GAGNEP. & COURCH. in Fl. Gén. Indo-Chine 4 (1915) 231.—Fig. 21.

Prostrate or twining herbs. *Leaves* petioled, linear, oblong, lanceolate, ovate or elliptic, often mucronulate. *Flowers* on axillary peduncles, in one- to few-flowered cymes. *Sepals* 5, herbaceous, acute or acuminate, unequal, the 3 outer ones much larger than the inner, often decurrent on the pedicel, enlarged in fruit. *Corolla* regular, broadly tubular to funnel-shaped, with 5 well-limited hairy midpetaline bands outside, limb 5-toothed or nearly entire. *Stamens* and style included. *Stamens* 5, filaments adnate to the corolla, filiform; pollen smooth. Disk small or absent. *Ovary* glabrous, 2-celled, each cell with 2 ovules; style 1, simple, filiform; stigmas 2, thick, globular or oblong. *Capsule* ovoid or globose, glabrous, 2-celled, 4-valved. Seeds 4 or less, trigonous or globose, black.

Distr. A small genus of at most ca 5 spp. confined to tropical and subtropical America with the exception of one, which also occurs in the tropics of the Old World.

1. *Aniseia martinicensis* (JACQ.) CHOISY, Mém. Soc. Phys. Genève 8 (1838) 66; OOSTSTR. *Blumea* 3 (1939) 279.—*Convolvulus martinicensis* JACQ. Sel. Stirp. Amer. (1763) 26, t. 17.—*Convolvulus uniflorus* BURM. f. Fl. Ind. (1768) 47, t. 21, f. 2.—? *Convolvulus emarginatus* VAHL, Symb. Bot. 3 (1794) 23.—*Ipomoea uniflora* R. & SCH. Syst.

4 (1819) 247.—*A. uniflora* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 483, t. 2, f. 9.—*A. emarginata* HASSK. Cat. Hort. Bogor. (1844) 139.—Fig. 21.

Stems herbaceous, twining or prostrate, rooting in the basal parts (always?), to 1½ m long, terete, finely striate or smooth, appressed-pilose or gla-



brous. *Leaves* narrowly to broadly oblong  $3\frac{1}{2}$ -7 (-11) by  $\frac{3}{4}$ -3(-5) cm, attenuate towards the base, obtuse, truncate or emarginate, and mucronulate at the apex, rarely acute, glabrous or sparsely pilose above, sparsely pilose or rarely glabrous beneath; petiole short,  $\frac{1}{2}$ -2 cm. *Peduncles* 1- or sometimes 2-3-flowered, shorter than the leaves, 2-5 cm long, more or less densely pilose, often denser towards the top. Pedicels shorter than the outer sepals, 5-7 mm or slightly longer, appressed-pilose. Bracts small, narrow-lanceolate to subulate, acute. *Sepals* reticulately veined, the 3 outer ones 12-20 mm long, sparsely pilose outside; sepal 1 & 2 ovate, acute and mucronulate at the apex, rounded, slightly cordate or acute at the base, and shortly decurrent on the pedicel; sepal 3 lanceolate, more or less falcate, shortly decurrent; two inner sepals 10-13 mm long, ovate to lanceolate, acute or acuminate at the apex, not decurrent at the base; outer sepals enlarged in fruit, scarious, 2-2 $\frac{1}{2}$  cm long. *Corolla* funnel-shaped, 2-3 cm long, white; limb shallowly 5-lobed; midpetaline bands hairy, with a hairy mucro; connecting fields glabrous. Filaments hairy at the base. *Capsule* ovoid, valves oblong, acute, brown outside, silvery white and shining inside. Seeds 4 or less, 5-6 mm diam., minutely pilose on the sides, woolly at the edges.

Distr. Pantropic, throughout *Malaysia*: not yet known from the Lesser Sunda Islands.

Ecol. In marshy grasslands, freshwater swamps, marshy thickets, along river-banks, edges of pools, at low altitudes.

Use. Used as a vegetable in the Malay Peninsula and in Borneo.

Vern. *Akar ulan putih*, *akar lidah patong*, Mal. Pen., *bagiu serut*, Djambi, *kurut*, Palembang, *hat bijawak*, W. Kutai, *m(w)anaring-i-lawanau*, *wanaring pante*, Manado, *imerpur*, *dro*, Neth. N. Guinea.



Fig. 21. *Aniseia martinicensis* (JACQ.) CHOISY. Left: flowering branch; right: fruiting branch,  $\times \frac{1}{3}$ .

## 10. CONVULVULUS

LINNÉ, Sp. Pl. (1753) 153; Gen. Pl. ed. 5 (1754) 76; OOSTSTR. *Blumea* 3 (1939) 282.

Annual or perennial, prostrate, erect or twining herbs, or erect undershrubs or shrubs; hairs simple or rarely with 2 arms. *Leaves* entire, or rarely more or less deeply lobed, often spathulate and attenuate into the petiole, or more or less hastate or sagittate at the base. *Flowers* on axillary peduncles, in one- to few-flowered cymes or in dense involucrate heads. *Sepals* 5, equal or subequal, obtuse or acute. *Corolla* regular, medium-sized or small, campanulate or funnel-shaped, white, pink, blue or yellow, with 5 often not well-defined midpetaline bands; limb shallowly lobed or subentire. *Stamens* and style included. Stamens 5; filaments adnate to the corolla, often unequal, filiform; pollen smooth, ellipsoid. Disk annular or cup-shaped. *Ovary* 2-celled, each cell with 2 ovules; style 1, simple, filiform; stigmas 2, filiform. *Capsule* 2-celled, usually 4-valved. Seeds 4 or less, often verruculose, mostly glabrous, black or brown.

Distr. A large genus of ca 250 spp. or more, in the temperate and subtropical regions of both hemispheres, rarer in the tropics; one species in *Malaysia*.

1. *Convolvulus arvensis* LINNÉ, Sp. Pl. (1753) 153; OOSTSTR. Blumea 3 (1939) 283.

A perennial herb. Stems prostrate or twining, glabrous or sparsely pubescent. *Leaves* ovate-oblong to lanceolate, 1½–5 by 1–3 cm, mostly hastate or sagittate at the base, obtuse and mucronulate at the apex, often more or less secund; petiole shorter than the blade. *Peduncles* axillary, 1- or sometimes 2–3- to more-flowered, shorter to longer than the leaves. Pedicels much longer than the calyx. Bracts linear, ca 3 mm long. *Sepals* 3½–5 mm long, slightly unequal, 2 outer ones a little shorter, oblong-elliptic, obtuse, shortly ciliate; inner ones nearly orbicular, obtuse or slightly retuse, more or less distinctly mucronulate. *Corolla* broadly funnel-shaped, ca 2 cm long, white or pink, or white with pink or red midpetaline bands, or pink with red or white midpetaline bands. Stamens slightly unequal, filaments with a broadened base, papillose at the margins. Ovary glabrous. *Capsule* ovoid-globose, 5–8 mm long,

glabrous. Seeds 4, dark brown or black, 3–4 mm long.

Distr. Widely distributed in the temperate parts of both hemispheres, rarely in the subtropics and the tropics, in *Malaysia*: local on Mt Tengger-Smeru (1927) at 2100 m, apparently introduced.

Ecol. In waste places, cultivated land, along roadsides and railways.

Vern. *Bindweed*, E, *akkerwinde*, D.

Excluded

*Convolvulus sphaerostigma* CAV. Icon. 5 (1799) 54, t. 481 (= *Jacquemontia hirsuta* CHOISY) has been mentioned by CAVANILLES from Mindanao and from Mexico. According to MERRILL (Philipp. J. Sc. 10, 1915, Bot. 193; En. Philip. 3, 1923, 359) the Mindanao record was based either on an erroneously localized specimen (Malaspina Expedition), or on an erroneously identified one.

11. CALYSTEGIA

R.BR. Prod. (1810) 483, *nom. cons.*; OOSTSTR. Blumea 3 (1939) 284.—*Convolvulus sect. Calystegia* BTH. Fl. Austr. 4 (1869) 428, 430.

Prostrate or twining, perennial herbs. *Leaves* petioled, mostly glabrous, often sagittate to hastate, with rounded, angular or lobed basal lobes. *Flowers* on axillary, peduncled, one- or rarely few-flowered cymes. Bracts 2, mostly large, ovate or elliptic, embracing the calyx, persistent. *Sepals* 5, subequal, ovate to oblong, acute or obtuse, herbaceous. *Corolla* regular, medium-sized or large, glabrous, campanulate to funnel-shaped, white or pink (rarely yellowish), outside with 5 distinct midpetaline bands; limb shallowly lobed or subentire. *Stamens* and style included. Stamens 5, adnate to the corolla-tube; filaments subequal; pollen globular, smooth. Disk annular. *Ovary* 1-celled or imperfectly 2-celled, 4-ovuled; style 1, simple, filiform; stigmas 2, mostly oblong or elliptic, complanate. *Capsule* ovoid or globose, 4-valved. Seeds 4, smooth or verrucose, black.

Distr. Ca 25 spp. in the warm and temperate regions of both hemispheres; one species in *Malaysia*, possibly only as a casual weed.

1. *Calystegia hederacea* WALL. in ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 94; OOSTSTR. Blumea 3 (1939) 285.—*Convolvulus wallichianus* SPRENG. Syst. 4, 2 (1827) 61.

Probably a perennial herb. Stems slender, prostrate or twining, glabrous. *Leaves* glabrous, oblong to triangular, 1½–4(–7½) by ½–2(–2½) cm, the base cordate or sagittate, the basal lobes rounded and entire, or angular to 2-lobed; the apex obtuse or slightly emarginate; petiole shorter than or nearly as long as the blade. *Peduncles* axillary, 1-flowered, 2–5 cm long. Bracts elliptic, 6–8 mm long, obtuse. *Sepals* oblong, obtuse, mucronulate, glabrous, the outer ones ca 6 (–7½) mm long, the inner ones somewhat shorter. *Corolla* campanulate, ca 2 cm long, pinkish purple, limb subentire. Filaments dilated at the base. Ovary

glabrous; stigmas elongate. *Capsule* ovoid, subacute, ca 7½ mm long, glabrous. Seeds glabrous.

Distr. Abyssinia, S. Asia (from Punjab and Afghanistan to N. and E. Bengal) and E. Asia (China, Amurland, and Japan), in *Malaysia*: Malay Peninsula (Penang), once collected, acc. to PRAIN possibly only a casual weed.

Excluded

*Calystegia sepium* (L.) R.BR. Prod. (1810) 483; OOSTSTR. Blumea 3 (1939) 285.—*Convolvulus sepium* LINNÉ, Sp. Pl. (1753) 153.

This species, mentioned by MIQUEL, BOERLAGE, and KOORDERS for Java, does not occur in *Malaysia*.

## 12. HEWITTIA

WIGHT & ARNOTT, *Madr. J. Sc. I*, 5 (1837) 22.—*Shutereia* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 485, t. 2, f. 11; OOSTSTR. *Blumea* 3 (1939) 286; *non Shuteria* WIGHT & ARNOTT, 1834, *nom. cons. Legum.*—Fig. 22.

A twining or prostrate pubescent herb. *Leaves* petioled, entire, angular or lobed, usually cordate at the base. *Flowers* on axillary peduncles, in one- to few-flowered cymes. Bracts 2, oblong or linear-lanceolate, acuminate, inserted at some distance of the calyx. *Sepals* 5, usually acute, herbaceous; the 3 outer ones large, ovate, accrescent in fruit; the 2 inner ones much smaller. *Corolla* regular, medium-sized, campanulate to funnel-shaped; limb shallowly 5-lobed. *Stamens* and style included; filaments adnate to the corolla-tube, filiform with a dilated base; pollen smooth. Disk annular. *Ovary* hairy, 1-celled, or imperfectly 2-celled at the top, 4-ovuled; style 1, simple, filiform; stigmas 2, ovate-oblong, complanate. *Capsule* 1-celled, more or less distinctly 4-valved. Seeds 4 or less, dull black.

Distr. Monotypic, distributed through the tropics of the Old World, throughout *Malaysia* to *Polynesia*.

1. *Hewittia sublobata* (L. f.) O.K. *Rev. Gen. Pl.* (1891) 441.—*Convolvulus sublobatus* LINNÉ *f. Suppl.* (1781) 135.—*Convolvulus bracteatus* VAHL, *Symb. Bot.* 3 (1794) 25.—*Convolvulus bicolor* VAHL, *l.c.* 25.—*Ipomoea bracteata* R. & SCH. *Syst.* 4 (1819) 227.—*Ipomoea malabarica* (non R. & SCH.) BL. *Bijdr.* (1825) 715.—*Shutereia bicolor* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 486, t. 2, f. 11.—*Convolvulus hederaceus* BLANCO, *Fl. Filip.* ed. 1 (1837) 90.—*H. bicolor* WIGHT & ARNOTT, *Madr. J. Sc. I*, 5 (1837) 22.—*Aniseia bracteata* HASSK. *Pl. Jav. Rar.* (1848) 516.—*Argyreia cymosa* (non SWEET) CLARKE in HOOK. *f. Fl. Br. Ind.* 4 (1883) 190, *quoad specim. Philip.*—*Shutereia sublobata* HOUSE, *Bull. Torr. Bot. Club* 33 (1906) 318; OOSTSTR. *Blumea* 3 (1939) 287.—Fig. 22.

Stems herbaceous, slender, 1–2 m long, prostrate or twining, more or less densely pubescent, glabrescent, angular, occasionally rooting. *Leaves* ovate to broad-ovate, 3–12 by 4–10 cm, cordate or sometimes truncate at the base, the basal lobes entire or angular, sometimes spreading and then the blade more or less hastate; apex acuminate, acute or obtuse, mucronulate; leaf-surfaces appressed-pilose with short hairs, especially beneath, or nearly glabrous; petiole 1–6 cm long, pubescent. *Peduncles* shorter to longer than the petioles, 1–10 cm, pubescent, upwards often more densely so. Pedicels very short, up to 3, in fruit up to 5 mm long. Bracts oblong-lanceolate or narrower, 1/2–1 1/2 cm long. *Sepals* more or less hairy outside and along their margins, unequal, the three outer ones much larger than the inner, broadly to narrowly ovate, 9–15, afterwards to 17 mm long, acute or obtusish; sepal 3 more or less oblique; two inner sepals ovate with a broadened and scariously margined base, 7–7 1/2 mm long; nerves of sepals prominent in fruiting stage. *Corolla* pale yellow or white, mostly with a purple centre, 2–2 1/2 cm long, with 5 pilose midpetaline bands; limb with very short, rounded, emarginate, mucronulate lobes. Filaments with a minutely papillose

base. *Capsule* depressed-globose to more or less quadrangular, mucronate, ca 8 by ca 10 mm, patently pilose. Seeds 2–4, glabrous, except the pubescent hilum, 5–6 mm long.

Distr. Tropical Africa (S. to Natal), tropical

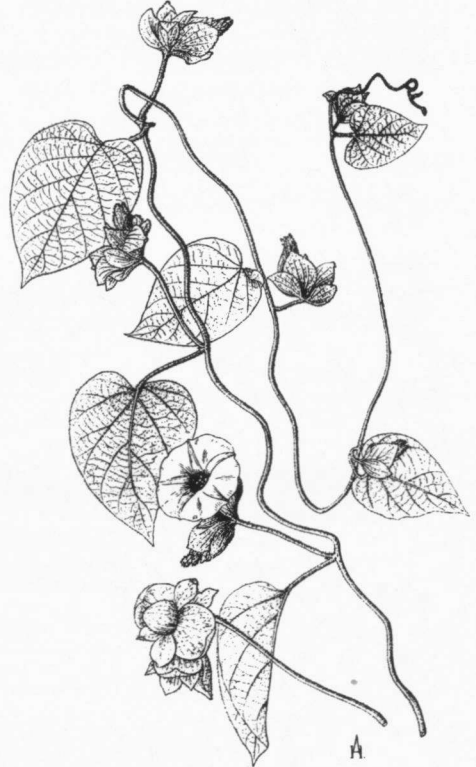


Fig. 22. *Hewittia sublobata* (L. f.) O.K. Flowering specimen and fruiting peduncle,  $\times 1/3$ .

Asia (India, Ceylon, Indo-China, N. to China), Polynesia, throughout *Malaysia*.

Ecol. Open grasslands, thickets, hedges, teak-forests, grassy dikes and waysides, waste places, at low and medium altitudes, both in regions with

a feeble and with a pronounced dry season, from sea-level to 1400 m.

Vern. *Kamet, sembanjan, lawatan, J, uwi malojo*, Manado; Philippines: *banalyan, palupasagig*, P. Bis., *dinukdukto, Ig., pangpipanggi*, Sulu.

13. MERREMIA

DENNSTEDT, (Schlüss. Hort. Malab. 1818, 34, *emend.* HALLIER f. Bot. Jahrb. 16 (1893) 581; OOSTSTR. *Blumea* 3 (1939) 292.—*Skinneria* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 487, t. 6, *non Skinnera* FORST. 1776.—*Spiranthera* BOJ. Hort. Maurit. (1837) 226, *p.p.*, *non* ST. HIL., 1823.—Fig. 23–31.

Herbs or shrubs, usually twining, but also prostrate or erect herbs or low erect shrubs. *Leaves* mostly petioled, variable in shape and size, entire, dentate, lobed or palmately or pedately partite or compound (rarely very small and subulate). *Flowers* axillary, solitary, or in axillary few- to many-flowered variously ramified inflorescences, large, medium-sized or small. Bracts usually small. *Sepals* 5, usually subequal, elliptic to lanceolate, acute or acuminate, or ovate to orbicular, obtuse or emarginate, concave, in several *spp.* enlarged in fruit. *Corolla* regular, funnel-shaped or campanulate, mostly glabrous, white, or yellow to orange, mostly with 5 distinctly nerved midpetaline bands; limb slightly 5-lobed. *Stamens* 5, included; anthers often contorted; filaments filiform, often broadened at the base, often unequal; pollen smooth. *Ovary* 2- or 4-celled, rarely incompletely 2-celled, 4-ovuled; style 1, simple, filiform, included; stigma 2-globular. Disk often annular. *Capsule* generally 4-valved or more or less irregularly dehiscent; 4–1-celled. *Seeds* 4, or less by abortion, glabrous, pubescent or villose, especially at the margins.

Distr. *Ca 80 spp.*. Widely spread in the tropical countries of both hemispheres.

Use. Several species are used in native medicine.

KEY TO THE SPECIES

1. Leaves palmately 5–7-lobed to palmately compound, with 5 leaflets.
2. Peduncles glandular in the upper part, the glands sometimes mixed with patent bristly hairs. Sepals narrow-ovate to oblong, obtuse, to 8 mm long. Corolla 2½ cm long or less, pale yellow, or whitish. Leaves palmately compound, with 5 leaflets . . . . . 7. *M. quinquefolia*
2. Peduncles glabrous or hairy, not glandular.
3. Leaves palmately compound; leaflets 5, entire.
4. Outer sepals glabrous, 7½–8½ mm long, ovate to ovate-oblong, obtuse. Corolla to 5 cm long.
  4. Outer sepals patently hirsute, 15–25 mm long, ovate-lanceolate, acute or acuminate. Corolla 2½–3½ cm long . . . . . 10. *M. aegyptia*
3. Leaves palmately 5–7-lobed or sometimes divided nearly to the base, not palmately compound.
5. Plant entirely glabrous. Leaves palmately divided to far below the middle, with 7 entire, oblong-lanceolate segments. Outer sepals ovate to broad-ovate, obtuse, 23–25 mm long. Corolla *ca* 5½ cm long, yellow . . . . . 9. *M. tuberosa*
5. Plant hairy. Leaf-segments mostly dentate, crenate, or lobed.
6. Leaves palmately divided nearly to the base; segments 5–7, lanceolate, coarsely dentate to irregularly pinnately lobed. Peduncles patently hirsute, pedicels and sepals glabrous. Sepals ovate-lanceolate, acute, 20–25 mm long. Corolla 3–3½ cm long, white with a rose-purple throat.
  6. Leaves palmately 5–7-lobed; lobes broadly triangular to lanceolate, coarsely dentate to crenate, or subentire. Peduncles, pedicels and outer sepals patently hirsute. Sepals oblong or ovate-oblong, obtuse or acutish, 12–20 mm long. Corolla 4–6 cm long, yellow . . . . . 12. *M. vitifolia*
1. Leaves entire, crenate, or at most 3-lobed.
7. Pedicels with a thick, lobed ring immediately below the calyx. Sepals obovate to broadly elliptic or

- orbicular, obtuse or retuse, to 15–18 mm long. Corolla *ca* 4 cm long . . . . . 23. *M. similis*
7. Pedicels without a thick, lobed ring at the apex.
8. Leaves peltate (occasionally with exception of the leaves of the inflorescences).
9. Sepals (15–)18–25 mm long. Corolla 4<sup>1</sup>/<sub>2</sub>–6 cm long, yellow or white . . . . . 21. *M. peltata*
9. Sepals less than 15 mm long. Corolla 3–3<sup>1</sup>/<sub>2</sub> cm long, white . . . . . 22. *M. elmeri*
8. Leaves not peltate.
10. Midpetaline bands of the corolla pilose outside, or only at their top.
11. Corolla pilose at the upper portion of the midpetaline bands, 2–3<sup>1</sup>/<sub>2</sub> cm long, white, or yellow to orange. Sepals broad-elliptic to orbicular, rounded to emarginate, 5–8 mm long. . . . . 13. *M. umbellata*
11. Midpetaline bands of the corolla densely sericeous outside. Corolla *ca* 2 cm long, white or yellow. Outer sepals orbicular to transverse-elliptic, broadly rounded to emarginate, 5–7 mm long, inner ones transverse-elliptic . . . . . 14. *M. boisiana*
10. Corolla entirely glabrous outside, sometimes with minute glands.
12. Peduncle very short or nearly absent. Flowers in axillary clusters or solitary in the leaf-axils. Pedicels short, 2–4 mm; sepals hairy on the back and fimbriate along the margins. Corolla 10 mm long, or less. Leaves kidney-shaped to broadly ovate. Prostrate herb. . . . . 5. *M. emarginata*
12. Peduncles longer.
13. Sepals 10 mm long or mostly shorter.
14. At least the inner sepals acute, attenuate-acuminate into a slender point. 6. *M. tridentata*
14. Sepals obtuse.
15. Twining or prostrate herbs, rarely woody plants. Midpetaline bands with distinct dark lines, at least in the dried state.
16. Sepals slightly unequal in length; outer ones broadly obovate to orbicular, or broadly spatulate, distinctly concave.
17. Outer sepals mostly hairy, 4–7 mm long, broadly obovate to orbicular, emarginate, not or slightly mucronulate; inner ones 6–8 mm. Corolla 1<sup>1</sup>/<sub>2</sub>–2 cm long (in *var. splendens* 3–3<sup>1</sup>/<sub>2</sub> cm), yellow. Capsule depressed-globose, valves coarsely wrinkled. Petiole generally without tubercles . . . . . 1. *M. gemella*
17. Outer sepals generally glabrous, 3<sup>1</sup>/<sub>2</sub>–4 mm long, broadly obovate to spatulate, broadly notched at the apex and distinctly mucronulate; mucro directed outwards; inner sepals to 5 mm long. Corolla *ca* 1 cm or less, yellow. Capsule depressed-globose or broadly conical, slightly 4-angular, less coarsely wrinkled. Petiole often with small tubercles. . . . . 2. *M. hederacea*
16. Sepals unequal in length; outer ones shorter, elliptic to oblong-elliptic or oblong, less concave or flat.
18. Outer sepals elliptic, 3–4 mm long, inner ones oblong or elliptic, 4<sup>1</sup>/<sub>2</sub>–6 mm long. Peduncles filiform. Bracts minute, 1–2 mm. Leaves variable, linear to oblong or ovate, rounded, truncate, cordate or hastate at the base. Capsule broadly ovoid to globular, smooth. . . . . 3. *M. hirta*
18. Outer sepals oblong or oblong-elliptic, 4 mm long, inner ones broadly ovate to orbicular, 6 mm long. Peduncles thicker. Bracts larger, to 4 mm long. Leaves ovate, cordate at the base. Capsule subglobular, valves reticulately wrinkled . . . . . 4. *M. dichotoma*
15. Larger woody twiners. Midpetaline bands without distinct dark lines.
19. Two outer sepals broadly oblong, *ca* 7 mm long, three inner ones broadly elliptic to orbicular, 8–9 mm long. Corolla 1<sup>1</sup>/<sub>2</sub> cm long, yellow (or sometimes white?). Nerves 5–6 on either side of the midrib . . . . . 19. *M. clemensiana*
19. Sepals broadly elliptic to orbicular, outer ones 9–10 mm long. Corolla 2–2<sup>1</sup>/<sub>2</sub> cm long, yellow. Nerves 7–10 on either side of the midrib . . . . . 20. *M. korthalsiana*
13. Sepals longer than 10 mm.
20. Sepals at most 12 mm long, outer ones broadly elliptic, inner ones broadly elliptic to orbicular. Corolla *ca* 2<sup>1</sup>/<sub>2</sub> cm long. Flower-buds conical, acute. Leaves ovate, cordate at the base; nerves very prominent beneath. Woody twiner; stems lenticellate. . . . . 18. *M. crassinervia*
20. Sepals longer, 15 mm or more. Corolla 5 cm long or more.
21. Corolla 7–8 cm long, white. Sepals *ca* 25–30 mm long, the outer ones broadly ovate to broadly elliptic, inner ones narrower. Stems smooth . . . . . 15. *M. mammosa*
21. Corolla smaller, *ca* 5<sup>1</sup>/<sub>2</sub>–6 cm long, yellow.
22. Leaves orbicular to broadly ovate, with (6–)8–11 nerves on either side of the midrib, more or less bullate. Sepals elliptic to broadly elliptic, 15–22 mm long. Stems woody, distinctly lenticellate . . . . . 16. *M. borneensis*
22. Leaves ovate, with 6–7 nerves on either side of the midrib, not bullate. Sepals oblong or elliptic-oblong, 25–28 or the inner ones to 30 mm long. Stems woody, sparsely lenticellate. . . . . 17. *M. pulchra*

1. Section Eu-Merremia

OOSTSTR. Blumea 3 (1939) 297.—*Skinneria* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 487, t. 6, non *Skinnera* FORST. 1776.—*Merremia* sect. *Skinneria* (CHOISY) HALLIER f. Bot. Jahrb. 16 (1893) 552.

Flower-buds oblong, ovoid or globular, obtuse; midpetaline bands in the dried state with 5 dark lines; flowers rather small or small.

1. *Merremia gemella* (BURM. f.) HALLIER f. Bot. Jahrb. 16 (1893) 552; OOSTSTR. Blumea 3 (1939) 297, f. 1, g-h.—*Convolvulus gemellus* BURM. f. Fl. Ind. (1768) 46, t. 21, f. 1.—*Ipomoea gemella* ROTH, Nov. Pl. Sp. (1821) 110.—*Ipomoea radicans* BL. Bijdr. (1825) 712, non BERT. ex CHOISY, 1845.—*Ipomoea polyantha* MIQ. Fl. Ind. Bat. 2 (1857) 613, non *Convolvulus polyanthus* WALL., 1828.—*Ipomoea cymosa* R. & SCH. var. *radicans* MIQ. Fl. Ind. Bat. 2 (1857) 613.—Fig. 23c.

KEY TO THE VARIETIES

- 1. Corolla 1½-2 cm long . . . var. *gemella*
- 1. Corolla 3-3½ cm long . . . var. *splendens*

var. *gemella*.

A twining or prostrate herb. Stems slender, to 3 m long, with rather long, curled, more or less appressed to patent hairs, especially at the nodes, afterwards glabrescent, sometimes already glabrous in youth; prostrate stems often rooting both

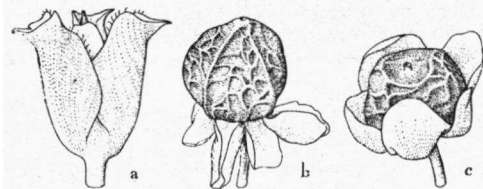


Fig. 23. a-b. *Merremia hederacea* (BURM. f.) HALLIER f. a. calyx, × 5, b. capsule, × 2½.—c. *Merremia gemella* (BURM. f.) HALLIER f., capsule, × 2.

at the nodes and internodes. Leaves usually ovate or broad-ovate, rarely narrow-ovate to oblong in outline, more rarely nearly kidney-shaped, 2½-12 by 1½-10 cm, broadly cordate or rarely more or less sagittate at the base, acuminate or gradually attenuate at the apex, with obtuse or acute, sometimes slightly retuse, mucronulate top; in the kidney-shaped leaves with a broadly rounded apex; leaf-margin entire or coarsely crenate to dentate, sometimes 3-lobed; surfaces glabrous or pilose on the nerves beneath or occasionally on both sides, or pilose on both sides over the whole surface; petiole shorter than or as long as the blade, 1½-6(-10) cm, appressed-pilose, rarely minutely tuberculate. Peduncles axillary, with short curled hairs, or glabrous, 2½-10(-16) cm, cymosely branched at the apex. Pedicels 3-6 mm

long, appressed-pilose. Bracts minute, caducous. Flower-buds ovoid to globose, obtuse. Sepals thinly coriaceous with scarious margin, slightly unequal, concave, broadly obovate to orbicular, emarginate and mostly mucronulate at the apex, outer ones 4-7 mm, inner ones 6-8 mm long (in poorly developed specimens sometimes only ca 4 mm), outer more or less pilose or sometimes glabrous, inner glabrous or nearly so, all slightly enlarged in fruit. Corolla campanulate to funnel-shaped, 1½-2 cm long, glabrous, yellow; limb slightly 5-lobed, lobes shallowly emarginate and mucronulate. Filaments hairy at the base. Ovary glabrous. Capsule depressed-globose, coarsely wrinkled in dry specimens, glabrous, ca 7 mm long, 2-celled. Seeds 4-1, dark grey or brownish puberulent, trigonous, or globose when only one seed has been developed.

Distr. SE. Asia to tropical Australia, throughout Malaysia.

Ecol. In thickets, on hedges, in grasslands, in teak-forests, along railroads, on dikes of rice-fields, often on moist soil, from sea-level to 250 m.

Vern. Lawattan, tatapajan, S, lawatan, rawatan, lawatan kuning, sampar kidang, indjèn indjèn, J. keritang tikus, Kutai, beloka, djonge djonge, wale-in-sengit, amut peror, Celebes; Philippines: bangbañgau, marakamóte, II., kamokamotihan, Pang., talanuk, Tag.

var. *splendens* OOSTSTR. Blumea 3 (1939) 302.

Corolla longer than in the typical form, to 3-3½ cm long.

Distr. Malaysia: SE. New Guinea (Lake Daviumbu on the Middle Fly River).

Ecol. River-banks, lake-shores, reed-swamps, on grass and borders of undergrowth of rain-forest.

2. *Merremia hederacea* (BURM. f.) HALLIER f. Bot. Jahrb. 18 (1894) 118; OOSTSTR. Blumea 3 (1939) 302, f. 1, e-f, m-n.—*Evolvulus hederacens* BURM. f. Fl. Ind. (1768) 77, t. 30, f. 2.—*Convolvulus acetosellaefolius* DESR. in LAMK, Enc. 3 (1789) 564.—*Convolvulus dentatus* VAHL, Symb. Bot. 3 (1794) 25.—*M. convolvulaceu* DENNST. (Schlüss. Hort. Malab. 1818, 12, 23, 34, nom. nud.) ex HALLIER f. Bot. Jahrb. 16 (1893) 552.—*Ipomoea chryseides* KER-GAWL. Bot. Reg. (1818) t. 270.—*Lepistemon muricatum* SPANOGHE, Linnaea 15 (1841) 339.—*Ipomoea acetosellaefolia* CHOISY in DC. Prod. 9 (1845) 383.—*Ipomoea subtriflora* ZOLL. & MOR. in MOR. Syst. Verz. (1846) 51.—*M. chryseides* HALLIER f. Bot. Jahrb. 16 (1893) 552.—Fig. 23 a-b; 24c-d.

A twining or prostrate herb; the prostrate specimens rooting at the nodes or sometimes at the internodes. Stems slender, smooth or minutely tuberculate, glabrous or sparsely hirsute, especially at and above the nodes. *Leaves* ovate in outline,  $1\frac{1}{2}$ –5 by  $1\frac{1}{4}$ –4 cm, broadly cordate at the base, mostly obtuse and mucronulate at the apex; margin entire or crenate to shallowly or deeply 3-lobed; surfaces glabrous or sparsely hairy; petiole slender,  $\frac{1}{2}$ –6 cm, with a few small tubercles, especially in the basal half. *Peduncles* thicker than the petioles, shorter than or exceeding the leaves, 1–10 cm, mostly glabrous, smooth or occasionally minutely tuberculate. *Flowers* one or few to several,

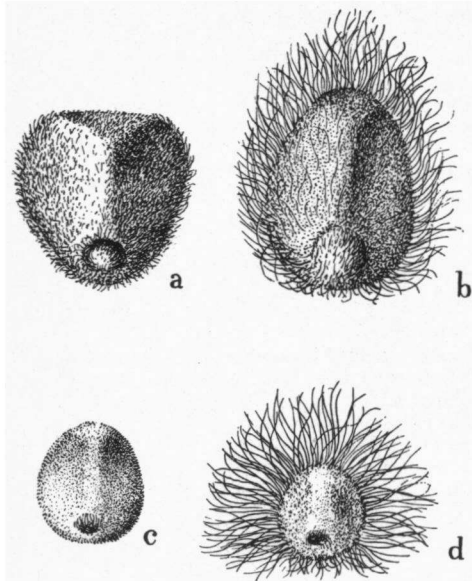


Fig. 24. *a*–*b*. *Merremia umbellata* (L.) HALLIER *f.*, *a*. seed of *ssp. umbellata*, *b*. seed of *ssp. orientalis* (HALLIER *f.*) OOSTSTR.,  $\times 5$ .—*c*–*d*. *Merremia hederacea* (BURM. *f.*) HALLIER *f.*, *c*. seed of *f. pubescens* OOSTSTR., *d*. seed of *f. barbata* OOSTSTR.,  $\times 5$ .

in the latter case the first ramification of the peduncle dichasial, the subsequent ones often monochasial. Pedicels 2–4 mm, smooth or minutely tuberculate. Bracts narrow-obovate, mucronulate, 3 mm long, caducous. Flower-buds oblong to broadly elliptic, obtuse. *Sepals* glabrous or occasionally slightly pilose on the back and along the margins, concave, broadly obovate to spatulate, broadly notched at the apex, distinctly mucronulate, the mucro directed outwards; two outer sepals  $3\frac{1}{2}$ –4 mm, inner ones to 5 mm long. *Corolla* campanulate, 6–10(–12) mm long, yellow, outside glabrous, inside with long hairs near the hairy base of the filaments. *Ovary* glabrous. *Capsule* broadly conical to depressed-globular, somewhat 4-angular, ca 5–6 mm high, 4-valved, the valves

transversely or reticulately wrinkled, less coarsely than in *M. gemella*. Seeds mostly 4, short-pubescent or nearly glabrous over the whole surface, or with longer hairs at the hilum and along the edges, sometimes also on the sides (see below),  $2\frac{1}{2}$  mm long.

*Distr.* Tropical Africa, Mascarene Islands, tropical Asia from the Himalaya southwards to Ceylon and eastwards to Burma, Southern China, Indo-China and Siam, to Queensland, and the Carolines (Yap), throughout *Malaysia*, also in Christmas Island.

*Ecol.* In thickets, in open grasslands, and on sand-banks, from sea-level to 50 m.

*Use.* A poultice of the leaves, with turmeric and broken rice, is used upon chapped hands and feet. Animals eat the plant; even if given nothing else, may thrive on it (BURKILL).

*Vern.* *Ramijo*, Djambi, *araj djonong gëdë*, *atapajan*, S, *lawatan*, J, *këlëmbiet*, W. Borneo.

*Note.* On account of the pubescence of the seeds two forms can be distinguished:

*f. pubescens* OOSTSTR. *Blumea* 3 (1939) 307. Seeds shortly pubescent or nearly glabrous over the whole surface, or with only some slightly longer reddish brown hairs at the hilum and the margins.—Fig. 24*c*.

*f. barbata* OOSTSTR. *Blumea* 3 (1939) 307. Seeds shortly pubescent, the hilum and the margins with long hairs; sometimes these long hairs are also found on the sides.—Fig. 24*d*.

These forms can only be distinguished when ripe seeds are available. As the type specimen described by BURMAN, and preserved at Geneva, has no ripe seeds, it is impossible to decide to which of the two forms it belongs.

3. *Merremia hirta* (L.) MERR. *Philip. J. Sc.* 7 (1912) Bot. 244; *ibid.* 59 (1936) 452, t. 1; OOSTSTR. *Blumea* 3 (1939) 307, f. 1, k; f. 2, P-W.—*Convolvulus reptans* LINNÉ, *Sp. Pl.* (1753) 158, *excl. syn.* RHEED.—*Convolvulus hirtus* LINNÉ, *l.c.* 159.—*Convolvulus caespitosus* ROXB. *Fl. Ind. ed. CAREY & WALL.* 2 (1824) 70.—*Ipomoea linifolia* BL. *Bijdr.* (1825) 721.—*Ipomoea philippinensis* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 475.—*Skinneria caespitosa* CHOISY, *l.c.* 487, t. 6.—*Convolvulus linifolius* (BL.) DIETR. *Syn. Pl.* 1 (1839) 675, *non* LINNÉ 1759, *nec* WALL. 1828.—*Convolvulus hybridus* ZOLL. & MOR. *Nat. Geneesk. Arch. N.I.* 2 (1845) 6.—*Ipomoea setulosa* ZOLL. & MOR. in *MOR. Syst. Verz.* (1846) 51.—*M. caespitosa* HALLIER *f.* *Bot. Jahrb.* 16 (1893) 552.—Fig. 25.

#### KEY TO THE VARIETIES

1. Inner sepals oblong or elliptic-oblong, obtuse.  
*var. hirta*
1. Inner sepals broadly elliptic to subquadrate, truncate to retuse and mucronulate at the apex.  
*var. retusa*

*var. hirta*.—Fig. 25.

A twining or prostrate herb; the prostrate specimens rooting at the nodes or sometimes at the

internodes. Stems slender, 20–50 cm long, filiform, sparsely patently hirsute or glabrous. *Leaves* very variable in form, linear, linear-oblong, oblong-lanceolate, oblong to ovate-oblong or ovate, occasionally orbicular to subquadrate; the narrow leaves 3–6 by  $1\frac{1}{3}$ –1 cm, 5–12 times as long as broad, the broad ones  $1\frac{1}{2}$ – $4\frac{1}{2}$  by  $\frac{4}{5}$ – $2\frac{1}{2}$  cm, 1–5 times as long as broad, rounded, truncate, more or less cordate or hastate at the base with small or large, obtuse, spreading or parallel basal lobes, obtuse to slightly emarginate and mucronulate at the apex, the surfaces glabrous or sparsely hairy beneath and along the margins, sometimes also above, rarely the indumentum is more developed, especially on stems, petioles, leafblades and basal part of peduncles; petiole short, (1–

3–8(–20) mm. *Peduncles* filiform, variable in length, 1– $7\frac{1}{2}$  cm, glabrous or with a few hairs near the base. *Flowers* 1 to few, mostly up to 4, in some specimens to 8; the ramifications of the peduncle monochasial (racemielike and unilateral), or the first ramification dichasial and the subsequent ones monochasial. *Pedicels* 3–5 mm, glabrous. *Bracts* ovate, obtuse, 1–2 mm long, glabrous, persistent. *Flower-buds* oblong to elliptic, obtuse. *Sepals* glabrous, unequal, the 2 outer ones shorter, elliptic, obtuse, 3–4 mm long, the 3 inner oblong or elliptic-oblong, obtuse,  $4\frac{1}{2}$ –6 mm long; sepals slightly enlarged in fruit, to 6–7 mm, with more or less prominent nerves. *Corolla* broadly funnel-shaped,  $1\frac{1}{2}$ –2 cm long, pale-yellow or whitish, glabrous, midpetaline bands in dried state with distinct dark nerves. *Filaments* hairy at the base; *anthers* spirally twisted. *Ovary* glabrous, 2-celled. *Capsule* broadly ovoid to globular, with a thin papery wall, smooth, glabrous, crowned by the base of the style, ca 6 mm long, 1-celled, 4-valved. *Seeds* 4 or less, dark brown or black, glabrous or sparsely floccose at the margins and the hilum.

Distr. India to Southern China, Siam, and tropical Australia, throughout *Malaysia*.

Ecol. In open grasslands, along waysides, in dry rice-fields, from sea-level to 1100 m.

Vern. *Rebbha teng-ketteng*, Md.

*var. retusa* OOSTSTR. *Blumea* 3 (1939) 311, f. 2, X–Z.—? *Ipomoea hepaticifolia* BLANCO, *Fl. Filip.* ed. 2 (1845) 72; see note.

Differs from *var. hirta* by having the inner sepals broader, broadly elliptic to subquadrate, with a truncate to retuse, mucronulate apex, and the outer ones elliptic, obtuse to acutish, mucronulate. *Leaves* oblong,  $\frac{4}{5}$ – $2\frac{1}{2}$  cm long, hastate at the base, with entire or 1–2-dentate lobes, obtuse to subtretuse and mucronulate at the apex. *Peduncles* short, to 1 cm long, 1- or sometimes 2–3-flowered.

Distr. *Malaysia*: Philippines (LUZON).

Note. The specimen MERRILL, Sp. Blanc. 679 from Luzon (prov. of Bulacan, Angat), was distributed by that author as an illustrative specimen of *Ipomoea hepaticifolia* BLANCO. See MERRILL, Sp. Blanc. (1918) 324. On account of BLANCO's short and incomplete description it is, however, impossible to verify MERRILL's opinion.

4. *Merremia dichotoma* OOSTSTR. *Blumea* 3 (1939) 311, f. 1, b–c.—Fig. 26.

Stems twining, slender, minutely tuberculate; sparsely hirsute, glabrescent or glabrous. *Leaves* ovate, 4–7 by  $2\frac{1}{2}$ – $3\frac{1}{2}$  cm, cordate at the base with rounded basal lobes, gradually attenuate towards the obtuse mucronulate apex, entire, glabrous; lateral nerves 8–10 on either side of the midrib; petiole  $1\frac{1}{2}$ – $2\frac{1}{2}$  cm, glabrous or sparsely hairy towards the apex. *Inflorescences* glabrous, 6–15 cm long, peduncles terete, smooth, 4–7 cm, 1–3 times dichasially ramified at the apex, the ultimate ramifications monochasial, all with oblong to ovate, concave, 2–4 mm long, persistent bracts. *Pedicels* 5–6, in fruit to 8–9 mm long. *Flower-*

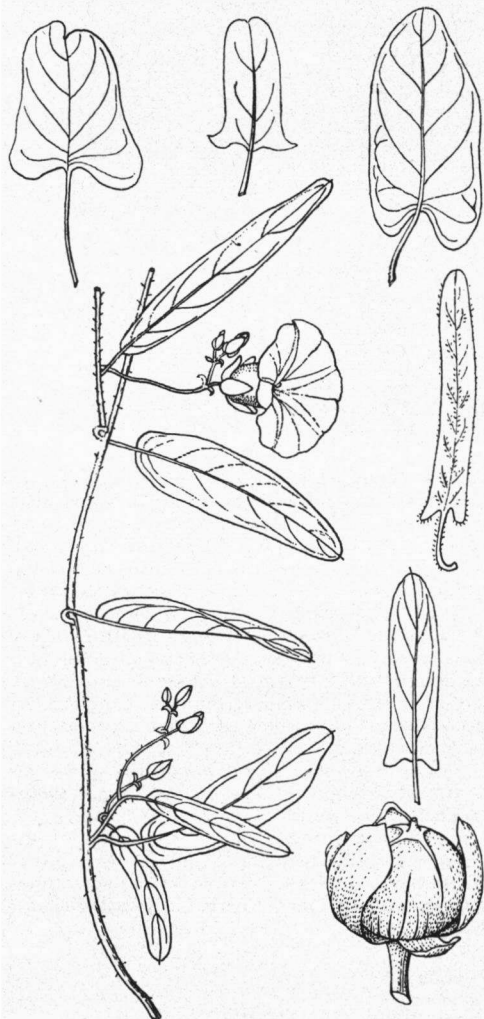


Fig. 25. *Merremia hirta* (L.) MERR. Flowering branch and various shapes of leaves, nat. size; capsule,  $\times 2\frac{1}{2}$ .



buds obtusish. *Sepals* glabrous, unequal, 2 outer ones shorter, 4 mm long, oblong to oblong-elliptic, obtuse, mucronulate, inner ones 6 mm long, broadly ovate to orbicular, obtuse or subretuse. *Corolla* broadly funnel-shaped, ca 18 mm long, white, glabrous, inside below the hairy base of the filaments with two rows of hairs; the broad basal pilose part of the filaments with an incurved appendage at the apex. Ovary glabrous. *Capsule* subglobular, mucronate, ca 7 mm high, 2-celled, 4-valved; valves reticulately wrinkled. Seeds 2 in each cell, ca 3½ mm long, dull black, pubescent, villose at the edges.

*Distr. Malaysia:* Lesser Sunda Islands (Central Timor, only once collected on the S. coast near Kolbano).

*Vern. Knātan*, Timor.

5. *Merremia emarginata* (BURM. f.) HALLIER f. Bot. Jahrb. 16 (1893) 552; OOSTSTR. Blumea 3 (1939) 312.—*Evolvulus emarginatus* BURM. f. Fl. Ind. (1768) 77, t. 30, f. 1.—*Convolvulus reniformis* ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 67.—*Ipomoea reniformis* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 446.—*Convolvulus excisus* ZIPP. Linnaea 15 (1841) 338, *pro syn.*—*Lepistemon reniformis* HASSK. Pl. Jav. Rar. (1848) 524.

A perennial herb. Stems prostrate, rooting at the nodes, sparsely hairy and glabrescent, 30–75 cm long, the adult parts sometimes warty. *Leaves* kidney-shaped to broad-ovate, ½–2½(–3½) by 2½–2½(–3½) cm, cordate at the base with a broadly rounded sinus and rounded basal lobes, obtuse to broadly rounded or slightly emarginate at the apex, coarsely crenate or entire, glabrous or sparsely appressed pilose; petiole about as long as the blade or shorter, ½–2(–3¼) cm long, shortly hairy or minutely verrucose. *Flowers* axillary, solitary, or in 2–3-flowered cymose clusters; peduncle very short to nearly absent. Pedicels 2–4 mm. Bracts small, ovate to linear, acute, hairy. Flower-buds globular, obtuse. *Sepals* obovate to orbicular or subquadrate, the outer ones 2½–3 mm long, obtuse with a cucullate and distinctly mucronate tip, the inner ones 3–4(–6) mm long, deeply emarginate, all more or less hairy on the back and long ciliate at the margins. *Corolla* tubular-campanulate. 5–9 mm long, glabrous, yellow with a paler base, the midpetaline bands distinctly 5-nerved and suffused purple outside; the limb slightly 5-lobed; corolla hairy inside at the hairy base of the filaments. Ovary glabrous. *Capsule* subglobular, 5–6 mm diam., longitudinally sulcate, glabrous, brownish black or black, crowned by the thickened smooth base of the style, at the base enclosed by the sepals. Seeds 4 or less, ca 2½ mm long, greyish brown, glabrous, dotted.

*Distr.* Tropical Africa, tropical Asia, in

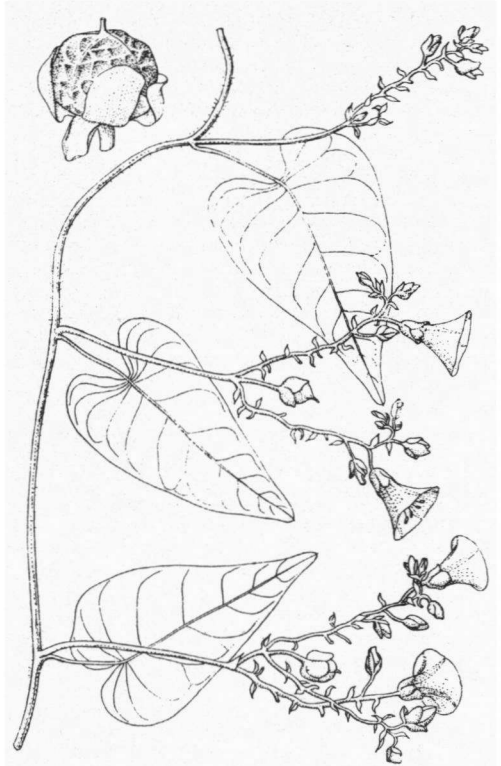


Fig. 26. *Merremia dichotoma* OOSTSTR. Flowering branch,  $\times \frac{2}{3}$ , and capsule,  $\times 2$ .

*Malaysia:* Java, SE. Borneo, Celebes (Donggala, Pasui), the Lesser Sunda Islands (Timor, Sumbawa), and the Philippines (Luzon). According to MERRILL (Sp. Blanc. 1918, 324) the species has all the appearance of being an introduced one in the Philippines, as it occurs only in the settled areas.

*Ecol.* Restricted to regions with a rather strong to very strong dry season, on rather heavy soils, in fields and open grasslands, along railroads and in waste places, from sea-level to 200 m.

*Use.* In the Philippines the leaves and tops in decoction are sometimes used as a diuretic, and in Java for coughs.

*Vern.* *Embun*, *pëgagan utan*, *paschaga-utan-kejtijl*, J; Philippines: *bato-bato*, Tag., *kupit-kupit*, Il.

*Note.* There is a certain resemblance of the vegetative parts with those of the Umbellifer *Centella asiatica* URB. The species has sometimes been confounded in the herbaria with *Dichondra repens* FORST.

## 2. Section Streptandra

HALLIER f. Bot. Jahrb. 18 (1894) 114; OOSTSTR. Blumea 3 (1939) 315.

Flower-buds ovoid or conical, mostly acute; midpetaline bands in the dried state often with 5 dark lines; flowers of moderate size or large.

6. *Merremia tridentata* (L.) HALLIER f. Bot. Jahrb. 16 (1893) 552; OOSTSTR. *Blumea* 3 (1939) 315.—*Convolvulus tridentatus* LINNÉ, Sp. Pl. ed. 1 (1753) 157.—*Evolvulus tridentatus* LINNÉ, l.c. ed. 2 (1762) 392.—*Ipomoea tridentata* ROTH in ROEM. Arch. Bot. 1, 2 (1798) 38.—Fig. 27.

KEY TO THE SUBSPECIES

- 1. Outer sepals mostly obtuse to emarginate at the apex, inner ones attenuate-acuminate with an acute apex. Corolla 10–12 mm long. Filaments inserted ca 1½ mm above the corolla-base. Leaves mostly obtuse, truncate or emarginate at the apex . . . . . *ssp. tridentata*
- 1. All sepals attenuate-acuminate to the apex with an acute point. Corolla 12–20 mm long. Filaments inserted ca 3 mm above the corolla-base. Leaves mostly attenuate towards the acute apex . . . . . *ssp. hastata*

*ssp. tridentata*.—*M. tridentata* HALLIER f. *ssp. genuina* OOSTSTR. *Blumea* 3 (1939) 315, f. 2, J-N.—*M. tridentata* HALLIER f. var. *genuina* HALLIER f. ex OOSTSTR. l. c. 315, pro syn.—Fig. 27 b'-b'''.

A prostrate herb. Stems 10–80 cm long, angular, glabrous, several from a stout perpendicular root. Leaves glabrous, linear (or in some specimens nearly filiform), linear-oblong to oblanceolate, spatulate or subquadrate, 4–20(–30) by (½–) 1½–4(–6) mm, base not or slightly broadened, truncate to hastate, basal lobes as far as present spreading or parallel, with 1 tooth or with a few teeth, leaf-margin above the base entire or slightly crenate to dentate, apex obtuse, truncate or emarginate and mucronulate to tridentate (occasionally part of the leaves has the apex acute and mucronulate); petiole ½–2 mm or nearly absent. Flowers in 1–2(–3)-flowered cymes. Peduncles axillary, ¼–1½(–2) cm long, glabrous or pubescent near the base. Pedicels 4–8 mm long, glabrous, angular, thickened above in fruit. Bracts minute, oblong, mucronulate. Flower-buds narrowly conical, acute. Outer sepals mostly shorter than inner, 3–4 mm long, oblong, obtusish, obtuse to emarginate, mucronulate; inner ones 4–6 mm long, lanceolate, attenuate-acuminate into a slender point; occasionally the outer sepals are more acute at the apex, more rarely the outer as well as the inner sepals are obtuse and mucronulate (so in specimens from India). Corolla funnel-shaped, 10–12 mm long, glabrous, completely yellow, yellowish white or white, or with a purple centre. Filaments inserted ca 1½ mm above the corolla-base, glabrous or sparsely hairy at the slightly dilated base. Ovary glabrous. Capsule ovoid, 4–5 mm long, 4-valved, pericarp papery, glabrous, straw-coloured. Seeds 4 or less, 2–2¼ mm long, dull black, glabrous.

Distr. Tropical Africa, Mascarene Islands, tropical Asia from Bengal and Central Provinces southwards to S. India and Ceylon, eastwards to Malaysia: Malay Peninsula, Anambas Islands, Riouw Archip., Banka, SW. Celebes (once near Pasui), and S. Moluccas (Aru Islands).

Ecol. Sandy places near the coast; the collection from Celebes more inland, at 600 m. Vern. *Kong kong pasir*, Mal. Pen..

*ssp. hastata* (DESR.) OOSTSTR. *Blumea* 3 (1939) 317, f. 2, O.—*Convolvulus hastatus* DESR. in LAMK, Enc. 3 (1789) 542, non FORSK. 1775, THUNB. 1794, SIEB. ex CHOISY, 1845.—*Convolvulus blumei* DIETR. Syn. Pl. 1 (1839) 675.—*Ipomoea blumei* STEUD. Nom. ed. 2, 1 (1840) 815.—*M. hastata*

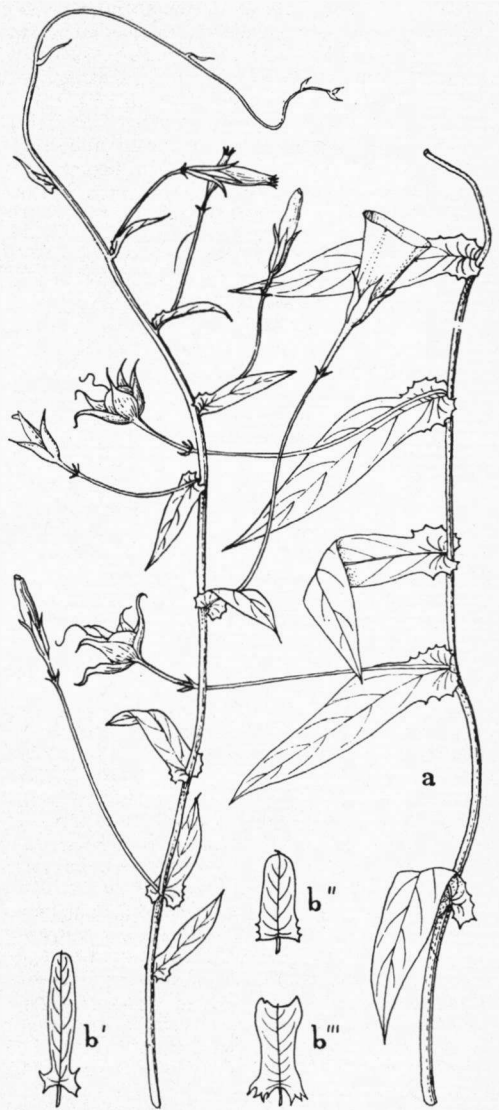


Fig. 27. *Merremia tridentata* (L.) HALLIER f., a. Flowering and fruiting branches of *ssp. hastata* (DESR.) OOSTSTR., nat. size, b'-b''' leaves of *ssp. tridentata*, nat. size.

HALLIER f. Bot. Jahrb. 16 (1893) 552.—Fig. 27a.

A herbaceous twiner, occasionally prostrate. Stems one or several from a stout perpendicular root, 60–200 cm, slender, more or less angular to subulate, glabrous. *Leaves* mostly glabrous, narrowly oblong, linear-oblong, linear or sometimes (especially the upper ones, or occasionally all) narrow-linear, larger than in *ssp. tridentata*, 25–80(–100) by 1½–15(–20) mm, more or less contracted above the base, with more or less stem-clasping, obscurely to sharply dentate basal lobes, leaf-margin above the base entire or indistinctly undulate, blade gradually attenuate towards the distinctly mucronulate, sharply acute, or obtuse or rarely emarginate apex; petiole nearly absent or very short, 1–3 mm. *Flowers* in one- to few-flowered cymes. Peduncles axillary, 1–8 cm long, thin, glabrous, or mostly pubescent near the base. Pedicels as long as or longer than the calyx, glabrous, angular, 6 mm long or longer, thickened above in fruit and to 15 mm long. Bracts minute, subulate. Flower-buds narrowly conical, acute, the tips of the sepals more or less curved outwards. *Sepals* equal in length or the outer ones a little shorter, (5)–6–7(–10) mm long, glabrous, all lanceolate to ovate-lanceolate, attenuate-acuminate into a sharp, slender point, the margin of the sepals narrowly scarious, undulate e. *Corolla* funnel-shaped, 12–20 mm long, glabrous, wholly pale yellow or white, or with a purple to chocolate brown centre. Filaments inserted ca 3 mm above the corolla-base, sparsely hairy at the slightly dilated base. Ovary glabrous. *Capsule* globose to ovoid, 4-valved, pericarp papery, glabrous; dissepiment often persistent after dehiscence. Seeds 4 or less, 2½–3 mm long, dull black or dark-grey, glabrous.

*Distr.* Tropical East Africa, tropical Asia from the Khasia Hills and Bengal southwards to Ceylon, eastwards and southwards to China, Hongkong, Formosa, and tropical Australia, throughout *Malaysia*.

*Ecol.* On rather light soil, in open grasslands, climbing on grasses and other low herbaceous plants and shrubs, in waste places, along waysides, in alang-fields, teak-forests, from sea-level to ca 1200 m.

*Uses.* The leaf is made into poultice and applied to the head in cases of jungle-fever (Mal. Pen.).

*Vern.* *Akar keremak*, *karok relia*, *pungulang*, Mal. Pen., *sanem-sanem*, *kangkong rimbu*, *akar tali tali*, Sum. W. coast, *tulan dalin*, Djambi, *klitang*, *djangut boang*, Banka, *irit-iritan*, *rangitan*, *pakissan rambat*, J, *kitjoke*, Md, *djala djala*, *bejawak*, S. Borneo, *mawow-entut*, Minah., *luré-luré*, *kradjok*, *dongi-dongi*, *lilah kali sarang*, Celebes, *djala ma tubu*, Ternate, *guwi djala*, Tidore, *saputangan dua*, Ceram; Philippines: *karadkad*, Ig., *maragta*, *talanuk*, Tag., *tatalon*, Man., *sigid*, P. Bis.

*Notes.* The subspecific epithet *hastata*, although based on *Convolvulus hastatus* DESR. (1789, non FORSK. 1775) is maintained as provided under art. 81 of the Code, and is treated as a new name in this rank.

BLUME, Bijdr. (1825) 721, and several authors after him incorrectly used the name *Ipomoea filicaulis* (VAHL) BL. for this taxon. Others have mentioned it as *Ipomoea angustifolia* JACQ. Both names are synonyms of *Merremia tridentata* (L.) HALLIER f. *ssp. angustifolia* (JACQ.) OOSTSTR. Blumea 3 (1939) 323, note. For more detailed data see *l.c.* 322–324.

7. *Merremia quinquefolia* (L.) HALLIER f. Bot. Jahrb. 16 (1893) 552; OOSTSTR. Blumea 3 (1939) 324.—*Ipomoea quinquefolia* LINNÉ, Sp. Pl. (1753) 162.—*Convolvulus quinquefolius* LINNÉ, Syst. ed. 10 (1759) 923.—Fig. 28.

A herbaceous twiner. Stems slender, glabrous or sparsely to densely hirsute with patent hairs. *Leaves* palmately compound, with 5 leaflets; leaflets glabrous, sessile or shortly petiolulate, oblong or narrow-oblong to lanceolate, or sometimes still narrower, 2½–6 by ½–2 cm, attenuate towards both ends, acute or obtusish and mucronulate at the apex, the margins coarsely dentate to undulate or nearly entire; petiole 2–5(–9) cm, thin, glabrous or with a few patent hairs. *Inflorescences* axillary, to ca 12 cm long. Peduncles shorter to longer than the petioles, 4–7 cm, glandular towards the apex, the glands sometimes mixed with patent bristly hairs, 1-flowered or cymosely 3–5-flowered; branches of cyme glandular. Pedicels glabrous or with a few glands near the base, 5–7, sometimes to 15 mm long, in fruit to 15–20 mm

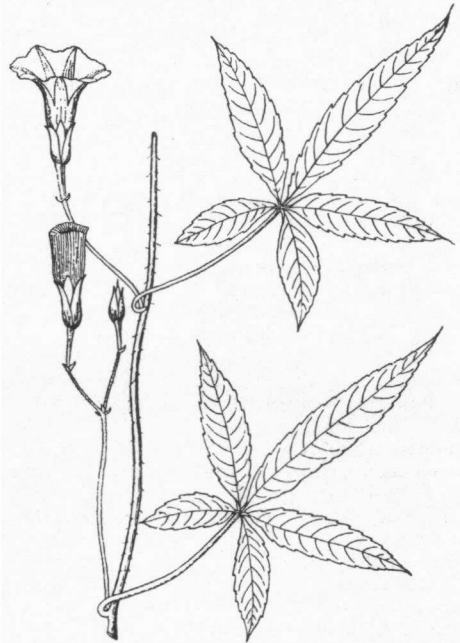


Fig. 28. *Merremia quinquefolia* (L.) HALLIER f. Flowering branch, nat. size.

and thickened at the apex. Bracts narrow-triangular, acute, ca 1½ mm long. Flower-buds ovoid, acute. *Sepals* narrow-ovate to oblong, obtuse, mucronulate, glabrous, subequal in length, or the outer ones shorter; outer sepals 4–6, inner 6–8 mm long, slightly enlarged in fruit. *Corolla* funnel-shaped, 18–25 mm long, glabrous, pale yellow or whitish. Filaments inserted ca 3–4 mm above the base of the corolla, shortly pubescent at their dilated base; anthers spirally twisted. Ovary glabrous. *Capsule* globose, straw-coloured, 4-celled, 4-valved; valves ca 9 mm long. Seeds 4, ca 4½ mm long, black or greyish black, shortly hairy with appressed curled hairs.

Distr. Tropical America, in *Malaysia* cultivated and occasionally run wild, introduced before 1840.

Ecol. A very rapid grower, in a short time covering all other plants; perhaps of some value as a cover-crop.

Vern. *Rau tjanga*, Ternate.

8. *Merremia quinata* (R. BR.) OOSTSTR. *comb. nov.*—*Ipomoea quinata* R. BR. Prod. (1810) 486; BTH. Fl. Austr. 4 (1869) 415; F.V.M. Descr. Notes Pap. Pl. 3 (1876) 44; WARB. Bot. Jahrb. 18 (1894) 207; BAILEY, Queensl. Fl. 4 (1901) 1057; SCHUM. & LAUT. Fl. Deut. Schutzgeb. (1901) 517; OOSTSTR. Blumea 3 (1940) 581.—*Ipomoea hirsuta* R. BR. l.c. 486.—*Convolvulus quinatus* SPRENG. Syst. 1 (1825) 590.

Stems twining, slender, glabrous, or more or less hirsute with long, spreading hairs. *Leaves* palmately compound, with 5 leaflets; leaflets mostly glabrous, linear, lanceolate or narrowly oblong, 2½–3½ by ¼–¾ cm, obtuse or obtusish and mucronulate at the apex, narrowed towards the base, entire; petiole 1–1½ cm, glabrous or hirsute. *Peduncles* axillary, shorter to longer than the leaves, glabrous, or hirsute near the base, mostly 1-flowered. Pedicels glabrous, 8–9 mm long. Bracts ovate, acuminate, ca 3–4 mm long. *Sepals* ovate to ovate-oblong, obtuse, glabrous; two outer ones 7½–8½ mm long; three inner ones longer, ca 10–13 mm. *Corolla* campanulate to funnel-shaped, up to 5 cm long, white or pale pink. Filaments inserted ca 6–7 mm above the base of the corolla. Ovary glabrous, 2-celled. *Capsule* ca 12 mm long, ovoid, somewhat acuminate. Seeds glabrous. (Description partly after ROBERT BROWN, BENTHAM, and BAILEY, *ll. cc.*).

Distr. N. Australia, Queensland, in *Malaysia*: New Guinea (NE. New Guinea; Yule Island; Jarvis Island), Philippines (Luzon). Also mentioned from Burma and S. China, but it is not quite certain that these specimens are conspecific.

9. *Merremia tuberosa* (L.) RENDLE in Fl. Trop. Afr. 4, 2 (1905) 104; OOSTSTR. Blumea 3 (1939) 325.—*Ipomoea tuberosa* LINNÉ, Sp. Pl. (1753) 160, non LOUR. 1790.—?*Convolvulus paniculatus* BLANCO, Fl. Filip. (1837) 96.—*Ipomoea tuberosa* L. var. *oligantha* HASSK. Retzia 1 (1855) 69.—*Operculina tuberosa* MEISSN. in MART. Fl. Bras. 7 (1869) 212.—Fig. 29.

A glabrous perennial twiner. Stems from a large

subterranean tuber, robust, terete, finely striate. *Leaves* orbicular in outline, 6–16 cm long and as broad, palmately divided to far below the middle; segments 7, oblong-lanceolate, acuminate at the apex, narrowed to the base, entire, the middle segment larger than the lateral ones; petiole 6–18 cm, slender. *Peduncles* axillary, few- to several-flowered, terete or more or less applanate to the apex, 4–15 cm long. Pedicels 15–18 mm, clavate, in fruit to 5 cm. Bracts triangular, ca 2 mm long. Two outer *sepals* 23–25 mm long, ovate to broadly ovate, obtuse, indistinctly minutely mucronate; three inner ones narrower, oblong; sepal 3 about

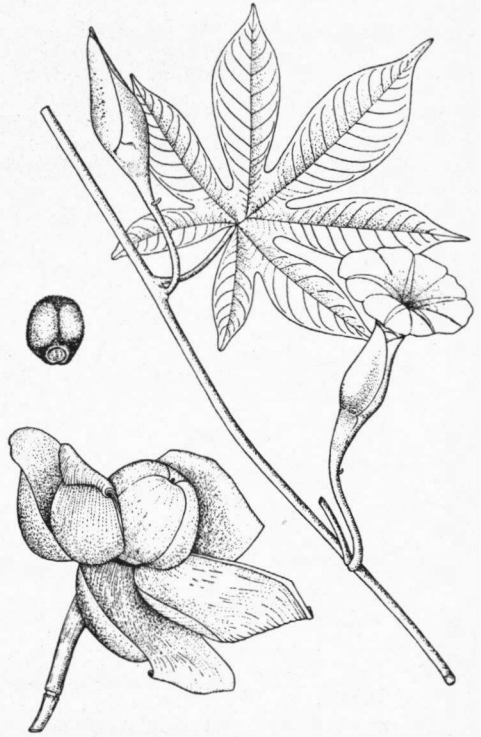


Fig. 29. *Merremia tuberosa* (L.) RENDLE. Flowering branch, capsule, and seed, × ½.

as long as the two outer ones; two inner sepals ca 21–22 mm long; all sepals in fruit to 5–6 cm long, enclosing the capsule. *Corolla* funnel-shaped, ca 5½ cm long, glabrous, yellow. Anthers twisted. *Capsules* 4- or less-seeded; the 4-seeded ones subglobose to depressed-globose, ca 3½ cm diam., the less-seeded ones ellipsoid, ellipsoid-globose or oblique-ellipsoid, with a smaller diameter; the thin, straw-coloured pericarp splits more or less irregularly and moreover loosens circumscissile at its base. Seeds ca 17 mm long, black, with a black pubescence on the sides and with somewhat longer black hairs along the margins, glabrescent.

Distr. Probably of tropical American origin; distributed through tropical Africa, the Mas-

carene Islands, India, Ceylon; in *Malaysia* cultivated and rarely escaped.

Ecol. From sea-level to ca 600 m. Corolla open in the early morning.

Vern. *Aroy kawoyang*, S.

Note. Though the capsule-wall loosens as a whole at its base from the receptacle and forms in this way a kind of 'operculum', it is completely different from that, found in *Operculina*. In the latter the wall shows two distinct layers; the outer of these, the exocarp, is fleshy in the upper part forming a circumscissile lid (*operculum*), while the scarious endocarp remains entire, to split at length irregularly.

10. *Merremia aegyptia* (L.) URBAN, Symb. Antill. 4 (1910) 505; OOSTSTR. *Blumea* 3 (1939) 327.—*Ipomoea aegyptia* LINNÉ, Sp. Pl. ed. 1 (1753) 162.—*Convolvulus pentaphyllus* LINNÉ, Sp. Pl. ed. 2 (1762) 223.—*Ipomoea pentaphylla* JACQ. Collect. 2 (1788) 297.—*Batatas pentaphylla* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 436.—*M. pentaphylla* HALLIER f. Bot. Jahrb. 16 (1893) 552.

Stems twining, slender, terete, hirsute with yellow-brown patent hairs. *Leaves* palmately compound, with 5 leaflets; leaflets appressed-pilose on both surfaces, sessile, elliptic or elliptic-oblong, 2½–10 by 1–4 cm, acute at the base, acute or acuminate at the apex, entire; petiole slender, as long as or longer than the blade, 2½–12 cm long, patently hirsute. *Peduncles* axillary, few- to several-flowered, 5–24 cm long, patently hirsute like the 10–25 mm long pedicels. Bracts lanceolate, 2–4 mm long, caducous. Three outer *sepals* 15–25 mm long, ovate-lanceolate, acute or acuminate, densely hirsute; two inner ones slightly shorter, ovate, acute, glabrous. *Corolla* funnel-shaped, 2½–3½ cm long, glabrous, white. Anthers spirally twisted. Ovary glabrous, 4-celled. *Capsule* globose, glabrous, 4-celled, 4-valved. Seeds 4, glabrous.

Distr. Circumtropical, in *Malaysia* perhaps formerly cultivated.

11. *Merremia dissecta* (JACQ.) HALLIER f. Bot. Jahrb. 16 (1893) 552 (*sphalm. dissecta*); OOSTSTR. *Blumea* 3 (1939) 328.—*Convolvulus dissectus* JACQ. Obs. 2 (1767) 4.—*Ipomoea sinuata* ORTEGA, Hort. Matr. Dec. 7 (1798) 84.

Stems twining, slender, terete, striate, patently hirsute with yellowish hairs, the adult parts woody, glabrescent and warted. *Leaves* palmately divided nearly to the base, with 5–7 lanceolate, mucronulate, coarsely dentate to irregularly pinnately lobed segments, glabrous or hairy on the veins beneath, the middle segment 2½–10 by ½–3 cm, the lateral ones smaller; petiole 2½–7 cm, patently hirsute like the stems. *Peduncles* axillary, one- to few-flowered, 5–10 cm long, patently hirsute, glabrescent in the upper portion. Pedicels 1½–2 cm long, thickened towards the calyx, glabrous, minutely verrucose at the apex. Flower-buds narrow-ovoid, acute. *Sepals* subequal, 2–2½ cm long, ovate-lanceolate, acute, mucronulate, glabrous, herbaceous with narrow scarious margin, enlarged and coriaceous in fruit. *Corolla* funnel-

shaped, 3–3½ cm long, white with a rose-purple throat; the limb with 5 distinct bands. Anthers spirally twisted. Ovary glabrous, 2-celled. *Capsule* globose, glabrous, 2-celled, 4-valved. Seeds normally 4, glabrous, black.

Distr. Probably indigenous only in America from the Southern United States to Argentina and Uruguay, elsewhere in the tropics and in *Malaysia* cultivated as an ornamental and occasionally escaped.

Vern. *Noon-flower*, E.

12. *Merremia vitifolia* (BURM. f.) HALLIER f. Bot. Jahrb. 16 (1893) 552; OOSTSTR. *Blumea* 3 (1939) 329.—*Convolvulus vitifolius* BURM. f. Fl. Ind. (1768) 45, t. 18, f. 1.—*Convolvulus angularis* BURM. f. l.c. 46, t. 19, f. 2.—*Ipomoea vitifolia* BL. Bijdr. (1825) 709.—*Ipomoea vitifolia* BL. var. *angularis* CHOISY in DC. Prod. 9 (1845) 361.

A large twiner. Stems terete, the older ones striate, 2–4 m, glabrous or patently hirsute with white or fulvous hairs. *Leaves* orbicular in outline, 5–18 by 5–16 cm, cordate at the base, palmately 5–7-lobed; lobes broad-triangular to lanceolate, more or less acuminate or acute to obtuse at the apex and mucronulate, mostly not contracted at the base or sometimes slightly so, coarsely dentate to crenate, or subentire, sparsely to densely hairy on both sides, more densely beneath than above, or glabrous above; petiole 2–15 cm, occasionally longer, patently hairy or glabrous. *Peduncles* axillary, 1–3- or several-flowered, shorter or longer than the petiole, 1–15 cm or more, patently hirsute. Pedicels 8–20 mm, hirsute like the peduncles, thickened towards the apex, clavate in fruit. Bracts subulate, 1½–2 mm. Flower-buds narrow-ovoid, acute. *Sepals* oblong to ovate-oblong, obtuse or acutish, mucronulate, the outer ones more or less hirsute, glabrescent, the inner ones glabrous, all with glandular pellucid dots, 12–20 mm long, in fruit to 20–25 mm and then thick, subleathery, whitish inside and with many glandular pits. *Corolla* funnel-shaped, 4–6 cm long, glabrous, bright-yellow, paler towards the base; the limb with 5 obtuse lobes, midpetaline bands distinctly 5-nerved. Anthers spirally twisted. Ovary glabrous. *Capsule* subglobose, ca 12 mm high, papery, straw-coloured, 4-valved. Seeds 4 or less, 6–7 mm long, dull black or blackish-brown, glabrous.

Distr. From India and Ceylon to Indo-China and the Andamans, throughout *Malaysia*.

Ecol. Both in regions with a feeble and in those with a rather strong dry season, in open grasslands, thickets, and hedges, along fields, in teak-forests, along edges of secondary forests, on river-banks and waysides, from sea-level to ca 900 m.

Use. It is used for poulticing, and an infusion is drunk for high fever (BURKILL).

Vern. *Akar lulang bulu*, *ulan raya*, Mal. Pen., *areuj kawojang*, S, *ginda pura utan*, *katapong*, *tampar kidang*, *ojod kotong*, *katong*, *samber kidang*, J, *dewulu*, *pos sepo*, *subulu*, Md, *rabet bulu*, Kangean, *taradju*, *tjambulu-bulu*, *kai-kai mamia*, Celebes, *takwaha*, Sula, *kalalakmit*, Sulu, *lakmit*, Tag.

3. Section *Xanthips*

(GRISEB.) HALLIER *f.* Bot. Jahrb. 16 (1893) 552; OOSTSTR. Blumea 3 (1939) 333.—*Ipomoea sect. Xanthips* GRISEB. Fl. Br. West Ind. Isl. (1864) 470.

Flower-buds ovoid, obtuse or subacute; midpetaline bands indistinctly defined, never with dark lines; flowers of moderate size.

13. *Merremia umbellata* (L.) HALLIER *f.* Bot. Jahrb. 16 (1893) 552; OOSTSTR. Blumea 3 (1939) 333, f. 1, p; f. 2, A-I.—*Convolvulus umbellatus* LINNÉ, Sp. Pl. (1753) 155.—*Ipomoea pilosa* HOUTT. Nat. Hist. II, 7 (1777) 573, t. 42, f. 2.—*Convolvulus cymosus* DESR. in LAMK, Enc. 3 (1791) 556.—*Ipomoea umbellata* G. F. W. MEY. Prim. Fl. Esseq. (1818) 99.—*Ipomoea cymosa* (DESR.) R. & SCH. Syst. 4 (1819) 241.—*Ipomoea cymosa* BL. Cat. 's Lands Pl.-tuin (1823) 50, note.—*Ipomoea cymosa* R. & SCH. *var. pilosa* & *var. sagittato-angulata* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 462 & 463.—*Ipomoea cymosa* R. & SCH. *var. sagittata* CHOISY in DC. Prod. 9 (1845) 371.—*Ipomoea sepiaria* (non KOEN.) ZOLL. & MOR. Syst. Verz. (1845–46) 51.—*Ipomoea modesta* CHOISY in ZOLL. Syst. Verz. 2 (1854) 129, 131.—*Ipomoea cymosa* R. & SCH. *var. typica* PRAIN, J. As. Soc. Beng. 63 (1894) 108.—*M. umbellata* HALLIER *f. var. orientalis* HALLIER *f.* Versl. 's Lands Pl.-tuin 1895 (1896) 132; *ibid.* Bull. Soc. Bot. Belg. 35 (1896) 270.—Fig. 24a–b; 30.

*ssp. orientalis* (HALLIER *f.*) OOSTSTR. *stat. nov.* (*var. orientalis* HALLIER *f., l.c.*)—Fig. 24b; 30.

Stems herbaceous, or the older parts woody, the young parts with a white milky juice, twining or prostrate and rooting, slender, 1–3 m, terete or slightly striate, softly pubescent or glabrescent to glabrous. Leaves variable in shape and size, 4–12 (–16) by 1–6½ (–9) cm, ovate, ovate-oblong or oblong, more or less cordate at the base or rounded to truncate, the basal lobes rounded or angular, sometimes hastate; more or less acuminate at the apex with obtuse, mucronulate top; lower surface sparsely to densely covered with short, soft, greyish or whitish hairs; upper surface mostly less densely hairy to glabrous; lateral nerves 5–7 (–9) on either side of the midrib; tertiary nerves many, subparallel; petiole pubescent or glabrous, variable in length, 1½–6 cm. Peduncles axillary, mostly short, 1–4, rarely to 7 cm long, mostly densely pubescent, mostly cymosely branched at the apex with short branches; cymes mostly few- to many-flowered, umbelliform, rarely 1-flowered. Pedicels mostly longer than the calyx, sparsely pubescent to glabrous. Bracts minute, lanceolate, caducous. Flower-buds ovoid, obtuse or acutish. Sepals slightly unequal, the outer ones somewhat shorter than the inner, or subequal, very concave, broad-elliptic or orbicular, rounded or emarginate, mucronulate, 5–7 (–8) mm long, the inner ones scarious at the margin, all glabrous or the outer ones sparsely pilose, often pectinately erose and slightly enlarged in fruit. Corolla funnel-shaped, 2–3, sometimes to 3½ cm long, white or yellow to orange, glabrous except for the upper parts of the midpetaline bands; limb slightly lobed. Anthers straight. Ovary glabrous or sparsely hairy at the top. Capsule ovoid to conical,

mucronate by the style-base, glabrous or sparsely hairy at the top, 10–12 mm high, ca 8 mm diam., 4-valved, valves lanceolate to narrow-ovate, splitting from the base. Seeds 4 or less, ca 5 mm long, densely hairy with long soft patent hairs.

Distr. Tropical East Africa, the Seychelles, India, Ceylon, eastwards to China, Indo-China, Siam and Queensland; throughout Malaysia. Fig. 30. The *ssp. umbellata* (*var. occidentalis* HALLIER *f.*) occurs in America from Mexico to Paraguay, in the West Indies and in tropical W. Africa. See further under Notes.

Ecol. In thickets, along edges of forests, in grasslands, along fields, along waysides, from sea-level to ca 1100 m.

Uses. The young leaves may be mixed with vegetables and eaten. The pounded leaves may be used as a poultice for burns and scalds. They are used as poultices for sores in the Moluccas (BURKILL; HEYNE).

Vern. *Akar bungah kuning, akar ulan tapak pelandok, akar lakoon, akar liha patong, akar ulan bitina*, Mal. Pen., *andur nasi*, Toba-Batak, *akar kalimanan, akar manji, ubi-ubi, akar bulu*, Sum. W. coast, *akar slemang, baju seluang, akar seluang, rawatan*, Palembang, *akabulu, akar itang*, Djambi, *akar biabak*, Banka, *areuj kidang, areuj reteu(n), areuj jeuteum, tatapajan, areuj geureung, areuj bulu*, S, *ojod kedangan, M, lawatan kebo, warungan, J, rabet saobi sabbian*, Kangean, *akar laren, lankal lankal*, Br. N. Borneo, *akar endit*, Kutai, *pala parang, rongo, ampas-ampas, uwi-im-pager, katama, timbohu kusu*, Celebes; Philippines: *bangañgau*, Il., *kalamitmit*, Tagb., *kamokamotlan*, Pamp., Tag., *malakamóte*, Pamp., *tukod-tukod*, P. Bis.; *petatas utan*, Ambon, *daun bisul (bissol)*, Moluccas, *maboka*, NE. New Guinea.

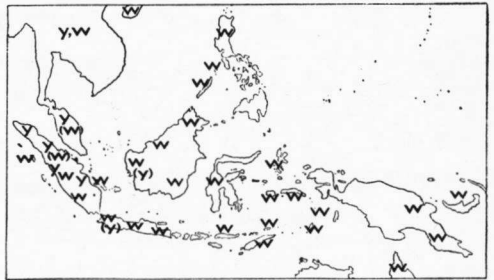


Fig. 30. *Merremia umbellata* (L.) HALLIER *f. ssp. orientalis* (HALLIER *f.*) OOSTSTR. Distribution of specimens with yellow to orange and with white corollas. y: corolla yellow or orange; (y): corolla rarely yellow or orange; w: corolla white, (w) corolla rarely white.

Notes. The specimens from Malaysia belong to *ssp. orientalis* with the exception of a specimen from Depok, W. Java (KOORDERS 31153) which most probably represents *ssp. umbellata*.—Fig. 24a. This subspecies is of a more robust habit, with larger leaves, the peduncles are longer, and generally more-flowered, the flowers are larger, sepals 7–10 mm long; corolla always yellow; moreover, the capsule is subglobose instead of ovoid to conical (ca 15 mm diam.), with broader, ovate valves, and the seeds are not so long villose, but pubescent to short-tomentose and only with slightly longer hairs at the margins. Another specimen, mentioned by the present author in *Blumea* 3 (1939) 341, collected by KEULEMANS, appears

to have been found in Ilha do Principe (Prinsen-eiland), off the Westcoast of Africa (cf. Bull. Bot. Gard. Btzig III, 18, 1950, 466).

*Ssp. umbellata* has a yellow corolla; the majority of the specimens of *ssp. orientalis* in the eastern part of Malaysia have white flowers; completely or partly yellow to orange ones are found in the western part of this region, although white corollas also occur there. Fig. 30. In *M. peltata* (L.) MERR. there is a remarkably conform parallel variation in the colour of the corolla: the majority of the specimens in the western part of Malaysia have yellow flowers, whereas in the eastern part the corolla seems to be constantly white. Fig. 31.

#### 4. Section Hailale

HALLIER *f. Bot. Jahrb.* 49 (1913) 379; OOSTSTR. *Blumea* 3 (1939) 342.

Closely related to *sect. Xanthips*: Mostly large woody twiners. Inflorescences corymbose, often forming terminal panicles; lower bracts often foliaceous. Flowers of moderate size or large. Buds ovoid or narrow-ovoid, acute or acutish, rarely subglobular. Midpetaline bands mostly not with distinct dark lines.

14. *Merremia boisiana* (GAGNEP.) OOSTSTR. *Blumea* 3 (1939) 343.—*Ipomoea boisiana* GAGNEP. Not. Syst. 3 (1914) 141.

##### KEY TO THE VARIETIES

1. Branches, petioles and peduncles glabrous or nearly so. Leaves glabrous . . . *var. boisiana*
1. Branches, petioles, peduncles and leaves more or less densely greyish or fulvous pubescent. *var. sumatrana*

*var. boisiana*.  
A large woody twiner; branches terete or slightly striate, fistulose, glabrous, greyish brown to brownish black. Leaves broad-ovate to orbicular, 8–14 by 7–12 cm, cordate to truncate at the base, acuminate to cuspidate at the apex, glabrous; midrib and 7–9 lateral nerves on either side prominent beneath, impressed above, secondary nerves parallel, prominulous beneath, slightly impressed above, tertiary nervation finely reticulate, prominulous above; petiole to 7 cm long, glabrous or sparsely pubescent near the apex. Inflorescences axillary, corymbosely ramified at the apex, several-flowered; peduncle terete and glabrous in the basal part, more or less applanate and pubescent to the apex, 9–13 cm long. Pedicels slightly thickened towards the calyx, sparsely pubescent, to 8(–12) mm. Bracts narrow-triangular, 1–1½ mm long, caducous, the lower ones sometimes foliaceous. Flower-buds subglobose. Sepals subequal in length or the outer ones slightly shorter, 5–7 mm long, concave, glabrous or the outer ones slightly pubescent; outer sepals orbicular to transverse-elliptic, rounded or slightly retuse at the apex, inner ones transverse-elliptic. Corolla broadly funnel-shaped to campanulate, ca 22 mm long, yellow (in the Tonkin specimen), or white (in the Sumatran one); midpetaline bands sericeous outside. Filaments curved at the dilated papillose

base; the corolla inside with two longitudinal hairy lines below the place of insertion of each filament; anthers straight, finally twisted. Ovary glabrous. Capsule (acc. to GAGNEPAIN) ovate-conical, 4-valved, glabrous, castaneous at the base, yellow upwards.

Distr. Indo-China (Tonkin), in *Malaysia*: Sumatra (East Coast).

Ecol. Edge of clearing, ca 900–1050 m.

Note. The specimen from Sumatra (YATES 975) is almost entirely identical with the type (Bois 138) from Tonkin; the lower surface of the leaves of the Tonkin specimen is, however, somewhat more glaucous than in that from Sumatra. The specimen BECCARI 3594, from Borneo, mentioned by GAGNEPAIN, belongs to *M. crassinervia* OOSTSTR.

*var. sumatrana* OOSTSTR. *Blumea* 3 (1939) 344.

Differs from *var. boisiana* by the grey to fulvous pubescent, afterwards glabrescent branches, petioles, peduncles, and pedicels, by the leaves being densely greyish pubescent on both sides, and becoming glabrous above.

Distr. *Malaysia*: Sumatra (East Coast: Sibolangit).

Ecol. In young forest and thickets, ca 500–600 m.

Note. Specimens of this variety are to 20 m high; the leaves may reach a length of 20 cm and 16 cm diam., petiole to 10 cm long, inflorescences 8–16 cm long.

15. *Merremia mammosa* (LOUR.) HALLIER *f. Teysmannia* 7 (1897) 164; OOSTSTR. *Blumea* 3 (1939) 345.—*Convolvulus mammosus* LOUR. Fl. Cochinch. 1 (1790) 108.—*Ipomoea mammosa* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 475.—*Ipomoea gomezii* CLARKE in HOOK. *f. Fl. Br. Ind.* 4 (1883) 211.

A glabrous twiner with subterranean, fusiform to globose, fasciculate, ca 10–25 cm long tubers, containing a white milky juice. Stems annual, terete, brown, finely striate in the older parts. *Leaves* broad-ovate to orbicular or sometimes broader than long, 6–12 by  $4\frac{1}{2}$ –12(–15) cm, cordate at the base, abruptly acuminate at the apex, with a narrow, obtuse, mucronulate acumen; margin entire or slightly undulate; lateral nerves 7–9 on either side of the midrib, 3–4 of them from near the base; secondary nerves many, parallel; tertiary nervation reticulate; petiole slender, to 6, or sometimes to 10 cm long or more. *Inflorescences* axillary. Peduncle terete, or angular near the apex, 3–15 cm, 1–3- or sometimes more-flowered. Pedicels thickened and angular towards the apex, 12–15 mm. Bracts linear-lanceolate or lanceolate, 7–10 mm long, membranous, caducous. Flower-buds narrow-ovoid, acute. *Sepals* concave, about equal in length, 24–30 mm long, the 3 outer ones broad-ovate to broad-elliptic, obtuse, mucronulate, the inner ones narrower and less obtuse. *Corolla* broadly funnel-shaped, 7–8 cm long, white, glabrous but with minute glands outside; mid-petaline bands distinctly nerved. Base of the filaments decurrent with a row of hairs on either side; anthers spirally twisted. Ovary glabrous. *Capsule* enclosed by the persistent calyx. Seeds 8 mm long, greyish to black, with long brownish hairs along the margins.

Distr. India, Indo-China, Andamans, in *Malaysia*: cultivated in Java, formerly also in Bali, the Moluccas, and the Philippines (acc. to RUMPHIUS); occasionally escaped (Madura).

Use. The tubers are edible, they are also used as a native anti-diabetes remedy; and in affections of the throat and the respiratory organs, or in cases of lung-tuberculosis.

Vern. *Bidara upas*, M, *widara upas*, *wirodjo*, *blanar*, J, *rabët belading*, Md, *ubi sufu*, Moluccas, *bangkuwang*, Bali (RUMPHIUS), *hailalé*, Ambon (RUMPHIUS, HEYNE), *angcoa*, Philip. (RUMPHIUS).

16. *Merremia borneensis* MERR. Univ. Calif. Publ. Bot. 15 (1929) 260; OOSTSTR. *Blumea* 3 (1939) 347.

A large woody quite glabrous twiner, stems ca 2 cm diam.. Branches terete, fistulose, pale to dark brown, warty by pale lenticels. *Leaves* more or less bullate, orbicular, or rarely ovate, (5)–8–22 by ( $3\frac{1}{2}$ )–6–18 cm, cordate at the base, cuspidate at the apex with a long and narrow mucronulate acumen, sometimes acuminate and less distinctly cuspidate; midrib and (6)–8–11 curved lateral nerves on either side prominent beneath, secondary nerves parallel, prominent beneath; tertiary nerves reticulate, conspicuous; petiole 4–11 cm. *Inflorescences* axillary. Peduncle 6–12 cm long, several-flowered, lenticellate, cymosely branched towards the apex. Pedicels  $1\frac{1}{2}$ –3 cm, angular, thickened above, especially in fruit. Bracts caducous. Flower-buds ovoid to oblong, acute. *Sepals* elliptic to broad-elliptic, obtuse to slightly emarginate at the apex, mucronulate, (15)–18–22 mm long, the two outer ones leathery, the inner

ones more or less membranous, all slightly accrescent in fruit. *Corolla* campanulate to funnel-shaped,  $5\frac{1}{2}$ –6 cm long, yellow, outside glabrous, inside papillose below the base of the filaments. Filaments glabrous; the corolla inside above the insertion of the filaments with a semicircular thickening. Ovary glabrous, 4-celled. *Capsule* ovoid, ca 12 mm high, mucronate, glabrous, black. Seeds oblong-ovoid, ca 6–7 mm long, pale, appressed-pilose.

Distr. *Malaysia*: Malay Peninsula (Tringganu), W., NW, and N. Borneo.

Ecol. Forming tangled masses over thickets, especially along small streams.

Vern. *Pohon lapa gaga*, Mal. Pen., *akar larum*, *laran*, Br. N. Borneo, Mal.

17. *Merremia pulchra* OOSTSTR. *Blumea* 3 (1939) 348, f. 3, a-c.

Most probably a large twiner, quite glabrous. Branches terete, greyish brown, with sparse, pale lenticels. *Leaves* ovate, 7–11 by 5–6 $\frac{1}{2}$  cm, cordate at the base, abruptly acuminate at the apex, with an acute, ca 1 cm long acumen; midrib and 6–7 lateral nerves on either side slightly impressed above, prominent beneath; secondary nerves nearly parallel, slightly prominulous above, flat beneath; tertiary nerves indistinctly reticulate; petiole sulcate above,  $1\frac{1}{2}$ –2 $\frac{1}{2}$  cm long. *Inflorescences* ca 8–20 cm long, racemosely ramified; peduncle ca 3–6 cm, terete, lower branches 3–7, upper 2 $\frac{1}{2}$ –5 cm long, 1-flowered. Pedicels  $1\frac{1}{2}$ –2 $\frac{1}{2}$  cm, angular and thickened towards the apex. *Sepals* thinly coriaceous, or the inner ones membranous, equal in length or the outer ones slightly shorter, 25–30 mm long, oblong to elliptic-oblong, obtuse at the apex and mucronulate. *Corolla* broadly funnel-shaped, ca 6 cm long, glabrous.

Distr. *Malaysia*: Borneo (N. Sarawak); a specimen collected in the Philippines by G. T. LAY, without indication of the exact locality (Herb. Brit. Mus.) seems to be conspecific.

Note. The type specimen from P. Muara, Brunei Bay, in Herb. Singapore, possesses one open flower, glued upon the sheet; therefore I could not examine details.

18. *Merremia crassinervia* OOSTSTR. *Blumea* 3 (1939) 350, f. 1, a.

A woody quite glabrous twiner. Branches terete, solid or fistulose, greyish brown, warty by pale lenticels. *Leaves* ovate to broadly ovate, 7–13 by  $3\frac{1}{2}$ –9 cm, cordate at the base, attenuate or slightly acuminate towards the obtuse or acutish apex; margin entire or slightly undulate; midrib and 8–10 curved lateral nerves on either side impressed above, prominent beneath; secondary nerves parallel, like the reticulate tertiary ones slightly impressed above, prominulous beneath; petiole narrowly sulcate above,  $1\frac{1}{2}$ –5 cm long. *Inflorescences* axillary, up to 20–30 cm long, widely corymbosely branched, many-flowered; lower branches in the axils of small caducous leaves, upper ones in the axils of minute bracts. Peduncle 7–11(–17) cm, terete. Pedicels up to 15 mm, slightly



angular. Flower-buds conical, acute. *Sepals* subequal in length, 11–12 mm long, the two outer ones elliptic, rounded and mucronulate at the apex, concave, subcoriaceous; 3 inner ones broadly elliptic to orbicular, rounded and mucronulate at the apex, and with membranous margins. *Corolla* funnel-shaped, ca 2–2½ cm long, glabrous, the limb shallowly lobed. Filaments papillose at the margins of the dilated base. Ovary glabrous.

Distr. *Malaysia*: Borneo (Sarawak).

**19. *Merremia clemensiana* OOSTSTR.** *Blumea* 3 (1939) 350, f. 1, d.

A woody twiner. Branches terete, slightly striate, glabrous or pubescent towards the apex, minutely warty by pale lenticels. *Leaves* ovate to broadly ovate, 5–14 by 3–10 cm, rounded at the base, gradually attenuate or shortly acuminate towards the obtuse mucronulate apex, glabrous; midrib and 5–6 curved lateral nerves on either side impressed above, prominent beneath; secondary nerves nearly parallel, prominent on both sides or indistinct above; tertiary nerves reticulate, prominent above, flat beneath; petiole 1–3 cm, narrowly sulcate above, glabrous. *Inflorescences* axillary, more or less secund, to 12 cm long, corymbosely branched at the apex, many-flowered; peduncles to 8 cm, terete, glabrous or pubescent towards the apex; branches of the inflorescences short, pubescent. Pedicels 12–16 mm long (in fruit 25–35 mm), glabrous or pubescent at the base, slightly thickened and subangular at the apex. Lower bracts foliaceous, to 3–5 cm long, upper ones subulate, ca 1½ mm long. Flower-buds ovoid, acute to obtusish. *Sepals* glabrous, two outer ones subcoriaceous, broadly oblong, rounded at the apex, ca 7 mm long, three inner ones broadly elliptic to orbicular, retuse at the apex, 8–9 mm long, subcoriaceous in the middle portion, and with membranaceous margins. *Corolla* campanulate to broadly funnel-shaped, ca 1½ cm long, yellow (or sometimes white?), glabrous, limb hardly lobed, crenulate(?). Dilated base of the filaments curved, and papillose at the margins; anthers straight. Ovary glabrous. *Capsule* ca 12–13 mm high, straw-coloured, 4-, or by splitting of the valves, more-valved; valves at the apex with a sharp incurved tooth. Seeds ca 6 mm long, densely covered with long blackish brown or greyish brown soft hairs.

Distr. *Malaysia*: Borneo (Sarawak).

Ecol. Scandent in thickets and open forests.

**20. *Merremia korthalsiana* OOSTSTR.** *Kew Bull.* (1938) 175; *Blumea* 3 (1939) 351.

A large woody twiner. Stems terete or obtusely angular, substriate, greyish brown when dry, glabrous or slightly pubescent in the younger parts; the adult stems fistulose, to 7 mm diam. *Leaves* broadly ovate or orbicular, 6–15 by 4–14 cm, broadly cordate or truncate at the base, abruptly acuminate or cuspidate at the apex with a narrow, acute, 1–1½ cm long acumen, glabrous and dull or more or less shining above, paler beneath and there pubescent on the nerves or glabrous; midrib

and 7–10 lateral arcuate nerves on either side often subimpressed above, prominent beneath; secondary nerves subparallel, prominent above, prominent beneath; tertiary nerves reticulate, prominent above; petiole 2½–6 cm long, substriate and slightly sulcate above, glabrous or sparsely hairy in the groove. *Inflorescences* axillary, corymbosely branched at the apex, to 20 cm long, secund, or often forming a more or less umbelliform panicle at the end of the branches; peduncle to 12 cm, pubescent or glabrous, longitudinally striate; primary branches many, in the axils of foliaceous bracts, pubescent, 1½–4 cm long, cymose at the apex with several flowers. Pedicels 12–20 mm long, pubescent. Upper bracts small, linear-subulate, 2½–4 mm, pubescent. Flower-buds ovoid, acutish. *Sepals* black when dry, shining, broad-elliptic or orbicular, broadly rounded at the apex, mucronulate or not so, outside glabrous, inside with many minute resinous dots, equal in length or the outer ones slightly shorter, 9–10 mm long. *Corolla* broadly funnel-shaped or campanulate, 2–2½ cm long, yellow, shallowly lobed, outside glabrous, inside with some hairs below and between the bases of the filaments. Filaments papillose at the margins of the slightly broadened base; anthers straight, glabrous. Ovary glabrous.

Distr. *Malaysia*: Borneo (Indonesian Borneo, Sarawak).

Ecol. Mostly in secondary forests, between 150 and 300 m.

**21. *Merremia peltata* (L.) MERR.** *Interpr. Rumph. Herb. Amb.* (1917) 441; OOSTSTR. *Blumea* 3 (1939) 352.—*Convolvulus peltatus* LINNÉ, *Sp. Pl.* (1753) 1194.—*Ipomoea nymphaefolia* BL. *Bijdr.* (1825) 719, non GRISEB. 1866.—*Ipomoea peltata* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 452.—*Chironia capsularis* BLANCO, *Fl. Filip.* ed. 1 (1837) 102.—*Chironia lanosantha* BLANCO, *l.c.* ed. 2 (1845) 71.—*Operculina peltata* HALLIER f. *Bot. Jahrb.* 16 (1893) 549.—*Merremia nymphae(i)-folia* HALLIER f. *Versl. 's Lands Pl.-tuin* 1895 (1896) 127.—*Ipomoea menispermacea* DOMIN, *Bibl. Bot. Heft* 89 (1929) 535, f. 177.—**Fig. 31.**

A large twiner, to 30 m high, covering whole trees, rarely procumbent. Stems from a large subterranean tuber, terete, fistulose or pithy, containing a milky juice, glabrous, or hairy at the base of the petioles, the thickest parts striate. *Leaves* peltate, broadly ovate to orbicular or even broader than long, 7–30 by 7–30 cm, rounded or slightly retuse at the base (the leaves of the inflorescences sometimes cordate at the base and not or indistinctly peltate), acuminate or abruptly cuspidate at the apex, with an acute and mucronulate acumen; glabrous on both surfaces or slightly hairy beneath along the nerves, rarely on the whole surface; lateral nerves 7–10 on either side of the midrib; secondary nerves many, parallel; finer nervation reticulate; petiole shorter or longer than the blade, 3–20 cm long or more, glabrous. *Inflorescences* to 40 cm long, widely corymbose, several- to many-flowered; peduncles axillary,

1-2 in a leaf-axil, stout, terete. Pedicels  $1\frac{1}{2}$ -2 $\frac{1}{2}$  cm, thickened and angular at the apex, in fruiting stage clavate and to 5 cm. Bracts caducous. Flower-buds narrow-ovoid, acute. *Sepals* (15-) 18-25 mm long, equal in length or the outer ones slightly shorter; three outer sepals broad-ovate, subcoriaceous; two inner ones narrower, ovate-oblong, thinner, all mucronulate at the obtuse apex. *Corolla* broadly funnel-shaped,  $4\frac{1}{2}$ -6 cm long, yellow or white, limb shallowly lobed. Filaments dilated and hairy in the basal part; corolla inside above the insertion of each filament with a semicircular thickening; anthers spirally twisted, hairy. Ovary glabrous. *Capsule* 4-celled, 4-valved; valves splitting longitudinally into several segments. Seeds 4, densely yellowish to dark-brown tomentose and long-villose.

Distr. Madagascar, Mascarenes, Seychelles, N. & E. tropical Australia, Polynesia; throughout Malaysia. Fig. 31.

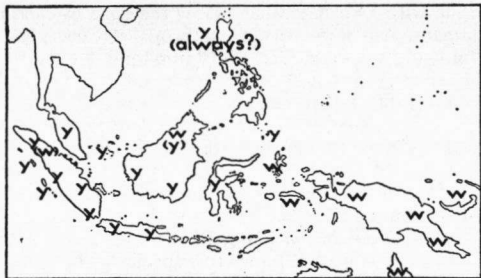


Fig. 31. *Merremia peltata* (L.) MERR. Distribution of specimens with yellow, and with white corollas. y: corolla yellow, (y): corolla rarely yellow; w: corolla white, (w): corolla rarely white.

Ecol. Edges of primary and secondary forests, clearings, thickets, from sea-level to ca 700 m.

Uses. The tubers are reputed edible, but may cause purging. The Sundanese use an extract for stomach-ache. The juice of the stems is taken for coughs, diarrhoea, and worms; and is used for sore eyes. RUMPHIUS states that the juice of the stems may be applied to fresh wounds, and dropped into sore eyes. The leaves are used for washing the hair, and are applied as poultices on sore breasts, ulcers, and wounds (BURKILL; HEYNE). In the Philippines the stems are sometimes used for tying purposes (BROWN, QUISUMBING).

Vern. *Akar ulan*, *akar ulan gajah*, Mal. Pen., *akar sambang*, W. Sum., *rabana uding*, Simalur, *akar lonkembung*, Palembang, *ritang*, *melading*, Banka, *areuj tjarajun*, *areuj ki parumpung* or *ki palumpung*, S., *klurak*, *kangkung tirto*, *akar belaran*, J., *bukalung*, Bali, *blaran*, SE. Borneo, *akar kachangbing*, *akar laran*, N. Borneo, *balanteteh*, *talabo*, Celebes, *wanaring*, *manaring*, *tichinian*, Minahassa, *buran'a*, Talaud, *afay*, Sula, *daun rambut*, *obat rambut*, *halen*, *hailalé*, Ambon, *long*, *kugè*, *kugètè*, Halmahera, *koegè*, Ternate;

Philippines: *budakin*, Bag., *bulakán*, Tag. & Bis., *bulak-bulakán*, Bik., *burákan*, S. L. Bis., Bik. & Sulu, *tampinita*, Sub..

Note. Yellow-flowered specimens appear to be restricted, with a few exceptions, to W. Malaysia, whereas white-flowered ones occur in E. Malaysia. Fig. 31. A similar distribution of the flower-colour is found in 13. *M. umbellata*. Fig. 30.

22. *Merremia elmeri* MERR. Univ. Calif. Publ. Bot. 15 (1929) 261; OOSTSTR. Blumea 3 (1939) 358.

A large woody twiner; stems, inflorescences and lower surface of the leaves, especially the nerves greyish pubescent to villose (or plant quite glabrous: var. *glaberrima* OOSTSTR.). Stems stout, terete or slightly flattened, to 5-7 mm diam. *Leaves* peltate, broadly ovate to orbicular, 6-25 by 5-21 cm, rounded to slightly retuse at the base, more or less abruptly acuminate to cuspidate at the apex, with a narrow and acute acumen; lateral nerves 8-10 on either side of the midrib, curved at the margin; secondary nerves many, parallel, tertiary nerves reticulate; petiole shorter to longer than the blade, 3-20 cm or more, glabrous or sparsely pubescent. *Inflorescences* 7-25 cm long, solitary or in pairs in the leaf-axils, more or less secund; peduncles terete or flattened at the apex, pubescent and glabrescent like the stems, patent, corymbosely branched from ca 5-15 cm above the base, several-flowered. *Pedicels* 7-15 mm long, angular, striate, sparsely hairy or glabrous. Bracts caducous, lower ones sometimes foliaceous, not peltate. Flower-buds ovoid, acute or obtusish. *Sepals* broadly elliptic to elliptic-oblong, 9-13(-15) mm, outer ones concave, obtuse, glabrous, subcoriaceous, longitudinally striate outside; inner ones thinner, obtuse or slightly emarginate, glabrous, all slightly enlarged in fruit. *Corolla* funnel-shaped to campanulate, 3-3 $\frac{1}{2}$  cm long, white, except for the blackish grey basal outer parts, outside minutely granulose-glandular; limb indistinctly lobed, with ciliate margin. Filaments sparsely papillose at the margins of the broadened base; the corolla inside above the base of each filament with a semicircular thickening. Anthers twisted, villose. Ovary glabrous. *Capsule* subglobose to broadly conical, 13-14 mm diam., 2-celled, pericarp splitting into several valves; valves striate outside. Seeds 4, short-pubescent, brownish black, margins bearded with long brown hairs; seeds 5-6 $\frac{1}{2}$  mm long.

Distr. Malaysia: Borneo (Indonesian & Br. N. Borneo).

Ecol. Thickets, in recently cleared land in rather wet places.

Note. Closely related to *M. peltata* and mainly different by its smaller flowers, of which the corolla is granulose-glandular outside.

var. *glaberrima* OOSTSTR. Blumea 3 (1939) 359, f. 3, d-m. Like the typical form of the species, but quite glabrous.

Distr. Malaysia: Borneo (Indonesian Borneo, Sarawak).

## 5. Section Wavula

OOSTSTR. *Blumea* 3 (1939) 266, 359.

Closely related to *sect. Xanthips*. Flower-buds ovoid to narrow-ovoid or oblong, subacute; midpetaline bands not with distinct dark lines. Inflorescences subumbelliform. Flowers moderate to large. Pedicels immediately below the calyx with a ring of small thick lobes.

23. *Merremia similis* ELMER, Leaf. Philip. Bot. 1 (1908) 335; OOSTSTR. *Blumea* 3 (1939) 359.—*Convolvulus distillatorius* BLANCO, Fl. Filip. ed. 1 (1837) 95.—*M. distillatoria* MERR. Sp. Blanc. (1918) 325; En. Philip. 3 (1923) 360, *quoad specim.*

A twiner. Stems terete, smooth or finely striate, fistulose, 2½–4½ mm diam., the young parts densely grey or rusty farinose, pubescent or short-tomentose, glabrescent. *Leaves* broadly ovate to orbicular, 8½–20 by 8–20 cm, broadly cordate at the base, abruptly acuminate at the apex with a narrow acumen; densely short-tomentose on both sides in youth with short curled hairs, afterwards the upper surface glabrescent, finally with some scattered white hairs mainly along the nerves, the lower surface with a dense, short, rusty or greyish brown tomentum; lateral nerves 7–10 on either side of the midrib, curved at the margin, secondary nerves many, parallel, all distinctly prominent beneath; tertiary nervation reticulate; petiole 3–17 cm, pilose like the stems, glabrescent. *Inflorescences* axillary; peduncle to 30(–760) cm, terete, pilose like the stems, glabrescent, branched close to the apex; branches *ca* 1 cm long or slightly longer. Pedicels gradually thickened to the apex, with a thick lobed ring immediately below the calyx, farinose, glabrescent towards the apex, 2–3 cm, in fruit erect, 4–4½ cm. Bracts elliptic, 2–2½ mm long, glabrous inside, short-tomentose

outside, caducous. Flower-buds narrow-ovoid to oblong, acute. *Sepals* concave, thin-coriaceous with a membranous margin and with glandular dots, obovate to broad-elliptic or orbicular, obtuse, or the outer ones slightly retuse, mucronulate, to 15–18 mm long, the innermost a little shorter; the calyx enclosing the fruit as a cup, with sepals to 20 mm long. *Corolla* broadly funnel-shaped, *ca* 4 cm long, white with a tinge of red, slightly 5-lobed, nearly glabrous, only with a few hairs at the top of the midpetaline bands. Filaments pilose at the somewhat broadened base; the corolla-tube inside with two hair lines below the base of each filament. Anthers twisted, glabrous. Ovary glabrous. *Capsule* ovoid, *ca* 15–18 mm long, 4-valved; the soon loosening outer layer of the valves brownish-black, afterwards the valves are straw-coloured outside, white inside. Seeds 6 mm long, black, sparsely tomentose and densely villose.

Distr. *Malaysia*: Philippines.

Ecol. In thickets and secondary forests at low and medium altitudes.

Vern. *Bulakán, burakán, P. Bis.*

Note. MERRILL assumes this species to be conspecific with *Convolvulus distillatorius* BLANCO. If this is accepted the correct name for the species would be *Merremia distillatoria* (BLCO) MERR.. However, in my opinion, this identity is not quite certain.

## 14. OPERCULINA

S. MANSO, Enum. Subst. Bras. (1836) 16; OOSTSTR. *Blumea* 3 (1939) 361.—Fig. 32–33.

Large, herbaceous twiners, the stems, peduncles, and petioles often winged. *Leaves* petioled, entire, angular or digitate, often cordate at the base. *Flowers* large, in one- to few-flowered axillary, peduncled cymes. Bracts often large, caducous. *Sepals* 5, large, pergameneous to coriaceous, mostly glabrous, often ventricose, often enlarged in fruit and ultimately with an irregularly lacerate margin. *Corolla* regular, broadly funnel-shaped or campanulate, white or yellow, glabrous, or with midpetaline bands hairy outside. *Stamens* 5, included; filaments adnate to the corolla-tube, filiform; anthers large, often at length spirally twisted; pollen ellipsoid, smooth. Disk annular. *Ovary* glabrous, 2-celled, each cell with 2 ovules; style 1, simple, filiform, included; stigma biglobular. *Capsule* large, dry; epicarp circumscissile in or above the middle, the upper part of it (*operculum*, lid) more or less fleshy, separating from the lower part and from the endocarp; this scarious, at length splitting irregularly. Seeds 4 or less, large, trigonous or globular, glabrous, or pilose along the edges, often dull black.

Distr. *Ca* 20 spp. in the tropics of both hemispheres.

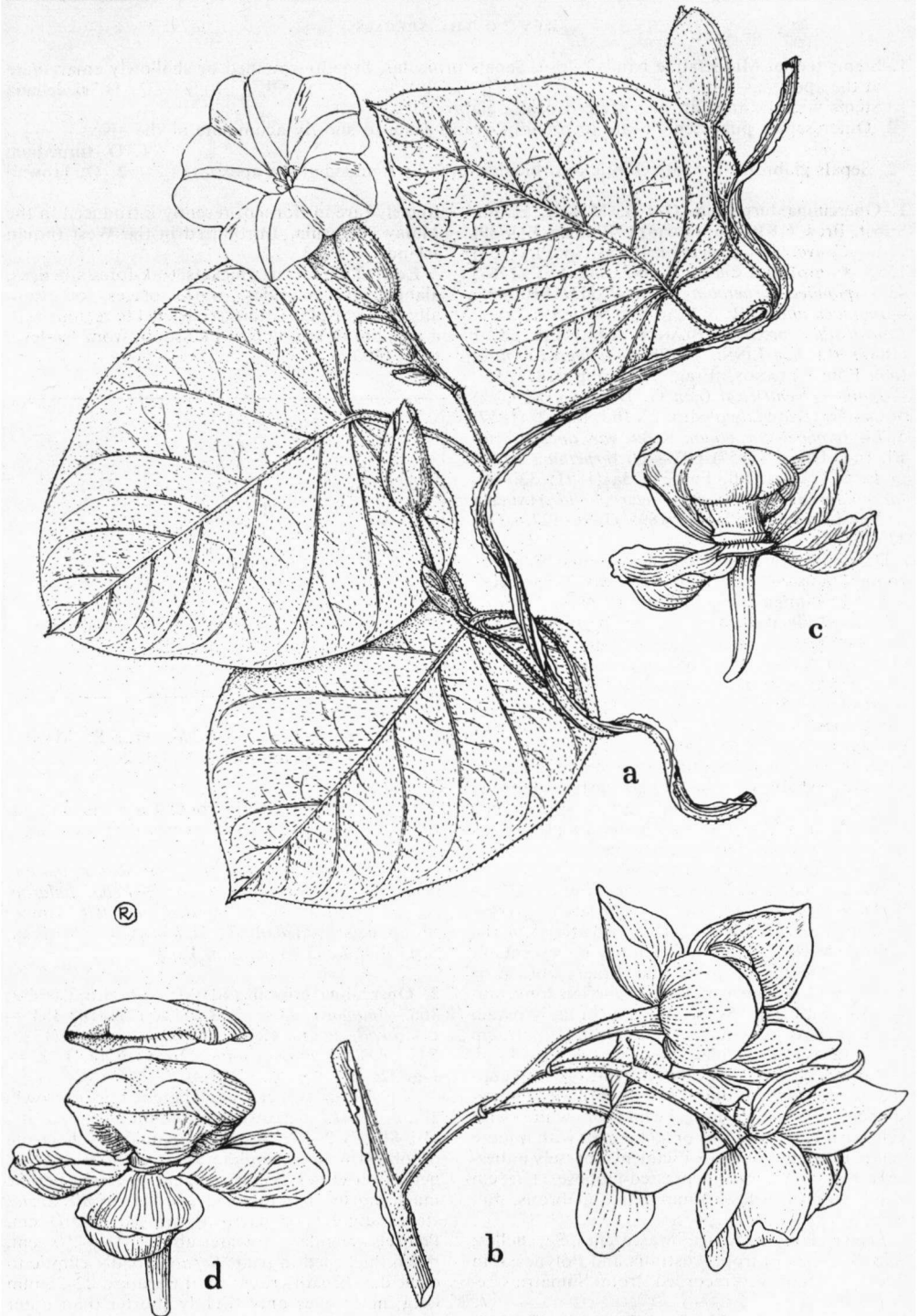


Fig. 32. a-b. *Operculina turpethum* (L.) S. MANSO. a. Flowering branch,  $\times \frac{2}{3}$ , b. infructescence,  $\times \frac{2}{3}$ .—  
c-d. *Operculina brownii* OOSTSTR., c. young capsule,  $\times \frac{2}{3}$ , d. capsule with operculum,  $\times \frac{2}{3}$ .

## KEY TO THE SPECIES

1. Stems terete. Midpetaline bands pilose. Sepals orbicular, broadly rounded or shallowly emarginate at the apex . . . . . 3. *O. riedeliana*  
 1. Stems winged, angular, or sulcate. Corolla glabrous.  
 2. Outer sepals pubescent, ovate to broadly ovate, acute to shortly acuminate at the apex. . . . . 1. *O. turpethum*  
 2. Sepals glabrous, broadly elliptic to orbicular, broadly rounded at the apex . . . . . 2. *O. brownii*

1. *Operculina turpethum* (L.) S. MANSO, Enum. Subst. Bras. (1836) 16; OOSTSTR. Blumea 3 (1939) 362.—*Convolvulus turpethum* LINNÉ, Sp. Pl. (1753) 155.—*Convolvulus anceps* LINNÉ, Mant. 1 (1767) 43.—*Ipomoea turpethum* R. BR. Prod. (1810) 485.—*Ipomoea anceps* R. & SCH. Syst. 4 (1819) 231.—*Convolvulus maximus* BLANCO, Fl. Filip. ed. 1 (1837) 91<sup>1</sup>, non LINNÉ f. 1781.—*Ipomoea reptans* (non POIR.) LLANOS, Fragm. Pl. Filip. (1851) 55<sup>1</sup>.—*Ipomoea ventricosa* (non G. DON) LLANOS, l.c. 56<sup>1</sup>.—*Argyrea alulata* MIQ. Fl. Ind. Bat. 2 (1857) 587.—*Ipomoea turpethum* R. BR. var. *anceps* MIQ. Fl. Ind. Bat. 2 (1857) 607.—*O. turpethum* PETER in E. & P. Nat. Pfl. Fam. 4, 3a (1891) 32.—*O. turpethum* S. MANSO var. *heterophylla* HALLIER f. Versl. 's Lands Pl.-tuin 1895 (1896) 127.—Fig. 32a–b, 33.

Perennial twiner with long fleshy much branched roots. Stems 2–4 mm high, narrowly 3–5-winged, sulcate or angular, glabrous or sparsely short-pilose, mainly at the nodes; young parts sometimes more or less tomentose. Leaves very variable in shape, orbicular, broadly ovate, ovate-lanceolate or lanceolate; broad leaves 5<sup>1</sup>/<sub>2</sub>–15 by 4–14 cm, narrow ones 5<sup>1</sup>/<sub>2</sub>–7<sup>1</sup>/<sub>2</sub> by 1–2<sup>1</sup>/<sub>2</sub> cm; base cordate, sometimes hastate, apex acuminate, acute or obtuse to rounded, rarely slightly emarginate, mucronulate; margin entire or sometimes coarsely dentate to shallowly lobed; upper surface glabrous or appressed-pilose, lower surface pubescent; midrib and 8–11 nerves on either side prominent beneath; petiole terete or sometimes winged, 2<sup>1</sup>/<sub>2</sub>–7<sup>1</sup>/<sub>2</sub> cm. Inflorescences cymosely one- to few-flowered; peduncles 2–18 cm long, terete or sometimes winged like the stems, glabrous or pubescent. Pedicels angular, 12–15 mm or those of the central flower up to 35 mm long, pubescent, in fruit clavate and up to 40 mm. Bracts oblong or elliptic-oblong, mucronulate, 1<sup>1</sup>/<sub>2</sub>–2 cm long, pubescent, caducous. Sepals ovate or broadly ovate, acute or shortly acuminate, outer ones 1<sup>1</sup>/<sub>2</sub>–2<sup>1</sup>/<sub>2</sub> cm long, pubescent outside, inner ones ca 2 cm long, glabrous or nearly so; calyx in fruit broadly cup-shaped, up to 6 cm diam. Corolla broadly funnel-shaped, 3–4<sup>1</sup>/<sub>2</sub> cm long, white or white with yellowish base, glabrous or sometimes with minute yellowish glands outside. Filaments sparsely pubescent below. Capsule depressed-globose, 1<sup>1</sup>/<sub>2</sub> cm diam. Seeds 4 or less, 6 mm diam., glabrous, dull black.

Distr. Trop. E. Africa, Mascarenes, Seychelles; S. & SE. Asia to trop. Australia and Polynesia, in Malaysia: not yet recorded from Sumatra, ex-

remely rare in Borneo; recently introduced in the Malay Peninsula. Introduced in the West Indian Islands. Fig. 33.

Ecol. Thin forests, thickets, teak-forests, hedges, along-fields, waysides, waste places, occasionally in sugar-plantations, restricted to regions with a medium or strong east monsoon; from sea-level to ca 1300 m.

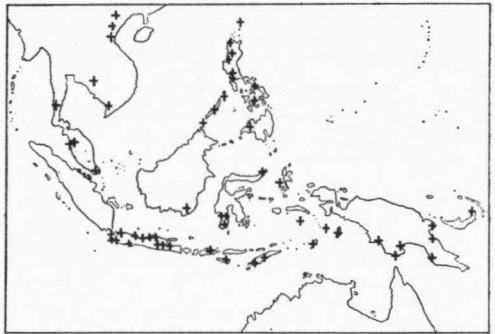


Fig. 33. *Operculina turpethum* (L.) S. MANSO. Distribution in Malaysia.

Uses. The bark of the roots is used as a purgative; the stems are used for tying purposes (Philippines).

Vern. Indian *jalap*, *turpeth-root*, E, *arog djotang benèr*, S, *sampar-kédong*, *sampar-kébo*, *balaran*, *rajudan*, J, *languwi*, Sumbawa, non *loli*, Timor; Philippines: *bangbangau*, *laplapsut*, Il., *burákan*, S. L. Bis., *kamokamotihan*, Tag.

2. *Operculina brownii* OOSTSTR. Blumea 3 (1939) 366.—*Ipomoea alata* R. BR. Prod. (1810) 484.—*Convolvulus alatus* (R. BR.) SPRENG. Syst. 1 (1825) 596, non *Operculina alata* (HAM.) URB. 1902.—Fig. 32c–d.

A glabrous twiner. Stems angular to narrowly alate. Leaves narrowly ovate-oblong or ovate, 5<sup>1</sup>/<sub>2</sub>–8<sup>1</sup>/<sub>2</sub> by 2–4<sup>1</sup>/<sub>2</sub> cm, long-attenuate to the acute or obtusish, mucronulate apex; midrib and 7–8 nerves on either side prominent beneath; petiole much shorter than the blade, ca 1–2 cm. Peduncles stout, angular or narrowly winged, 2–3<sup>1</sup>/<sub>2</sub> cm. Pedicels angular, clavate above, 1<sup>1</sup>/<sub>2</sub>–2<sup>1</sup>/<sub>2</sub> cm, much thickened in fruit. Sepals broadly elliptic to orbicular, broadly rounded at the apex, 22–25 mm long; inner ones only slightly shorter than outer ones, all glabrous and all much enlarged in fruit, up to 30 mm long. Corolla funnel-shaped, to 5 cm

(1) According to MERRILL, En. Philip. 3 (1923) 363.

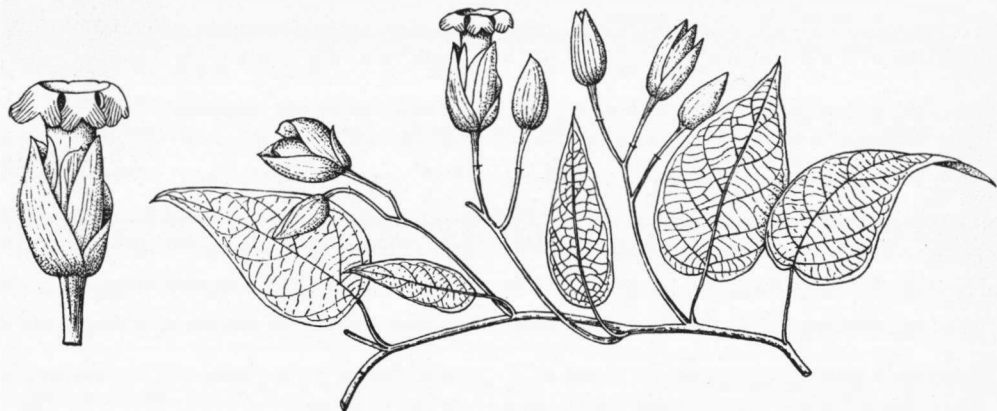


Fig. 34. *Decalobanthus sumatranus* OOSTSTR. Flowering branch,  $\times \frac{1}{2}$ , and flower, nat. size.

long (only one examined), white, glabrous. Capsule  $3\frac{1}{2}$ –4 cm diam., enclosed by the large cup-shaped calyx. Seeds ca 15 mm long, glabrous, dull black.

Distr. Australia (N. Territory, N. Queensland), Thursday Island, likely to occur in the dry savannah regions of S. New Guinea.

3. *Operculina riedeliana* (OLIV.) OOSTSTR. *Blumea* 3 (1939) 366.—?*Convolvulus bufalinus* LOUR. *Fl. Coch.* 1 (1790) 109.—?*Ipomoea bufalina* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 452.—*Convolvulus platypeltis* ZIPP. ex SPANOGHE, *Linnaea* 15 (1841) 338, *pro syn.*—*Ipomoea riedeliana* OLIV. in *Hook. Ic.* III, 5 (1883) t. 1424.—*Merremia riedeliana* HALLIER *f. Bot. Jahrb.* 16 (1893) 552.—*Merremia platypeltis* PRAIN, *J. As. Soc. Beng.* 74, 2 (1906) 307.—*Merremia bufalina* MERR. & ROLFE, *Philipp. J.Sc.* 3 (1908) 122, *quoad specim. tantum.*—*O. bufalina* HALLIER *f. Med. Rijksherb.* 1 (1910) 26, *quoad specim. tantum.*

Plant glabrous. Stems twining, robust, terete, more or less woody, fistulose or with pith. Leaves broadly ovate to orbicular, sometimes oblong or rarely narrowly oblong, occasionally contracted about the middle, 8–18 by (3–)6–15 cm, broadly cordate at the base or in narrow leaves sometimes slightly cordate to truncate, more or less abruptly acuminate at the apex, with acute mucronulate

point; often reddish brown when dry; nerves ca 7–8 on either side of the midrib; petiole thin, slender, 2–10 cm. Inflorescences one- to several-flowered. Peduncles shorter or longer than the petioles, 2–11 cm, terete at the base, applanate upwards. Pedicels 1–2(–3) cm long, clavate above, much thickened in fruit. Bracts oblong, 10–15 mm long, scarious. Sepals about equal in length, orbicular, broadly rounded or shallowly emarginate at the apex, 13–17 mm long, in fruit up to 20 mm; calyx in fruit cup-shaped and enclosing the capsule. Corolla broadly funnel-shaped, 4–5 cm long, pale yellow or rarely white; midpetaline bands densely sericeo-pilose outside. Filaments pubescent at the base as is the corolla inside below their insertion. Capsule  $2\frac{1}{2}$ –3 cm diam.; seeds ca 7 mm long, dull black, with 2 pilose-papillose edges.

Distr. Indo-China (?), in *Malaysia*: Malay Peninsula (Negri Sembilan), W. Java, S. Celebes (Palopo), Lesser Sunda Islands (Flores, Timor, Wetar), Moluccas (Buru, Key), Philippines (Luzon, Cebu), and W-E. New Guinea.

Ecol. Thickets, edges of secondary forests, hedges, at low altitudes.

Vern. *Kengkong bulit*, Mal. Pen., *bulakandagat*, Tag.

Note. Concerning the doubtful synonym *Convolvulus bufalinus* LOUR., see MERRILL, *Trans. Am. Phil. Soc.* 24, 2 (1935) 327–328.

## 15. DECALOBANTHUS

OOSTSTR. *Blumea* 2 (1936) 99, f. 1; *ibid.* 3 (1939) 370.—Fig. 34.

Prostrate, glabrous herb, with slender stems. Leaves petioled, ovate, entire. Inflorescences axillary, peduncled, cymosely 1–3-flowered. Sepals 5, large, equal in length, or the outer ones a little shorter, ovate or elliptic, obtuse or shallowly emarginate at the apex. Corolla regular, medium-sized, yellow, salver-shaped, with a fleshy long and narrowly obconical to cylindrical tube; limb 5-lobed; lobes bifid, their middle portion thicker than the oblong, obtuse lobules. Stamens 5, included; filaments flattened, adnate to the corolla-tube; pollen smooth. Disk cylindrical,

slightly lobed. *Ovary* glabrous, 2-celled, each cell with 2 ovules; style 1, simple, filiform, included; stigmas 2, globose, papillose. *Fruit* unknown.

Distr. Monotypic, endemic in *Malaysia*.

1. *Decalobanthus sumatranus* OOSTSTR. *Blumea* 2 (1936) 99, f. 1; *ibid.* 3 (1939) 370.—Fig. 34.

Herb with prostrate, thin, terete stems. *Leaves* ovate or narrowly ovate, 4–6 by 2–4 cm, truncate or slightly retuse at the base, gradually attenuate towards the obtusish mucronulate apex; midrib and 6–7 nerves on either side prominent on both sides; petiole 10–17 mm. *Inflorescences* axillary, 1–3-flowered; peduncles 1½–3½ cm; pedicels slightly angular, thickened at the apex, 1–1½ cm. *Sepals* equal in length or the exterior ones a little shorter, up to nearly 20 mm long, concave; two outer ones ovate, shallowly emarginate, indistinct-

ly mucronulate, coriaceous; three inner ones elliptic, coriaceous, with membranous margins. *Corolla* salver-shaped, yellow; tube narrowly obconical to cylindrical, fleshy, up to 2½ cm long; limb 5-lobed, the lobes reflexed (or patent?), bifid with oblong, obtuse, ca 5–5½ mm long lobules. Filaments inserted ca 6½ mm above the corolla-base. *Ovary* glabrous, 2-celled. Disk cylindrical, slightly lobed. *Fruit* unknown.

Distr. *Malaysia*: Sumatra (Djambi).

Ecol. The only collection known was found along a wayside, on an open sunny place on weathered tuff, 60 m.

## 16. IPOMOEA

LINNÉ, *Sp. Pl.* ed. 1 (1753) 159; *Gen. Pl.* ed. 5 (1754) 76; OOSTSTR. *Blumea* 3 (1940) 481.—*Quamoelit* MOENCH, *Meth.* (1794) 453 ('*Quamoelit*').—*Batatas* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 434.—*Pharbitis* CHOISY, *l.c.* 438.—*Calonyction* CHOISY, *l.c.* 441.—*Exogonium* CHOISY, *l.c.* 443.—Fig. 35–55.

Herbs or shrubs, usually twining, sometimes prostrate, floating, or erect. *Leaves* mostly petioled, variable in shape and size, entire, lobed or divided. Petiole sometimes with pseudostipules (small leaves of the axillary shoot) at its base. *Inflorescences* mostly axillary, cymose, one- to few- or many-flowered, the cymes rarely paniculate; bracts various. *Flowers* large, medium-sized or small. *Sepals* 5, herbaceous or subcoriaceous, variable in shape and size, glabrous or hairy, persistent, often more or less enlarged in fruit. *Corolla* regular, or rarely slightly zygomorphic, usually funnel-shaped, or campanulate, more rarely tubular or salver-shaped, purple, red, pink, white or yellow; limb shallowly or rarely deeply 5-lobed; mid-petaline bands well-defined by 2 distinct nerves. *Stamens* 5, mostly inserted near the base of the corolla-tube, included or rarely exerted; filaments filiform, often dilated at the base, often more or less unequal in length; pollen globular, spinulose. Disk annular. *Ovary* usually 2-, or sometimes 4-celled, 4-ovuled, rarely 3-celled, 6-ovuled, glabrous or hairy; style 1, simple, filiform, included, rarely exerted; stigma capitate, entire or often 2-, rarely 3-globular. *Fruit* a globose or ovoid capsule, mostly 4- or rarely 6-valved, or splitting irregularly. *Seeds* 4(–6) or less, glabrous or hairy.

Distr. A large genus of ca 500 spp., widely spread in the tropical and subtropical regions of both hemispheres.

Many species inhabit large or very large areas; still some of them are rare in *Malaysia*, e.g. 26. *I. diversifolia*. This phenomenon even occurs in species which are confined to the sandy sea-beach, as 22. *I. stolonifera*. A few species occupy apparently very local areas of distribution, as 16. *I. ochroleuca* which is endemic in Timor, and 17. *I. stibaropoda* which is hitherto only known from the Salajar Islands (S of Celebes).

Ecol. As a rule species of *Ipomoea* are restricted to the tropical lowland and hills, the highest locality recorded being about 1650 m altitude, or cultivated 13. *I. batatas* still higher. But further their distribution is usually not bound to special ecological niches. As is the case with the family generally, the representatives are heliophilous, hence they occur in great quantities along forest edges, in secondary forest, and in thickets which they may occasionally cover with a 'vegetable blanket' in conjunction with representatives of the *Cucurbitaceae*, *Vitaceae*, *Passifloraceae*, etc. (fig. 43).

Some species are restricted to the sandy beach, or nearly so, as 20. *I. pes-caprae*, 22. *I. stolonifera*, and 40. *I. tuba*. Specially the first species often plays a predominant part in the beach-vegetation where it is commonly associated with *Vigna*, *Canavalia*, and *Spinifex*. However, *I. pes-caprae* also occurs in-

land: some of these inland spots have been considered to represent relict localities, but, as they are situated mainly along roads and railways, dispersal through anthropogenic transport seems to be the main cause of this phenomenon. The highest locality recorded of it is along roadsides in Central Celebes at ca 200 m (see the instructive discussion by BOOBERG, Hand. 7e Ned.-Ind. Nat. Wet. Congr. 1935 (1936) 403, on the inland occurrence of the species in Java and Bali). Flowers and fruits are produced in these inland spots.

Most *Ipomoeas* grow both under everwet and seasonal climatic conditions. However, there are some species distinctly restricted to regions subject to a pronounced dry monsoon, as 1. *I. eriocarpa*, 2. *I. plebeja*, 3. *I. polymorpha*, and 27. *I. graminea*. They prefer savannah-country and grassfields (fig. 36, 37, 39).

Uses. Many species are used as ornamentals; quite a few have been imported for that aim from the New World. As food plants the most important are 19. *I. aquatica* and 13. *I. batatas*. The former is an excellent, palatable vegetable. The sweet potato is an important food plant; it is a cultigen from the New World, brought to Malaysia by the Portuguese in post-Columbian time. This origin is still reflected in several vernacular names, e.g. in 'ubi kastela' (tuber of Castile) and many names derived from it. It is now the main starch food of the mountain Papuans who grow it in many varieties. Some species are used in native medicine.

KEY TO THE SPECIES

- 1. Sepals distinctly awned at or below the apex; awn straight or curved. Corolla salver-shaped with a long and narrow tube. Stamens and style mostly exerted.
  - 2. Corolla rather small, 3-4 1/2 cm long, scarlet, rarely pure white. Outer sepals 2-4 1/2 mm long (awn exclusive), inner ones 3-6 mm (awn exclusive).
    - 3. Leaves pinnately parted into numerous linear or filiform segments<sup>1</sup>, rarely less deeply pinnately cut.
      - 31. *I. quamoclit*
    - 3. Leaves not pinnately cut; ovate to orbicular, cordate at the base; margin entire or lobed.
      - 30. *I. angulata*
  - 2. Corolla larger, white or purplish. Outer sepals 5-12 mm long (awn exclusive), inner ones 7-15 mm (awn exclusive).
    - 4. Corolla white; tube not or slightly widened above, 7-12 cm long; limb rotate. Stamens and style exerted . . . . . 28. *I. alba*
    - 4. Corolla purplish, the tube distinctly widened above, 3-6 cm long, the limb funnel-shaped to rotate. Stamens and style not or scarcely exerted . . . . . 29. *I. muricata*
- 1. Sepals obtuse, acute or acuminate, whether or not mucronulate but not distinctly awned at or below the apex. Corolla mostly funnel-shaped, or campanulate, sometimes salver-shaped. Stamens and style mostly included, sometimes exerted. (When leaves pinnately cut, see 31. *I. quamoclit*).
  - 5. Corolla large, 10 cm long or longer, salver-shaped with a long and narrow tube, white, or with greenish or reddish midpetaline bands. Sepals obtuse. Seeds hairy. Large twiners.
    - 6. Stamens inserted near the mouth of the corolla-tube. Sepals subequal or outer ones slightly longer than inner, 12-18 mm long . . . . . 39. *I. aculeata*
    - 6. Stamens inserted near the base of the corolla-tube. Outer sepals slightly or much shorter than the inner ones.
      - 7. Outer sepals much shorter than inner ones. Leaves mostly 5(3-7)-lobed, rarely entire. Corolla white, or with reddish midpetaline bands, 11-14 cm long. Stamens exerted. 41. *I. trichosperma*
      - 7. Outer sepals mostly slightly shorter than inner ones. Leaves mostly entire. Corolla white with greenish bands, 9-12 cm long. Stamens included . . . . . 40. *I. tuba*
  - 5. Corolla large, medium-sized, or small, mostly funnel-shaped or campanulate, 10 cm long, or mostly shorter, rarely salver-shaped, in the latter case not longer than ca 7 cm. Sepals obtuse, acute or acuminate. Seeds hairy or glabrous. Large to small twiners, or prostrate or erect plants.
    - 8. Sepals entirely glabrous (sometimes muricated).
      - 9. Sepals at least 14 mm long, the outer ones with lanceolate to broadly lanceolate base, long- and gradually attenuate towards the apex . . . . . 6. *I. congesta*
      - 9. Sepals not long- and gradually attenuate towards the apex, mostly shorter.
        - 10. Ovary densely to sparsely hairy . . . . . 13. *I. batatas*
        - 10. Ovary entirely glabrous.
          - 11. Stamens exerted.
            - 12. Leaves entire, linear . . . . . 27. *I. graminea*
            - 12. Leaves entire, ovate to orbicular. Corolla funnel-shaped, yellow. Outer sepals not very concave, ovate to oblong, subacute, 5-6 mm long . . . . . 17. *I. stibaropoda*
            - 12. Leaves deeply palmately lobed. Corolla salver-shaped, red or red-purple. Outer sepals distinctly concave, elliptic or ovate-elliptic, obtuse, 7-10 mm long . . . . . 34. *I. horsfalliae*

(1) Or segments less numerous, ca 3-7 on either side of the midrib, linear or linear-lanceolate. 31a. *I. x sloteri*



13. Leaves palmately lobed to palmately compound.
14. Leaf-segments entire.
15. Leaves palmately cut to the base. Pseudostipules (small leaves of the axillary shoot) often present. Sepals 4–6½ mm long, not very concave; outer ones ovate, obtuse or acutish, inner ones broader . . . . . 24. *I. cairica*
15. Leaves palmately lobed to or mostly beyond the middle, not to the base. No pseudostipules.
16. Stems twining. Sepals concave, rounded at the apex, at least the inner ones orbicular; the outer ones occasionally somewhat narrower; sepals not mucronulate.
17. Plant entirely glabrous or very sparsely pubescent with simple hairs. 32. *I. digitata*
17. Plant with stellate hairs, at least at the nodes, but mostly also on the leaves. 33. *I. asterophora*
16. Stems prostrate, rooting at the nodes. Inner sepals oblong to elliptic-oblong, distinctly mucronulate.
18. Leaves herbaceous, thin, the middle lobe acute or subacute. Corolla pink or purple. Subterranean tubers present. Cultivated, occasionally run wild . . . . . 13. *I. batatas*
18. Leaves fleshy, the middle lobe obtuse or emarginate. Corolla white or yellowish with a purple centre. No subterranean tubers. Plant of sandy sea-shores. 22. *I. stolonifera*
14. Leaf-segments coarsely dentate to deeply and irregularly pinnatifid.
19. Corolla less than 1½ cm long. Sepals *ca* 4 mm long, the back mucronate. 25. *I. coptica*
19. Corolla *ca* 5 cm long. Sepals 6–10 mm long, the back carinate and mucronate. 26. *I. diversifolia*
13. Leaves not palmately cut.
20. Leaves long and narrowly linear; midrib and lateral nerves nearly parallel. Corolla salver-shaped, white. Outer sepal elliptic, *ca* 6 mm long, inner ones oblong to ovate-oblong, 7–10 mm . . . . . 27. *I. graminea*
20. Leaves mostly broader; midrib and lateral nerves not parallel. Corolla mostly funnel-shaped, rarely salver-shaped.
21. Corolla 7 cm or longer; at least the inner orbicular sepals *ca* 9–12(–18) mm long.
22. Leaves with 3–4 nerves on either side of the midrib. Plant more or less tomentose with stellate hairs, or glabrescent to glabrous, except at the nodes. Corolla *ca* 7 cm long. 33. *I. asterophora*
22. Leaves with 10–15 nerves on either side of the midrib. Plant glabrous, or pubescent with simple hairs. Corolla up to 10 cm long . . . . . 36. *I. illustris*
21. Corolla mostly smaller, not exceeding 5 cm, or rarely longer, but then the inner sepals not orbicular, but narrower, 4½–6 mm long, and with distinct pale margins (see 23. *I. tricolor*).
23. Large woody glabrous twiner; stems stout. Flowers in axillary panicles, the primary branches racemose, the ultimate partial inflorescences cymose. Leaves ovate, slightly cordate to truncate at the base; lateral nerves 11–14 on either side of the midrib. Corolla *ca* 2½–3½ cm long. Seeds with long silky hairs . . . . . 38. *I. sumatrana*
23. Smaller, mostly herbaceous twiners with thinner stems, or prostrate plants, glabrous or hairy. Flowers in few- to several-flowered peduncled, axillary cymes, or solitary in the leaf-axils.
24. Corolla salver-shaped, up to 3–3½ cm long, pale lilac or white, with a purple centre. Peduncles stout, thickened towards the apex, often applanate. Outer sepals 4–6 mm long. Seeds short-tomentose, often with longer hairs along the edges . . . . . 18. *I. maxima*
24. Corolla funnel-shaped.
25. Corolla up to 2½ cm long, white or pale yellow, with a purple centre. Peduncles thin, filiform. Outer sepals 3–4 mm long. Seeds puberulent . . . . . 15. *I. obscura*
25. Corolla 3 cm long or longer.
26. Plants of marshy places or aquatic, mostly with trailing and rooting, or floating, thick, soft, fistulose or spongy stems. Leaves with truncate, cordate, sagittate or hastate base. Outer sepals 7–8 mm long, ovate-oblong. Corolla pink or pale-lilac, often with a purple centre, rarely white, 3–5 cm long . . . . . 19. *I. aquatica*
26. Terrestrial plants with twining or trailing stems; not as in *I. aquatica*.
27. Stems mostly twining. Leaves mostly herbaceous, attenuate towards the apex, acute or acuminate, sometimes obtuse.
28. Corolla yellow. Seeds tomentose. Sepals oblong or ovate-oblong, obtuse to truncate or slightly emarginate at the apex, subequal, 5–6½ mm long. 16. *I. ochroleuca*
28. Corolla pink, blue or purple. Seeds glabrous, puberulent or pilose along the edges only.
29. Sepals without a distinct mucro, subequal, 4½–6 mm long, not very concave, carinate, green with pale margins. Corolla skyblue with a paler or white tube. 23. *I. tricolor*
29. At least the outer sepals distinctly mucronulate. Outer sepals mostly shorter than the inner, 6–10 mm, inner ones 8–12 mm, concave, not carinate, without a distinct pale margin. Corolla pink or purple, rarely white.

- 30. Outer sepals oblong, acute, mucronulate, inner ones elliptic, obtuse, with less distinct mucro. Corolla 4-6 cm long. Filaments sparsely pubescent nearly to the top; longest *ca* 17 mm. Pedicels 5-12 mm . . . . . 12. *I. tillacea*
- 30. Outer sepals oblong to elliptic, acutish or obtuse, inner ones elliptic to orbicular, obtuse to emarginate, all distinctly mucronuate at or slightly below the apex. Corolla 3-4½ cm long. Filaments pubescent in the basal half; longest *ca* 6-7 mm. Pedicels 10-25(-40) mm . . . . . 14. *I. gracilis*
- 27. Stems trailing and mostly rooting at the nodes, rarely twining, mostly thick.
- 31. Leaves subcoriaceous or fleshy, mostly obtuse to broadly rounded, or emarginate at the apex. No subterranean tubers.
- 32. Corolla white or yellowish, with a purple centre. Leaves small, fleshy, very variable in shape often on the same plant, linear, lanceolate, oblong or ovate, obtuse or emarginate at the apex, obtuse or truncate or subcordate at the base; or leaves 3-5-lobed . . . . . 22. *I. stolonifera*
- 32. Corolla pink or purple. Leaves larger, subcoriaceous, kidney-shaped, orbicular, elliptic, ovate or quadrangular to oblong, broadly rounded or emarginate at the apex.
- 33. Leaves kidney-shaped, with broadly rounded apex; base cordate. Sepals unequal, the outer ones shorter, all elliptic-oblong . . . . . 21. *I. asarifolia*
- 33. Leaves orbicular, elliptic, ovate or quadrangular to oblong, emarginate at the apex; base truncate, rounded, subcuneate, or sometimes subcordate. Sepals subequal or the outer ones slightly shorter; outer sepals ovate or elliptic, inner ones broader . . . . . 20. *I. pes-caprae*
- 31. Leaves herbaceous, attenuate towards the acute or obtuse apex. Leaf-margin entire or angular (or lobed). Subterranean tubers present . . . . . 13. *I. batatas*
- 8. Sepals hairy on the outer surface, or fimbriate at the margins.
- 34. Flowers in the leaf-axils; peduncles very short, or absent. Length of corolla not exceeding 1½ cm.
- 35. Erect or ascending herb. Leaf-base acute, attenuate into the petiole. Corolla glabrous, *ca* 1¼ cm long . . . . . 3. *I. polymorpha*
- 35. Twining or prostrate herbs. Leaf-base cordate. Midpetaline bands outside at least pilose towards the apex.
- 36. Ovary and capsule hairy. Pedicels none or very short, to 3 mm. Outer sepals linear-acuminate from an ovate base. Corolla pink or purple, *ca* 7-9 mm long . . . . . 1. *I. eriocarpa*
- 36. Ovary and capsule glabrous. Pedicels 5-7 mm. Outer sepals linear-acuminate from a broadly triangular, slightly cordate to truncate base. Corolla white, *ca* 9-13 mm long. 2. *I. plebeia*
- 34. Peduncles mostly longer, well-developed. Corolla 1½ cm long, or mostly longer.
- 37. Flowers aggregate at the end of the peduncle, involucrate by large bracts.
- 38. Leaves palmately divided nearly to the base. Bracts oblong. Outer sepals lanceolate, acute. Corolla funnel-shaped, white . . . . . 8. *I. pes-tigridis*
- 38. Leaves entire. Bracts boat-shaped. Outer sepals oblong-spathulate to oblong, obtuse. Corolla salver-shaped, pink or purple . . . . . 9. *I. pileata*
- 37. Flowers whether or not aggregate at the end of the peduncle, not distinctly involucrate.
- 39. Sepals with stellate hairs . . . . . 33. *I. asterophora*
- 39. Sepals not stellately hairy.
- 40. Sepals 4 mm long or less. Corolla white or pale yellow with a purple centre. 15. *I. obscura*
- 40. Sepals 5 mm long or longer.
- 41. Outer sepals orbicular, broadly rounded at the apex.
- 42. Outer sepals 7-10(-15) mm long. Corolla glabrous. Ovary glabrous. Nerves 10-15 on either side of the midrib . . . . . 36. *I. illustris*
- 42. Outer sepals 5-6 mm long. Corolla with puberulent tube and midpetaline bands. Ovary puberulent. Nerves 7-9 on either side of the midrib . . . . . 37. *I. crassicaulis*
- 41. Outer sepals narrower, mostly acute, sometimes subobtuse.
- 43. Corolla with sericeous midpetaline bands outside. Seeds villose . . . . . 35. *I. riparia*
- 43. Corolla glabrous outside. Seeds puberulent or glabrous, sometimes pilose at the hilum or at the edges only.
- 44. Sepals long-attenuate, or long and linear-acuminate at the apex, herbaceous.
- 45. Sepals nearly linear, attenuate towards the acute apex, hirsute at the base, glabrous in the upper portion, 8-15 mm long. Corolla up to 3 cm long. Stems and peduncles filiform. 7. *I. decaisnei*
- 45. Sepals lanceolate or linear-lanceolate at the base, with a long and linear acumen, or long-attenuate towards the apex; length of sepals *ca* 15 mm or more. Corolla 5-8 cm long. Stems and peduncles thicker.
- 46. Outer sepals lanceolate at the base with a long and linear acumen, patently hirsute in the basal portion, *ca* 17-25 mm long. Corolla 5-6 cm long . . . . . 5. *I. nil*
- 46. Outer sepals lanceolate to broadly lanceolate at the base, long and gradually attenuate

- towards the apex; hairs of sepals appressed (or sepals glabrous). Sepals *ca* 14–22 mm long. Corolla 5–8 cm long . . . . . 6. *I. congesta*
44. Sepals acute or subobtuse, often mucronulate, not long-attenuate towards the apex, herbaceous, membranaceous, or coriaceous.
47. Outer sepals herbaceous, oblong, acute, 10–15 mm long, patently hirsute in the basal portion. Corolla 5–6 cm long, mostly purple-blue, with reddish midpetaline bands, the tube paler to white . . . . . 4. *I. purpurea*
47. Sepals coriaceous or membranaceous, not or indistinctly patently hirsute in the basal portion, fimbriate at the margins. Corolla smaller.
48. Plant cultivated for its edible subterranean tubers, sometimes escaped from cultivation. Stems mostly prostrate and rooting at the nodes, thick. Leaves broad-ovate to orbicular in outline, cordate or truncate at the base, entire or angular to palmately 3–5(–7)-lobed. Corolla pale violet, 3–4½ cm long . . . . . 13. *I. batatas*
48. No tubers. Stems mostly twining, thinner.
49. Ovary glabrous. Sepals glabrous outside, sparsely fimbriate at the margins only. Filaments sparsely pubescent nearly to the top . . . . . 12. *I. tiliacea*
49. Ovary hairy.
50. Corolla small, *ca* 1¾–2 cm long. Flowers aggregate; branches of the cyme very short. . . . . 10. *I. triloba*
50. Corolla longer, to 3 cm. Inflorescences laxer; branches of the cyme longer. . . . . 11. *I. trifida*

### 1. Section Calycanthemum

(KLOTZSCH) HALLIER *f.* Bot. Jahrb. 18 (1893) 123; OOSTSTR. Blumea 3 (1940) 483, 490.—*Calycanthemum* KLOTZSCH in PETERS, Reise Mossamb., Bot. 1 (1861) 243, t. 40.

Small, mostly annual, rarely perennial pilose herbs. Stems prostrate, erect, or rarely twining. *Leaves* cordate or subhastate, elliptic, ovate, oblong or lanceolate, entire, or rarely pinnately lobed. *Sepals* ovate or lanceolate, acute, their base often broadened or auriculate. *Corolla* mostly small, rarely larger, mostly white or pink, sometimes purple. Seeds mostly shortly tomentose.

1. *Ipomoea eriocarpa* R. BR. Prod. (1810) 484.—*Convolvulus hispidus* VAHL, Symb. Bot. 3 (1794) 29.—*I. hispida* R. & SCH. Syst. 4 (1819) 238, *non* ZUCCAGNI 1809; OOSTSTR. Blumea 3 (1940) 490.—*I. sessiliflora* ROTH, Nov. Pl. Sp. (1821) 116.—*I. horsfieldiana* MIQ. Fl. Ind. Bat. 2 (1857) 611.—Fig. 35–36.

Stems herbaceous, slender, twining or prostrate, 1–2 m long, retrorsely to patently pilose. *Leaves* mostly lanceolate to oblong- or linear-lanceolate, 2½–6 by ½–1½ cm, sometimes ovate-lanceolate to ovate, 2½–9 by 1½–5½ cm, cordate at the base with rounded sinus and basal lobes, long-attenuate to acuminate towards the apex, with an acute or obtuse mucronulate point, sparsely pilose on both surfaces or more densely beneath; nerves 7–8 on either side of the midrib; petiole shorter than or as long as the blade, ¾–8 cm, pilose. *Inflorescences* axillary, sessile or with a short peduncle, much shorter than the petiole, cymosely 1–3- or sometimes more-flowered. *Flowers* sessile or pedicels very short, to 3 mm. Bracts pilose, linear or lanceolate, lower ones

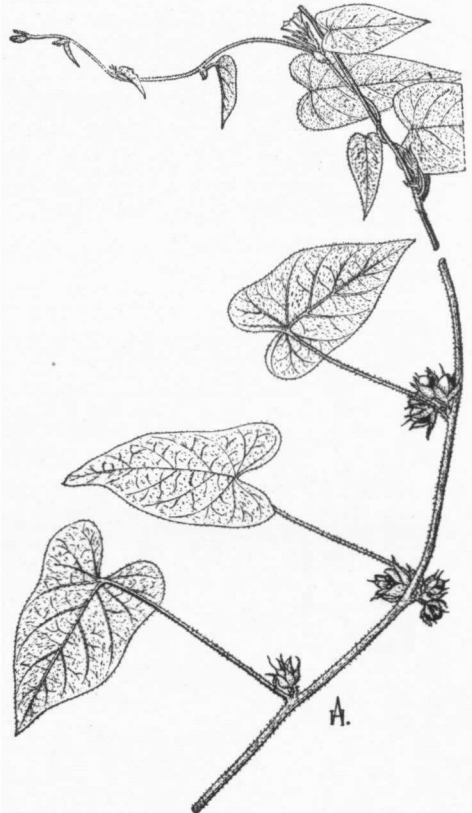


Fig. 35. *Ipomoea eriocarpa* R. BR. Branch with flowers and capsules,  $\times \frac{1}{2}$ .

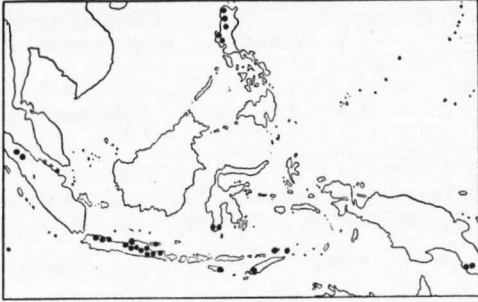


Fig. 36. *Ipomoea eriocarpa* R.Br. Distribution in Malaysia.

3–8 mm, upper ones shorter. *Sepals* pilose, about equal in length, 7–8 mm, linear-acuminate from an ovate base, the inner ones slightly narrower than the outer. *Corolla* tubular to funnel-shaped, little exceeding the sepals, 7–9 mm long, pink or purple, darker inside, the tube and the pilose midpetaline bands paler without. Stamens and style included; stamens inserted near the corolla-base, filaments glabrous, the base excepted. Ovary hairy; style hairy at the base. *Capsule* broadly ovoid to globular, ca 5–6 mm diam., shorter than the sepals, hairy, crowned by the hairy style-base, 2-celled, 4-valved. Seeds 4, ca 2½ mm long, glabrous, minutely reticulate.

Distr. Tropical Africa, Madagascar, and tropical Asia to North Australia, in *Malaysia*: not yet collected in the Malay Peninsula, Borneo, and the Moluccas. Fig. 36.

Ecol. Open grasslands, grassy waysides, thickets, hedges, occasionally in secondary forests, on periodically dry soil; in regions with a fairly pronounced dry season; from sea-level to 1300 m.

Vern. *Slawatan*, J.

2. *Ipomoea plebeia* R.Br. Prod. (1810) 484; OOSTSTR. *Blumea* 3 (1940) 492.—?*Convolvulus biflorus* LINNÉ, Sp. Pl. ed. 2, App. (1763) 1668.—?*I. biflora* PERS. Syn. 1 (1805) 183, non R.Br.

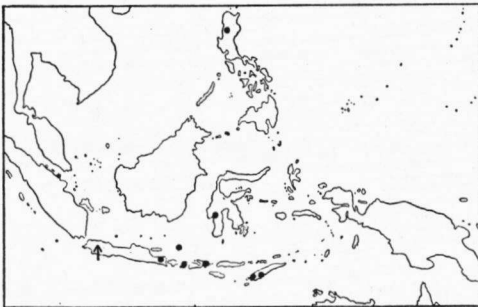


Fig. 37. *Ipomoea plebeia* R.Br. Distribution in Malaysia. The arrow indicates a presumably introduced occurrence.

1810.—*I. timorensis* BL. Bijdr. (1825) 711.—Fig. 37.

Stems herbaceous, slender, twining or prostrate, patently to retrorsely hairy. *Leaves* ovate, 3–8 by 1½–6 cm, rarely narrower, cordate at the base with a broad or narrow, rounded sinus and broad obtuse basal lobes, attenuate to short-acuminate towards the apex, with an acute or obtusish mucronulate point, sparsely pilose on both surfaces; nerves ca 5–7 on either side of the midrib; petiole



Fig. 38. *Ipomoea polymorpha* R. & SCH. Habit, × 1/3.

slender, shorter to longer than the blade, 1–6 cm, hairy. *Inflorescences* axillary, sessile or with a short peduncle, much shorter than the petiole, 1–2, sometimes 3-flowered. Pedicels slender, 5–7 mm, hairy. Bracts small, ca 2–2½ mm long. *Sepals* hairy, equal in length, 7–8 mm, 2 outer ones long- and linear-acuminate from a broadly triangular slightly cordate to truncate base; 2 inner ones much narrower at the base. *Corolla* tubular to funnel-shaped, little exceeding the sepals, ca 9–13 mm long, white; midpetaline bands pilose towards the top. Stamens and style included;

stamens inserted near the corolla-base, filaments glabrous, the base excepted. Ovary and style glabrous. *Capsule* broadly ovoid to globular, ca 7 mm high, little shorter than the sepals, glabrous, crowned by the style-base, 2-celled, 4-valved. Seeds 4, ca 4-4½ mm long, shortly brown to grey-tomentose and sometimes with longer white hairs along the margins.

Distr. Queensland and *Malaysia*: Java, Kangean, Lesser Sunda Islands (Lombok, Sumbawa, Timor), S. Celebes, Philippines (Luzon, only one record from Bontoc subprov.: VANOVERBERGH 1410). Fig. 37.

Ecol. Grasslands, dry thickets, in regions subject to a pronounced dry season, from sea-level to 600 m; rare.

Note. Though *I. biflora* (L.) PERS., described from China, is the oldest name I prefer that of R. BROWN as the identity of the former seems doubtful to me (cf. *Blumea* 3, 1940, 493).

3. *Ipomoea polymorpha* R. & SCH. Syst. 4 (1819) 254; OOSTSTR. *Blumea* 3 (1940) 493.—*I. heterophylla* R. BR. Prod. (1810) 487, non ORTEGA 1800.—*I. pumila* SPANOGHE, *Linnaea* 15 (1841) 341.—*Convolvulus nolanaeflorus* ZIPP. ex SPANOGHE l.c., pro syn.—*Convolvulus defloratus* CHOISY in ZOLL. Syst. Verz. 2 (1854) 130, 132.—Fig. 38-39.

Herbaceous annual. Stems erect, 8-60 cm high, simple, or branched from the base with patent or ascending branches; young parts densely pilose, adult parts less densely so to glabrous. *Leaves* narrowly elliptic, elliptic-oblong, obovate or oblanceolate, 1½-7½ by ½-3 cm, mostly attenuate towards both ends; base acute, attenuate into the petiole, apex acute or obtuse to rounded, mucronulate; margin entire, undulate or coarsely dentate, occasionally irregularly pinnatifid with few segments, or lyrate with a large, ovate or elliptic entire or coarsely dentate terminal segment and small triangular to hastate basal ones; glabrous or sparsely pilose; nerves 5-6 on either side of the midrib; petiole shorter than the blade,

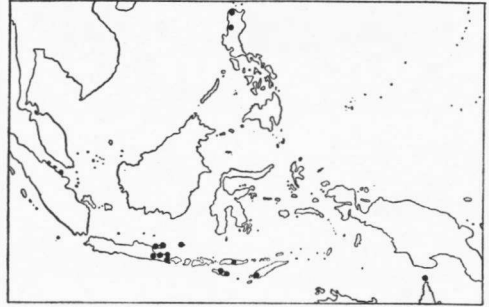


Fig. 39. *Ipomoea polymorpha* R. & SCH. Distribution in Malaysia. The species also occurs in NE. New Guinea: Morobe District.

½-3 cm, sparsely pilose. *Flowers* axillary, solitary. Peduncle and pedicel very short or absent. Bracts linear-filiform, ca 1 cm long, long hairy. *Sepals* with a distinct midrib, hairy, 8-10 mm long, long-acuminate; outer ones ovate-lanceolate, entire or with 1 or 2 teeth at the margin, inner ones lanceolate. *Corolla* tubular-funnel-shaped, ca 1¼ cm long, red-purple, darker inside, rarely white, glabrous. Stamens and style included; filaments hairy at the base. Ovary and style glabrous. *Capsule* globular, 4-6 mm high, shorter than the calyx, glabrous, straw-coloured, 2-celled, 4-valved. Seeds 4, ca 2½-3¼ mm long, with a mottled brownish or greyish black pubescence.

Distr. Abyssinia, ?India, Indo-China, and Formosa to NE. Australia, in *Malaysia*: E. Java, Madura, Lesser Sunda Islands (Sumba, Flores, Timor), Philippines (Luzon), NE. New Guinea & Thursday Island. Fig. 39.

Ecol. Grasslands, grassy waysides, fields, sandy plains, dunes, in the lower parts of the islands with a strong dry monsoon, on hard or stony soil, in sunny localities, from sea-level to ca 100 m.

Vern. *Camarin*, Iloko (Philippines).

## 2. Section *Pharbitis*

(CHOISY) GRISEB. Fl. Brit. W. Ind. Isl. (1864) 473; OOSTSTR. *Blumea* 3 (1940) 483, 495.—*Pharbitis* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 438.—*Ipomoea* subg. *Pharbitis* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 199.

Annual, or rarely perennial, high-twining, rarely small herbs. Stems mostly hispid or lanate, very rarely glabrous. *Leaves* cordate, entire, 3-lobed, or palmately 5-7-lobed, rarely oblong or lanceolate, hispid or villose, sometimes white-lanate beneath, very rarely glabrous. *Flowers* mostly showy. *Sepals* herbaceous, oblong, lanceolate or linear, often hirsute, very rarely glabrous. *Corolla* mostly reddish or purple, funnel-shaped or rarely tubular, subentire. Seeds glabrous, puberulent, or shortly arachnoid.

### 1. Subsection *Chorisanthae*

HALLIER f. Bot. Jahrb. 18 (1893) 135; OOSTSTR. *Blumea* 3 (1940) 484, 495.

Flowers axillary, solitary, or in lax axillary dichasia, rarely aggregate. Leaves

distinctly cordate, entire, or 3-lobed, or palmately 5-lobed, never oblong or lanceolate.

4. *Ipomoea purpurea* (L.) ROTH, Bot. Abh. (1787) 27; OOSTSTR. Blumea 3 (1940) 496.—*Convolvulus purpureus* LINNÉ, Sp. Pl. ed. 2, 1 (1762) 219.—*I. hispida* ZUCC. Cent. Obs. (1806) no 36.—*Pharbitis hispida* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 438.

Herbaceous annual. Stems twining, with short hairs mixed with longer retrorse bristles. *Leaves* broadly ovate or orbicular in outline, entire or 3-lobed, 4–15 by 2½–12 cm, cordate at the base with broadly rounded basal lobes, shortly acuminate at the apex; upper and lower surface with short bristly hairs; petiole 2–15 cm, retrorsely hirsute. *Inflorescences* axillary; peduncle shorter or longer than the petiole, with retrorse bristles, 3–18 cm, one- to few-flowered at the apex. Pedicels 8–15 mm, recurved in bud, afterwards erect, finally recurved again, in fruit up to 20 mm. Bracts linear or filiform, to 7 mm long. *Sepals* about equal in length, ca 10–15 mm, in fruit to 20 mm, three outer ones herbaceous or sepal 3 with a narrow scarious margin, oblong, slightly narrowed at the base, acute at the apex, with bristly, patent hairs in the basal portion, glabrous towards the apex; two inner ones herbaceous with narrow scarious margins, linear-oblong to linear, acute. *Corolla* funnel-shaped, 5–6 cm long, glabrous; limb inside purple-blue with reddish midpetaline bands, outside often paler; tube much paler to white. Stamens and style included; filaments at the base with long hairs. Ovary glabrous, 3-celled. *Capsule* globular, glabrous, 3-celled, with thin straw-coloured wall. Seeds 6 or less, glabrous or sparsely pilose at the hilum.

Distr. Native in America from New Mexico & Virginia as far S. as Argentina and Uruguay, in *Malaysia* occasionally cultivated in gardens for ornamental purposes, but showing no tendency to become naturalized.

Vern. *Morning glory*, E, *dagschone*, *dagbloem*, *purperwinde*, D.

5. *Ipomoea nil* (L.) ROTH, Cat. Bot. 1 (1797) 36; OOSTSTR. Blumea 3 (1940) 497.—*Convolvulus nil* LINNÉ, Sp. Pl. ed. 2, 1 (1762) 219.—*I. scabra* FORSK. Fl. Aeg.-Arab. (1775) 44.—*I. setosa* BL. Bijdr. (1825) 714.—*Pharbitis nil* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 439.—*I. trichocalyx* STEUD. Nom. ed. 2, 1 (1840) 819, non DON 1838.—*I. nil* ROTH var. *setosa* BOERL. Handl. Fl. Ned. Ind. 2 (1899) 511.

Herbaceous annual or perennial. Stems twining, or sometimes prostrate, retrorsely hirsute. *Leaves* broadly ovate to orbicular in outline, entire or 3-lobed, 4–14 by 3–12 cm, cordate at the base, acuminate at the apex; upper and lower surface with few to many more or less appressed hairs; petiole 3–16 cm, retrorsely hirsute. *Inflorescences* axillary; peduncle 2½–12 cm, hirsute like the stem, one- to several-flowered at the apex; flowers in a small umbellate cyme. Pedicels 5–10 mm, with

retrorse hairs. Bracts linear to filiform, 5–8 mm long. *Sepals* herbaceous, about equal in length, 17–25, afterwards to 28 mm long, patently hirsute especially in the basal portion; sometimes the bristly hairs are mixed with shorter and softer ones; outer sepals with a lanceolate, inner ones with a narrow-lanceolate base, all with a long and linear acumen. *Corolla* funnel-shaped, ca 5–6 cm long, glabrous, pale blue or bright blue, paler without, afterwards red or reddish purple, rarely the corolla is white. Stamens and style included; base of filaments with curled hairs. Ovary glabrous. *Capsule* ovoid to globular, mucronate by the base of the style, ca 1 cm diam., glabrous, mostly 3-valved and 3-celled. Seeds ca 5 mm long, black, grey-puberulent.

Distr. Circumtropical, throughout *Malaysia*, but not yet found in Borneo.

Ecol. Waysides, hedges, thickets, grasslands, from sea-level to 1300 m; also cultivated in gardens for ornamental purposes. Flowers closing before noon.

Use. The seeds are said to be purgative.

Vern. *Areuj djotang bodas*, S, *teleng*, J, *bula-kán*, *kamokamotihan*, Tag.

Note. Several authors have wrongly considered the Malaysian specimens conspecific with the North American *Ipomoea hederacea* (L.) JACQ. See HALLIER f. Jahrb. Hamb. Wiss. Anst. 16, 1898, Beih. 3 (1899) 42; OOSTSTR. Blumea 3 (1940) 499.

var. *limbata* (LINDL.) BAILEY, Gentes Herb. 1, 3 (1923) 135.—*Pharbitis limbata* LINDL. J. Hort. Soc. 5 (1850) 33; mentioned by BOERLAGE, Handl. Fl. Ned. Ind. 2 (1899) 511 as *I. limbata*, is a cultivated variety with the corolla deep violet-purple edged with white.

6. *Ipomoea congesta* R.Br. Prod. (1810) 485; OOSTSTR. Blumea 3 (1940) 500.—*Convolvulus indicus* BURM. Ind. Univ. Herb. Amb. 7 (1755) 6.—*Convolvulus acuminatus* VAHL, Symb. Bot. 3 (1794) 26.—*I. cathartica* POIR. in LAMK, Enc. Suppl. 4 (1816) 633.—*I. acuminata* R. & SCH. Syst. 4 (1819) 228, non RUIZ & PAV. 1799.—*I. amoena* BL. Bijdr. (1825) 718.—*I. acuminata* R. & SCH. var. *burckii* BOERL. Handl. Fl. Ned. Ind. 2 (1899) 511.—*I. indica* MERR. Interpr. Rumph. Herb. Amb. (1917) 445.—Fig. 39A.

Herbaceous. Stems twining or sometimes prostrate and then sometimes rooting at the nodes, more or less densely retrorsely pilose. *Leaves* broadly ovate to orbicular in outline, entire or 3-lobed, 5–17 by 3½–16 cm, cordate at the base, shortly or long-acuminate at the apex; lower surface often densely, upper surface less densely pilose with short, soft, appressed hairs, sometimes the lower surface sericeo-tomentose; petiole 2–18 cm long, retrorsely hairy. *Inflorescences* axillary; peduncle (1½–)4–20 cm, more or less densely and



Fig. 39 A. *Ipomoea congesta* R.Br. Right flower with a honey-sucking Hesperid. Cultivated at Bogor, 1931.

retrorsely pilose like the stem, few- to several-flowered at the apex. *Flowers* in a dense umbellate cyme with very short branches. Pedicels 2-5(-8) mm. Bracts linear to filiform, occasionally broader and foliaceous. *Sepals* herbaceous, about equal in length, 14-22 mm, especially near the base with rather soft, appressed hairs, or nearly glabrous, not with patent bristly hairs as in *I. nil*; outer sepals with a lanceolate to broadly lanceolate base, inner ones with a narrower base, all long and gradually linear-acuminate. *Corolla* funnel-shaped, 5-8 cm long, glabrous, bright blue or bluish purple, afterwards more reddish purple or red, the tube much paler to whitish. Stamens and style included; base of filaments with curled hairs. Ovary glabrous. *Capsule* not seen in Malaysian specimens.

*Distr.* Circumtropical, throughout *Malaysia*, but not yet collected in Borneo.

*Ecol.* Waste places, road-sides, thickets, hedges, edges of secondary forests, occasionally on sandy sea-shores; from sea-level to 1650 m; also cultivated in gardens for ornamental purposes (see note).

*Vern.* *Bungah*, Sumatra, *pitur*, Manado, *apukung'a*, Talaud, *lobokè ma dorooë*, Halmahera, *bulakan*, Sulu.

*Note.* *Ipomoea leari* PAXT. Bot. Mag. 6 (1839)

267, which is sometimes found cultivated for ornamental purposes, is a very closely related species or only a variety of *I. congesta*. It has the leaves thickly clothed with a whitish pubescence beneath; the corolla is of a deep purplish blue colour, with lighter midpetaline bands.

7. *Ipomoea decaisnei* OOSTSTR. *Blumea* 3 (1940) 503.—*Pharbitis variifolia* DECAISNE, *Nouv. Ann. Mus. Hist. Nat. Par.* 3 (1834) 390, *non I. variifolia* MEISSN. 1869.

A herbaceous annual (DECAISNE). Stems twining, almost filiform, glabrous or sparsely pilose with long patent hairs. *Leaves* broadly ovate, ovate or triangular, (1½)-3-9 by (1-)-1½-7 cm, cordate at the base with rounded basal lobes, shortly or long-acuminate at the apex with an acute or obtusish, mucronulate acumen; upper and lower surface sparsely or sometimes densely pilose; petiole shorter than the blade, (½)-2-4½ cm, with sparse patent hairs. *Inflorescences* axillary; peduncle mostly rather short, ½-4 cm, patently pilose, few-flowered at the apex; *flowers* in an umbellate cyme. Pedicels 5-9 mm, in fruit 10-17 mm. Bracts linear or filiform, the lower ones to 9 mm long, with sparse patent hairs. *Sepals* herbaceous, subequal, 8-15 mm long, linear, attenuate towards the acute apex, patently hairy in the lower

half, the hairs with thickened base, glabrous towards the top. *Corolla* funnel-shaped, ca 2-2½ cm long, glabrous, violet. Stamens and style included; filaments hairy at the base. Ovary glabrous. *Capsule* globular, mucronate by the style-base, with a thin straw-coloured pericarp, ca 7-8 mm high, 4-valved. Seeds 4-4½ mm long, black, finely puberulent, mottled brownish and greyish.

Distr. *Malaysia*: E. Java, Madura, SW. and SE. Celebes (Buton Isl.), Lesser Sunda Islands (Lombok, Sumbawa, Timor).

Ecol. Thickets, hedges, waysides, apparently restricted to regions subject to a pronounced dry period, from sea-level to 750 m.

Vern. *Kelawat wungu, gamet, J, daun tapahaik*, Timor.

## 2. Subsection *Cephalanthae*

(CHOISY) HALLIER *f.* Bot. Jahrb. 18 (1893) 131; OOSTSTR. *Blumea* 3 (1940) 484, 504.—*Ipomoea* sect. *Strophipomoea* § *Cephalanthae* CHOISY in DC. Prod. 9 (1845) 363.—*Ipomoea* sect. *Cephalanthae* BAKER & RENDLE, Fl. Trop. Afr. 4, 2 (1905) 131.—*Ipomoea* sect. *Involucratae* BAKER & RENDLE, *l.c.* 130.

Flowers in dense capitate, involucrate, peduncled inflorescences; outer bracts mostly large.

8. *Ipomoea pes-tigridis* LINNÉ, Sp. Pl. (1753) 162; OOSTSTR. *Blumea* 3 (1940) 504.—*I. hepaticaeifolia* LINNÉ, *l.c.* 161.—Fig. 40.

Herbaceous annual. Stems twining, or sometimes prostrate, slender, ½-3 m long, patent!y hairy with rigid hairs. *Leaves* orbicular or transversely elliptic in outline, 3-7½ by 2½-10 cm,



Fig. 40. *Ipomoea pes-tigridis* L. Branches with flowers and fruits, × ½.

palmately divided nearly to the base with (3-)-5-7 (-9) segments; segments oblong to elliptic-oblong or elliptic, attenuate or slightly acuminate towards both ends, mostly rather densely hairy with appressed to patent hairs; petiole 1½-10 cm, hairy like the stem. *Inflorescences* axillary; peduncle 2-18 cm, hairy like the stem, with an involucrate, cymose, few-flowered head at the apex. Outer bracts oblong to linear-oblong, 1½-3 cm, inner ones smaller. *Sepals* herbaceous, slightly unequal in length, 7-12 mm, lanceolate or the inner ones narrow-lanceolate, long-hairy. *Corolla* funnel-shaped, ca 3-4 cm long, white, the midpetaline bands sparsely hairy. Stamens and style included; filaments glabrous. Ovary glabrous. *Capsule* ovoid, ca 8 mm high, 1-celled, 4-valved. Seeds 4, sparsely grey-tomentose, 4 mm long.

Distr. East tropical Africa, Mascarene Islands, continental tropical Asia, throughout *Malaysia*.

Ecol. Grasslands, waste places, fields, thickets, occasionally in teak-forest, also on sandy soil near the sea; from sea-level to 1000 m.

Use. The leaves are used in Java and in the Philippines for poulticing sores (HEYNE; BROWN).

Vern. *Lau attan*, Djakarta, *djembutan, topong, kontolan, gamet, gametan, J, kak samangkakan, Md, bungku-kuale, bumbuhuale*, Gorontalo, *kahanga kurung*, Sumba, *samaka furu*, Ternate, *maka maka*, Tidore, *sajor patolla, patolla utang*, Banda, *waras fufulu*, Tenimber; Philippines: *bangbañgau-ñg-buduan*, Ilóko, *malasandta, sala-sandta*, P. Bis.

9. *Ipomoea pileata* ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 94; OOSTSTR. *Blumea* 3 (1940) 507.—?*Convolvulus trichocalyx* ZOLL. Nat. Genesk. Arch. 2 (1845) 6.

Herbaceous annual. Stems twining, 1.2-1.8 m long, slender, retrorsely short-pilose. *Leaves* ovate or broadly ovate, 2-7 by 1½-5½ cm, broadly cordate at the base with rounded basal lobes, attenuate to slightly acuminate towards the apex, pilose, beneath sometimes more densely than above; nerves 4-6 on either side of the midrib; petiole thin, 1½-10 cm, pilose like the stem.



*Inflorescences* axillary; peduncles 2–4½ cm, pilose like the stem; *flowers* in a few- to several-flowered dense head, enclosed by a large foliaceous boat-shaped bract, 2½–4 cm long, with 2 cusps; other bracts much smaller, oblong or elliptic, obtuse. *Sepals* herbaceous, 3 outer ones oblong-spathulate to oblong, obtuse, 10 mm long, 2 inner ones narrower, lanceolate with a long and slender point, 9 mm long, all long pilose along the margins, and outside and inside especially in the upper part. *Corolla* salver-shaped, ca 3 cm long, pink with darker centre, or violet; tube narrow, cylindrical, ca 2 cm long, glabrous except near the top, limb with sparsely pilose midpetaline bands. Stamens and style included; filaments inserted half-way the corolla-tube, glabrous, the base excepted.

Ovary glabrous. *Capsule* small, globose. Seeds glabrous or thinly pubescent.

*Distr.* Tropical E. Africa, Mascarene Islands, continental tropical Asia from India to China, Indo-China and Hainan, in *Malaysia*: Malay Peninsula (Perlis), Banka, Java, Borneo, and the Philippines (Culion).

*Ecol.* Dry open places, grassy waysides, fields, from sea-level to 400 m.

*Vern.* *Bissur hutang*, Banka.

*Note.* Several authors have considered this species as being conspecific with the African *I. involucreta* BEAUV. (See VAN OOSTSTR. *Blumea* 3, 1940, 509, note). BAKER & RENDLE, *Fl. Trop. Afr.* 4, 2 (1905) 150, 151, 152, have rightly distinguished them as two distinct species.

### 3. Section *Batatas*

(CHOISY) GRISEB. *Fl. Br. West Ind. Isl.* (1864) 468; OOSTSTR. *Blumea* 3 (1940) 484, 509.—*Batatas* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 434.—*Ipomoea subg. Batatas* CLARKE in HOOK. *f. Fl. Br. Ind.* 4 (1883) 201.—*Ipomoea sect. Leicalyx* HALLIER *f. sensu* BAKER & RENDLE, *Fl. Trop. Afr.* 4, 2 (1905) 132, *p.p.*

*Leaves* petioled, distinctly cordate or pandurate or 3-lobed or palmately 5-lobed, glabrous, or appressed-hairy. *Flowers* mostly small, axillary, in long- or short-peduncled umbellate cymes, rarely solitary; flower-buds conical, often acute. *Sepals* subcoriaceous, often oblong or lanceolate, acute, with ciliate margins, further often glabrous, often attenuate from a stiff pale base into a herbaceous green, recurved acumen, rarely obtuse, or entirely glabrous. *Corolla* funnel-shaped, entire, pink or white, 1½–5 cm long, glabrous. Ovary often hirsute. Seeds glabrous.

10. *Ipomoea triloba* LINNÉ, *Sp. Pl.* (1753) 161; OOSTSTR. *Blumea* 3 (1940) 509.—*Convolvulus deniatus* BLANCO, *Fl. Filip. ed. 1* (1837) 89, non VAHL 1794 (acc. to MERRILL).—*I. blancoi* CHOISY in DC. *Prod.* 9 (1845) 389.—Fig. 41.

Herb with twining or sometimes prostrate stems, 1–3 m long, glabrous or sparsely hairy, mainly at the nodes. *Leaves* broadly ovate to orbicular in outline, rarely narrower, 2½–8 by 2–7 cm, entire, coarsely dentate to more or less deeply 3-lobed, base cordate, basal lobes rounded or angular to lobed, upper and lower surface glabrous or sparsely pilose; petiole slender, 3–10(–18) cm, glabrous, or sometimes minutely tuberculate. *Inflorescences* axillary; peduncle shorter to longer than the petiole, 1–10(–12) cm, slightly thicker than this, glabrous, angular, minutely verrucose towards the apex, 1-flowered or cymosely few- to several-flowered; branches of the cyme very short, *flowers* aggregate. Pedicels more or less angular, minutely verrucose, glabrous, 2½–8 mm. Bracts minute, lanceolate-oblong. *Sepals* slightly unequal, 7–8(–10) mm long, the outer ones a little shorter, oblong to narrowly elliptic-oblong, obtuse or acutish, mucronulate, glabrous or sparsely hairy on the back, the margins always distinctly fimbriate; inner sepals somewhat broader, elliptic-oblong, acute, mucronulate, glabrous or sparsely hairy. *Corolla* funnel-shaped, ca 18–20 mm long, glabrous, pink or pale red-purple, sometimes with

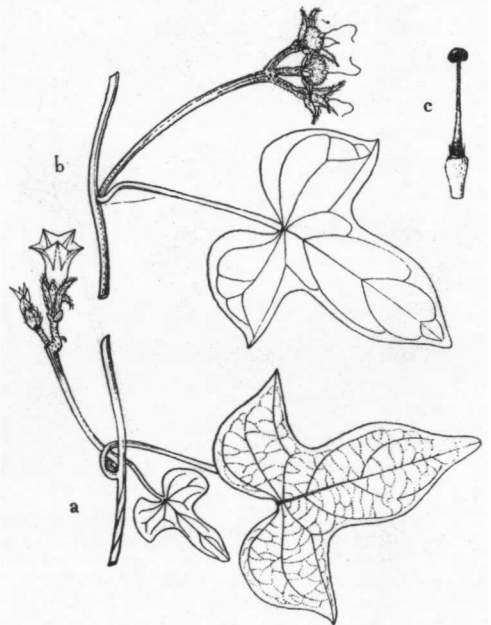


Fig. 41. *Ipomoea triloba* L. a. Flowering branch,  $\times 1/2$ , b. fruiting branch,  $\times 1/2$ , c. pistil.

a darker centre, the limb with short obtuse, mucronulate lobes. Stamens included, filaments hairy at the base. Ovary hairy. *Capsule* subglobular, 5–6 mm high, apiculate by the base of the style, bristly hairy, 2-celled, 4-valved. Seeds 4 or less, 3½ mm long, glabrous.

Distr. Native of tropical America, now a circumtropical weed; throughout *Malaysia*.

Ecol. Grasslands, thickets, hedges, waste places, waysides, fields, also in savannah-forests and occasionally on sandy sea-shores, from sea-level to 750 m. Flowers closing before noon.

Vern. *Gégasing*, Singapore; in the Philippines: *aurora*, Spanish and Tag., *bang-ba-ñgao*, *kamkamôte*, *koskusipa*, *kupit-kupit*, *Iloko*, *halobagbug*, Tag., *muti-muti*, C. Bis., *sagikat*, Bag.

11. *Ipomoea trifida* (H.B.K.) G. DON, Gen. Syst. 4 (1838) 280.—*Convolvulus trifidus* H.B.K. Nov. Gen. Sp. 3 (1819) 107.—*I. commutata* (non R. & SCH.) OOSTSTR. Blumea 3 (1940) 512.

Much resembling the preceding species. Mainly differing in the short-pilose stems, petioles, leaf-blades, peduncles and pedicels, the thinner peduncles, the longer branches of the cymose *inflorescences* with less aggregate flowers, the paler, in dry specimens straw-coloured *calyces* with more densely pilose sepals, the margins of which bear less stiff hairs. Moreover the sepals often have a longer, needle-shaped mucro, whilst the outer ones are often distinctly shorter than the inner. *Corolla* mostly longer than in *I. triloba*, to 3 cm long, red-purple with a darker centre.

Distr. Native of Tropical America; in *Malaysia* sometimes as a garden-escape in Java.

Ecol. Occasionally cultivated in gardens and run wild in thickets and hedges up to 300 m.

Vern. *Djëndjèngang*, J.

Note. The Javan plants almost match South American specimens in the Rijksherbarium, Leyden, identified by HALLIER as *I. trifida*. As appears from his notes HALLIER saw the type of *Convolvulus trifidus* H.B.K. from Venezuela in the Berlin Herbarium. The leaves of *I. trifida* have been described as 3-lobed; those of the Javan plants and of the above-mentioned specimens from South America are entire.

12. *Ipomoea tiliacea* (WILLD.) CHOISY in DC. Prod. 9 (1845) 375; OOSTSTR. Blumea 5 (1942) 233.—*Convolvulus tiliaceus* WILLD. Enum. 1 (1809) 203.—*Convolvulus fastigiatus* ROXB. [Hort. Beng. (1814) 13, *nom. nud.*] Fl. Ind. ed. CAREY & WALL. 2 (1824) 48.—*I. fastigiata* SWEET, Hort. Brit. ed. 1 (1826) 288.

Stems twining, slender, several metres long, glabrous or hirsute, lignescent. *Leaves* ovate, 5–15 by 3–10 cm, cordate at the base, acuminate, with an acute or obtusish mucronulate acumen, mostly entire, glabrous or appressed-pilose; petiole slender, 3–7 cm. *Inflorescences* axillary; peduncles solitary or in pairs, as long as, or often longer than the petiole, 4–15 cm, cymosely few- to several-flowered. Pedicels 5–12 mm. Bracts minute, narrow-lanceolate. *Sepals* glabrous or sparsely

fimbriate at the margins, nearly equal in length or the outer ones shorter; outer sepals oblong or ovate-lanceolate, acute, mucronulate, 5–10 mm long, inner ones elliptic, acutish or obtuse, often with a less distinct mucro, to 10 mm long. *Corolla* funnel-shaped, ca 4–6 cm long, glabrous, pink or purple, often with a darker centre, or rarely white. Stamens and style included; filaments sparsely pubescent nearly to the apex. Ovary glabrous. *Capsule* globular, 2-celled, 4-valved. Seeds 4, glabrous or pilose along the edges.

Distr. Tropical America, West tropical Africa (Cameroons, I. do Principe); in *Malaysia*: North Moluccas (Karakelong), NW. New Guinea.

Ecol. River-banks, clearings in secondary forests, up to ca 100 m.

Vern. *Bariwuan'a*, Talaud.

13. *Ipomoea batatas* (L.) LAMK, Tabl. Enc. 1 (1791) 465; OOSTSTR. Blumea 3 (1940) 512.—*Convolvulus batatas* LINNÉ, Sp. Pl. (1753) 154.—*Convolvulus edulis* THUNB. Fl. Jap. (1784) 84.—*Batatas edulis* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 435.

Herb with subterranean fusiform or elongate tubers. Stems prostrate or ascending, or occasionally twining, 1–5 m long, much branched, more or less angular, or terete, rooting at the nodes, glabrous or hairy, green or tinged with purple. *Leaves* broadly ovate to orbicular in outline, 4–14 by 4–11 cm, entire, angular, or more or less deeply palmately 3–5(–7)-lobed, the lobes from broadly ovate to linear-oblong; base of leaf broadly cordate to truncate; upper and lower leaf-surfaces glabrous or sparsely hairy; petiole 4–20 cm. *Inflorescences* axillary; peduncle stout, angular, glabrous or hairy like the stem, shorter to much longer than the petiole, 3–18 cm, cymosely 1- to few- or several-flowered. Pedicels 3–12 mm. Bracts acute, 2–3 mm long, caducous. *Sepals* equal in length or the inner ones longer; outer ones oblong or elliptic-oblong, 7–8 mm long, inner ones elliptic-oblong to ovate-oblong, to 9–12 mm long, all acute or acutish, distinctly mucronulate, wholly glabrous or pilose on the back and fimbriate. *Corolla* campanulate to funnel-shaped, gradually attenuate towards the base, ca 3–4½ cm long, glabrous, pale violet. Stamens and style included; filaments glabrous, the hairy base excepted. Ovary hairy or sometimes glabrous. *Capsule* ovoid, 4- or less-celled, rare, or absent in Malaysian specimens. Seeds glabrous.

Distr. Cultivated throughout the tropical and subtropical regions of both hemispheres.

Ecol. Cultivated throughout *Malaysia*, and occasionally wild as a relic of cultivation; at low and medium altitudes; in Java sometimes up to 2200 m (KOORDERS).

Uses. Cultivated for its edible tubers. The young leaves are used as a vegetable; young shoots are eaten as a salad, and are also used for poulticing.

Vern. *Kèladi*, *kèludèk*, *ubi kèladi*, Mal. Pen., *gadong*, *pièk*, *kèpèlèk*, N. Sum., *ubi djawa*, *ubi tjina*, Sum. E. Coast, *katèlo*, *ubi djalah*, *u. katèlo*, *u. pélo*, Minangk., *sètilo*, Lampongs, *kèlèdèk*, *ketèla*, *ketèla rambat*, *tèla*, J, *huwi bolèd*, *huwi*

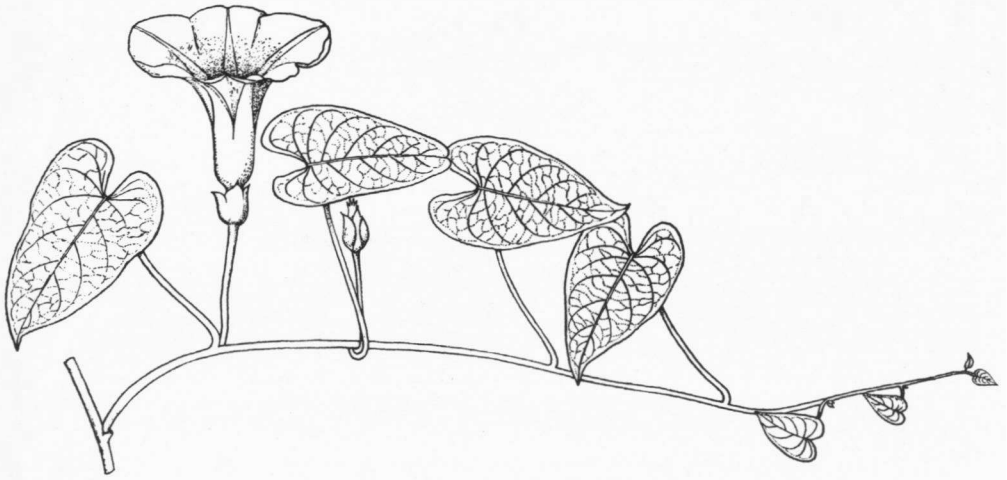


Fig. 42. *Ipomoea gracilis* R.Br. Flowering branch,  $\times \frac{2}{3}$ .

*mantang*, S, *sabhrang*, s. *longgha*, Md, *kēsèla*, Bali, *katabang*, Sumbawa, *loli*, Timor, *sané*, Wetar, *watata*, *batata*, *bagé*, *lamé djawa*, l. *kamumu*, l. *kandora*, Celebes, *urlau*, *uru*, Aru, *en mav*, Kei, *ihim basala*, *uwi kastèla*, *kastèra*, *kaitela*, *asitèla*, Ceram, *patatas*, *paära tukalé*, Ambon, *mangat*, Buru, *daso*, Halmaheira, *ima*, Ternate, *daso*, Tidore, *ranso*, Noef, *sabakruwa*, *ningoi*, Neth. N. Guinea; Philippines: *camóte*, all dialects, *lapni*, Ifugao, *panggibagun*, Sulu, *tigsi*, Bis., *tugi*, Bont.; *sweet potato*, E, *bataat*, D. See for more local names DE CLERCQ-PULLE, Nieuw Plantk. Woordenb. ed. 2 (1927) 125, HEYNE, Nutt. Pl. Ned. Ind. (1927) 1301, VAN OOSTSTROOM, l.c.

Note. A large number of varieties is found in cultivation, mainly distinguished on account of the leaf-shape and the size, form and colour of the tubers. The tubers may be red, purple, orange, pale yellow, or white.

Caterpillars of *Herse convolvuli* L. feed on the leaves of this species.

14. *Ipomoea gracilis* R.Br. Prod. (1810) 484; OOSTSTR. Blumea 3 (1940) 516.—*Convolvulus denticulatus* DESR. in LAMK, Enc. 3 (1789) 540.—*I. littoralis* BL. Bijdr. (1825) 713.—*I. denticulata* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 467, non R.Br. 1810.—*Calystegia affinis* (non ENDL.) SCHUM. Bot. Jahrb. 9 (1887) 216.—Fig. 42–43.

A glabrous or sometimes sparsely hairy littoral plant. Stems prostrate and rooting (always?), or twining, thin, slender, herbaceous, or becoming woody with age. Leaves membranaceous or often thicker, broadly ovate to oblong in outline, occasionally orbicular to kidney-shaped, variable in size, 1–10 by 1–7½ cm; margin entire or slightly undulate to angular, or more or less deeply 3-lobed; apex acute, obtusish, obtuse or retuse, mucronulate; base cordate, basal lobes rounded, or occa-

sionally lobed; upper and lower surface of leaf-blade glabrous or nearly so; petiole thin, ½–7 cm. Inflorescences axillary; peduncles mostly short, 1–3(–9) cm, glabrous, one- to few-flowered. Pedicels mostly longer than the calyx, 10–25(–40) mm long, glabrous. Bracts minute, narrow, 1–2 mm long, caducous. Outer sepals shorter than the inner ones, oblong-elliptic or elliptic, acutish or obtusish, 6–10 mm long, inner ones elliptic to orbicular, 8–12 mm, all mucronulate with the mucro at the top or somewhat lower, all glabrous and concave; outer sepals thinly coriaceous, inner ones thinner with membranous margins. Corolla funnel-shaped, 3–4½ cm long, with the rather narrow tube gradually narrowed towards the base, glabrous, pink or pink purple, often darker near the base inside. Stamens and style included; filaments glabrous in the upper, and hairy in the lower half. Ovary glabrous. Capsule depressed-globose, crowned by the style-base, ca 9 mm diam., 2-celled. Seeds 4, glabrous, black, ca 3½–4 mm long.

Distr. Coasts of the Indian and Pacific Ocean: Madagascar and adjacent islands, India, Ceylon, Indo-China, throughout *Malaysia*, eastwards to N. Australia and the Pacific Islands; according to HALLIER f. also in Mexico & West Indies.

Ecol. On sandy beaches and in thickets near the sea-shore, occasionally covering large trees; from sea-level to ca 15 m.

Use. The species is useful as a sand-binder.

Vern. *Kangkong*, *tapak kuda kechik*, Mal. Pen., *akar hitang*, Palembang, *kangkong laut*, Banka; Minahasa: *sejawan salojon*, *siahabu salojen*, Ponosakan, *wanaring pante*, Tombulu; *meo bot*, Sula, *lobokè*, *lobokè ma loha*, Halmaheira, *sajor petu*, Buru, *barwuan'a*, Talaud, *tjuf*, Sorong, *gamielke*, S. Neth. N. Guinea; Philippines: *bulakán*, Tag., *ditadit*, Iv., *koskusipa*, Iloko, *malakamóte*, Ibanág, *panggi-panggi*, Sulu.



Fig. 43. *Ipomoea gracilis* R. BR. in a bay on the beach of the eastern part of the Island of Krakatao twining round trees of *Casuarina equisetifolia* L. which appear like elongate cocoons (DOCTERS VAN LEEUWEN).

#### 4. Section *Leiocalyx*

HALLIER *f.* Bot. Jahrb. 18 (1893) 139; OOSTSTR. *Blumea* 3 (1940) 484; *l.c.* 519, *p.p.*—*Ipomoea* sect. *Leiocalyx* subsect. *Eu-Leiocalyx* OOSTSTR. *l.c.* 519.

Plants mostly glabrous, rarely with hairy stems, more rarely with hairy leaves or sepals. *Leaves* mostly petioled, very variable in form. *Flowers* peduncled, axillary, solitary or in subumbellate dichasia. *Sepals* variable, mostly oblong or lanceolate, often verrucose or cristate on the back. *Corolla* mostly red or purple, rarely white or yellow, glabrous, or rarely farinose or pubescent outside, mostly subentire. Seeds mostly glabrous, rarely velutinous or with bearded edges.

15. *Ipomoea obscura* (L.) KER-GAWL. Bot. Reg. 3 (1817) t. 239; OOSTSTR. *Blumea* 3 (1940) 519.—*Convolvulus obscurus* LINNÉ, Sp. Pl. ed. 2 (1762) 220.—*I. solanifolia* (non L.) BURM. *f.* Fl. Ind. (1768) 49.—*I. insuavis* BL. Cat.'s Lands Pl.-tuin (1823) 50.—Fig. 44.

Stems twining or prostrate, 1–2 m long, thin and slender, glabrous or patently hairy, sometimes almost lanate, the older parts lignescent. *Leaves* ovate to orbicular, or almost kidney-shaped, 2–10 by 2–9 cm; margin entire or slightly undulate, base cordate with rounded basal lobes; apex attenuate or acuminate with acute to obtuse, mucronulate top; glabrous or sparsely pilose on both sides with short, appressed hairs, or only fimbriate along the margins; petiole long, slender, up to 9 cm, glabrous or sparsely hairy. *Inflorescences* axillary; peduncles thin, almost filiform, 1–14 cm,

glabrous or sparsely pilose, one- to few-flowered. Pedicels much longer than the calyx, ca 1–2 cm, minutely verrucose, glabrous or very sparsely hairy, thickened towards the top in fruit. Bracts minute, narrow, acute, 1–2 mm long. *Sepals* subequal or the two outer ones slightly shorter, acutish, mucronulate, 3–4 mm long, glabrous or sometimes pubescent; outer sepals ovate, with narrow, white margins, the middle portion thicker, minutely verrucose; inner ones broadly ovate, thinner; sepals often reflexed in fruit. *Corolla* funnel-shaped, ca 2–2½ cm long, white or pale yellow with darker midpetaline bands, and with a dark purple centre. Stamens and style included; filaments very unequal in length, hairy at the base. Ovary glabrous. *Capsules* on reflexed pedicels, broadly ovoid, crowned by the style-base, 7–8(–9) mm high, straw-coloured, 2-celled, 4-

valved. Seeds 4, black, finely grey-puberulent, ca 4–4½(–5) mm long.

Distr. East tropical Africa, Mascarene Islands tropical Asia, throughout *Malaysia* to N. Australia and Fiji.

Ecol. Grasslands, thickets, hedges, thin forests, waysides, waste ground, occasionally on sandy soil near the sea, from sea-level to 1300 m.

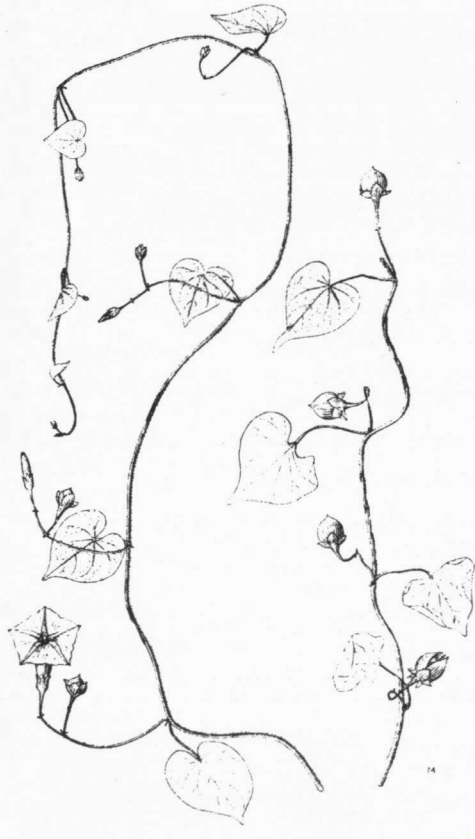


Fig. 44. *Ipomoea obscura* (L.) KER-GAWL.  
Flowering and fruiting branch,  $\times 1/2$ .

Uses. The leaves, together with those of *Argyreia mollis*, are used against sores (HEYNE).

Vern. *Ki papésan*, S, *indjén-indjénan*, *malingan*, *tingkil*, J, *kalah bibi*, Celebes; Philippines: *kuskusipa*, *bang-bañgau*, Iloko, *panggi-panggi*, Sulu; for more local names see *Blumea* 3 (1940) 523.

16. *Ipomoea ochroleuca* SPANOGHE, *Linnaea* 15 (1841) 340 ('*ochroleuca*'); MIQ. *Fl. Ind. Bat.* 2 (1857) 614 ('*ochroleuca*'); OOSTSTR. *Blumea* 3 (1940) 523 ('*ochroleuca*').

Stems twining, thin, slender, glabrous or very sparsely, shortly and patently pilose; old stems with yellow, lacerate bark. *Leaves* ovate to broadly

ovate, 3½–8 by 2½–7 cm, cordate at the base with rounded lobes, shortly to long-acuminate at the apex, with acute or obtusish mucronulate point; mostly glabrous on both sides, the margins sometimes shortly fimbriate; petiole thin, 1–4 cm. *Inflorescences* axillary, peduncles thin, 3½–5 cm, glabrous or with very short patent hairs, one- to several-flowered, cymosely branched. Pedicels much longer than the calyx, 1½–3 cm, smooth, glabrous or hairy like the peduncle, thickened towards the apex in fruit. Bracts minute, oblong or triangular. *Sepals* equal in length, 5–6½ mm long, oblong to ovate-oblong, with attenuate, broadly rounded to truncate, slightly emarginate, mucronulate apex, glabrous; outer sepals with thick centre and thin, pale margins, inner ones thinner. *Corolla* widely funnel-shaped, ca 4 cm long, sulphur-yellow, glabrous, the pubescent apical parts of the midpetaline bands excepted. Stamens and style included; filaments unequal in length, hairy at the base. Ovary glabrous. *Capsules* on reflexed pedicels, broadly ovoid, crowned by the style-base, 10–11 mm high, straw-coloured, 2-celled, 4-valved, at the base with the reflexed sepals. Seeds 4, black, shortly brownish tomentose, ca 6 mm long.

Distr. *Malaysia*: Lesser Sunda Islands (Timor).

Ecol. On rocks near the sea; according to Mrs WALSH restricted to that habitat.

17. *Ipomoea stibaropoda* OOSTSTR. *Blumea* 3 (1940) 524.

Stems herbaceous, twining, slender, glabrous or sparsely pilose. *Leaves* broadly ovate to orbicular, 3½–6 by 3–6 cm, deeply cordate at the base, with rounded lobes, shortly acuminate at the apex, glabrous on both sides but shortly pilose near the entire, fimbriate margins; petiole 2–2½ cm, glabrous or sparsely hairy near the base. *Inflorescences* axillary; peduncles short, ½–1½ cm, terete, glabrous or sparsely pilose, 1–2-flowered. Pedicels much longer than the calyx, thick, glabrous, 15–18 mm long, at first erect, in fruit turned down, thickened, and up to 20–28 mm. *Sepals* equal in length, 5–6 mm long, rather thick, glabrous, mucronulate, outer ones ovate-oblong, acutish, with very narrow scarious margin, inner ones broader, to orbicular, rounded at the apex, with broader scarious margin. *Corolla* funnel-shaped, ca 4½ cm long, yellow. Stamens exerted; filaments shortly pilose at the base. Ovary glabrous. Young *capsule* ovoid, mucronate, glabrous.

Distr. *Malaysia*: S. Celebes (Salajar Islands).

Ecol. The only specimen known was found on limestone rocks.

18. *Ipomoea maxima* (L. f.) DON ex SWEET, Hort. Brit. ed. 2 (1830) 372; OOSTSTR. *Blumea* 3 (1940) 525.—*I. sagittaeifolia* BURM. f. *Fl. Ind.* (1768) 50, t. 18, f. 2.—*Convolvulus maximus* LINNÉ f. *Suppl.* (1781) 137.—*I. sepiaria* KOEN. ex ROXB. *Fl. Ind. ed. CAREY & WALL.* 2 (1824) 90.—*I. verrucosa* BL. *Bijdr.* (1825) 718.—*Quamoclit sagittaeifolia* CHOISY in DC. *Prod.* 9 (1845) 335; MERR. *Philip. J. Sc.* 19 (1921) 375.—*I. subtrilobans* MIQ. *Fl. Ind. Bat.* 2 (1857) 615.—Fig. 45–46.

A herbaceous perennial. Stems few to several from a stout perpendicular root, twining or prostrate, 1-2½ m long, patently hirsute to glabrous. *Leaves* broadly ovate, orbicular or kidney-shaped, (1-2)½-6 by (1-2)-5 cm, mostly deeply cordate at the base, or sometimes slightly cordate to truncate with rounded or rarely angular basal lobes, attenuate towards the apex, or more or less abruptly acuminate with obtuse or acutish mucronulate acumens; the surfaces glabrous but with minute hairs along the margins above, often with purple margin or with purple spots, the margin entire or slightly angular; petiole often shorter than the blade, 1-3 cm, glabrous, with some minute hairs, or minutely verrucose. *Inflorescences* axillary; peduncle thick, often applanate, minutely verrucose towards the top, 1½-12 cm; few- to several-flowered; flowers aggregate in an umbellate cyme. Pedicels verrucose, ¾-1 cm. Bracts minute, persistent. *Sepals* equal in length or the interior ones slightly longer, 4-6 mm, glabrous, elliptic-oblong, obtuse, mucronulate, the minute mucro somewhat below the apex; outer sepals verrucose, coriaceous with thinner margins

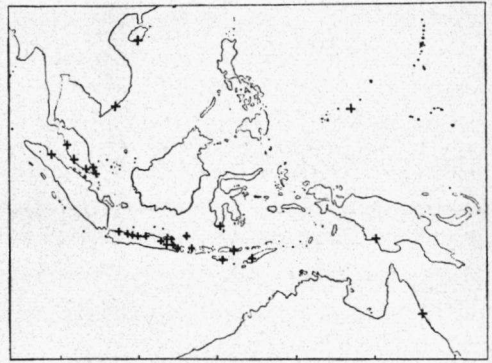


Fig. 46. *Ipomoea maxima* (L. f.) DON ex SWEET. Distribution in Malaysia.

*Corolla* about salver-shaped, pale lilac, pink, or nearly white, with a purple centre, 2-3 cm long, the limb 1¼-2½ cm diam. with shortly apiculate lobes. Stamens and style included; filaments glabrous, except the dilated base. Ovary glabrous. *Capsule* depressed-globular, ca 6-7 mm high, glabrous, 2-celled, 4-valved. Seeds 4, covered with a dense, very short, pale greyish or white tomentum, and often with some longer arachnoid hairs along the edges.

*Distr.* Tropical Asia, from India and Ceylon, Indo-China, Hainan, Formosa, Siam to Queensland; *Malaysia*: Sumatra (E. Coast), Malay Peninsula, Java, SW. Celebes, the Lesser Sunda Islands (Lombok, Sumba, Flores, Timor), and Neth. S. New Guinea (Merauke). Fig. 46.

*Ecol.* In moist, often somewhat saltish localities, near salines, on beaches, but also in moist grasslands, in fields, thickets, hedges, waste grounds and along waysides, from sea-level to 50 m. In Malaysia not found on the beaches bordering the Indian Ocean, but apparently almost confined to the clays of muddy seas.

*Vern.* *Akar kangkong bulu*, M, *tjemplingan*, J.

*Notes.* Some authors (see *Blumea* 3, 1940, 528, note 1) consider this to be conspecific with *I. sagittaeifolia* BURM. f., the type of which is unfortunately not to be found at Geneva. If they are right, BURMAN's name has priority.

A specimen from Timor (leg. Mrs WALSH, in Herb. Bog. and Herb. Mus. Brit.) has the leaves ovate-oblong with a sagittate base.



Fig. 45. *Ipomoea maxima* (L. f.) DON ex SWEET. Flowering branch, nat. size.

19. *Ipomoea aquatica* FORSK. Fl. Aeg.-Arab. (1775) 44; OOSTSTR. *Blumea* 3 (1940) 528.—*Convolvulus repens* VAHL, Symb. Bot. 1 (1790) 17, non LINNÉ 1753.—*I. reptans* POIR. in LAMK, Enc. Suppl. 3 (1814) 460, non *Convolvulus reptans* LINNÉ 1753.—*I. repens* ROTH, Nov. Pl. Sp. (1821) 110, quoad descript., non *Convolvulus repens* LINNÉ 1753, nec *I. repens* LAMK, 1791; Bl. Bijdr. (1825) 713.—? *Convolvulus rostratus* ZIPP. *Linnaea* 15 (1841) 339, pro syn.—*I. subdentata* Miq. Fl. Ind. Bat. 2 (1857) 614.—Fig. 47, 47 A, 48.

Herbaceous, perennial or sometimes annual



Fig. 47. *Ipomoea aquatica* FORSK. in gregarious development among lowland forest dying off on account of flooding in the ever-changing delta of the Djenemaëdja River, S. of Palopo, SW. Celebes.

(see notes). Stems mostly thick, hollow or spongy, rooting at the nodes, up to 2 or 3 m, trailing on moist soil or mud, or floating on water, occasionally thinner, trailing or twining; glabrous or hairy at the nodes. *Leaves* glabrous, variable in shape and size, even on the same plant, ovate, triangular, ovate-oblong, lanceolate or linear, 3–15 by 1–9 cm, truncate, cordate to sagittate or hastate at the base, with rounded or acutish to acute, entire or dentate basal lobes, acute or obtuse to retuse and mucronulate at the apex; leaf-margin above the basal lobes entire or coarsely dentate; petiole 3–20 cm, glabrous. *Inflorescences* axillary; peduncle 1–12 cm, glabrous, cymosely one- to few-flowered. Pedicels longer than the calyx, 2–6½ cm, glabrous. Bracts minute, narrow, acute. *Sepals* equal in length or the outer ones a little shorter, glabrous, with thin pale margins; outer ones ovate-oblong, obtuse, minutely mucronate or blunt, 7–8 mm long, inner ones ovate-elliptic, minutely mucronate, ca 8 mm long. *Corolla* funnel-shaped, (2½–)3–5 cm long, glabrous, pink or pale lilac, often with a purple centre, rarely entirely white. Stamens and style included; filaments hairy at the base. Ovary glabrous. *Capsule* ovoid to globose, ca 8–10 mm high, glabrous. Seeds 4 or less, densely greyish pubescent or sometimes glabrous.

*Distr.* Circumtropical, throughout *Malaysia*. *Ecol.* In moist, marshy or inundated localities, in shallow pools, ditches, wet rice-fields, forming

dense masses; also along waysides, wild and cultivated, from sea-level to 1000 m. The species is easily propagated by cuttings.



Fig. 47A. *Ipomoea aquatica* FORSK. on a dense submerged growth of *Hydrilla verticillata* PRESL in the Lake of Lamongan, E. Java (RUTTNER).

Uses. An excellent palatable vegetable, especially the young shoots and leaves. Also used as 'fish-food' and in medicine. In the Malay Peninsula it is very general to feed it to pigs (BURKILL; HEYNE).



Fig. 48. *Ipomoea aquatica* FORSK. a. Flowering branch,  $\times \frac{1}{2}$ , b. part of thick, hollow, floating stem,  $\times \frac{1}{2}$ .

Vern. *Kangkung*, *kankong* in many languages. *Kangkung darat*, *kangkung paya*, Mal. Pen., *walai keraí*, *vellai keraí*, Tamil, *rumpun*, Atjeh, *kalajau*, *lalidih*, *kangkuëng*, Minangk., *kangkung*, *kangkung ajër*, M., *kangkong*, Md, *lara*, *kangko*, *sajoha*, *sëriokang*, *sajor*, *ponangoi*, *kanto*, *tatanggo*, *tanggo*, *naniri*, *laré*, Celebes, *pangpung*, Bali, *nggango dano*, *ango dano*, *kako dano*, Roti, *kingkoi*, *kongkia*, *kangko*, Ceram, *utangko*, Buru, *beehob*, Marind., *takako*, *kako*, Halmahera, *kangko*, Tidore; Philippines: *balãngög*, *galatgat*, Iloko, *kangkung*, *tankúng*, Sulu, *kangkóng*, Bik., Tag., Pamp., *tangkóng*, Iloko, Kuyonon, Bis.. For more local names see Blumea 3 (1940) 531.

Notes. According to BACKER, the species is perennial, or sometimes, in unfavourable localities, annual. There is a form in cultivation growing in dry places and another one growing in water;

in the Malay Peninsula they are distinguished as *kangkung darat* and *kangkung paya*, the former are grown in beds, the latter in ponds. OCHSE & BAKHUIZEN VAN DEN BRINK mention two forms, viz: *kangkung biasa*, S, with dark green leaves and stems, and lilac flowers, and *kangkung nagri*, S, with yellow-green leaves, yellowish stems, and white flowers.

HOCHREUTINER (Candollea 5, 1934, 186) states that a specimen preserved at Geneva, is the type of *I. sagittaeifolia* BURM. f.. This specimen is *I. aquatica* FORSK.. It is not the type of *I. sagittaeifolia* BURM. f. as the specimen does not match BURMAN's picture and description and, moreover, the sheet carries only HOUTTUYN's handwriting.

20. *Ipomoea pes-caprae* (L.) SWEET, Hort. Suburb. Londin. (1818) 35; OOSTSTR. Blumea 3 (1940) 532. —*Convolvulus pes-caprae* LINNÉ, Sp. Pl. (1753) 159.—*Convolvulus maritimus* DESR. in LAMK, Enc. Bot. 3 (1789) 550.—*I. maritima* R.BR. Prod. (1810) 486.—Fig. 49-50.

KEY TO THE SUBSPECIES

- 1. Leaves deeply 2-lobed, with rounded lobes; leaf-base cuneate to attenuate into the petiole. Outer sepals ca 9 mm long, inner ones ca 13 mm. Corolla ca 6½ cm long. ssp. *pes-caprae*
- 1. Leaves emarginate or sometimes truncate at the apex; truncate, rounded, shortly attenuate to subcuneate or slightly cordate at the base. Outer sepals 5-8, inner ones 7-11 mm long. Corolla 3-5 cm long. ssp. *brasiliensis*

ssp. *brasiliensis* (L.) OOSTSTR. Blumea 3 (1940) 533.—*Convolvulus brasiliensis* LINNÉ, Sp. Pl. (1753) 159.—*Convolvulus bilobatus* ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 73.—*I. pes-caprae* (L.) SWEET var. *emarginata* HALLIER f. Bull. Soc. Roy. Bot. Belg. 37 (1898) 98.—Fig. 49-50.

Perennial, with a thick taproot. Stems long-trailing and rooting at the nodes, or occasionally twining, 5-30 m long, terete, angular, or flattened, glabrous, containing a milky juice. Leaves often secund, ovate, obovate, elliptic, orbicular, or transverse-elliptic to kidney-shaped, or quadrangular to oblong, 3-10½ cm, truncate, rounded, shortly attenuate to subcuneate or slightly cordate at the base, emarginate or sometimes truncate at the apex, mucronulate, rather thick and firm, glabrous; midrib below with two glands at the base of the blade; lateral nerves 8-10 on either side of the midrib; petiole up to 12(-17) cm, glabrous. Inflorescences axillary, secund; peduncles 3-16 cm, stout, angular or flattened, glabrous, cymosely one- to several-flowered. Pedicels longer than the calyx, glabrous, 12-30(-45), in fruit up to 45(-70) mm. Bracts small, ovate-lanceolate, 3-3½ mm long, caducous. Sepals subequal or the outer ones slightly shorter; outer sepals ovate to elliptic or broadly elliptic, 5-8 mm long, distinctly 3-5-nerved; inner ones broader, to orbicular and concave, 7-11 mm long, all obtuse and mucronulate,





Fig. 49. *Ipomoea pes-caprae* (L.) SWEET ssp. *brasiliensis* (L.) OOSTSTR. C  
Leiden, Bay of Djakarta (DOCTERS VAN LEEUW...).

glabrous, subcoriaceous. *Corolla* funnel-shaped, 3–5 cm long, glabrous, pink, reddish purple or violet, darker inside at the base, rarely entirely white. Stamens and style included; filaments hairy at the base. Ovary glabrous. *Capsule* globular to depressed-globular, ca 12–17 mm high, glabrous, 2-celled, 4-valved. Seeds 4, black, densely brownish tomentose, 6–10 mm long.

*Distr.* Circumtropical, the common subspecies throughout *Malaysia*.

*Ecol.* On and immediately behind sandy sea-shores, occasionally in the interior, along waysides, ditches and canals, from sea-level up to 600 m.

*Uses.* The seeds are said to be a good remedy for stomach-ache and cramp. In E. *Malaysia* the leaves are made into poultices, which are used to ripen boils and applied to swellings, wounds, ulcers, etc. The juice of the stems is used in the Island of Nusa Kembangan (S. Java) as a medicine against bites and stings of fishes. The species may be useful as a sand-binder (BURKILL; HEYNE).

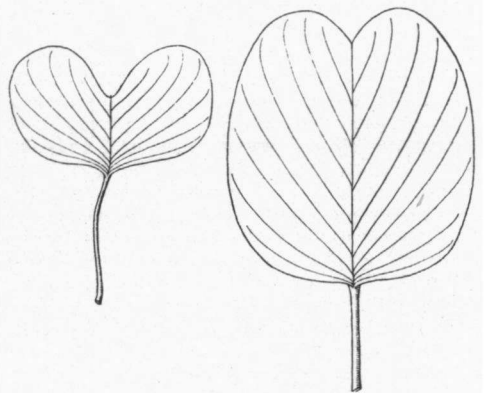


Fig. 50. *Ipomoea pes-caprae* (L.) SWEET. Left: leaf of ssp. *pes-caprae*; right: leaf of ssp. *brasiliensis* (L.) OOSTSTR.  $\times 1/2$ .

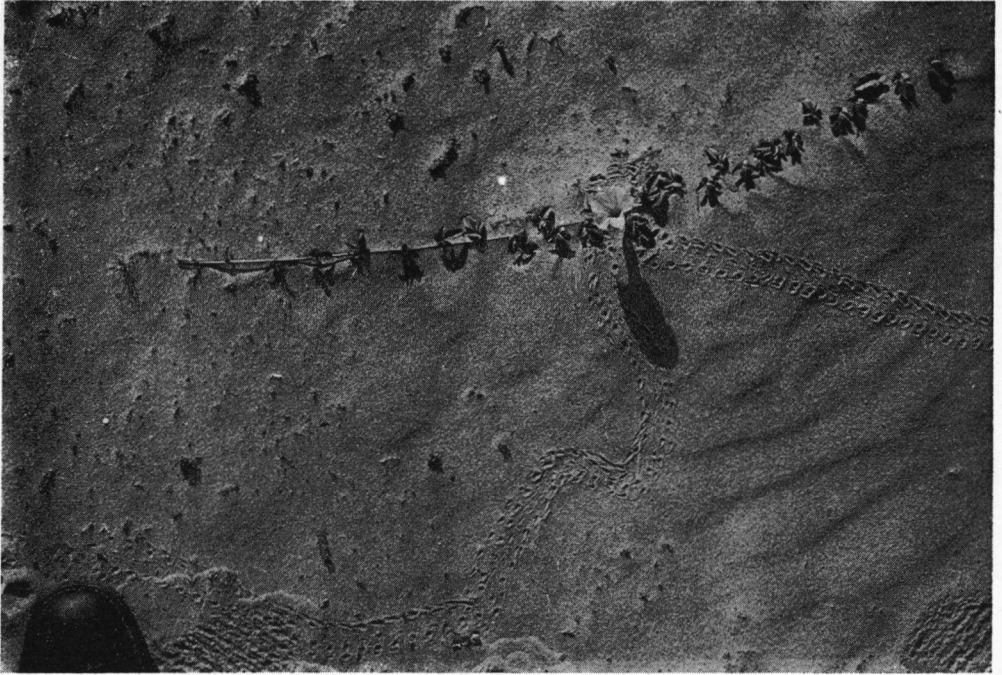


Fig. 51. *Ipomoea stolonifera* (CYRILL.) J. F. GMEL. in the early morning on the beach of the Island of Madura, E. Java; during the previous night a crab has inspected the bud and left a track (JESWIET).

Vern. *Batata pantai*, *daun katang*, *tapak kuda*, *M*, *tang-katang*, Md, *katang-katang*, Bali, *andali arana*, Talaud, *daléré*, Sangir, *watata ruruan*, *daredei*, *dolodei*, *daléré*, *kapu'né ruru'an*, *kaput i lamanan*, *tilaladé*, *bulalingo*, *alere*, *lèlèri*, *lalèrè*, Celebes, *mari-mari*, Ceram, *wèdor*, *wèdule*, Ambon, *ngemir-gamir*, Marind., *loloro*, Halmahera; Philippines: *arodaidai*, *katang-katang*, *lagairai*, Tag. & Bik., *kamigang*, *bagasua*, Tag. & Bis., *daripai*, Tag., Bik., Bis., *balim-balim*, *kabai-kabai*, *kamokamothan*, *tagarai*, Tag., *palang-palang*, P. Bis., *lagilai*, Bag., *lambaiong*, Sulu & Ilk., *daloidoi*, Bik., *kamkamóte*, Ilk., *vadinó*, Ivatan; *geitepoot*, D. See for more local names DE CLERCQ-PULLE, Nieuw Plantk. Woordenb. ed. 2 (1927) 126, HEYNE, Nutt. Pl. Ned. Ind. (1927) 1304, VAN OOSTSTR. *Blumea* 3 (1940) 538.

*ssp. pes-caprae*.—*Convolvulus pes-caprae* LINNÉ, Sp. Pl. (1753) 159.—*I. biloba* FORSK. Fl. Aeg.-Arab. (1775) 44.—*I. pes-caprae* SWEET var. *biloba* (FORSK.) HALLIER f. Ann. R. Istit. Bot. Roma 7 (1898) 231.—*I. pes-caprae* (L.) SWEET *ssp. pes-caprae* (L.) OOSTSTR. *Blumea* 3 (1940) 538.—Fig. 50.

Differs from the preceding subspecies in the shape of the leaves and the dimensions of calyx and corolla. Leaves in the average smaller, deeply 2-lobed, with rounded lobes, cuneate at the base or attenuate into the petiole. Outer sepals ca 9 mm

long, inner ones ca 13 mm long. Corolla ca 6 $\frac{1}{2}$  cm long.

Distr. Somaliland, tropical Asia, and Malaysia: W. Sumatra (Batu Islands), Krakatao, and Malay Peninsula (Penang, probably only cultivated in the Botanic Gardens).

Ecol. Sandy beaches.

21. *Ipomoea asarifolia* (DESR.) R. & SCH. Syst. 4 (1819) 251; OOSTSTR. *Blumea* 3 (1940) 539.—*Convolvulus asarifolius* DESR. in LAMK, Enc. 3 (1789) 562.—*I. repens* LAMK, Tabl. Enc. 1 (1791) 467, non ROTH 1821.—*Convolvulus rugosus* ROTTL. Ges. Naturf. Fr. Neue Schr. 4 (1803) 196.—*I. rugosa* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 446.

Herbaceous perennial, much resembling *I. pes-caprae*. Stems prostrate or sometimes twining, thick, terete or angular. Leaves orbicular to kidney-shaped, 3 $\frac{1}{2}$ –8 by 3 $\frac{1}{2}$ –10 cm, cordate at the base with rounded lobes, broadly rounded at the apex, not or slightly emarginate, mucronulate; petiole rather thick, with a deep, longitudinal groove above, 3–9 cm long, smooth or minutely muricated. Inflorescences axillary, often together with an axillary leafy shoot; peduncles angular, shorter to slightly longer than the petiole, 2–5 $\frac{1}{2}$  (–10) cm, cymosely one- to few-flowered, at least the central flower with a pedicel much longer than the calyx, 14–24 mm. Sepals unequal, the outer

ones shorter, all elliptic-oblong, obtuse, mucronulate; outer ones 3-nerved, more or less muricated, 5–6 mm long, inner ones 8–9 mm. *Corolla* funnel-shaped, ca 5 cm long, glabrous, red-purple. Stamens and style included; filaments shortly pilose at the base. Ovary glabrous. *Capsule* globose, ca 15 mm diam., glabrous. Seeds glabrous, as large as a pea (BAKER & RENDLE).

Distr. Tropical America, Cape Verde Islands, tropical Africa, tropical Asia, in *Malaysia*: E. Java and Bali.

Ecol. In marshy grasslands, and along waysides, from sea-level to 250 m.

Vern. *Kangkong*, Bali.

**22. *Ipomoea stolonifera* (CYRILL.) J. F. Gmel.** Syst. Nat. ed. 13, 2 (1791) 345; OOSTSTR. *Blumea* 3 (1940) 540.—*Convolvulus littoralis* LINNÉ, Syst. ed. 10 (1759) 924.—*Convolvulus stoloniferus* CYRILL. Pl. Rar. Neap. 1 (1788) 14.—*I. carnosa* R. BR. Prod. (1810) 485.—*I. littoralis* BOISS. Fl. Orient. 4 (1879) 112, non BLUME 1825.—Fig. 51–52.

A glabrous perennial. Stems trailing, rooting at the nodes, to 5 m long, terete, glabrous. *Leaves* fleshy, very variable in shape, often of various forms on the same plant, linear, lanceolate, ovate or oblong, with entire or undulate margin, obtuse, truncate or cordate at the base, obtuse or emarginate to 2-lobed at the apex, or the blade is 3–5-lobed with a lanceolate to ovate or oblong, large middle-lobe and smaller lateral ones; blade 1½–4(–6) by 1–3(–5) cm; petiole ½–4 cm. *Inflorescences* axillary; peduncle short, 12–15 mm, 1- or occasionally 2–3-flowered. Pedicels 8–15 mm, in fruit up to 25 mm. Bracts minute, linear, 2–3 mm long. *Sepals* unequal, inner ones 10–15 mm long, outer ones shorter, all oblong, acutish or obtuse, mucronulate, glabrous, subcoriaceous. *Corolla* funnel-shaped, 3½–5 cm long, glabrous, white, pale yellow inside and with a purple centre. Stamens and style included. Filaments hairy at the base. Ovary glabrous. *Capsule* globular, ca 1 cm high, smooth, 2-celled, 4-valved. Seeds 4 or less, ca 8 mm long, short-tomentose and with longer hairs along the edges.

Distr. Tropical and subtropical countries of both hemispheres, in *Malaysia*: apparently rare, Malay Peninsula, Madura Island and the Philippines (Cagayan and Babuyan Islands). Fig. 52.

Ecol. Sandy sea-shores, dunes, from sea-level to 5 m.

Use. It might be of some service as a sand-binder.

**23. *Ipomoea tricolor* CAV.** Icon. 3 (1794) 5, t. 208.—?*I. violacea* LINNÉ, Sp. Pl. (1753) 161; OOSTSTR. *Blumea* 3 (1940) 541.—*I. rubro-caerulea* HOOK. Bot. Mag. (1834) t. 3297.

A herbaceous, glabrous twiner, with terete stems. *Leaves* ovate, 3½–7 by 2½–6 cm, cordate at the base, long-acuminate at the apex with an acute, mucronulate acumen; petiole 1½–6 cm. *Inflorescences* axillary; peduncles as thick as the stems, terete, fistulose, 3–9 cm, cymosely branched at the top. Pedicels much longer than the calyx,

15–18, afterwards up to 25 mm. Bracts minute, triangular. *Sepals* subequal, narrowly triangular to ovate-lanceolate, gradually narrowed towards the apex, 4½–6 mm long, green with white margins, carinate on the back. *Corolla* funnel-shaped, 4–6 cm long, glabrous, in bud red with a white tube, in anthesis bright sky-blue with a paler or white tube. Stamens and style included, filaments very unequal, glabrous. Ovary glabrous. *Capsule* ovoid, ca 8–10 mm long, mucronate by the style-base, pale straw-coloured, 2-celled, 4-valved; dissepiment persistent. Seeds 4, nearly 5 mm long, black, minutely puberulent.

Distr. Mexico, Central America, West Indies, tropical South America, elsewhere cultivated and perhaps occasionally escaped, in *Malaysia* only known from the Malay Peninsula (as a garden escape), and Timor, where it is locally frequent in the N. central portion of the island, at 400 m.

Vern. *Non luli*, Timor.

**24. *Ipomoea cairica* (L.) SWEET,** Hort. Brit. (1827) 287; OOSTSTR. *Blumea* 3 (1940) 542.—*Convolvulus cairicus* LINNÉ, Syst. ed. 10 (1759) 922.—*I. palmata* FORSK. Fl. Aeg.-Arab. (1775) 43.—*Convolvulus tuberculatus* DESR. in LAMK, Enc. 3 (1789) 545.—*I. tuberculata* R. & SCH. Syst. 4 (1819) 208.—*Convolvulus paniculatus* (non LINNÉ) NAVES in BLANCO, Fl. Filip. ed. 3 (1877–83) t. 32.

A glabrous twiner (or occasionally prostrate). Root tuberous. Stems more or less tuberculate or smooth. *Leaves* ovate to orbicular in outline, 3–10 by 3–10 cm, palmately cut to the base into 5 lanceolate or ovate-lanceolate to ovate or elliptic, basally and apically acuminate entire segments with acute or obtusish mucronulate apex; the basal pair of segments usually again lobed or parted; petiole 2–6 cm, often with pseudostipules (small leaves of the axillary shoot) at its base. *Inflorescences* axillary; peduncle ½–7 cm, cymosely one- to few-flowered; pedicels 12–20 mm; bracts minute. *Sepals* glabrous, subequal or the exterior ones slightly shorter, 4–6½ mm, often minutely tuberculate without, with pellucid dots and with pale, scarious margins; outer ones ovate, obtuse to acutish, mucronulate, inner ones broader, obtuse, mucronulate. *Corolla* funnel-shaped, 4½–6 cm long, white with a purplish-red tinge on both surfaces and purplish-red towards the base only on the inner surface, occasionally entirely white. Stamens and style included; filaments pilose at the base. Ovary glabrous. *Capsule* subglobose, 10–12 mm high, smooth, 2-celled, 4-valved. Seeds 4 or less, ca 5–6 mm long, densely short-tomentose and with long silky hairs along the edges.

Distr. Widely distributed in tropical Africa and Asia; cultivated and naturalized elsewhere, in *Malaysia* cultivated and/or run wild in the Malay Peninsula, Java, Borneo, Moluccas, Philippines, New Guinea, and the Bismarck Archipelago.

Ecol. Cultivated; wild in waste places, thickets, hedges, etc..

Vern. *Railway creeper*, E, *tatampajan*, M, *patula hutan*, Sandakan, *aurora*, Spanish.

Note. *I. cairica* has been mentioned by several authors under the name of *I. pulchella* ROTH, which is, however, another species, differing *i.a.* by its much smaller, *ca* 1½ cm long, corolla.

25. *Ipomoea coptica* (L.) ROTH *ex* R. & SCH. Syst. 4 (1819) 208; OOSTSTR. *Blumea* 3 (1940) 544.—*Convolvulus copticus* LINNÉ, Mant. 2, App. (1771) 559.—*I. dissecta* WILLD. Phytogr. (1794) 5, t. 2.

A glabrous annual. Stems slender, trailing, or sometimes twining. *Leaves* orbicular in outline, 1–3 cm long and broad, digitate, with 5 coarsely dentate to deeply and irregularly, once or sometimes twice pinnatifid segments; the teeth or lobes of the segments mostly acute; the middle segment larger than the lateral ones, ovate, oblong, lanceolate or oblanceolate in outline, the two basal segments sometimes 2-lobed again; petiole mostly shorter than the blade, 3–8(–20) mm, with pseudo-stipules (small leaves of the axillary shoot) at its base. *Inflorescences* axillary; peduncles mostly shorter than the leaves, 1–3½ cm long, narrowly 2-alate, cymosely 1–3-flowered. Pedicels 4–5(–7) mm, at first erect, in fruit bent downwards. Bracts lanceolate, entire, small, 1½–3 mm long, acute, or sometimes larger and palmately lacinate like the leaves (*var. acuta* CHOISY in DC. Prod. 9, 1845, 384). *Sepals* subequal, *ca* 4 mm long, oblong or elliptic, minutely cuspidate, thinly coriaceous, verruculose on the back. *Corolla* funnel-shaped, small, *ca* 12 mm long, white. *Capsule* globose, *ca* 7–8 mm diam., glabrous, 3-celled. Seeds 6, *ca* 2½ mm long, densely greyish-tomentose.

Distr. Tropical and South Africa to tropical Asia and North Australia, in *Malaysia* mentioned from the Malay Peninsula (Penang) by MIQUEL, *Fl. Ind. Bat.* 2 (1857) 608, and from West New Guinea by SCHEFFER, *Ann. Jard. Bot. Btzg* 1 (1876) 39, both under the name of *I. dissecta* WILLD..

26. *Ipomoea diversifolia* R.Br. Prod. (1810) 487; OOSTSTR. *Blumea* 3 (1940) 545.—*Pharbitis laciniata* DALZ. in HOOK. *Kew J. Bot.* 3 (1851) 178.—*I. laciniata* CLARKE in HOOK. *f. Fl. Br. Ind.* 4 (1883) 200.—Fig. 52.

A glabrous annual. Stems slender, trailing or twining. *Leaves* orbicular in outline, 1–2½(–5) cm diam., digitate, with 5 coarsely and irregularly dentate to pinnatifid segments, the two basal of which sometimes bifid, the central segment larger than the lateral ones, all narrow-oblong to oblanceolate in outline; petiole mostly shorter than the blade, 3–12(–15) mm long, with pseudo-stipules. *Inflorescences* axillary; peduncles mostly shorter than the leaves, 7–20 mm long, angular or flattened, mostly 1-, sometimes to 3-flowered. Pedicels 8–12(–18), in fruit to 15(–20) mm, erect, also in

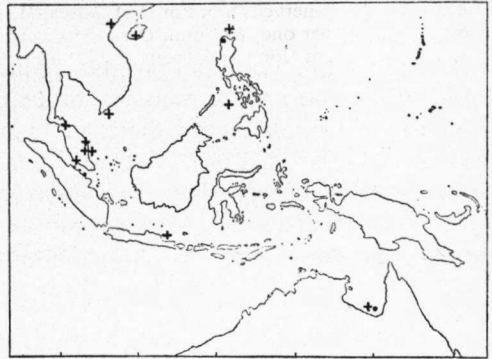


Fig. 52. Distribution in Malaysia of *Ipomoea stolonifera* (CYRILL.) J. F. GMEL. (+) and *Ipomoea diversifolia* R.Br. (●).

fruit. Bracts linear-lanceolate, small, *ca* 3 mm long, very acute. *Sepals* subequal or the inner ones slightly longer, 6–10 mm long, elliptic or narrow-elliptic or oblong-lanceolate, cuspidate or acute, the back more or less carinate and muricated. *Corolla* tubular to funnel-shaped, small, 5–6 mm long, white, purple inside at the tube. Stamens and style included. *Capsule* subglobose, 8–10 mm diam., glabrous. Seeds short-tomentose.

Distr. India to NE. Australia, in *Malaysia*: Philippines (Luzon: Ilocos Norte). Fig. 52.

Ecol. In grasslands at low altitudes.

27. *Ipomoea graminea* R.Br. Prod. (1810) 485; OOSTSTR. *Blumea* 3 (1940) 546.

A glabrous twiner. Stems slender. *Leaves* linear, 4–14 cm long or still longer, 2–5 mm broad, obtuse, mucronulate; petiole 4–10 mm; midrib and lateral nerves nearly parallel. Peduncles 1-flowered, 3–5 mm, in fruit up to 12–15 mm. Pedicels 6–9 mm, in fruit up to 15–18 mm. *Sepals* unequal, the inner ones longer; outer sepal elliptic, *ca* 6 mm long, inner ones oblong or ovate-oblong, 7 and 8–10 mm long, somewhat longer in fruit, all obtuse, and mucronulate at the apex. *Corolla* salver-shaped, white, *ca* 4 cm long (according to BENTHAM up to 7½ cm long). Filaments inserted near the corolla-base (perhaps slightly exerted), hairy at their base. Ovary glabrous. *Capsule* ovoid-globular, *ca* 8 mm high, glabrous. Seeds greyish.

Distr. North Australia, Queensland, and *Malaysia*: SE. New Guinea and SW. Celebes (Wadjo, N. of Singkang).

Ecol. In open savannah-land and in savannah-forests, climbing up grasses *etc.*, *ca* 15–150 m. Flowers opening in the evening.

##### 5. Section *Calonyction*

(CHOISY) GRISEB. *Fl. Br. West Ind. Isl.* (1864) 466, *p.p.*—*Calonyction* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 441.—*Ipomoea subg. Calonyction* CLARKE in HOOK. *f. Fl. Br. Ind.* 4 (1883) 197.—*Ipomoea sect. Leiocalyx subsect. Calonyction*

HALLIER f. Med. Rijksherb. Leiden no 46 (1922) 19; OOSTSTR. Blumea 3 (1940) 547.

Annual or perennial herbaceous twiners, mostly glabrous; stems often muricated. *Leaves* cordate, sometimes angular, herbaceous. *Flowers* axillary, solitary, or often in a cincinnus or in a dichasial cyme, nocturnal. *Sepals* herbaceous to membranaceous, glabrous or sometimes hirsute, long-aristate or rarely blunt, subequal or the exterior ones smaller. *Corolla* large, actinomorphic or slightly zygomorphic, white, pink or lilac, glabrous, salver-shaped, the tube long, narrow-cylindrical or rarely widened above the middle. *Stamens* and style often exerted. *Ovary* glabrous, 2-celled or rarely 4-celled, 4-ovuled. *Capsule* 4-valved, 4-seeded. *Seeds* large, glabrous, dull.

28. *Ipomoea alba* LINNÉ, Sp. Pl. (1753) 161; OOSTSTR. Blumea 3 (1940) 547.—*Convolvulus aculeatus* LINNÉ, Sp. Pl. (1753) 155.—*I. bona-nox* LINNÉ, Sp. Pl. ed. 2 (1762) 228.—*Calonyction speciosum* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 441, t. 1, f. 4, excl. var. b.—*Calonyction bona-nox* BOJ. Hort. Maurit. (1837) 227.—*Convolvulus muricatus* BLANCO, Fl. Filip. ed. 1 (1837) 92.—*Calonyction speciosum* CHOISY var. *muricatum* (non CHOISY) HASSK. Pl. Jav. Rar. (1848) 522, excl. syn. *I. aculeata* BL.—*Calonyction aculeatum* HOUSE, Bull. Torr. Bot. Club 31 (1904) 590.—For a more detailed list of synonyms see HALLIER f. Bull. Herb. Boiss. 5 (1897) 1028, under *Calonyction bona-nox* (L.) BOJ.; see also HALLIER f. Med. Rijksherb. Leiden no 1 (1911) 25, sub 77.—Fig. 53.

A glabrous or rarely pubescent annual or perennial<sup>1</sup> twiner, containing a white milky juice. *Stems* herbaceous or lignescent<sup>1</sup> at the base, slender, terete, to 5 m high, smooth or sometimes muricated. *Leaves* ovate or orbicular in outline, rarely oblong to ovate-oblong, 6–20 by 5–16 cm, the margin entire, or 3-lobed often on the same plant, cordate at the base with a broad or narrow rounded sinus and with broadly rounded or sometimes angular lobes, acuminate at the apex with an acute or obtuse, mucronulate acumen; petiole slender, 5–20 cm. *Inflorescences* axillary, one- to several-flowered; the flowers in a cincinnus, rarely dichasial; peduncle stout, terete, 1–24 cm. *Pedicels* 7–15 mm, much thickened and clavate in fruit and then up to 25–30 mm. *Bracts* small, caducous. *Sepals* subcoriaceous, elliptic, glabrous, unequal, the 2 or 3 outer ones shorter, 5–12 mm and with a long, thick, recurved or patent awn, 4–9 mm long; the inner ones longer, 8–15 mm, mucronulate, with a much shorter and thinner mucro, 2–3 mm long; sepals often reflexed in fruit. *Corolla* opening after sunset, fragrant, salver-shaped, white with greenish bands; the cylindrical to slightly angular tube 7–12 cm long, suddenly expanding into a 11–14 cm broad rotate limb. *Stamens* and style exerted; stamens inserted in the upper part of the corolla-tube; filaments glabrous. *Ovary* glabrous. *Capsule* ovoid, mucronate, 2½–3 cm high, glabrous, 2-celled, 4-valved. *Seeds* 4, gla-

brous, yellowish white to brown or black, 10–12 by 7–9 mm.

*Distr.* Circumtropical; originally in tropical America, in *Malaysia* cultivated in gardens and run wild.

*Ecol.* Widely distributed in the settled areas at low and medium altitudes; cultivated and run

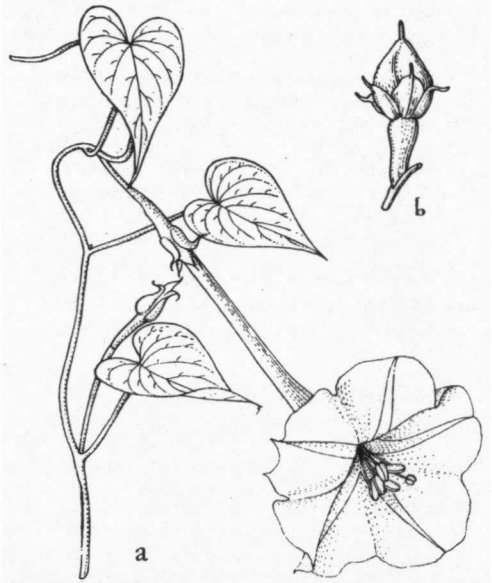


Fig. 53. *Ipomoea alba* L. a. Flowering branch,  $\times 2/5$ , b. unripe capsule,  $\times 1/2$ .

wild in thickets, hedges, along waysides and edges of forests.

*Uses.* Often cultivated in gardens for its nocturnal, fragrant flowers. The young leaves are eaten as a vegetable (according to HEYNE); the dried flowers (*sundal malam*, *sédép malam*) are used in pies and in *kimlo* (Chinese vegetable soup) (according to OCHSE).

*Vern.* Běring *rumbi*, *trulak*, *andor simar gandung*<sup>2</sup>, Sumatra, *têrulak*, M, *terong kori bodas*, *sundal malam*, *areuj kutjubung*, S, *kurulak*, *klurak*,

(1) See HALLIER f. Bull. Herb. Boiss. 5 (1897) 1038 & 1039.

*J. teja*, Alor, *bunga pareh*, Celebes, *pitur*, Minah.; Philippines: *kalakamôte*, *malakamôte*, *kamokamotihan*, Tag., Bis., *kakaiuit*, Gad., *pekpeket*, Bont., *moonflower*, *good-night flower*, E., *nachtschone*, D.

Notes. HALLIER *f.* (Bull. Herb. Boiss. 5, 1897, 1037 & 1038) distinguishes two varieties, each subdivided into two subvarieties, on account of 1. the leaf-shape and 2. the absence or presence of a pubescence. The varieties appear to be of little systematic value as there are many specimens of which the leaves are partly entire and partly 3- to 5-lobed. By far the greater part of the specimens from Malaysia is glabrous; pubescent specimens are very rare.

29. *Ipomoea muricata* (L.) JACQ. Hort. Schoenbr. 3 (1798) 40, t. 323, non CAV. 1799; OOSTSTR. Blumea 3 (1940) 551.—*Convolvulus muricatus* LINNÉ, Mant. (1767) 44.—*I. bona-nox* L. var. *purpurascens* KER-GAWL. Bot. Reg. 4 (1818) t. 290.—*Calonyction muricatum* G. DON, Gen. Syst. 4 (1838) 264.—*Calonyction longiflorum* HASSK. Cat. Hort. Bog. (1844) 140.—*Calonyction speciosum* CHOISY var. *muricatum* CHOISY in DC. Prod. 9 (1845) 345, excl. syn. WILLD., LEDEB., BL., DIETR.—*Convolvulus colubrinus* BLANCO, Fl. Filip. ed. 2 (1845) 66.

A glabrous or nearly glabrous twiner, containing a white milky juice. Stems herbaceous, annual, terete or angular, muricated. *Leaves* broadly ovate to orbicular, 7–18 by 6½–15 cm, cordate at the base with wide or narrow sinus and broadly rounded lobes, acuminate at the apex with an acute or

obtuse, mucronulate acumen; petiole 4–12 cm, muricated or smooth. *Inflorescences* axillary, one- to few-flowered; peduncles muricated, 3–6 cm. Pedicels 10–20 mm or longer, smooth, thickened towards the calyx, very thick in fruit. Bracts oblong, acute, ca 8 mm long, scarious. *Sepals* about equal in length; two outer ones oblong to ovate, ca 6–7 mm long, more or less plicate at the top and attenuate into a thick suberect awn, 4–6 mm long; three inner ones ca 7–8 mm long, obtuse or slightly emarginate, distinctly awned, awn ca 4 mm; sepals in fruit patent, afterwards reflexed. *Corolla* opening at night, glabrous, long funnel-to salver-shaped, pale bluish-purple, ca 5–7½ cm long, with a narrow, cylindrical, ca 3–6 cm long tube; tube widened above at the place of insertion of the filaments; limb funnel-shaped to rotate, 5-angular. Stamens and style not or scarcely exerted; stamens inserted in the upper part of the corolla-tube; filaments with some short hairs at the base. Ovary glabrous. *Capsule* ovoid, ca 18–20 mm high, 2-celled, 4-valved. Seeds 4, glabrous, black, ca 9–10 mm long.

Distr. From Mexico to Colombia and Brazil, the West Indies, tropical Africa and adjacent islands to India, China, and Japan, in *Malaysia* cultivated in the Philippines.

Uses. Cultivated as an ornamental. In the Philippines the seeds are used as a remedy against snake-bites; they are also said to be purgative (BROWN, QUISUMBING).

Vern. *Pipita de tonkin*, Philip., *tonkin*, *tunkin*, Tag..

#### 6. Section *Quamoclit*

(MOENCH) GRISEB. Fl. Br. West Ind. Isl. (1864) 472.—*Quamoclit* MOENCH, Meth. (1794) 453 ('*Quamoelit*').—*Ipomoea* subg. *Quamoclit* CLARKE in HOOK. *f.* Fl. Br. Ind. 4 (1883) 198.—*Ipomoea* sect. *Leicalyx* subsect. *Quamoclit* HALLIER *f.* Med. Rijksherb. Leiden no 46 (1922) 20; OOSTSTR. Blumea 3 (1940) 552.

Annual (or perennial?) herbaceous twiners, mostly glabrous. *Leaves* cordate, often angular or palmately 3–5-lobed, rarely deeply pinnately divided. *Flowers* mostly axillary, often in a dichasium consisting of two scorpioid cymes or in a real dichasium, rarely solitary. *Sepals* herbaceous to membranaceous, small, glabrous, obtuse, mostly aristate below the apex, subequal or the exterior ones shorter. *Corolla* small or medium-sized, often slightly zygomorphic, often bright red, rarely yellow or white, glabrous, salver-shaped, the tube cylindrical or widened upwards, the limb patent. Stamens and style exerted, usually declinate. Ovary glabrous, 4-celled, 4-ovuled. Capsule 4-celled, 4-valved, 4-seeded. Seeds glabrous or rarely puberulent, dull-black.

30. *Ipomoea angulata* LAMK, Tabl. Enc. 1 (1791) 464; OOSTSTR. Blumea 3 (1940) 553.—*I. phoenicea* ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 92.—*Quamoclit phoenicea* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 433.—*Quamoclit angulata* BOJ. Hort. Maurit. (1837) 224.—Fig. 54.

An annual twiner. Stems herbaceous, terete or slightly angular, often contorted, 2–5 m high, glabrous or sparsely pilose. *Leaves* mostly gla-

brous, ovate or broadly ovate to orbicular in outline, 3–15 by 3–10 cm, cordate at the base, acuminate and mucronulate at the apex, the margin entire, angular, coarsely dentate or obscurely to deeply 3-lobed, the middle lobe narrowed towards the base; petiole shorter or longer than the blade, 3–12 cm, glabrous or sparsely pilose. *Inflorescences* lateral or terminal, few- to several-flowered, 10–35 cm long; peduncle often longer than the petiole,

3–20 cm, terete or angular, glabrous or pubescent, cymosely branched at the top; first ramification mostly dichasial, subsequent ones monochasial; flowers and fruits on erect pedicels. Pedicels angular, 5–7 mm or longer, in fruit up to 8–12 mm, that of the central flower up to 15 mm. Bracts minute, 1½–2 mm, triangular, mucronulate. *Sepals* oblong-rectangular with broadly obtuse or truncate apex and with a large straight or slightly

purposes; run wild in waste places, fields, grasslands, thickets and thin forests, up to 1200 m.

Vern. *Bunga wolanda*, M, *ajong ajong*, *areuj tjatjabean*, S, *rajutan*, *sanggo langit*, J, *kardinaalsbloem*, D.

Note. Several authors have confounded this with the N. American *I. coccinea* L. (see VAN OOSTSTR. *Blumea* 3 (1940) 555, note). For a discussion of the differences between the two species see HALLIER f. *Bull. Herb. Boiss.* 7 (1899) 415.

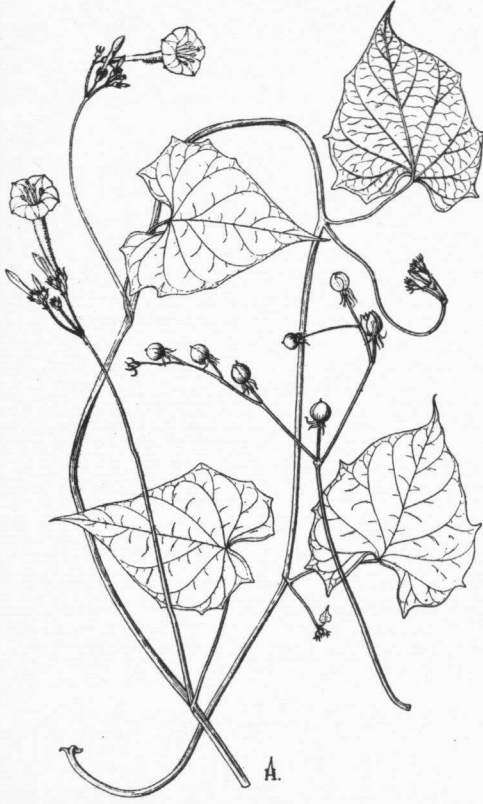


Fig. 54. *Ipomoea angulata* LAMK. Flowering branch, and fruiting peduncle,  $\times 1/2$ .

curved awn inserted immediately below the top; outer sepals 2–2½, inner ones *ca* 3 mm long (awn excluded); awn 3–4 mm; sepals in fruit patent, afterwards reflexed. *Corolla* glabrous, salver-shaped, scarlet, the tube 3–4 cm long, narrowed towards the base, slightly curved; the limb patent, up to 2–2½ cm diam.. Stamens and style exserted; filaments slightly unequal, glabrous. Ovary glabrous. *Capsules* on erect pedicels, globular, 5–7 mm high, glabrous, 4-celled, 4-valved; the dissepiments persistent, pellucid, with a thickened circular margin. Seeds 4, *ca* 4 mm long, black, densely pubescent.

Distr. Native of tropical America, now circumtropical; in *Malaysia* cultivated and run wild.

Ecol. Cultivated in gardens for ornamental

31. *Ipomoea quamoclit* LINNÉ, *Sp. Pl.* (1753) 159; OOSTSTR. *Blumea* 3 (1940) 555.—*Convolvulus pennatus* DESR. in LAMK, *Enc. Meth.* 3 (1791) 567.—*Quamoclit vulgaris* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 434.—*Quamoclit pinnata* BOJ. *Hort. Maurit.* (1837) 224.

An annual glabrous twiner, rarely prostrate. *Leaves* ovate or oblong in outline, 2–10 by 1–6 cm, pinnatifid to the midrib, with (8–)10–18 pairs of linear to filiform patent segments, the inferior of which are often bifid; rarely the leaves are less deeply incised [*var. pectinata* (HALLIER f.) OOSTSTR. 1]; petiole 8–40 mm, at the base often with pseudo-stipules. *Inflorescences* axillary, cymosely one- to few-flowered; peduncles mostly exceeding the leaves, 1½–10(–14) cm. Pedicels much longer than the calyx, (5–)9–20 mm, thickened and clavate in fruit. Bracts minute, deltoid, acute. *Sepals* slightly unequal, outer ones shorter, verruculose outside; all oblong to oblong-spathulate, obtuse, mucronulate somewhat below the apex; outer sepals (mucro excluded) 4–4½ mm, inner ones (mucro excluded) 5–6 mm long; mucro ¾–1 mm; margins of sepals pale. *Corolla* glabrous, salver-shaped, red or sometimes white (*var. albiflora* G. DON, *Gen. Syst.* 4, 1838, 260; OOSTSTR. *Blumea* 3, 1940, 556), the tube 2½–3½ cm long, slightly narrowed towards the base, straight; the limb expanded, 1¾–2 cm diam., 5-lobed with acutish, mucronulate lobes. Stamens and style exserted; filaments hairy at the base. Ovary glabrous. *Capsules* ovoid, obtuse, 6–8 mm long, often crowned by the thickened base of the style, 4-celled, 4-valved, with longitudinally splitting valves, the dissepiments persistent, pellucid, with a thickened circular margin. Seeds 4, ovoid-oblong, 5–6 mm long, blackish-brown, marmorate by tufts of minute hairs.

Distr. Circumtropical, in *Malaysia* cultivated and run wild throughout the region.

Ecol. Cultivated in gardens as an ornamental plant; run wild in waste places, hedges, thickets, thin forests and along edges of cane and rice-fields, up to 1200 m.

Use. In the Philippines the leaves are prepared in poultices and employed as a remedy for bleeding haemorrhoids.

Vern. *Bunga tali-tali*, *sangga langit*, M, *katilan*, *ratjik bumi*, *rintjik bumi*, S, *séri kading*, Brunei,

(1) *I. quamoclit* LINNÉ *var. pectinata* (HALLIER f.) OOSTSTR. *nov. comb.*—*Quamoclit pinnata* BOJ. *var. pectinata* HALLIER f. *Versl. 's Lands Pl.-tuin* 1895 (1896) 131.

*bugada*, Celebes, *gambir*, Halmah.; Philippines: *malabokbok*, *agoho*, *agau*, Tag., *lumpitan*, Mag., *malmarama*, *piros-piros*, C. Bis., *sailatan*, *silauk-ankambing*, Sulu, *tartaraok*, *tentedór*, Iloko, *cabello de angel*, Spanish, *cyress-vine*, *red jasmine*, E, *kardinaalsbloem*, D. For more local names see DE CLERCQ-PULLE, Nieuw Plantk. Woordenb. ed. 2 (1927) 188, under *Quamoclit pinnata* Boj.

31a. *Ipomoea* × *sloteri* (HOUSE) OOSTSTR. nov. comb.—*Quamoclit* × *sloteri* HOUSE, Gent. Herb. 1, 3 (1923) 128, f. 60.

7. Section *Eriospermum*

HALLIER f. Bot. Jahrb. 18 (1893) 149; OOSTSTR. Blumea 3 (1940) 484, 558.

Perennial plants, very variable in habit, pubescence, leaves and flowers. Flower-buds rarely acute, mostly obtuse, often globular. Sepals mostly obtuse, often orbicular, convex, rarely flat or acute. Seeds with long-bearded edges, further glabrous or rarely the whole surface villose.

32. *Ipomoea digitata* LINNÉ, Syst. ed. 10 (1759) 924; OOSTSTR. Blumea 3 (1940) 558.—*Convolvulus paniculatus* LINNÉ, Sp. Pl. (1753) 156.—*I. paniculata* R.Br. Prod. (1810) 486, non BURM. 1768.—*Batatas paniculata* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 436.—Fig. 55.

KEY TO THE VARIETIES

- 1. Leaves palmately divided to or mostly beyond the middle . . . . . var. *digitata*
- 1. Leaves entire or shallowly lobed. . . . . var. *eriosperma*

var. *digitata*.—Fig. 55.

A large perennial twiner, sometimes prostrate. Roots tuberous. Stems terete, glabrous. Leaves glabrous, orbicular in outline, 6–14 by 6–16 cm, palmately divided to or mostly beyond the middle; base more or less cordate or truncate, segments (3–)7(–)9, lanceolate to ovate, entire, acuminate with an acute or blunt, mucronulate top; petiole smooth or minutely mucronate, 3–10 cm long. Inflorescences axillary; peduncles generally longer than the petioles, terete but often angular near the top, glabrous, cymosely branched, few- to many-flowered, 2½–20 cm. Pedicels longer than the calyx, terete, minutely mucronate, glabrous, 9–25 mm long. Flower-buds globular. Sepals equal in length or the outer ones shorter, all orbicular or the outer ones oblong to broadly elliptic, obtuse, concave, coriaceous, 6–12 mm long, pale green, glabrous. Corolla pale reddish-purple, the tube darker inside, funnel-shaped, the tube cylindrical, narrowed at the base, the limb patent; corolla 5–6 cm long, limb 5–7 cm diam. Stamens and style included, filaments hairy at the base. Ovary glabrous. Capsule ovoid, obtuse, 12–14 mm high, glabrous, 2-celled, 4-valved. Seeds 4, black, with long woolly-sericeous easily detaching hairs.

According to HOUSE a hybrid between *I. coccinea* L. and *I. quamoclit* L. differing from the latter by: Leaves deltoid-ovate in outline, pectinately lobed to beyond the middle with ca 3–7 linear or linear-lanceolate, acuminate lobes on either side of the midrib; middle segment broadest, basal ones shortest and sometimes again lobed. Corolla salver-shaped, 4–5 cm long, crimson.

Note. Originally cultivated by Mr SLOTER of Columbus, Ohio. In *Malaysia* occasionally found as an ornamental (Malay Peninsula, Java).

Distr. Circumtropical; throughout *Malaysia*. Ecol. In thickets on the beach, but also in the interior, in waste places, thickets, hedges, savan-



Fig. 55. *Ipomoea digitata* L. in the Botanic Gardens, Singapore (HENDERSON).

nah-forests, teak-forests, along-fields, and along waysides; also cultivated; up to 700 m. Uses. Cultivated for ornamental purposes. The root is pounded and applied for swellings



(Malay Peninsula); moreover it is said to be cathartic.

Vern. *Kēledok hutan, kangkong laut, akar kērēmak, akar lanar*, Mal. Pen., *rombut, rabet*, Kangean, *laluli*, Timor, *sablejanin*, Tenimber, *pala puang*, S. Celebes, *kangkung utan, beteta pante*, Minahasa, *ondo*, Talaud, *aurorang gubat, bulakan, puntas puntas*, Tag., *kam-kamôte*, Iloko.

Note. A form with variegated leaves is found in cultivation.

*var. eriosperma* (P.B.) RENDLE, Fl. Trop. Afr. 4, 2 (1905) 190 (*sphalm. eriocarpa*).—*I. eriosperma* P.B. Fl. Owar. 2 (1807) 73, t. 105.—*I. paniculata* (L.) R.Br. *var. eriosperma* O.K. Rev. Gen. Pl. 2 (1891) 445 (*sphalm. eriocarpa*); HALLIER f. Bot. Jahrb. 18 (1894) 150 (*id.*).—*I. paniculata* (L.) R.Br. *var. indivisa* HALLIER f. Bull. Herb. Boiss. 5 (1897) 378.

As *var. digitata*, but the leaves entire or shallowly lobed; nerves 2-4 on either side of the midrib.

Distr. Probably throughout the range of *var. digitata* but apparently very rare in *Malaysia*: West New Guinea.

33. *Ipomoea asterophora* OOSTSTR. Blumea 3 (1940) 561.

#### KEY TO THE VARIETIES

1. Leaves densely covered with stellate hairs on both surfaces; stems with similar hairs mainly at the nodes . . . . . *var. asterophora*
1. Leaves with stellate hairs below on the nerves only, or entirely glabrous; stems with similar hairs over the whole surface or only at the nodes. . . . . *var. subglabra*

*var. asterophora*.

Stems twining, terete, stellately hairy mainly at the nodes, glabrescent. *Leaves* broadly ovate to orbicular, 7-16 by 7<sup>1</sup>/<sub>2</sub>-12 cm, broadly cordate at the base, attenuate to shortly acuminate at the apex with a broadly triangular, obtuse to slightly emarginate, mucronulate acumen; margins entire, slightly undulate or more or less deeply lobed with 1-2 broad or narrow triangular obtuse lobes on either side, stellately hairy on both surfaces; lateral nerves strongly curved, 3-4 on either side of the midrib, 2-3 of which rising from the leaf-base; petiole with stellate hairs, glabrescent, 3-8 cm long. *Inflorescences* axillary; peduncles terete or slightly angular, ca 6-15 cm long, 2-6- or sometimes more-flowered, stellately hairy to glabrous. Pedicels slender, longer than the calyx, 1-2 cm. Bracts minute, caducous. *Sepals* slightly unequal, outer ones elliptic, 7-9 mm long, inner ones orbicular, 9-10 mm long, all concave with rounded apex, subcoriaceous, glabrous or the outer ones sparsely hairy with stellate hairs. *Corolla* pale purplish or purplish white, darker purple inside towards the base, campanulate to funnel-shaped, ca 7 cm long, glabrous. Stamens and style included; filaments hairy at the base. Ovary glabrous.

Distr. *Malaysia*: Kangean Islands, Moluccas (Ceram), W.-E. New Guinea.

Ecol. River-banks, up to 100 m.

*var. subglabra* OOSTSTR. Blumea 3 (1940) 563.

Differs from *var. asterophora* by the much less dense to almost lacking indument; the stems may be stellately hairy over the whole surface but specimens with nearly glabrous stems are also found; such almost glabrous stems still bear a few stellate hairs at the nodes. Leaves with stellate hairs below on the nerves only, or entirely glabrous; petioles stellately hairy to glabrous.

Distr. *Malaysia*: West New Guinea; a fragmentary specimen (TEYSMANN 12114) collected in SW. Celebes (near Pangkadjene) may belong to this variety.

Ecol. As in *var. asterophora*.

34. *Ipomoea horsfalliae* HOOK. Bot. Mag. (1834) t. 3315; OOSTSTR. Blumea 3 (1940) 564.

A large, glabrous twiner. Stems terete, the adult parts woody, lenticellate. *Leaves* orbicular in outline, 5-20 by 5-20 cm, deeply palmately lobed to beyond the middle or to the base into 3-5 segments; middle segment mostly much larger than the lateral ones, ovate, elliptic or elliptic-oblong, mostly attenuate towards both ends, acuminate at the apex with acute or obtusish, mucronulate point; lateral segments ovate-lanceolate to linear-lanceolate; margins of segments slightly crisped, entire or coarsely dentate to crenate; petiole shorter than the blade, 2<sup>1</sup>/<sub>2</sub>-13 cm. *Inflorescences* axillary, 8-30 cm long, few- to several-flowered; peduncle 1<sup>1</sup>/<sub>2</sub>-14 cm, widely cymosely branched. Pedicels as long as or longer than the sepals, 8-15 mm. *Sepals* subequal or the outer ones slightly shorter, elliptic or ovate-elliptic, obtuse, concave, 7-10 mm long, green at the base, for the rest red-purple or purplish black. *Corolla* red or red-purple, salver-shaped, the tube slightly angular, somewhat narrowed to the base, ca 4 cm long, ca 1 cm diam.; limb ca 4-4<sup>1</sup>/<sub>2</sub> cm diam., 5-lobed with rounded lobes. Stamens and style exerted; filaments pale purple, densely villous at the base; style white, stigma dark purple, ovary glabrous.

Distr. Native of the West Indian Islands, cultivated throughout the tropics, also in *Malaysia*.

Use. Cultivated in gardens for ornamental purposes.

Vern. *Red Stephanotis, E, rode Clematis, rode Stephanotis, D.*

Note. Caterpillars of *Euchromia horsfieldi* MOORE feed on the leaves of this species.

35. *Ipomoea riparia* G. DON, Gen. Syst. 4 (1838) 265; EXELL, Cat. Vasc. Pl. S. Tomé (1944) 251.—*I. lilacina* BL. Bijdr. (1825) 716, non SCHRANK 1822.—*Pharbitis fragrans* BOJ. ex CHOISY in DC. Prod. 9 (1845) 341.—*I. fragrans* BOJ. ex HALLIER f. Bot. Jahrb. 18 (1893) 153; OOSTSTR. Blumea 3 (1940) 564.

A perennial hairy twiner. Stems terete, densely short-pilose with soft whitish hairs. *Leaves* broadly ovate to orbicular, 5-15 by 4-12 cm, broadly

cordate at the base, acuminate at the apex with an acute or obtuse mucronulate point, densely pilose beneath, much more sparsely so and glabrescent above; nerves 7-9 on either side of the midrib; petiole slender, 3-12 cm, pilose like the stem. *Inflorescences* axillary; peduncle terete, 2-14 cm long, pilose like the stem, often glabrous or nearly so in the basal portion, cymosely one- to few-flowered with very short branches; flowers consequently subumbellate. Pedicels pilose, mostly longer than the calyx,  $3/4-1\frac{1}{2}$  cm, in fruit up to 2 cm. *Sepals* equal in length,  $3/4-1$  cm, the 2 outer ones elliptic-oblong, acute, shortly pilose, the inner ones broader, ovate-elliptic, less acute. *Corolla* pink or purple with a darker centre, funnel-shaped, 4-5 cm long, with sericeous hairs on the midpetaline bands outside. Stamens and style included. Filaments hairy at the flattened base. Ovary glabrous. *Capsule* globose, 12 mm diam., glabrous, 2-celled, 4-valved. Seeds 4, ca 6 mm long, white-villous.

Distr. Guianas, tropical Africa, Madagascar and adjacent islands, in *Malaysia*: Sumatra, Java, Borneo, Lesser Sunda Islands (Bali), Philippines (Luzon, Mindanao).

Ecol. In marshes, along rivers, and in marshy forests, occasionally in waste places, up to 1000 m.

36. *Ipomoea illustris* (CLARKE) PRAIN, Beng. Pl. 2 (1903) 735; OOSTSTR. Blumea 3 (1940) 566.—*I. campanulata* auctt. div., non L. 1753.—*I. campanulata* L. var. *illustris* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 211.

A woody twiner, rarely prostrate and rooting. Stems longitudinally wrinkled to angular<sup>1</sup>, glabrous or pubescent. *Leaves* ovate to orbicular, sometimes ovate-oblong, 6-16 by  $3\frac{1}{2}-14$  cm, shallowly cordate to truncate at the base, acuminate at the apex with a short or long and narrow, acute or obtusish, mucronulate acumen; margin entire or undulate; surfaces glabrous or lower surface pubescent; nerves 10-15 on either side of the midrib; petiole slender, 3-10 cm, glabrous or pubescent. *Inflorescences* axillary; peduncle stout, 1-8 cm long, glabrous or rarely pubescent, cymosely one- to several-flowered. Pedicels  $1-1\frac{1}{2}(-2\frac{1}{2})$  cm, in fruit to 3 cm, angular, thickened towards the calyx, glabrous or rarely pubescent. *Sepals* slightly unequal, glabrous or rarely pubescent, coriaceous, with pale thinner margins, orbicular with rounded apex; outer ones 7-10(-15), inner ones 10-12(-18) mm long, in fruit up to 14-15 and 18 mm or still longer. *Corolla* reddish purple with a darker centre, paler without, sometimes pale purple or rarely white, tubular to funnel-shaped, up to 10 cm long, contracted at ca  $1\frac{1}{2}$  cm above the base. Stamens and style included. Filaments hairy at the base. Ovary glabrous. *Capsule* ovoid, ca  $1\frac{1}{2}$  cm long, brown, 2-celled, 4-valved. Seeds 4,

(1) Stems, peduncles and pedicels may be warty by galls (see DOCTERS VAN LEEUWEN, Zoocetid. Neth. E. Ind. 1926, 474, no 1262, under *Calonyction spec. div.*).

ca 8-9 mm long, black, with long silky hairs along the margins.

Distr. India, Ceylon, Indo-China, Siam, Andamans, in *Malaysia*: Sumatra, Malay Peninsula, Java, Borneo, Celebes, Lesser Sunda Islands (Bali), Moluccas (Ceram), New Guinea (Papua), Philippines (Luzon).

Ecol. Sea-shores, and in thickets and along edges of forests near the sea, up to 25 m.

Vern. *Olor bauwo uding*, Simalur, *blaran*, Java (Pekalongan), *budokkin*, Minah.

Note. This species is generally known both in systematic literature and in herbaria under the name of *I. campanulata* LINNÉ. However, the type of *I. campanulata* L. is conspecific with the Malvacea *Thespesia populnea* (L.) SOLAND., as appears from LINNÆUS's description and herbarium (see HALLIER f. Med. Rijksherb. Leiden no 1, 1910, 26; VAN OOSTSTROOM Blumea 3, 1940, 568; KERR, Kew Bull. 1941, 18). The synonym *Adamboe RHEEDE*, mentioned by LINNÆUS under *I. campanulata* most probably belongs to *Stictocardia tiliifolia* (DESR.) HALLIER f..

37. *Ipomoea crassicaulis* (BENTH.) B. L. ROBINSON, Proc. Amer. Acad. 51 (1916) 530; OOSTSTR. Blumea 3 (1940) 569.—*Batatas crassicaulis* BENTH. Voy. Sulph. (1844) 134.—*I. fistulosa* MART. ex CHOISY in DC. Prod. 9 (1845) 349.

A shrub, 1-2 $\frac{1}{2}$  m high, erect or ascending, or sometimes twining, and to 5 m high. Branches thick, terete to angular, fistulose or solid, containing a white milky juice, the adult parts lenticellate, pale greyish, the younger parts densely puberulent, glabrescent. *Leaves* ovate or ovate-oblong, 6-25 by 4-17 cm, cordate to truncate at the base, acuminate at the apex, with an acute or obtuse, mucronulate acumen; young leaves densely puberulent on both surfaces, adult ones puberulent below, mainly on the nerves, glabrous or nearly so above; midrib below with 2 small glands at the base of the leaf-blade; lateral nerves 7-9 on either side of the midrib, secondary nerves many, parallel; petiole slender,  $2\frac{1}{2}-15$  cm. *Inflorescences* axillary and terminal; peduncle stout, terete, 5-15 cm long, puberulent or glabrous, cymosely several- to many-flowered. Pedicels longer than the calyx, puberulent. Bracts minute, ovate, obtuse, caducous. *Sepals* subequal or the outer ones slightly shorter, 5-6 mm long, orbicular, broadly rounded, puberulent; calyx with 5 nectaries between the sepal-bases. *Corolla* pink or pale lilac, inside often dark purple towards the base, tubular to funnel-shaped,  $7\frac{1}{2}-9$  cm long, limb 8-12 cm diam.; tube constricted close to the base; tube and midpetaline bands minutely puberulent outside, connecting fields glabrous or nearly so. Stamens and style included. Filaments very unequal, hairy at the dilated base. Ovary and basal part of the style puberulent. *Capsule* ovoid, mucronate,  $1\frac{1}{2}-2$  cm long, pale brown, finely puberulent in the basal portion, incompletely 4-celled, or 2-celled, 4-valved. Seeds 4 or less, black, their whole surface sericeo-villose.

Distr. Native of America, from Mexico, Florida and the West Indies S. as far as Brazil and Paraguay, in *Malaysia* cultivated and run wild occasionally.

Ecol. Escaped from cultivation and naturalized at low altitudes along rivers, canals, sometimes on the beach; locally abundant.

Use. Cultivated as an ornamental plant; the leaves are eaten as a vegetable by the Madurese.

Vern. *Klémüt, kangkungan, ula, daun krag-kungan, J.*

Note. In exposed situations the plant is shrubby, but twines up if under shade (FURTADO in Herb. Singapore). It is sometimes found in cultivation under the erroneous name *I. carnea* JACQ.

38. *Ipomoea sumatrana* (MIQ.) OOSTSTR. *Blumea* 3 (1940) 571.—*Lettsomia sumatrana* MIQ. Fl. Ind. Bat. Suppl. (1861) 560.—*I. staphylina* R. & SCH. var. *malayana* PRAIN, J. As. Soc. Beng. 63, 2 (1894) 106.—*Argyrea sumatrana* BOERL. Handl. Fl. Ned. Ind. 2 (1899) 513.

A large, woody, glabrous twiner. Stems terete or angular, fistulose, greyish brown. *Leaves* ovate or rarely broadly ovate, 6–12 by 5–10 cm, slightly cordate or truncate at the base, obtuse or acute to shortly acuminate at the apex; lateral nerves prominent beneath, 11–14 on either side of the midrib; petiole slender, 4–10 cm. *Inflorescences* axillary, 6–18(–30) cm long, paniculate, one or two times racemously branched, the ultimate partial inflorescences cymose; large inflorescences with leaflike bracts at the base of the lowest branches; peduncle under the lowest branch ca 3–6 cm long. Pedicels longer than the calyx, 6–10 mm. Outer *sepals* broadly ovate, obtuse, ca 3½–4½ mm long, coriaceous, slightly shorter than the inner ones; inner sepals orbicular, broadly rounded, ca 4½–5 mm long, coriaceous with scarios margins. *Corolla* white or slightly tinged with pink, tubular to funnel-shaped, 2½–3½ cm long, glabrous; tube ca 5–6 mm wide; midpetaline bands with many minute, dark, glandular lines. Stamens and style included. Filaments sparsely pilose at the dilated base. Ovary glabrous. *Capsule* ovoid, subacute, ca 7½ mm long. Seeds 4, with long, silky hairs.

Distr. Siam and *Malaysia*: Sumatra (only known from the type loc., Sungai Pagu, W. Coast), Malay Peninsula (Perlis, Kedah, Penang, Perak, Pahang), Java (Salatiga); perhaps also in the Lesser Sunda Islands (Sumbawa, Timor?).

Ecol. Probably in thickets, up to 1000 m.

Vern. *Akar këtjambang*, Sumatra.

Note. The majority of the specimens have been found in the Malay Peninsula. In Sumatra and in Java the species appears to be very rare. The specimen Mrs RENSCH 619, from Sumbawa, in Herb. Bog. is somewhat aberrant; it has the stems minutely warty, the peduncles thinner and few-flowered, and the corolla white with a dark red centre. ELBERT 3740, also from Sumbawa, in Herb. Leyden, a sterile specimen, is perhaps conspecific and so is a specimen from Timor, collected by WILES & SMITH s.n. in Herb. Brit. Mus..

39. *Ipomoea aculeata* BL. Bijdr. (1825) 715; OOSTSTR. *Blumea* 3 (1940) 572.—*Calonyction mollissimum* ZOLL. var. *glabrior* MIQ. Fl. Ind. Bat. 2 (1857) 597.—*I. mollissima* HALLIER f. var. *glabrior* BOERL. Handl. Fl. Ned. Ind. 2 (1899) 512.

#### KEY TO THE VARIETIES

1. Plant glabrous or nearly so. . . var. *aculeata*
1. Plant softly pubescent, or short-tomentose. . . var. *mollissima*

var. *aculeata*.

A glabrous or nearly glabrous twiner, to 10–15 m, occasionally prostrate. Stems woody, grey or pale straw-coloured, often thickened at the nodes, terete to angular, smooth or mucronate with small curved hooks. *Leaves* ovate to orbicular, entire or rarely 3-lobed, 5–14 by 3–10 cm, cordate to truncate at the base, if cordate with a narrow to very broad sinus and rounded basal lobes, acuminate at the apex, with a short or long and narrow, acute or obtusish, mucronulate acumen; lateral nerves 5–6 on either side of the midrib; petiole slender, 2½–8(–12) cm, smooth or sometimes with some acute warts. *Inflorescences* axillary, one- to few-flowered; peduncle short, 2–10(–15) mm. Pedicels terete or angular and thickened towards the calyx, 7–15 mm, in fruit clavate and to 20 mm, recurved in bud, afterwards erect, finally recurved again. *Sepals* coriaceous, broadly elliptic or orbicular, rarely narrower, broadly rounded to emarginate at the apex and minutely mucronate, 12–18 mm long, in fruit to 20 mm, the inner ones mostly somewhat shorter than the outer and with a narrow scarios margin. *Corolla* white, greenish outside, opening at night, fragrant, salver-shaped, 14–17 cm long, tube long and narrow. Stamens and style exserted. Filaments inserted at the mouth of the tube, hairy at their base. Ovary glabrous. *Capsule* enclosed by the sepals, ovoid, mucronate, ca 15 mm long, 2-celled, 4-valved, with more or less lacerate valves. Seeds 4, densely grey-woolly, 6–8 mm long.

Distr. *Malaysia*: N. Sumatra (Karolands), Java, Lesser Sunda Islands (Wetar).

Ecol. In thickets and thin forests, from sea-level to 700 m.

Use. The pulverized top of the plant is used in the Karolands, Sumatra, as a medicine against boils.

Vern. *Waren tan tan*, Karo-Batak, *klorak*, S.

Note. The type of *Calonyction mollissimum* ZOLL. var. *glabrior* MIQ. is a transition between this var. and the next one, as to the density of the indumentum.

var. *mollissima* (ZOLL.) HALLIER f. ex OOSTSTR. *Blumea* 3 (1940) 574.—*Calonyction mollissimum* ZOLL. Syst. Verz. 2 (1854) 128, 131.—?*I. yomae* KURZ, For. Fl. Brit. Burma 2 (1877) 218.—*I. mollissimum* HALLIER f. ex BOERL. Handl. Fl. Ned. Ind. 2 (1899) 512.

Differs from var. *aculeata* in being pubescent or short-tomentose.

Distr. Possibly in continental Asia (Silhet, Pegu, and Tenasserim), in *Malaysia*: M. & E. Java, Madura, Lesser Sunda Islands (Lombok, Sumbawa, Timor, Alor), and Philippines (Luzon).

Ecol. In thickets and thin forests, from sea-level to 700 m.

Use. The leaves are used as a purgative and as a substitute for soap (HEYNE).

Vern. *Uluk-uluk*, *S*, *rabet kalorak*, *klorak*, Md.

40. *Ipomoea tuba* (SCHLECHTEND.) G. DON, Gen. Syst. 4 (1838) 271; OOSTSTR. *Blumea* 3 (1940) 575.—*Convolvulus grandiflorus* JACQ. Hort. Vindob. 3 (1776) 39, t. 69, non LINNÉ f. 1781.—*Convolvulus tuba* SCHLECHTEND. *Linnaea* 6 (1831) 735.—*Calonyction grandiflorum* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 442, note.—*I. glaberrima* BOJ. ex BOUTON in HOOK. Journ. Bot. 1 (1834) 357.—*Calonyction muticum* DECAISNE, Nouv. Ann. Mus. Par. 3 (1834) 390.—*Convolvulus catharticus* BLANCO, Fl. Filip. ed. 1 (1837) 94, acc. to MERRILL.—*I. grandiflora* HALLIER f. Bot. Jahrb. 18 (1893) 153, non LAMK, 1791, nec ROXB. 1832.—*Calonyction album* HOUSE, Bull. Torr. Bot. Club 31 (1904) 591, as to the description, not *I. alba* L. 1753, see HALLIER f. Med. Rijksherb. Leiden no 1 (1911) 24, sub 76.

A glabrous twiner. Stems woody, straw-coloured in dry specimens, terete or angular, often longitudinally wrinkled, smooth or rarely muricated. *Leaves* orbicular or ovate, 5–16 by 5–14 cm, deeply cordate at the base, with rounded or rarely angular lobes, acuminate at the apex, with obtuse, mucronulate tip; lateral nerves 7–8 on either side of the midrib, secondary nerves parallel, tertiary nervation distinctly reticulate (in dry specimens the secondary and tertiary nervation often pellucid); petiole  $3\frac{1}{2}$ –16 cm. *Inflorescences* axillary, one- to few-flowered; peduncle terete, variable in length,  $\frac{3}{4}$ –7(–12) cm. Pedicels angular,  $1\frac{1}{2}$ –3 cm long, thickened to clavate in fruit. *Sepals* orbicular, with broadly rounded to emarginate, mucronulate apex, equal in length or the inner ones slightly longer, outer ones 15–20 mm, inner ones 18–25 mm long, all coriaceous, the inner ones somewhat thinner; sepals enlarged in fruit, at first enclosing the capsule as a cup, afterwards reflexed against the pedicel, 20–30 mm long. *Corolla* white, with greenish bands, opening at night, salver-shaped, 9–12 cm long, tube cylindrical, 7–8 cm, limb ca 8–10 cm in diam. Stamens and style included. Filaments inserted near the base of the corolla-tube, hairy at their base. Ovary glabrous. *Capsule* globular, 2–2½ cm long, glabrous, pale-brown, 2-celled, 4-valved. Seeds 4, black, densely short-tomentose and with longer (to ca 3 mm) sericeous hairs along the edges, 1 cm long.

Distr. Tropical America, East tropical Africa, Mascarene Islands, and tropical continental Asia to Polynesia, throughout *Malaysia*.

Ecol. On the beach and in thickets near the sea.

Use. Used on the Sula Isl. as a remedy in maladies resulting from pregnancy.

Vern. *Alor bauwo alas*, Simalur, *tatampajan bēsar*, M, *mingumbai botti*, *bat bot*, Sula, *ganga-*

*mielke*, W. New Guinea, *lambatung*, Sulu, *bulacan*, Tag..

Note. This species has often been identified with *I. grandiflora* (L. f.) LAMK, Tabl. Enc. 1 (1791) 467 (= *Convolvulus grandiflorus* L. f. Suppl. 1781, 136). From the description of the latter it is evident that the specimen of KÖNIG, described by LINNAEUS f. belongs to another species. The pubescent stems and petioles as described by LINNAEUS f. are never found in *I. tuba*. HALLIER f. (Jahrb. Hamb. Wiss. Anst. 15, 1898, 45; & Med. Rijksherb. Leiden no 1, 1911, 25) considers *Convolvulus grandiflorus* L. f. conspecific with *Stictocardia tilifolia* (DESR.) HALLIER f.

—A specimen from Ternate, BEGUIN 1655, in Herb. Bog. has the seeds long hairy at the margins and otherwise glabrous.

41. *Ipomoea trichosperma* BL. Bijdr. (1825) 710; OOSTSTR. *Blumea* 3 (1940) 578.—*Calonyction trichospermum* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 442.—*I. capillata* SPANOGHE, *Linnaea* 15 (1841) 340.—*Calonyction diversifolium* HASSK. Flora, Beibl. 2 (1842) 29.—*Calonyction trichospermum* CHOISY var. *diversifolium* CHOISY in DC. Prod. 9 (1845) 346.—*Calonyction capillatum* MIQ. Fl. Ind. Bat. 2 (1857) 598.—*I. longiflora* R.Br. var. *diversifolia* HALLIER f. Versl. 's Lands Pl.-tuin 1895 (1896) 130.—*I. trichosperma* BL. var. *diversifolia* BOERL. Handl. Fl. Ned. Ind. 2 (1899) 512.

A glabrous twiner. Adult stems woody, pale brown, terete, smooth or minutely verrucose; young branches green. *Leaves* orbicular or transverse-elliptic in outline, 6–12 by 6–12 cm, (3–)5(–7)-lobed mostly far beyond the middle, the middle lobe elliptic or lanceolate, 5–8 by 2–5 cm, attenuate towards both ends, acuminate at the apex with a narrow, acute or obtusish, mucronulate acumen; the lateral lobes slightly smaller, obliquely ovate to lanceolate, long-acuminate, the basal lobes much smaller; leaf-base cordate with broadly rounded sinus; rarely the leaf-margin is entire or coarsely dentate; petiole slender,  $4\frac{1}{2}$ –12 cm. *Inflorescences* axillary, one-flowered, or dichasial or partly monochasial and few-flowered; peduncles 2–14 cm, terete, smooth. Pedicels more or less angular, thickened towards the calyx, 13–30 mm long. *Sepals* pale green, very unequal, the outer ones much shorter than the inner; sepals 1 & 2 coriaceous, broadly elliptic to orbicular, broadly rounded at the apex, mucronulate, 8–12 and 10–18 mm long; inner sepals coriaceous with scarious margin; sepal 3 broadly elliptic to orbicular, broadly rounded, mucronulate, ca 16–25 mm; sepals 4 & 5 broadly elliptic, rounded and mucronulate, ca 20–30 mm. *Corolla* white with reddish midpetaline bands, or entirely white, salver-shaped, 11–14 cm long, tube long and narrow, 8–9 cm, limb ca 10 cm diam. Stamens and style exerted. Filaments inserted near the base of the corolla, hairy at their base. Ovary glabrous. *Capsule* broadly ovoid to globose,  $2\frac{1}{2}$ –3 cm long. Seeds 7–9 mm long, densely brown-tomentose

and with long (10–12 mm) brownish sericeous patent hairs along the edges.

Distr. *Malaysia*: Java, Celebes (Salajar and Buton Isl.), Lesser Sunda Islands (Sumbawa, Timor, Alor).

Ecol. In thickets, hedges and thin forests, near the beach and in the interior; from sea-level to 400 m.

Vern. *Aroi uwat guling*, S, *tropongan*, J, *nachtschone*, D.

#### Cultivated only

Mentioned for *Malaysia* only on the basis of a single cultivated specimen:

*Ipomoea* (sect. *Calonyction*) *campaniflora* HALLIER f. Med. Rijksherb. Leiden no 46 (1922) 20; OOSTSTR. *Blumea* 3 (1940) 580.—*Calonyction campanulatum* HALLIER f. Bull. Herb. Boiss. 5 (1897) 1050, t. 18, f. 2; MERR. En. Philip. 3 (1923) 369.

Distr. Native of Mexico and Central America. MERRILL mentions a cultivated specimen from the Philippines (Luzon).

Vern. *Suma-ñg-nagisit*, Iloko.

*Ipomoea* (sect. *Leiocalyx*) *dasysperma* JACQ. Eclog. 1 (1811–16) 132, t. 89; OOSTSTR. *Blumea* 3 (1940) 580.

Distr. Tropical Africa and India. Formerly

cultivated in the Botanic Gardens, Bogor, Java. Vern. *Aroy kawoijang*, S.

#### Insufficiently known

*Ipomoea reflexa* SPANOGHE, *Linnaea* 15 (1841) 341; OOSTSTR. *Blumea* 3 (1940) 581.

Described from the island of Rotti.

#### Doubtful

*Ipomoea repanda* JACQ. En. Pl. Carib. (1760) 13; OOSTSTR. *Blumea* 3 (1940) 581.

FAWCETT in FORBES, *Wander.* (1885) 511, mentions a specimen from Timor, collected near Kupang by WILES & SMITH. It is unlikely that the West Indian *I. repanda* occurs in Timor. There is, however, a possibility that FAWCETT referred to a specimen WILES & SMITH s.n. in Herb. Brit. Mus., that most probably belongs to 38. *Ipomoea sumatrana* (MIQ.) OOSTSTR.

#### Excluded

*Ipomoea aspera* VATKE, *Linnaea* 43 (1880–82) 508; OOSTSTR. *Blumea* 3 (1940) 582.

HALLIER f. Bot. Jahrb. 18 (1893) 154, mentions this species for Sumatra. The specimen appears to belong to the *Menispermaceae* (cf. HALLIER f. Bot. Jahrb. 28, 1899, 52).

### 17. MINA

CERV. in DE LA LLAVE & LEX. *Nov. Veg. Desc. fasc.* 1 (1824) 11; OOSTSTR. *Blumea* 5 (1943) 339.—*Ipomoea* subg. *Quamoclit* sect. *Mina* MEISSN. in MART. Fl. Bras. 7 (1869) 220.—*Quamoclit* sect. *Mina* HOUSE, Bull. Torr. Bot. Club 36 (1909) 596.

Herbaceous twiner. *Leaves* petioled, entire or mostly palmately lobed. *Flowers* in axillary, peduncled, few- to several-flowered cincinni or double cincinni, often secund; pedicels short. Bracts minute. *Sepals* 5, subequal, herbaceous, distinctly awned, not enlarged in fruit. *Corolla* suddenly widened above a short narrow tubular basal part; limb long-urceolate to tubular, subangular, slightly curved, with a slightly constricted 5-toothed mouth. *Stamens* and style long-exserted. Filaments inserted at the top of the narrow basal tubular part of the corolla; pollen globular, spinulose. Disk annular. *Ovary* glabrous, 4-celled, each cell with 1 ovule; style 1, simple, filiform; stigmas 2, capitate. *Capsule* 4-celled, 4-valved. Seeds 4 or less, glabrous.

Distr. Monotypic, Mexico to Central and S. America, introduced in *Malaysia*.

1. *Mina lobata* CERV. in DE LA LLAVE & LEX. *Nov. Veg. Desc. fasc.* 1 (1824) 12; OOSTSTR. *Blumea* 5 (1943) 339.—*Quamoclit mina* G. DON, Gen. Syst. 4 (1838) 259.—*Ipomoea versicolor* MEISSN. in MART. Fl. Bras. 7 (1869) 220.—*Quamoclit lobata* HOUSE, Bull. Torr. Bot. Club 36 (1909) 602.

Perennial, glabrous twiner. Stems 2–5 m, slender, terete. *Leaves* broadly ovate in outline, 6–15 cm long and nearly as broad, cordate at the base, entire or mostly 3-lobed; lobes acuminate, the middle

lobe constricted below, the lateral ones with some coarse teeth or often again lobed; petiole 3–10 cm. *Inflorescences* up to 35 cm long (peduncle included), *flowers* in single or double cincinnal cymes, secund; pedicels 4–8 mm; bracts minute. *Sepals* oblong, 5–6 mm long, the 2–3 mm long awn included. *Corolla* at first red, afterwards pale yellow or whitish, the narrow basal part 5–8 mm, the slightly curved widened limb 17–20 mm long, the teeth mucronulate. *Stamens* and style finally

twice as long as the corolla; filaments pubescent towards the base. Disk shallowly 5-lobed. Ovary glabrous. *Capsule* broadly ovoid, 6-8 mm long.

Distr. Mexico to Central and S. America, cultivated in other tropical and temperate regions.

Ecol. Cultivated for ornamental purposes (Malay Peninsula, Java), above 200 m.

18. LEPISTEMON

BL. Bijdr. (1825) 722; OOSTSTR. *Blumea* 5 (1943) 340.—*Lepidostemon* HASSK. Cat. Hort. Bog. (1844) 140.—*Nemodon* GRIFF. Not. 4 (1854) 286.—*Ipomoea series Urceolatae* BTH. Fl. Austr. 4 (1869) 427.—Fig. 56.

Herbaceous or woody twiners, usually hairy. *Leaves* petioled, ovate to orbicular, often cordate at the base, entire to 3- or 5-lobed, herbaceous. *Flowers* in dense, axillary, sessile or shortly peduncled cymes. Bracts small, caducous. *Sepals* 5, subequal, herbaceous or subcoriaceous, acute or obtuse, hairy or glabrous. *Corolla* regular, rather small, yellowish-white, urceolate, with a shortly 5-lobed limb; midpetaline bands hairy outside. *Stamens* and style included. Filaments inserted near the base of the corolla, dilated in their basal portion into a large concave scale, arched over the ovary; pollen globular, spinulose. Disk large, annular or cupular. *Ovary* glabrous or hairy, 2-celled, each cell with 2 ovules. Style 1, very short; stigmas 2, capitate. *Capsule* 4-valved, with 4 or less glabrous or puberulous seeds.

Distr. *Ca* 10 spp. in tropical Africa, Asia, Australia, and Malaysia.

KEY TO THE SPECIES

- 1. Sepals ovate to lanceolate, acuminate or acute, 5-7½ mm long, herbaceous. 1. *L. binectariferum*
- 1. Sepals ovate to orbicular, obtuse or emarginate, 2-2½ mm long, margin membranaceous. 2. *L. urceolatum*

1. *Lepistemon binectariferum* (WALL.) O.K. Rev. Gen. (1891) 446; OOSTSTR. *Blumea* 5 (1943) 341.—*Convolvulus binectariferus* WALL. in ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 47.—*Lepistemon flavescens* BL. Bijdr. (1825) 722.—*Lepistemon wallichii* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 443.—*Nemodon* sp. GRIFF. Not. 4 (1854) 286.—Fig. 56.

KEY TO THE VARIETIES

- 1. Sepals with long patent fulvous or brownish hairs.
- 2. Ovary glabrous . . . . . var. *binectariferum*
- 2. Ovary hairy . . . . . var. *borneense*
- 1. Sepals with much shorter, less patent greyish hairs.
- 3. Ovary glabrous . . . . . var. *eymae*
- 3. Ovary hairy . . . . . var. *trichocarpum*

var. *binectariferum*.

Herbaceous twiner, 1-3 m high; stems densely patently or retrorsely brown pilose. *Leaves* broadly ovate, 5-18 by 5-15 cm, deeply cordate at the base, acuminate and mucronulate at the apex; margin entire or irregularly dentate with one or more large teeth or shallowly to deeply 3-5-lobed, with acute or acuminate lobes; appressed-pilose on both sides, young leaves (occasionally also the

adult ones) nearly tomentose with a golden-brown tomentum; petiole 2½-16 cm, hairy like the stem. *Flowers* in few- to many-flowered, axillary, cymose clusters, much shorter than the petiole. Peduncle short or absent. Pedicels up to 7 mm, glabrous or sparsely pilose. Bracts small, caducous. *Sepals* subequal or the inner ones a little shorter, ovate to lanceolate, acuminate or acute, 5-7½ mm long, herbaceous, with long patent hairs outside; not or slightly enlarged in fruit. *Corolla* urceolate, 12-15 mm long, white or yellowish white; tube inflated, contracted above, shortly hairy above and on the midpetaline bands of the limb; limb patent with 5 short lobes. Scales at the base of the filaments concave, papillose outside. Disk 5-lobed. Ovary glabrous. *Capsule* globose to ovoid, 6-8 mm high, mucronate, 4- or less-seeded. Seeds 3-4 mm long, glabrous, black.

Distr. SE. Asia (Assam, Burma, Indo-China, Hainan); in *Malaysia*: Malay Peninsula, Sumatra, Java.

Ecol. Thickets, edges of secondary forests, waysides, occasionally in hedges, or as a weed in plantations, 25-1100 m.

Use. Acc. to BOERLAGE the root is edible (Palabuan Ratu).

Vern. *Akar bulu, akar santen*, Sum. W. Coast, *areuj bulu, wawalukan, S. samparkidung, honglu, gamet kebo, tjuonan*, J.

*var. borneense* OOSTSTR. *Blumea* 5 (1943) 343.

As *var. binectariferum*, but the ovary hairy.

Distr. *Malaysia*: SE. Borneo, Moluccas (Ambon).

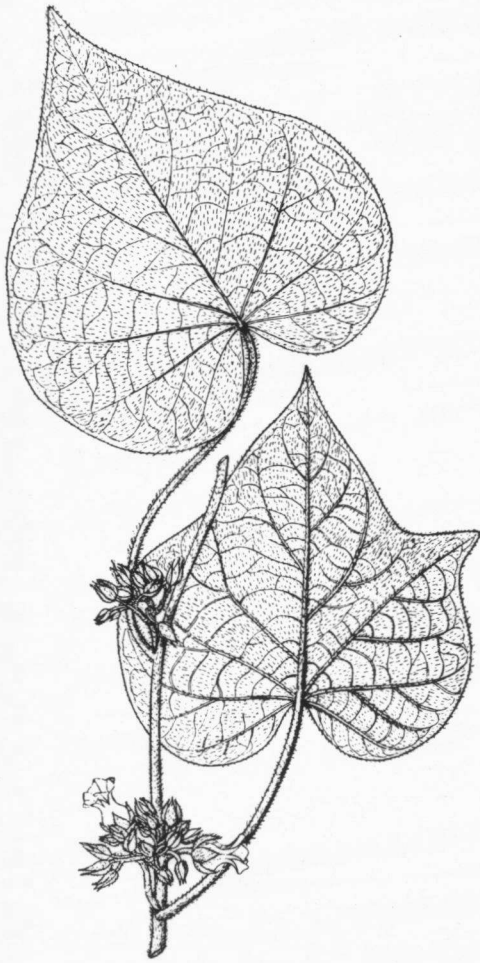


Fig. 56. *Lepistemon binectariferum* (WALL.) O. K.  
Flowering branch,  $\times 1/2$ .

*var. eymae* OOSTSTR. *nov. var.*<sup>1</sup>

Sepals with greyish, much shorter and less patent hairs than in *var. binectariferum*. Ovary glabrous.

Distr. *Malaysia*: E. Central Celebes.

(1) *A var. binectarifero differt sepalorum pilis brevioribus minus patentibus. Ovarium glabrum*: E. Central Celebes, between Tompantette and Lemo. EYMA 3990, *fl.* Oct. 1938, type in L, isotypes in A, Bo, K, U, SING.

*var. trichocarpum* (GAGNEP.) OOSTSTR. *Blumea* 5 (1943) 343.—? *Polemonium obscurum* BLCO, *Fl. Filip.* (1837) 103.—*Lepistemon flavescens* (non BL.) F.-VILL. *Nov. App.* (1880) 142.—*L. binectariferum* (non O.K.) MERR. *Fl. Manila* (1912) 383; *Spec. Blanc.* (1918) 321.—*L. trichocarpum* GAGNEP. *Not. Syst.* 3 (1915) 152.—? *L. obscurum* MERR. *En. Philip.* 3 (1923) 364.

Sepals with greyish, much shorter and less patent hairs than in *var. binectariferum*. Ovary hairy. Seeds puberulous (acc. to GAGNEPAIN).

Distr. *E. Malaysia*: Celebes, Moluccas (Kei Isl.), Philippines (Luzon, Mindanao), and ?Hainan.

Ecol. Thickets, waysides at low and medium altitudes.

Vern. Philippines: *baai*, Bon., *bangbañgau-ñg-buduan*, *ilk.*, *pisu*, *ig.*

2. *Lepistemon urceolatum* (R. BR.) F. v. M. *Syst. Census Austr. Pl.* (1882) 94; OOSTSTR. *Blumea* 5 (1943) 344.—*Ipomoea urceolata* R. BR. *Prod.* 1 (1810) 485.—*Lepistemon fitzalani* F. v. M. *Fragm. Phyt. Austr.* 10 (1877) 111.—*L. lucae* F. v. M. *Vict. Nat.* 11 (1885) 74.—*L. asterostigma* K. SCHUM. *Bot. Jahrb.* 9 (1888) 216.—*L. sp.* K. SCHUM. *l.c.*

Stems twining, 2–5 m high, young parts densely hairy with retrorse hairs, later on glabrescent and woody. *Leaves* broadly ovate to orbicular, rarely narrower, 5–16 by 3–14 cm, cordate or more or less truncate at the base; basal lobes entire and broadly rounded, or with a large tooth or nearly hastate; acuminate and mucronulate at the apex; lower surface sparsely to densely hairy with short appressed hairs, or sometimes tomentose, upper surface mostly less hairy, glabrescent; petiole 3–11 cm, hairy like the stem. *Flowers* in few- or mostly in many-flowered, more or less dense, axillary, cymose clusters, much shorter than the petiole. Peduncle short or almost absent. Pedicels 3–7 mm, in fruit up to 14 mm, more or less pilose. *Sepals* subequal, slightly concave, broadly ovate to orbicular, obtuse or shallowly emarginate, 2–2½ mm long, hairy or glabrous. *Corolla* urceolate, 10–12 mm long, creamy white, glabrous outside or with some hairs in the upper part; tube inflated, contracted above; limb shortly 5-lobed. Scales at base of filaments smaller than in the preceding species, concave, shortly pilose outside. Disk shallowly 5-lobed. Ovary glabrous. *Capsule* globose, 8–10 mm diam. Seeds 4 mm long, puberulous, greyish-black.

Distr. Tropical Australia, Solomon Isl., Bismarck Arch., in *Malaysia*: Celebes, Moluccas (Talaud Islands, Buru, Ceram), New Guinea.

Ecol. In thickets and secondary forests, in more or less moist localities, 5–1250 m.

Vern. *Libuh-libuh*, S. Celebes, *kepi*, *onugo*, *arra*, NE. New Guinea, *a lakkakis*, New Ireland.

19. STICTOCARDIA

HALLIER *f. Bot. Jahrb.* 18 (1894) 159; OOSTSTR. *Blumea* 5 (1943) 346.—*Argyreia sect. Pomifera* CLARKE in HOOK. *f. Fl. Br. Ind.* 4 (1883) 184.—Fig. 57.

Woody or herbaceous, mostly pubescent twiners. *Leaves* petioled, ovate to orbicular, mostly cordate at the base, entire, the lower surface with many minute glands (black dots in dried specimens). *Flowers* in axillary, peduncled, one- to many-flowered cymes. Bracts small, caducous. *Sepals* 5, equal in length or slightly unequal, ovate, elliptic or orbicular, obtuse to emarginate, subcoriaceous, often with thinner margins, much enlarged in fruit. *Corolla* regular, large, funnel-shaped, red or purple; midpetaline bands often somewhat pilose outside and with minute glands like the leaves. *Stamens* and style included. Filaments filiform, inserted near the corolla-base; pollen globular, spinulose. Disk annular. *Ovary* glabrous, 4-celled, each cell with 1 ovule; style 1, simple, filiform; stigma biglobular. *Fruit* enclosed by the much enlarged calyx, globular; dissepiments with two wings at the surface of the fruit; pericarp thin, disrupting irregularly from the dissepiments and their wings, so that 4 openings become free (giving a lantern-shaped fruit), through which the 4 pubescent seeds are visible.

Distr. *Ca* 6-7 species, circumtropical.

KEY TO THE SPECIES

- 1. Outer sepals distinctly cordate at the base, basal lobes up to 2 mm long . . . . . 4. *S. cordatosepala*
- 1. Outer sepals rounded at the base.
- 2. Sepals in anthesis 12 mm long or mostly longer. Corolla 8-10 cm long . . . . . 1. *S. tiliifolia*
- 2. Sepals in anthesis less than 12 mm long. Corolla smaller.
- 3. Stems, leaves and inflorescences very sparsely pubescent or glabrous. Leaves 8 cm long or more, long and narrowly acuminate at the apex, deeply cordate at the base . . . . . 3. *S. discolor*
- 3. Stems, leaves and inflorescences densely pubescent to tomentose. Leaves smaller, attenuate to slightly acuminate at the apex, more or less deeply cordate to truncate at the base. 2. *S. neglecta*

**1. *Stictocardia tiliifolia* (DESR.) HALLIER *f. Bot. Jahrb.* 18 (1894) 159 ('*tiliaefolia*'); OOSTSTR. *Blumea* 5 (1943) 346, f. 1, g-h.—*Ipomoea campanulata* LINNÉ, *Sp. Pl.* (1753) 160, only as to the syn. *Adamboe* RHEEDE (*cf.* VAN OOSTSTR. *Blumea* 3 (1940) 568).—*Convolvulus grandiflorus* LINNÉ *f. Suppl.* (1781) 136, non JACQ. 1776.—*Convolvulus tiliaefolius* DESR. in LAMK, *Enc.* 3 (1789) 544.—*Ipomoea grandiflora* LAMK, *Tabl. Enc.* 1 (1791) 467 (*cf.* VAN OOSTSTR. *Blumea* 3 (1940) 577).—*Ipomoea pulchra* BL. *Bijdr.* (1825) 716.—*Argyreia tiliaefolia* WIGHT, *l.c.* 4, 2 (1850) 12, t. 1358.—*Stictocardia campanulata* MERR. *Philip. J. Sc.* 9 (1914) *Bot.* 133.—*Argyreia campanulata* ALSTON in TRIM. *Fl. Ceyl. Suppl.* (1931) 201.—Fig. 57c-f.**

A large woody twiner, young stems terete, pubescent, finally glabrescent. *Leaves* broadly ovate to orbicular, 6-20 by 5-20 cm, cordate at the base, shortly acuminate with a mostly obtuse, mucronulate apex; upper and lower surface more or less densely pubescent or nearly glabrous; lower surface with minute black dots (glands); nerves 7-8 on either side of the midrib; petiole 3-14 cm. *Inflorescences* axillary, 1-3-flowered; peduncle mostly shorter than the petiole, 1½-7½ cm, pubescent. Pedicels as long as or longer than the calyx, 10-35 mm, pubescent. Bracts minute,

caducous. *Sepals* orbicular with a rounded or shallowly emarginate apex, subequal or the inner ones slightly shorter, 12-18 mm long, pubescent or glabrous, much enlarged in fruit, and up to 4 or the inner ones up to 5 cm long. *Corolla* funnel-shaped, 8-10 cm long, reddish purple with a darker centre, limb 8-10 cm diam., midpetaline bands pilose or glabrous and with minute black glands. Filaments hairy at the base. *Ovary* glabrous. *Capsule* enclosed by the enlarged, finally weathered sepals, globose, 2-3½ cm diam. *Seeds ca* 8-9 mm long, black or dark brown, pubescent.

Distr. Circumtropical, throughout *Malaysia*, not yet recorded from N. Guinea.

Ecol. On and behind the seashore, in thickets, hedges, and secondary forests, sometimes also in the interior, up to ca 900 m.

Vern. *Areuj tatapajan gèdè*, S, *kabor*, Central Celebes, *halalei*, Ceram; Philippines: *bulákan*, Tag., Sul., *burákan-maputi*, S. L. Bis., *kal-kalauag*, Ilik., *tibulbúl*, Bik..

**2. *Stictocardia neglecta* OOSTSTR. *Blumea* 5 (1943) 348, f. 1, i-j.**

Stems twining, terete, densely short-pilose or the young parts tomentose, finally glabrescent and lignescent. *Leaves* ovate to broadly ovate, 4-8 by



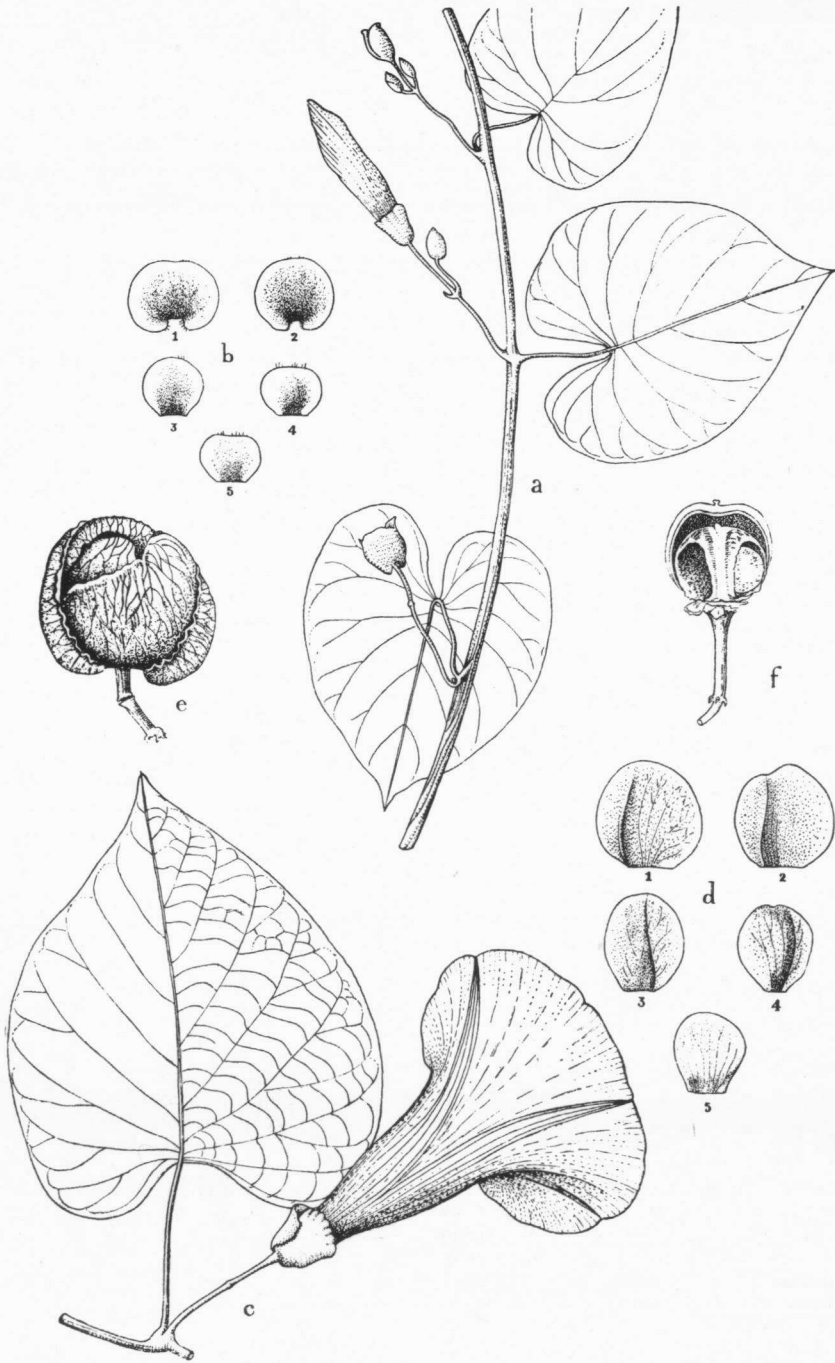


Fig. 57. *a-b. Stictocardia cordatosepala* OOSTSTR. *a.* Flowering branch,  $\times \frac{1}{2}$ , *b.* sepals 1-5,  $\times \frac{2}{3}$ .  
*c-f. Stictocardia tiliifolia* (DESR.) HALLIER *f.* *c.* flowering branch,  $\times \frac{1}{2}$ , *d.* sepals 1-5,  $\times \frac{4}{5}$ ,  
*e.* calyx enclosing the fruit,  $\times \frac{1}{2}$ , *f.* fruit, opened, lateral view,  $\times \frac{1}{2}$ .

3-7 cm, more or less deeply cordate or subtruncate at the base, attenuate to acuminate towards the acutish, mucronulate apex, densely short-pilose or the young ones tomentose on both sides, entirely green, or reddish beneath; nerves 7-8 on either side of the midrib; petiole 2-7 cm, shortly pilose. *Inflorescences* axillary, 1-flowered or cymosely branched, 2-4-flowered; peduncle 1/2-5 cm, in fruit up to 8 cm long, pilose like the stems. Pedicels (5-)10-18 mm, shortly pilose. Bracts minute, caducous. *Sepals* subequal in length or the outer ones slightly shorter, densely short-pilose to tomentose outside; two outer ones broadly ovate, elliptic or orbicular, shallowly emarginate at the apex, 8-11 mm long, three inner ones broadly elliptic, ca 10 mm long, the margins fimbriate towards the shallowly emarginate apex; all sepals much enlarged in fruit, up to 3-3 1/2 cm long. *Corolla* tubular to funnel-shaped, ca 5-6 cm long, violet, darker to the centre, the limb shortly pilose outside. Filaments shortly pilose at the base. Ovary glabrous. *Capsule* enclosed by the enlarged sepals, subglobose, ca 1 1/2 cm diam. Seeds 7-8 mm long, shortly tomentose.

Distr. *Malaysia*: SW. Celebes, Lesser Sunda Islands (Timor, Wetar).

Ecol. In thickets up to ca 900 m.

Vern. *Non laku, lololi*, Timor.

3. *Stictocardia discolor* OOSTSTR. *Blumea* 5 (1943) 350, f. 1, d-f.—*Ipomoea discolor* REINW. in sched.—*I. pulchra* BL. var. BL. *Bijdr.* (1825) 716.—*Stictocardia pulchra* HALLIER f. *Bull. Herb. Boiss.* 5 (1897) 380; *ibid.* 6 (1898) 548, as to the Timor specimens, *non Ipomoea pulchra* BL. 1825.

Stems twining, thin, slender, sparsely pubescent or glabrous. *Leaves* ovate, 8-15 by 4-7 1/2 cm, base deeply cordate, apex acuminate, with long and narrow, obtuse or acutish, mucronulate acumen, sparsely and minutely pubescent on both sides, more densely on the nerves beneath, or nearly glabrous; lower surface reddish; nerves 7-10 on either side of the midrib; petiole 4-7 cm. *Inflorescences* axillary, 1-2-flowered; peduncle thin, 2-5 cm long, sparsely pubescent or nearly glabrous. Pedicels longer than the calyx, slender, 15-30 mm.

Bracts minute, caducous. *Sepals* subequal, 9-11 mm long, the outer ones orbicular to broadly elliptic, rounded at the apex, sparsely pubescent outside, shortly ciliate in the upper part; interior ones broadly elliptic. *Corolla* funnel-shaped, probably 6-8 cm long; midpetaline bands sparsely pilose outside and with minute black glands, or glabrous. *Capsule* unknown.

Distr. *Malaysia*: Lesser Sunda Islands (Timor).

Note. The species can be distinguished from *S. tiliifolia* mainly by the much more slender stems and peduncles, the smaller flowers and the long-acuminate leaf-blades with a red lower surface.

4. *Stictocardia cordatosepala* OOSTSTR. *Blumea* 5 (1943) 351, f. 1, a-c.—Fig. 57a-b.

Stems twining, young parts shortly pilose, soon glabrescent to glabrous, afterwards lignescent. *Leaves* broadly ovate to orbicular, 6-12 by 5-12 cm, broadly cordate at the base, attenuate to shortly acuminate at the apex with an obtusish, mucronulate acumen, glabrous or nearly so and green above, glabrous or shortly pilose on the nerves, minutely glandular and reddish beneath; 6-7 nerves on either side of the midrib; petiole 3-9 cm. *Inflorescences* axillary, 1-flowered, or cymosely 2-3-flowered; peduncle 1-9 cm long, glabrous or shortly pilose mainly towards the apex. Pedicels 10-35 mm, sparsely short-pilose. Bracts oblong, obtuse, 3-5 mm long, caducous. *Sepals* slightly unequal in length; two outer ones orbicular to transverse-elliptic, 12 mm long, rounded to shallowly emarginate at the apex, cordate at the base with 2 mm long, fimbriate basal lobes; three inner ones orbicular, 8-9 mm long, rounded at the base, all sparsely pilose or glabrous, the shortly ciliate apex excepted. *Corolla* funnel-shaped, probably ca 6 cm high, violet; midpetaline bands with minute glands outside; margin fimbriate. Filaments shortly pilose at the base. Ovary glabrous. *Capsule* unknown.

Distr. *Malaysia*: Lesser Sunda Islands (Lombok).

Ecol. In thin forest, on loamy soil, 350-700 m.

Note. Distinguished by the remarkably cordate base of the sepals.

## 20. TURBINA

RAFINESQUE, *Fl. Tellur.* 4, 1836 (1838) 81.—*Legendrea* WEBB & BERTH. *Hist. Nat. Iles Canar. Bot.* 3, 2 (1844) 26, t. 137.

A genus closely related to *Ipomoea*, different by the indehiscent ovoid-oblong fruits, with a thin woody pericarp. Seed mostly 1, puberulous. Sepals narrow-ovate to oblong, obtuse, in fruit not or slightly enlarged, spreading, with a thick central part and thinner, pale margins.

Distr. Two spp. (or probably more, still under *Ipomoea*) in tropical America.

1. *Turbina corymbosa* (L.) RAF. *Fl. Tellur.* 4, 1836 (1838) 81.—*Convolvulus corymbosus* LINNÉ, *Syst. ed.* 10 (1759) 923.—*Convolvulus sidaefolius* H.B.K. *Nov. Gen.* 3 (1818) 99.—*Ipomoea sidaefolia* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 459.—*Rivea corymbosa* HALLIER f. *Bot. Jahrb.*

18 (1894) 157; MERR. *En. Philip.* 3 (1923) 371.—*Legendrea corymbosa* OOSTSTR. *Blumea* 5 (1943) 355.

A herbaceous or subwoody, mostly glabrous twiner. *Leaves* mostly ovate, 3-10 by 2-7 cm, cordate at the base, acuminate at the apex, entire;

petiole 1½–7 cm. *Flowers* in few- to many-flowered axillary, 2–10 cm peduncled cymes, often united into panicles. Pedicels as long as the calyx or longer, 1–1½ cm. Bracts minute. *Sepals* narrow-ovate to oblong, obtuse, inner ones 10–12 mm long, outer shorter, all with a thinner pale margin, spreading and not or slightly enlarged in fruit. *Corolla* campanulate, ca 2–3 cm long, white, with a yellowish centre, glabrous or sparsely pilose on

the distinctly limited midpetaline bands. *Stamens* and style included. Ovary glabrous. *Fruit* ovoid-oblong, ca 1 cm long, mucronate by the style-base. Seed mostly 1, ca 5 mm long, puberulent.

Distr. Tropical America, introduced here and there in the Old World, in *Malaysia* naturalized in the Philippines (Luzon).

Ecol. Thickets and secondary forests, at low altitudes.

21. ARGYREIA<sup>1</sup>

LOUR. Fl. Coch. (1790) 134; OOSTSTR. *Blumea* 5 (1943) 352; 5 (1945) 686; 6 (1950) 337; 7 (1952) 171; HOOGL. *Blumea* 7 (1952) 179.—*Lettsomia* ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 75.—*Moorcroftia* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 431.—*Rivea* CHOISY, l.c. 407, emend. HALLIER f., p.p., type species excluded.—Fig. 58–61.

Mostly woody twiners. *Leaves* petioled, variable in shape and size, entire, hairy to glabrous. *Inflorescences* axillary, cymose, few- to many-flowered, loose or compact to capitate; bracts minute or large; flowers large, medium-sized, or small. *Sepals* 5, herbaceous or subcoriaceous, variable in shape and size, often hairy outside, mostly glabrous inside, persistent, slightly or sometimes much enlarged in fruit, in the latter case often red inside. *Corolla* regular, campanulate, funnel-shaped, or tubular, purple, red, pink, or white; limb nearly entire to deeply lobed, with 5 well-defined, mostly hairy midpetaline bands outside and glabrous connecting fields; in deeply lobed corollas the lobes consisting of a hairy midpetaline band with 2 narrow glabrous wings over the whole length, or with 2 glabrous lobules at the top. *Stamens* 5, inserted on the corolla, included or exerted; filaments filiform, often dilated at the base; pollen globular, spinulose. Disk annular or cupular, entire or shallowly 5-lobed. *Ovary* 2- or 4-celled, 4-ovuled, glabrous or hairy; style 1, simple, filiform, included or exerted; stigma biglobular. *Fruit* an ellipsoid or globose, fleshy, leathery, or mealy berry, purplish, red, orange, or yellowish. *Seeds* 4 or less, glabrous, rarely pilose at the hilum.

Distr. A genus of ca 90 species in tropical continental Asia, and in *Malaysia*; one sp. [*A. southeri* (BAILEY) DOMIN] in Queensland. *A. queenslandica* DOMIN, also described from Queensland, belongs to *Stictocardia*. Fig. 59.

Note. For a discussion of the delimitation of the genus against *Rivea* and the inclusion in it of *Lettsomia* and *Moorcroftia*, see *Blumea* 5 (1943) 353–356.

KEY TO THE SPECIES<sup>2</sup>

- 1. Limb of corolla entire or shallowly lobed (*sect. Ptyxanthus* G. DON).
- 2. Bracts soon caducous, small or rarely large, occasionally a casual foliaceous bract in the cyme.
- 3. Leaves deeply cordate at the base, densely white-tomentose beneath, glabrous or nearly so above. Bracts large and broad, outer ones ovate to oblong or elliptic, long and narrowly acuminate. 7. *A. nervosa*
- 3. Leaves not deeply cordate at the base. Bracts smaller to minute.
- 4. Corolla glabrous outside.
- 5. Inner sepals broadly ovate. Corolla ca 5½ cm long. Minor nervation of leaves distinctly reticulate beneath. Peduncles 5–7 cm long, on leafy branches . . . . . 14. *A. linggaensis*
- 5. Inner sepals elliptic-orbicular. Corolla ca 3½ cm long. Minor nervation subparallel, not distinctly reticulate. Peduncle 1–2½ cm long, on defoliate branches . . . . . 13. *A. nuda*

(1) With the collaboration of R. D. HOOGLAND.  
 (2) Flowers of 42. *A. celebica*, 43. *A. crispa*, 44. *A. paucinervia*, 45. *A. samarensis* are unknown.  
 46. *A. robinsonii* is also insufficiently known. These species are, therefore, not inserted in the key.

- 4. Corolla with hairy midpetaline bands.
- 6. Outer sepals lanceolate or narrowly lanceolate, distinctly acute.
  - 7. Outer sepals patently hirsute. Leaves elliptic or elliptic-oblong. Corolla *ca* 2 cm long.
    - 15. *A. addressa*
  - 7. Outer sepals thinly white sericeous. Leaves broadly ovate to orbicular. Corolla *ca* 7 cm long.
    - 16. *A. hookeri*
- 6. Outer sepals oblong, ovate or elliptic, obtuse, rarely acutish, not patently hirsute.
  - 8. Lower surface of leaves covered by a dense haircloth.
  - 9. Sepals equal or subequal in length.
    - 10. Stamens and style much shorter than corolla; corolla 5 cm long or more. Lower surface of the leaves densely sericeous, silvery white or pale fulvous . . . . . 1. *A. mollis*
  - 10. Stamens and style about as long as or longer than corolla; corolla smaller, *ca* 3 cm long or less.
    - 11. Outer sepals broadly elliptic. Lower leaf-surface densely pubescent to tomentose with short, curled hairs, upper surface glabrescent . . . . . 5. *A. walshae*
    - 11. Outer sepals ovate or oblong. Leaves appressed-sericeous above, sericeo-tomentose beneath.
      - 6. *A. sumbawana*
  - 9. Outer sepals distinctly longer than inner ones.
    - 12. Outer sepals 8-9 mm long, oblong, obtuse or slightly emarginate, shortly tomentose on both sides. Peduncles much exceeding the petioles . . . . . 3. *A. bifrons*
    - 12. Outer sepals 12-18 mm long, oblong, acutish or obtusish, sericeo-tomentose outside, glabrous inside except for the apical portion. Peduncles as long as or shorter than the petioles.
      - 4. *A. nitida*
- 8. Lower surface of the leaves glabrous or sparingly strigillose.
  - 13. Outer sepals (10-)15-18 mm long. Peduncles much shorter than the petioles. Corolla 4-4 1/2 cm long . . . . . 2. *A. reinwardtiana*
  - 13. Outer sepals at most up to 10 mm long. Peduncles usually longer than the petioles (if shorter: corolla up to 2 1/2 cm long and outer sepals *ca* 4 mm long; see 8. *A. philippinensis*).
  - 14. Two inner sepals cucullate, afterwards (always?) deeply emarginate by tearing of the apex; two outer sepals slightly longer than inner ones . . . . . 12. *A. cucullata*
  - 14. Inner sepals not cucullate, afterwards not emarginate; two outer sepals equal to or slightly shorter than inner ones.
    - 15. Filaments entirely glabrous.
      - 16. Sepals all broadly ovate, at least the two outer ones sparsely strigose outside. Peduncles slender . . . . . 10. *A. penangiana*
      - 16. Two outer sepals broadly ovate, two inner ones transverse-elliptic, all densely and shortly appressed-pilose to tomentose outside. Peduncles stout . . . . . 11. *A. scortechinii*
    - 15. Filaments pilose at the base or glandular-papillose throughout.
      - 17. Filaments pilose at the base only. Peduncles short, 1/2-2 cm. Sepals *ca* 4 mm long, outer ones with some scattered hairs on their middle portion or glabrous. 8. *A. philippinensis*
      - 17. Filaments glandular-papillose throughout. Peduncles longer. Sepals 6-6 1/2 mm long, outer ones sparsely appressed-pilose . . . . . 9. *A. pedicellata*
- 2. Bracts persistent, large.
  - 18. Sepals with long, hirsute acumen, the latter at least as long as the lower part of the sepal.
    - 18. *A. maingayi*
  - 18. Sepals at the apex obtuse, acute or shortly acuminate.
    - 19. Outer bracts transverse-elliptic. Peduncles very slender . . . . . 21. *A. sphaerocephala*
    - 19. Outer bracts elliptic or ovate to narrowly lanceolate. Peduncles stouter.
      - 20. Outer sepals 15 mm long or more, lanceolate to ovate-oblong, acuminate, long patently hirsute.
        - 17. *A. capitata*
      - 20. Outer sepals 8 mm long or less.
        - 21. Outer sepals ovate, obtuse or shortly apiculate, densely appressed-pilose outside.
          - 20. *A. sorsogonensis*
        - 21. Outer sepals ovate, sharply acute to acuminate, glabrous or more or less appressed-pilose outside . . . . . 19. *A. ridleyi*
- 1. Limb of corolla distinctly 5-lobed to 5-parted (*sect. Schizanthus* G. DON).
  - 22. Lobes of corolla ovate to oblong, outside with a more or less hairy midpetaline band and with a thin glabrous wing on each side along the whole length.
    - 23. Inflorescences capitate, with obovate to spatulate, or orbicular, truncate, outside densely tomentose, subsistent bracts. Flowers sessile or nearly so. Stems, lower leaf-surface and inflorescences white, greyish or pale brown tomentose . . . . . 35. *A. osyrensis*
    - 23. Inflorescences not capitate. Bracts mostly soon caducous. Flowers pedicellate. Indumentum of stems and leaves whether or not tomentose.
      - 24. Two outer sepals ovate to orbicular, two inner ones broader, orbicular to transverse-elliptic.
      - 25. Leaves strigillose above.

26. Leaves with a minute crisped pubescence beneath. Pedicels 1–2 mm long. Corolla-tube  $2\frac{1}{2}$ – $3\frac{1}{2}$  mm, lobes  $5\frac{1}{2}$ –6 mm long . . . . . 34. *A. cinerea*
26. Leaves sparsely strigose beneath, with straight, appressed hairs.
27. Pedicels  $2\frac{1}{2}$ –5 mm long. Corolla-tube 4–5, lobes 8–10 mm long. Venation indistinct on both surfaces. Younger branches densely strigose . . . . . 32. *A. micrantha*
27. Pedicels 7–9 mm long. Corolla-tube *ca*  $7\frac{1}{2}$ , lobes *ca* 10–15 mm long. Venation distinct on both surfaces. Younger branches sparsely strigose . . . . . 22. *A. reticulata* var. *microcalyx*
25. Leaves glabrous above, usually sparsely strigose on midrib.
28. Leaves glabrous on both sides or nearly so. Inflorescences up to 6-flowered. 30. *A. parviflora*
28. Leaves distinctly hairy beneath. Inflorescences usually more-flowered.
29. Outer sepals 6–7 mm long, densely light fulvous-tomentose, as are the whole inflorescences. . . . . 29. *A. rubicunda*
29. Outer sepals up to *ca*  $4\frac{1}{2}$  mm long, strigose as are the whole inflorescences.
30. Corolla-lobes *ca* 5 mm long, ovate . . . . . 28. *A. kunstleri*
30. Corolla-lobes *ca* 15 mm long, ovate-oblong.
31. Outer sepals *ca*  $4\frac{1}{2}$  mm long, like the rest of the inflorescence densely strigose with long, stiff hairs. Lower leaf-surface strigose, green . . . . . 31. *A. erinacea*
31. Outer sepals *ca*  $3\frac{1}{2}$  mm long, like the rest of the inflorescence strigose-tomentose, with much shorter, less stiff hairs. Lower leaf-surface with less stiff, less appressed, slightly curved hairs, purple . . . . . 33. *A. discolor*
24. Two outer sepals broadly ovate to ovate-oblong, inner ones not distinctly different in shape.
32. Filaments entirely glabrous.
33. Corolla-lobes *ca* 4 mm long, ovate. Outer sepals broadly ovate, rounded at the apex. Corolla hairy inside above the base of the stamens. Leaves ovate . . . . . 23. *A. oostroomii*
33. Corolla lobes *ca* 9 mm long, ovate-oblong. Outer sepals ovate-triangular, attenuate towards the apex. Corolla glabrous inside. Leaves oblong to narrow-oblong, with subparallel margins. . . . . 25. *A. oblongifolia*
32. Filaments with hairs or stalked glands at the base, or over their whole length.
34. Lateral nerves 10–11 on either side of midrib. Both surfaces of leaves strigose, more densely beneath than above . . . . . 26. *A. glabra*
34. Lateral nerves 7 or less on either side of midrib.
35. Lower surface of leaves densely light yellowish sericeous. Peduncle short, up to 2 cm long; up to 5-, usually 1-flowered . . . . . 24. *A. corneri*
35. Lower surface of leaves sparsely strigose to glabrous. Peduncle mostly longer; 3–20-flowered.
36. Minor nervation distinctly prominent beneath. Lateral nerves 4–5 on either side of midrib. Outer sepals sparsely strigose outside, *ca*  $7\frac{1}{2}$  mm long . . . . . 22. *A. reticulata* var. *reticulata*
36. Minor nervation much less prominent beneath, almost flat. Lateral nerves 6–7 on either side of midrib. Outer sepals densely greyish or whitish appressed-pilose outside, 5–6 mm long. . . . . 27. *A. luzonensis*
22. Lobes of corolla linear, hairy outside and with 2 glabrous lobules at the apex only.
37. Outer sepals distinctly acuminate . . . . . 37. *A. caudata*
37. Outer sepals obtuse, at most minutely apiculate.
38. Upper surface of leaves distinctly hairy.
39. Bracts lanceolate or narrower, acuminate, pubescent on both sides . . . . . 39. *A. barnesii*
39. Bracts broadly obovate, rounded to truncate at the apex, glabrous inside. 41. *A. congesta*
38. Upper surface of leaves glabrous or at most with some hairs on the midrib.
40. Bracts linear to filiform, 8–12 mm long, soon caducous. Leaves glabrous above; sparsely appressed-pilose beneath. Filaments papillose at the base . . . . . 40. *A. apoensis*
40. Bracts minute, 1–2 mm long, soon caducous.
41. Both surfaces of leaves glabrous or with some hairs on the nerves beneath. Outer sepals slightly longer than inner ones. Filaments pubescent . . . . . 38. *A. boholensis*
41. Lower surface of leaves more or less densely appressed-pilose; upper surface glabrous or with some hairs on the midrib. Outer sepals slightly shorter than inner ones. Filaments glabrous. . . . . 36. *A. pseudorubicunda*

### 1. Section Ptyxanthus

G. DON, Gen. Syst. 4 (1838) 254.—*Argyreia* sect. *Samudra* ENDL. Gen. Pl. (1839) 655.

Corolla entire or shallowly lobed. Stamens and style mostly included.

1. *Argyreia mollis* (BURM. f.) CHOISY, Mém. Soc. Phys. Genève 6 (1833) 421; OOSTSTR. Blumea 5 (1943) 357; HOOGL. Blumea 7 (1952) 180.—*Convolvulus sericeus* LINNÉ, Mant. 1 (1767) 43, non BURM. f. 1768, nec *A. sericea* DALZ. & GIBS. 1861.—*Convolvulus mollis* BURM. f. Fl. Ind. (1768) 44, t. 17.—*A. obtusifolia* (non LOUR.) PRAIN, J. As. Soc. Beng. 74, 2 (1906) 320.—*Ipomoea sericea*

BL. Bijdr. (1825) 720.—*A. argentata* MIQ. Fl. Ind. Bat. 2 (1857) 588.—*A. championi* (non BENTH.) PRAIN l.c. 63, 2 (1894) 89.—?*A. obtecta* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 186.—*Lettsomia argentea* RIDL. J. Fed. Mal. St. Mus. 7 (1916) 47.—Fig. 58.

Stems twining, up to 10 m high; young parts densely appressed-pilose with whitish or pale fulvous hairs, glabrescent, occasionally more or less farinose. Leaves elliptic to narrowly oblong, sometimes ovate or lanceolate, 4–15 by 1½–7 cm, base acute or attenuate into the petiole, or rounded; apex acute, shortly acuminate or obtuse, mucronulate, upper surface densely to sparsely appressed-hairy or glabrous, mostly with exception



Fig. 58. *Argyreia mollis* (BURM. f.) CHOISY. Flowering branch, × 1/2.

of the nerves; lower surface mostly densely sericeo-tomentose, with silvery white or pale fulvous hairs; nerves 9–18(–20) on either side of midrib; petiole 1–6 cm, appressed-pilose. Peduncle shorter to slightly longer than the petiole, 1½–2½(–4½) cm, hairy, 1–5, rarely more-flowered. Pedicels 5–15 mm, angular, hairy. Bracts obovate-oblong, obtuse, caducous. Sepals about equal in length, 2 outer ones broadly elliptic, obtuse, 8–10 mm long; sepal 3 and 4 elliptic to elliptic-oblong, obtuse to slightly emarginate; inner sepal oblong, slightly emarginate; all sepals densely sericeo-lanate outside, glabrous inside, in fruit enlarged, patent, red or purplish inside. Corolla funnel-shaped to campanulate, 5–6½ cm long, pale violet or pink with white base, or rarely entirely white; limb shallowly lobed; midpetaline bands with long, appressed hairs. Stamens and style much shorter than corolla; filaments pilose at the base. Ovary glabrous, 4-celled. Fruit subglobose, ca 8–10 mm diam., red or orange red, 4- or less-seeded. Seeds ca 5 mm long, black.

Distr. Siam, Lower Burma, Andaman Isl., in Malaysia: Sumatra, Malay Peninsula, Java, Madura, Kangean Arch., and Bali.

Ecol. In secondary forests, thickets, teak-forests, along fields, along roadsides, occasionally in hedges, from sea-level to 1500 m.

Use. In Java a decoction of the root, along with *Callicarpa*, *Anethum*, and *Alyxia* is taken as a stomachic. The leaves serve as a poultice for boils, etc. The stems are sometimes used for tying purposes (BURKILL; HEYNE).

Vern. *Areuj tatapajan*, *areuj kujapu*, *podol landak*, *tatajan gedé*, *kihui*, *S. kéndal sapi*, *kemarang*, *kelawatan*, *rambatan*, *tulupan*, *uluk uluk*, *J. rabet po-sepo*, *sepo-sepoan*, Md, *butetulupan*, Bali.

Notes. Specimens from the Malay Peninsula cited by PRAIN under the names *A. obtusifolia* LOUR. and *A. championi* CLARKE certainly belong here. Most probably *A. obtecta* CLARKE belongs to the synonymy of the species; if so, the area would include Siam, Lower Burma, and the Andamans.

In most specimens from the Malay Peninsula the leaves are relatively narrower than in those from the Malay Islands.

2. *Argyreia reinwardtiana* (BL.) MIQ. Fl. Ind. Bat. 2 (1857) 589; OOSTSTR. Blumea 5 (1943) 360.—*Ipomoea reinwardtiana* BL. Bijdr. (1825) 720.—*A. guichenotii* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 423, excl. syn. *Ipomoea pulchra* BL.—*Convolvulus ovatus* REINW. ex CHOISY in DC. Prod. 9 (1845) 332, pro syn..

Stems twining; young parts sparsely pilose with short, appressed, whitish hairs, glabrescent. Leaves ovate, ovate-oblong, or elliptic-oblong, 5½–17 by 3–10 cm; rounded, truncate, or subcordate at the base; attenuate or acuminate and mucronulate at the apex; upper surface glabrous or nearly so, lower surface sparsely to rather densely pilose with short, appressed, straight hairs; midrib and 8–10 nerves on either side prominent beneath, minor nervation reticulate beneath; petiole 2–5 cm, appressed-pilose. Peduncle distinctly shorter than the petiole, 1–2½ cm, rather densely pilose, 2- to few-flowered. Pedicels 3–5 mm, hairy like the peduncle. Bracts linear to oblong, 8–15 mm long, appressed-pilose beneath, glabrous or nearly so above, caducous. Sepals unequal, outer ones longer than inner, with ± undulate margins; 2 outer ones ovate to orbicular, acutish to obtuse, (10–)15–18 mm long, outside densely sericeous, sometimes less densely so towards the apex, inside glabrous or nearly so; sepal 3 narrow-elliptic to ovate, obtuse, (7–)13 mm long; two inner sepals ovate-oblong, elliptic, or ovate, obtuse, (7–)8–9 mm long, densely whitish sericeous outside, sometimes with glabrous but ciliate margins; sepals enlarged in fruit, outer ones up to 20 mm long, red inside. Corolla funnel-shaped, ca 3–4½ cm long, purplish pink; limb shallowly lobed; midpetaline bands sericeous just as the upper portion of the tube. Stamens and style nearly as long as the corolla; filaments with pilose base. Ovary glabrous, 2-celled. Fruit depressed-globose (always?), 7–10

mm diam., 2-4-seeded. *Seeds* ca 5½ mm long (ripe?).

*Distr. Malaysia:* Lesser Sunda Islands (Timor).

*Ecol.* A specimen collected near Soë, S. Middle Timor, was growing between limestone rocks at 850 m.

*Note.* The type of *Ipomoea reinwardtiana* Bl. has the outer sepals acutish at the apex, in other specimens they are sometimes partly or all obtuse to rounded. It is not impossible that the specimen from Timor mentioned by CHOISY under *A. setosa* CHOISY [Mém. Soc. Phys. Genève 6 (1833) 425; in DC. Prod. 9 (1845) 332] belongs to this species [See *Blumea* 5 (1943) 361].

### 3. *Argyrea bifrons* OOSTSTR. *Blumea* 5 (1943) 362, f. 2, t.

Stems twining; young parts densely pubescent to farinose. *Leaves* ovate, 5-10 by 3½-6½ cm; base truncate to emarginate, apex acute to shortly acuminate; upper surface densely and appressedly grey or olive-green sericeous, lustrous, lower surface densely and shortly crisped-tomentose, paler and dull; midrib and 10-14 lateral nerves on either side prominent beneath; petiole short, 1-2 cm, densely and shortly tomentose. *Peduncle* much exceeding the petiole, 6-10 cm, angular or sulcate when dry, shortly tomentose, umbellately cymose at the apex, many-flowered. *Pedicels* (of young flowers) up to 5 mm. *Bracts* oblong to narrowly spatulate, densely short-pubescent to tomentose on both surfaces, 6 mm long, caducous. *Sepals* unequal, densely pubescent to tomentose on both sides; two outer ones oblong, obtuse or slightly emarginate, 8-9 mm long, sepal 3 a little shorter and narrower, obtuse, ca 6½ mm long, two inner sepals broadly elliptic, obtuse, 5 mm long. *Corolla* funnel-shaped (only young flowers seen), bright violet, the midpetaline bands sericeous, for the rest glabrous. *Filaments* pilose at the base. *Ovary* glabrous, 2-celled. *Fruit* unknown.

*Distr. Malaysia:* Lesser Sunda Islands (Lombok).

*Ecol.* Twining on trees and shrubs; the only specimen known at 5-10 m.

*Note.* The young flowers of the type specimen do not permit a close examination of the corolla, stamens and pistil.

### 4. *Argyrea nitida* (DESR.) CHOISY, Mém. Soc. Phys. Genève 6 (1833) 424; OOSTSTR. *Blumea* 6 (1950) 339.—*Convolvulus nitidus* DESR. in LAMK, Encycl. 3 (1791) 544.—*A. mollis* (non CHOISY) MERR. Fl. Manila (1912) 386.—*A. purpuricarpa* ELM. Leaf. Philip. Bot. 5 (1913) 1766.

Stems twining, terete, appressed-hairy, glabrescent. *Leaves* oblong, narrowly ovate, ovate, or elliptic, 6-12 by 2½-9 cm, rounded at the base, acute and mucronulate at the apex, appressed-sericeous on both sides, but much more densely beneath than above, and silvery shining; nerves about 6-8 on either side of midrib; petiole much shorter than blade, 6-40 mm. *Peduncles* axillary, very much shorter than leaves, 5-10 mm long, densely appressed-pilose, 1-3-flowered. *Pedicels*

much shorter than sepals, 4-6 mm. *Bracts* of lateral flowers lanceolate, 3-4 mm long. *Sepals* unequal in length; two outer ones ca 12-18 mm long, oblong, acutish or obtusish, with more or less crisped margin, densely appressed-sericeo-tomentose outside, sparsely hairy near apex inside; sepal 3 falcate, ca 12 mm long; two inner sepals broad-ovate, acuminate, ca 9-10 mm long. *Corolla* funnel-shaped to campanulate, up to 8 cm long, pale purple with white throat; limb slightly lobed; midpetaline bands with long appressed hairs, connecting fields and basal portion of corolla glabrous. *Stamens* and *style* included; filaments pilose at the base. *Ovary* glabrous, 4-celled. *Fruit* globular, purplish-red, at its base with the patent, enlarged concave sepals, which are purplish red inside. *Seeds* 4, ca 5 mm long, glabrous except the pilose hilum.

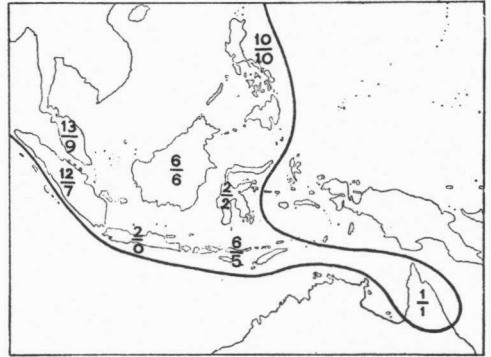


Fig. 59. Distribution of *Argyrea* in Malaysia. The figure above the line indicates the total number of species, the figure under the line that of endemic species.

*Distr. Malaysia:* Philippine Islands (Luzon, Culion, Panay, Palawan).

*Ecol.* In thickets and secondary forests at low and medium altitudes (MERRILL).

*Vern. Baging-kastila*, Tag., *bulakan*, *bulalakan*, P. Bis..

*Note.* Closely related to *A. mollis*; differs chiefly in the shape and size of the sepals with much shorter and more appressed hairs. *A. purpuricarpa* ELM. based on fruiting specimens from the island of Palawan, seems to be identical.

### 5. *Argyrea walshae* OOSTSTR. *Blumea* 5 (1943) 361, f. 2, n-p.

Stems twining, glabrous or sparsely short-pilose to farinose. *Leaves* broadly ovate or ovate, 5-16 by 2½-13 cm; base rounded or slightly emarginate, apex acute or slightly acuminate, mucronulate; upper surface sparsely appressed-pilose, glabrescent, lower surface densely pubescent to tomentose with short curled hairs; midrib and 9-12 lateral nerves on either side prominent beneath; petiole up to 10 cm long, shortly pubescent. *Inflorescences* umbellately-cymose, 4-12(-20)-flowered; peduncle

shorter than or as long as petiole, dirty white or greyish to fulvous tomentose as are the pedicels and the sepals outside. Pedicels 3–6 mm long, thickened at the apex. Bracts lanceolate to linear, tomentose beneath, glabrous above, caducous. *Sepals* subequal, broadly elliptic, obtuse, 6–8 mm long, outside tomentose, inside glabrous and brown. *Corolla* tubular to funnel-shaped, 2–2<sup>3</sup>/<sub>4</sub> cm long, the limb shallowly lobed; midpetaline bands and upper portion of tube sericeous. *Stamens* and *style* slightly exserted; filaments pilose at the base. Ovary glabrous, 2-celled. *Fruit* unknown.

*Distr. Malaysia:* Lesser Sunda Islands (Timor).

*Ecol.* The type specimen has been collected at 800 m; according to the collector Mrs WALSH, the species is rather frequent in Timor.

6. *Argyrea sumbawana* OOSTSTR. *Blumea* 5 (1943) 362, f. 2, q–s.—*Rivea sumbawana* HALLIER f. in ELBERT, Sunda-Exp. 2 (1912) 281, *nom. nud.*

Stems twining, young parts densely appressed-pubescent to farinose, pale fulvous, adult parts farinose to glabrous. *Leaves* ovate, 6–13 by 3–8<sup>1</sup>/<sub>2</sub> cm; base slightly emarginate to truncate or shortly attenuate into the petiole, apex shortly acuminate, acute, and mucronulate; upper surface densely appressed-sericeous, lower surface densely and shortly sericeo-tomentose, pale fulvous; midrib and 9–14 lateral nerves on either side prominent beneath, slightly impressed above; petiole 2<sup>1</sup>/<sub>2</sub>–6 cm, densely and shortly pilose. *Peduncle* slender, exceeding the petiole, 3–11 cm, umbellately cymose at the apex, densely pubescent to farinose as are its branches and the pedicels. Pedicels 4–8 mm. Bracts minute, ovate-lanceolate, acute, densely pubescent outside, subglabrous inside, caducous. *Sepals* equal or the inner ones slightly shorter, outside densely pubescent, inside sparsely so to glabrous, two outer ones ovate-triangular, ovate-oblong, or oblong, obtuse, 5<sup>1</sup>/<sub>2</sub>–6<sup>1</sup>/<sub>2</sub> mm long; sepal 3 narrowly elliptic to oblong, slightly oblique, 5<sup>1</sup>/<sub>2</sub>–6<sup>1</sup>/<sub>2</sub> mm long; two inner sepals ovate to ovate-triangular, attenuate towards the obtuse apex, 5–6 mm long. *Corolla* tubular to funnel-shaped, ca 2<sup>1</sup>/<sub>2</sub> cm long, pink to pale reddish purple; limb shallowly lobed, soon reflexed; midpetaline bands and upper portion of tube sericeous. *Stamens* and *style* exserted. Filaments densely pilose at the base. Ovary glabrous, 4-celled. *Fruit* unknown.

*Distr. Malaysia:* Lesser Sunda Islands (Sumbawa).

*Ecol.* The species has been collected in dry thickets at 50 m and in open places at 500 m.

*Note.* The shape of the sepals appears to be rather variable. In the type specimen they are ovate-triangular to ovate-oblong, in other collections they are narrower.

7. *Argyrea nervosa* (BURM. f.) BOJ. Hort. Maurit. (1837) 224; OOSTSTR. *Blumea* 5 (1943) 364; *ibid.* 6 (1950) 338; HOOGL. *Blumea* 7 (1952) 181.—*Convolvulus nervosus* BURM. f. Fl. Ind. (1768) 48, t. 20, f. 1.—*Convolvulus speciosus* LINNÉ f. Suppl. (1781) 137, *non ex Bras.*—*Ipomoea speciosa* PERS.

Syn. Pl. 1 (1805) 183.—*Lettsomia nervosa* ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 78.—*A. speciosa* SWEET, Hort. Brit. (1827) 289.—*Rivea nervosa* HALLIER f. Bull. Herb. Boiss. 5 (1897) 381.

Stems twining, up to 10 m high, densely whitish or fulvous tomentose, containing a milky viscid juice (WIGHT). *Leaves* large, ovate to orbicular, 10–30 cm or more by 8–25 cm or more, base deeply cordate, apex obtuse, acute or shortly cuspidate, mucronulate; upper surface glabrous or nearly so, lower surface densely white, greyish or fulvous sericeo-tomentose, shining; midrib and 11–16 nerves on either side prominent beneath, minor nerves many, parallel; petiole shorter than or as long as the blade, tomentose. *Flowers* in a subcapitate cyme at the end of a stout peduncle, this up to 20 cm long or longer, tomentose. Pedicels short, angular. Bracts large, ovate to oblong or elliptic, with long and narrow acumen, softly pilose outside, glabrous inside, 3<sup>1</sup>/<sub>2</sub>–5 cm long, caducous. *Sepals* equal in length or the inner ones slightly shorter, all densely whitish tomentose outside, glabrous inside. Two outer sepals broadly elliptic, obtuse or acutish, up to 15 mm long; three inner ones broadly elliptic to orbicular, obtuse, ca 10–12 mm long. *Corolla* large, tubular to funnel-shaped, ca 6 cm long, pink-purple; limb shallowly lobed; midpetaline bands and tube with exception of the most basal part densely sericeo-lanate outside. *Stamens* and *style* included. Filaments pilose at the base. Ovary glabrous, 4-celled. *Fruit* globose, apiculate, ca 2 cm diam., yellowish brown, nearly dry.

*Distr.* Native in India from Assam and Bengal to Belgaum and Mysore; cultivated in other tropical countries and occasionally escaped; in *Malaysia* cultivated as a garden plant.

*Vern.* *Areuj bohoh kēboh*, S, *hojas de seda, sedang-dahon*, Philip., *elephant creeper*, E.

8. *Argyrea philippinensis* (MERR.) OOSTSTR. *Blumea* 6 (1950) 341.—*Lettsomia philippinensis* MERR. Philip. J. Sc. 26 (1925) 488.

Stems twining, terete, longitudinally wrinkled in dry state, very sparsely appressed-pilose, glabrescent, pale greyish-brown. *Leaves* ovate to ovate-oblong, oblong-lanceolate or narrowly lanceolate, 7<sup>1</sup>/<sub>2</sub>–12<sup>1</sup>/<sub>2</sub> by (1<sup>1</sup>/<sub>2</sub>)–4–7 cm, rounded to truncate at the base, or in narrow leaves acute to cuneate; acuminate or attenuate towards the acute apex; glabrous on both sides except for a few scattered hairs, mainly along the nerves and especially beneath; nerves 5–7 on either side of the midrib; secondary nerves parallel; petiole 1<sup>1</sup>/<sub>2</sub>–6 cm, very sparsely pilose like the stems and the peduncles. *Peduncle* axillary, short, 1<sup>1</sup>/<sub>2</sub>–2 cm, cymosely branched at the apex, few-flowered. Pedicels 2<sup>1</sup>/<sub>2</sub>–5 mm, sparsely hairy. Bracts triangular, small, 1–2 mm long. *Sepals* about equal in length, ca 4 mm long; two outer ones ovate-elliptic; inner ones broader, all obtuse; outer ones with some scattered hairs on their middle portion or glabrous. *Corolla* tubular, ca 1<sup>1</sup>/<sub>2</sub>–2<sup>1</sup>/<sub>2</sub> cm long, white; limb very shortly lobed; midpetaline bands with appressed hairs outside, for the rest glabrous. Dilated



base of filaments with hairs along the margins. Ovary glabrous, 2-celled. *Fruit* ovoid, *ca* 12 mm long, on a pedicel 5–8 mm long.

*Distr. Malaysia:* Philippines (Luzon, Catanduanes Isl.).

*Ecol.* In damp forests at low altitudes (MERILL).

9. *Argyreia pedicellata* OOSTSTR. *Blumea* 5 (1943) 379, note, f. 2, h–j; *ibid.* 6 (1950) 340.

Stems twining, terete, pale greyish brown, lenticellate; young parts appressed-pilose, soon glabrous. *Leaves* oblong to ovate-oblong, 5–12 by 1½–6 cm, obtuse or acutish at the base, attenuate towards the obtusish or acute, mucronulate apex, or slightly acuminate, glabrous above except for the midrib, sparsely appressed-pilose and glabrescent beneath (occasionally densely hairy beneath); nerves 5–8 on either side of the midrib; petiole 1½–5 cm. *Peduncles* axillary, 5–10 cm, sparsely appressed-pilose, lenticellate, cymosely branched at the apex, few- to several-flowered. Pedicels sparsely appressed-pilose, more densely so near their base (occasionally hairy over the whole length), 7–12 mm, in fruit up to 25 mm long, at that time nodding, and slightly curved at the base, gradually thickened towards the apex. *Sepals* subequal or outer ones a little shorter; two outer sepals oblong to ovate-oblong, 6–6½ mm long, sparsely appressed-pilose; sepal 3 ovate, 6–6½ mm long, with one thin glabrous margin; two inner sepals broadly ovate to triangular, *ca* 7 mm long, with two glabrous margins. *Corolla* broadly funnel-shaped, white; limb subtentire, *ca* 4½–5 cm diam.; midpetaline bands sericeous, connecting fields and basal portion of corolla glabrous. Filaments glandular-papillose throughout. Ovary glabrous, 2-celled. *Fruit* ellipsoid, up to 12 mm long, with 1 ellipsoid seed.

*Distr. Malaysia:* Philippines (Luzon).

*Note.* Specimens collected by Mrs CLEMENS (no 50) in Mindanao (Camp Keithley, Lake Lanao) in the U.S. Nat. Herb., *ditto* (*s.n.*) in Herb. Bog., formerly referred to this species (*cf.* *Blumea* 5, 1943, 379, note) appear to be specifically distinct; the specimens are too imperfect for a full description.

10. *Argyreia penangiana* (CHOISY) BOERL. *Handl. Fl. Ned. Ind.* 2 (1899) 513; HOOGL. *Blumea* 7 (1952) 181.—*Convolvulus penangianus* WALL. *Cat.* (1828) no 1425, *nom. nud.*—*Moorcroftia penangiana* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 406, t. 4.—*Lettsomia penangiana* MIQ. *Fl. Ind. Bat.* 2 (1857) 592.

Stems twining, to 3 m, sparsely strigose-hirsute when young, soon glabrescent. *Leaves* ovate to broadly lanceolate, 6–20 by 2½–11 cm, rounded or slightly cordate at the base, acute or slightly acuminate at the apex, upper surface glabrous, lower surface sparsely strigose when young, soon glabrescent; midrib and 7–8 nerves on either side prominent beneath, minor nervation usually inconspicuous; petiole slender, 1½–5 cm, hairy like the stem. *Peduncles* axillary, terete, very slender,

longer than the petioles, 2½–20 cm, sparsely strigose when young, soon glabrescent, cymosely (1–)3–15-flowered. Pedicels 5–15 (in fruit 20) mm long. Bracts linear-lanceolate, *ca* 5 mm long, slightly hirsute beneath, caducous. *Sepals* subequal, broadly ovate, *ca* 4–5 mm long; outer two with obtuse, inner three with rounded apex, strigose outside; sepal 3 with one, sepals 4 and 5 with two glabrous margins. *Corolla* funnel-shaped, *ca* 20–35 mm long, bright purple within, paler outside; tube broad, not manifestly distinct from upper part of corolla; limb subtentire; midpetaline bands hirsute outside, connecting fields glabrous. *Stamens* and *style* included. Filaments dilated at the base, glabrous. Ovary glabrous, 2-celled. *Fruit* ovoid, *ca* 15 mm long, pink, 1-seeded.

*Distr. Malaysia:* Malay Peninsula (Perak, Pulau Penang).

*Ecol.* In forests from low altitude to 1700 m.

11. *Argyreia scortechinii* (PRAIN) HOOGL. *Blumea* 7 (1952) 182.—*Lettsomia scortechinii* PRAIN, *J. As. Soc. Beng.* 63, 2 (1894) 98.

Stems twining, to 4 m, rather densely and shortly strigose or strigose-hirsute to nearly glabrous. *Leaves* ovate to broadly ovate, 4–11 by 2½–7 cm, rounded or slightly cordate at the base, acute to slightly acuminate at the apex; upper surface glabrous, lower surface strigose-hirsute, most densely so on midrib and nerves, to nearly glabrous; midrib and 6–7 nerves on either side prominent beneath; minor nervation reticulate, rather distinct beneath; petiole slender, 1–4½ cm, hairy like the stem. *Peduncles* axillary, terete, 2–15 cm, hairy like the stem, but slightly more densely so, cymosely 2–25-flowered. Pedicels *ca* 3 mm long, in fruit up to 1 cm, hairy. Bracts triangular, *ca* 3 mm long, hirsute beneath, caducous. Two outer *sepals* broadly ovate, with rounded apex, *ca* 5–5½ mm long, densely and shortly appressed-pilose outside; two inner ones transverse-elliptic, *ca* 5½–6 mm long, with two broad glabrous margins, sepal 3 with one glabrous margin. *Corolla* funnel-shaped, *ca* 25 mm long; pale pink to nearly white outside, mauve or deep magenta inside; tube not distinct from upper part; limb shallowly lobed; midpetaline bands hirsute, connecting fields and basal portion of corolla glabrous. *Stamens* and *style* included. Filaments dilated at the base, glabrous. Ovary glabrous, 2-celled. *Fruit* ovoid, *ca* 1½ cm long, 1-seeded.

*Distr. Malaysia:* Malay Peninsula (Perak, Pahang).

*Ecol.* As far as known only at *ca* 1300–1500 m.

*Vern. Akar tokal*, Mal. Pen.

12. *Argyreia cucullata* OOSTSTR. *Blumea* 5 (1943) 366, f. 2, k–m.

Stems twining, up to 5 m; young parts shortly hairy, later glabrescent to glabrous. *Leaves* ovate or narrowly elliptic, 4–10 by 2–6 cm, base rounded, apex acutish, obtuse or shortly acuminate, mucronulate, margins subrevolute; upper surface glabrous or with hairs on midrib; lower surface shortly pilose with laxly appressed hairs; midrib

and 6-8 nerves on either side prominent beneath; petiole 1-2(-6) cm, shortly pilose. *Peduncles* in the axils of the upper leaves, exceeding the petioles, 2-5(-15) cm, sparsely pilose to glabrous, sulcate or angular, umbellately cymose at the apex, many-flowered. Pedicels 2-3 mm, thickened towards the apex. Bracts oblong or linear, crisped, lower ones ca 1 cm (or longer, up to 2 cm), caducous. *Sepals* glabrous or sparsely short-pilose outside, 2 outer ones broadly ovate to ovate-oblong, not or slightly crisped, rounded (or obtuse) at the apex, with inflexed margins, ca 7-9(-10) mm long; sepal 3 broader, 5-6 mm long; 2 inner sepals ca 5-5½ mm long, strongly concave and cucullate, finally deeply emarginate at the apex (always?). *Corolla* campanulate to funnel-shaped, ca 3 cm long, violet, paler to white at the margin, shallowly lobed, lobes soon reflexed; midpetaline bands sub-hirsute, rest of corolla glabrous. *Stamens* and *style* included. Base of filaments thickened, glabrous. Ovary glabrous, 2-celled. *Fruit* ellipsoid, apiculate, ca 17 mm long, pink.

Distr. *Malaysia*: Sumatra, East Coast (Mt Sibajak, Petani Valley; Karo Uplands).

Ecol. Moist thickets, edges of virgin forests, 850-1300 m.

Note. A discussion of the variability is given in the original publication.

13. *Argyreia nuda* OOSTSTR. *Blumea* 5 (1945) 686, f. 1; *ibid.* 7 (1952) 172.

Stems twining, leafless at flowering-time, terete or slightly angular, with some appressed hairs in youth, glabrescent, more or less warty (lenticellate). *Leaves* ovate-oblong (or ovate), 11-15(-17) by 5-6(-12) cm, base rounded, in young leaves broadly cuneate, apex shortly acuminate; glabrous, the nerves excepted; midrib, ca 4(-6-7) nerves on either side and subparallel minor nervation prominent beneath; petiole up to 6(-10) cm long, shortly appressed-pilose, sulcate. *Inflorescences* in the axils of fallen leaves on the main stem or on lateral branches; in the first case umbellately cymose, 4-8- or up to 20-flowered, in the second case also umbellately cymose, and moreover contracted into a panicle. *Peduncles* 10-24 mm long, flattened towards the apex, appressed-pilose. Pedicels 4-7 mm or in the central flower up to 10 mm, at the base densely, towards the apex more sparsely pilose. *Sepals* glabrous or sparsely pilose at the base outside; two outer ones ovate, rounded or slightly retuse at the apex, ca 6 mm long; sepal 3 slightly oblique, elliptic-orbicular, ca 6-6½ mm long, with one thinner margin; two inner sepals elliptic-orbicular, ca 6½ mm long, with two thinner margins. *Corolla* funnel-shaped, ca 3½ cm long, glabrous outside, white, pink or violet towards the limb; limb shallowly lobed, ca 4-4½ cm diam. *Stamens* and *style* included. Filaments pilose at the base. Ovary glabrous, 4-celled. *Fruit* ovoid or ellipsoid, ca 12-14 mm long, violet or crimson.

Distr. *Malaysia*: N. half of Sumatra (Mt Takmau, Upper Bila plain, Asahan).

Ecol. In forests, high climbing; flowers and

fruits in the basal parts of the stem; 600-900 m. Vern. *Akar kutjun pariwo*, Mt Takmau.

14. *Argyreia linggaensis* OOSTSTR. *Blumea* 7 (1952) 171.

Plant entirely glabrous, or with some appressed hairs in the leaf-axils and on the petioles and the nerves. Stems twining, branches terete or striate. *Leaves* oblong, ovate, or ovate-elliptic, 10-16 by 4-9 cm, rounded, truncate or slightly cordate at the base, acute to shortly acuminate, mucronulate at the apex; midrib, 5-7 arcuate nerves on either side of it, and reticulate minor nervation distinctly prominent beneath; petiole 2-6 cm, sulcate. *Peduncles* axillary, straight or curved, 5-7 cm, subangular, cymosely branched at the apex, 1-5-flowered. Pedicels 4-7 mm long. Two outer *sepals* ovate, acutish, ca 5 mm long; three inner ones slightly longer, up to 6 mm long, broadly ovate, obtuse, with thinner margins. *Corolla* funnel-shaped, ca 5½ cm long, glabrous outside, red; limb subentire. *Stamens* and *style* included. Filaments shortly pilose at the base. Ovary glabrous. *Fruit* unknown.

Distr. *Malaysia*: Lingga Arch., Sumatra (East Coast).

Ecol. Edges of forests, 20-30 m.

Note. The leaves of the specimens from P. Singkep (Lingga Arch.) are ovate or ovate-elliptic; those of the Sumatran specimen are oblong.

15. *Argyreia adpressa* (CHOISY) BOERL. *Handl. Fl. Ned. Ind.* 2 (1899) 513; OOSTSTR. *Blumea* 5 (1943) 367; HOOGL. *Blumea* 7 (1952) 182.—*Convolvulus adpressus* WALL. *Cat.* (1828) no 1424, *nom. nud.*—*Moorcroftia adpressa* CHOISY, *Mém. Soc. Phys. Genève* 6 (1833) 431.—*Lettsomia adpressa* MIQ. *Fl. Ind. Bat.* 2 (1857) 591.

Stems twining, up to 20 m, young parts brown pilose to hirsute, glabrescent. *Leaves* elliptic or elliptic-oblong, 4-13 by 2-8 cm, base rounded or slightly cordate, apex obtuse or acutish to very shortly acuminate, more or less densely and loosely appressed-pilose to strigillose on both sides or upper surface more sparsely strigillose, the indumentum more or less shining, surface of older leaves more or less rough; midrib and 9-11 nerves on either side prominent beneath, nerves parallel, straight at first, curved near the margin; petiole 1½-5½ cm, hairy like the stem. *Peduncles* 2½-11 cm, hirsute; *flowers* at the end in a dense, capitate or umbelliform cyme with hairy branches. Pedicels 2-3 mm long, hairy. Bracts linear-lanceolate, acute, caducous. Two outer *sepals* linear-lanceolate, acute, 10-12 mm long, hirsute outside, glabrous or nearly so inside; three inner sepals shorter, lanceolate, gradually attenuate towards the apex, respectively 8-10, 6½-8 and 5½-7 mm long, hirsute outside but with glabrous margins, glabrous inside. *Corolla* funnel-shaped, 2-3 cm long, white with reddish purple bands; inside of throat and tube violet; limb almost entire; midpetaline bands with long, patent hairs, forming a kind of pencil in bud; rest of corolla glabrous. Filaments thickened and glabrous at the base. Ovary glabrous, 2-celled. *Fruit* ellipsoid, 16 by 12 mm, reddish

purple, at base with the irregularly spreading and reflexed sepals.

Distr. Siam, in *Malaysia*: Sumatra (East Coast), Malay Peninsula.

Ecol. In thickets and thin forests, 350–800 m.

16. *Argyreia hookeri* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 185.

Stems twining, robust, terete, greyish-strigillose. *Leaves* broadly ovate to orbicular, 8–18 by 8–18 cm, shallowly cordate to truncate at the base, shortly acuminate, mucronulate at the apex, glabrous or nearly so above, sparsely hairy beneath, more densely so on the nerves; midrib and 9–11 nerves on either side prominent beneath; minor nerves many, subparallel; petiole shorter than the blade, 4–7 cm, hairy like the stem. *Peduncles* 8–28 cm, hairy like the stem, cymosely branched at the apex with several to many flowers, the larger ones bearing below the terminal cyme 1 or 2 lateral ones in the axils of small, ovate to broadly ovate leaves. Pedicels shorter than sepals, 5–8 mm, terete, greyish appressedly hairy. Bracts lanceolate or oblong-lanceolate, attenuate towards the base, acute at the apex, lower ones 10–18 mm long. *Sepals* lanceolate, acute, with recurved top; three outer ones 10–12 mm long, inner ones ca 9 mm, thinly white sericeous outside and inside near the apex. *Corolla* tubular to funnel-shaped, ca 7 cm long, pink purple, dark purple inside; midpetaline bands hairy outside, rest of corolla glabrous. Filaments pilose at the base. Ovary glabrous, 4-celled.

Distr. From Nepal and Sikkim to Assam, Pegu and the Andamans, in *Malaysia*: in the neighbourhood of Bogor (Java) as an escape from the Botanic Gardens.

17. *Argyreia capitata* (VAHL) CHOISY, Mém. Soc. Phys. Genève 6 (1833) 423; OOSTSTR. *Blumea* 5 (1943) 368; HOOGL. *Blumea* 7 (1952) 184.—*Convolvulus capitatus* VAHL, Symb. Bot. 3 (1794) 28.—*Lettsomia strigosa* ROXB. Fl. Ind. ed. CAREY & WALL. 2 (1824) 80.—*Ipomoea trichotoma* BL. Bijdr. (1825) 717.—*Lettsomia capitata* MIQ. Fl. Ind. Bat. 2 (1857) 591.—*Lettsomia peguensis* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 193.—*Rivea capitata* HALLIER f. Med. Rijksherb. Leiden 1 (1911) 26.

Stems twining, up to 10 or 15 m high, young parts patently brown or fulvous hirsute, occasionally appressed-pilose with softer hairs. *Leaves* ovate to orbicular, rarely oblong-lanceolate, occasionally slightly contracted in the middle, 7½–18 by 4–13 cm, base shallowly to deeply cordate, apex acuminate; brown or fulvous-hirsute on both sides with patent to appressed hairs; nerves 13–18 on either side of midrib, straight at the base, curved near the margin; petiole slender, 5–16 cm long, mostly patently hirsute. *Peduncles* rather stout, 3–30 cm, patently hirsute. *Flowers* in a dense, capitate cyme. Bracts persistent, outer ones elliptic to narrowly lanceolate, acute at both ends, ca 1½–4 cm long, brown or fulvous-hirsute outside and at the margins, glabrous inside

except at the apex; upper bracts narrower. Pedicels very short or none. *Sepals* lanceolate or ovate-oblong to oblong, acuminate, patently hirsute outside; 3 outer ones 15–17 mm long, 2 inner ones 12 mm. *Corolla* funnel-shaped, 4½–5½ cm long, reddish purple, pale violet or pink, often paler without and towards base, rarely entirely white; limb subentire, midpetaline bands hirsute outside. *Stamens* and *style* included. Filaments glandular-pilose at the base, the corolla inside with long hairs between their bases. Ovary glabrous, 2-celled. *Fruit* globose, 8 mm diam., with leathery wall, orange red, reddish or brownish, 4- or less-seeded.

Distr. Bengal to Indo-China, southwards to Siam, the Andaman Islands, and *Malaysia*: Sumatra, Malay Peninsula, Java, Madura.

Ecol. Thickets, secondary forests, edges of forests, teak-forests, roadsides, open grounds, from sea-level to 1700 m.

Use. The stems are used as binding material for bundles of firewood (Sumatra: Karo Uplands).

Vern. *Akar tapah rusa*, *akar têmiang*, *akar ulan bukit*, *akar lana bulu*, Mal. Pen., *akar bulu* or *bubulu*, Sumatra, *areuj bulu*, *areuj bulu beureum*, *areuji bulu*, S, *kotong*, *djamat*, *klurak*, J. For more local names see *Blumea* 5 (1943) 370.

Notes. The density of hairiness varies considerably; mostly the hairs are rather stiff and bristly, sometimes they are softer, more silky and more or less appressed to the stems, petioles and leaf-surfaces. Such specimens are found in Sumatra as well as in Java and Madura; however, they seem to be more common in Sumatra. The shape of the bracts also greatly varies; the outer ones may be elliptic to narrowly lanceolate.

For a discussion of the synonyms *Lettsomia capitata*, *L. peguensis*, and *L. strigosa*, see *Blumea* 5 (1943) 370, and 7 (1952) 184.

18. *Argyreia maingayi* (CLARKE) HOOGL. *Blumea* 7 (1952) 185.—*Lettsomia maingayi* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 195.

Stems twining, patently fulvous-hirsute when young, later on glabrescent. *Leaves* ovate, rarely elliptic-oblong or obovate, 9–20 by 3½–11 cm; rounded at the base or shortly attenuate into the petiole, acuminate at the apex; upper surface glabrous or nearly so, lower surface strigose-hirsute on the nerves only; midrib and 5–6 nerves on either side prominent beneath, minor nervation reticulate, rather prominent beneath; petiole 1½–5 cm, sparsely patent- to appressed-hirsute. *Peduncles* axillary, stout, terete, 1½–5 cm long, patently hirsute, deeply longitudinally grooved when dry; flowers in a dense, capitate cyme at the end of the peduncle; diam. of capitulum 5–9, with the corollas up to 17 cm, in poorly developed specimens smaller. Outer bracts broadly ovate to narrowly lanceolate, obtuse to acute at the apex, rounded at the base, 2½–4 cm long, rather sparsely fulvous-hirsute to nearly glabrous outside and at the margins, glabrous inside; upper bracts smaller and narrower. Pedicels very short or none. *Sepals* ovate-oblong, long-acuminate, three outer ones 11–15 mm long, of which the

acumen 6–9 mm, long-hirsute outside, the basal part glabrous; two inner ones 9–13 mm long. *Corolla* funnel-shaped with distinct tube, 4½–6 cm long, white with pink, red, crimson or purple stripe on the middle of each lobe; limb subentire, midpetaline bands hirsute, connecting fields glabrous. *Stamens* and *style* included. Filaments glandular-pilose at the base. Ovary glabrous, 2-celled. *Fruit* ovoid, ca 12 mm long, pink, 1-seeded.

Distr. *Malaysia*: Malay Peninsula.

Ecol. Jungle, swamps and edges of rivers, up to 1000 m.

Uses. The slightly sweet fruits are said to be edible; ALVINS states that a decoction of the roots may be used externally for pains in the bones.

Vern. *Akar bungah butang, akar sémulut, akar térong térong, akar ulan gajah, akar sapu utan, akar kélupus, akar tentérong*, Mal. Pen.

Note. As is the case in *Argyreia ridleyi* and *A. capitata* the shape of the bracts varies a great deal; in some specimens they are narrowly lanceolate, 30 by 3 mm, but mostly they are broader, up to broadly ovate, with a relatively small number of intermediates.

19. *Argyreia ridleyi* (PRAIN) PRAIN *ex* OOSTSTR. *Blumea* 5 (1943) 370; HOOGL. *Blumea* 7 (1952) 185.—*Lettsomia ridleyi* PRAIN, J. As. Soc. Bengal 63, 2 (1894) 98.—*Lettsomia ridleyi* PRAIN *var. velutina* PRAIN, *l.c.* 99.

Stems twining, densely hairy with fulvous, appressed hairs. *Leaves* ovate or elliptic, or the upper ones elliptic-oblong, 7½–18 by 3½–13 cm, base rounded, or shortly attenuate into the petiole; apex acuminate to cuspidate, with a narrow, acute and mucronulate acumen; upper surface glabrous or nearly so, lower surface rather densely hairy with patent or loosely appressed hairs, more densely so on the nerves; midrib and 6–9 nerves on either side prominent beneath, minor nervation reticulate, rather prominent beneath; petiole 2½–8 cm, hairy like the stem. *Peduncles* mostly shorter than or as long as the petiole, rarely longer, 1–18 cm, hairy like the stems; flowers in a broad, capitate, 8–10-flowered cyme. Bracts large, ovate to lanceolate, acuminate, 2–3 cm long, glabrous and purple inside, almost tomentose outside; upper bracts smaller and narrower. Pedicels very short. Two outer *sepals* ovate, sharply acute to acuminate, glabrous, hairy below the apex, or over the whole surface, 6–7 mm long, three inner ones elliptic to broad-elliptic, obtusish, ca 5½ mm long, glabrous; sepal 3 sometimes with a few hairs near the apex. *Corolla* funnel-shaped, ca 3 cm long, white or pinkish; limb shallowly lobed; midpetaline bands hirsute outside. Ovary glabrous, 2-celled. *Fruit* ovoid, ca 13 mm long, pink.

Distr. *Malaysia*: Malay Peninsula, Riouw and Lingga Archipelagos.

Ecol. In the Malay Peninsula locally in damp forests up to ca 600 m.

Vern. *Akar simpis, akar saga molek, akar térong*, Mal. Pen.

Notes. PRAIN'S *var. velutina* differs from '*var. typica*' (PRAIN, *l.c.* 98) by its somewhat smaller

leaves and by being more densely hirsute. The differences do not make the impression to be of great importance, and may be due to differences in age or habitat.

20. *Argyreia sorsogonensis* (ELMER) OOSTSTR. *Blumea* 6 (1950) 340.—*Rivea sorsogonensis* ELM. *Leaf. Philip. Bot.* 10 (1939) 3721.

Stems twining, terete, solid, very sparsely pilose, light to dark brown. *Leaves* narrowly ovate to oblong, 7–15 by 3–6 cm, rounded at the base, gradually attenuate towards the acute, mucronulate apex, sparsely strigillose or glabrous above, subglabrous beneath or sparsely strigillose on the nerves; nerves ca 8 on either side of the midrib; petiole 3½–7 cm, strigillose. *Peduncles* axillary, up to 18 cm long, strigillose. Flowers in a few-flowered cyme with long-persistent, oblong-lanceolate, acute, sparsely appressed-pilose, 15–22 mm long bracts, inserted at the base of the pedicels. Pedicels 2–3 mm long, densely appressed-pilose. *Sepals* 7½–8 mm long; two outer ones ovate, obtuse or shortly apiculate, densely greyish appressed-pilose outside, glabrous inside; sepal 3 slightly broader, obtuse, with one glabrous margin; two inner sepals broad-ovate, obtuse, with two glabrous margins. *Corolla* funnel-shaped (only seen in bud); limb subentire, slightly undulate; midpetaline bands sericeous, connecting fields and basal portion of corolla glabrous. Ovary glabrous, 2-celled. *Fruit* unknown.

Distr. *Malaysia*: Philippines (Luzon).

Ecol. In light woods among shrubberies at 300 m.

21. *Argyreia sphaerocephala* (PRAIN) HOOGL. *Blumea* 7 (1952) 183.—*Lettsomia sphaerocephala* PRAIN, J. As. Soc. Beng. 73, 2 (1904) 19.

Stems twining, terete, sparsely strigose. *Leaves* narrowly ovate, 5–10 by 2½–4 cm, rounded at the base, acute or slightly acuminate at the apex, sparsely strigose on both sides; midrib and 5–6 nerves on either side slightly prominent beneath; petiole 1–3½ cm, sparsely strigose. *Peduncles* axillary, thin, terete, up to ca 20 cm long, 2/3–1 mm diam., sparsely strigose; flowers in a dense, ca 30-flowered capitate cyme. Pedicels 3–4 mm. Outer bracts transverse-elliptic, ca 2½ by 3 cm, hirsute outside, sparsely so inside, innermost bracts obovate-spathulate, ca 5 by 3 mm. *Sepals* ovate, ca 4 mm long, two outer ones obtuse, sepal 3 rounded, two inner ones retuse at the apex; outer sepals hirsute near the apex only, inner ones in the central part only. *Corolla* infundibuliform-campanulate (PRAIN), 2½ cm long (PRAIN), pink; limb probably subentire, midpetaline bands hirsute, connecting fields and lower portion of corolla glabrous. Filaments glabrous. Ovary glabrous, 2-celled. *Fruit* unknown.

Distr. *Malaysia*: Malay Peninsula (Perak).

Note. The collections of this remarkable species only contain flower-buds. The species is easily recognized by the capitate inflorescences with large bracts at the end of the long and slender peduncle.

2. Section *Schizanthus*

G. DON, Gen. Syst. 4 (1838) 256.—*Argyreia* sect. *Euargyreia* ENDL. Gen. Pl. (1839) 655.

Corolla distinctly 5-lobed to 5-parted. Stamens and style mostly exerted.

22. *Argyreia reticulata* (PRAIN) HOOGL. *Blumea* 7 (1952) 190.—*Lettsomia penangiana* (CHOISY) MIQ. var. *reticulata* PRAIN, J. As. Soc. Beng. 63, 2 (1894) 99.

## KEY TO THE VARIETIES

1. Two outer sepals *ca* 7½ by 4 mm; two inner ones *ca* 7 by 5 mm, all broadly acute at the apex. var. *reticulata*  
 1. Two outer sepals *ca* 4 by 3 mm, broadly acute at the apex; two inner ones *ca* 4 by 4½ mm, rounded, mucronate at the apex. var. *microcalyx*

var. *reticulata*.

Stems twining, to 10 m, terete, sparsely strigose. *Leaves* ovate to broadly lanceolate, 5½–10 by 2½–4½ cm, obtuse to rounded at the base, slightly acuminate at the apex; upper surface sparsely strigose, glabrescent, lower surface sparsely strigose; midrib and 4–5 nerves on either side prominent beneath; minor nervation reticulate, rather conspicuous beneath; petiole slender, 1–3 cm, strigose. *Peduncle* axillary, terete, 2–9 cm long, strigose, cymosely 3–15-flowered. *Pedicels* *ca* 7–9 mm long. *Bracts* linear-lanceolate, *ca* 5 mm long, strigose beneath, caducous. *Sepals* ovate, two outer ones *ca* 7½ by 4 mm, two inner ones *ca* 7 by 5 mm, broadly acute at the apex, all sepals rather sparsely strigose, sepal 3 with one, two inner sepals with two broad glabrous margins. *Corolla* funnel-shaped, *ca* 20–25 mm long, waxy white, pale blue inside; tube distinct, *ca* 7½ mm long, glabrous; limb distinctly 5-lobed; lobes *ca* 10 mm long, midpetaline bands hirsute outside with a glabrous wing on either side along the whole length. *Stamens* and *style* about as long as corolla. Base of filaments dilated, with glandular hairs. Ovary glabrous, 2-celled. *Fruit* ovoid, *ca* 15 mm long, magenta, 1-seeded.

Distr. *Malaysia*: Malay Peninsula (Perak, Pahang, Selangor).

Ecol. In open bamboo-forest and in cleared places, 150–1400 m.

var. *microcalyx* HOOGL. *Blumea* 7 (1952) 191.

Differs from var. *reticulata* by the smaller calyx; two outer sepals *ca* 4 by 3 mm, broadly acute at the apex; two inner sepals *ca* 4 by 4½ mm, rounded, mucronate at the apex.

Distr. *Malaysia*: Malay Peninsula (Selangor).

Ecol. Forest-edges.

23. *Argyreia oostroomii* HOOGL. *Blumea* 7 (1952) 189, f. 1, a–g.

Stems twining, young parts fulvous-strigose with partly slightly patent hairs. *Leaves* ovate, 6–14 by 3½–8½ cm, rounded or slightly cordate at the base, acute or slightly acuminate at the

apex, upper surface glabrous, but sparsely strigose on midrib, lower surface strigose on midrib and lateral nerves, sparsely so on the intervenium; midrib and 5–8 nerves on either side prominent beneath, minor nervation reticulate, rather inconspicuous; petiole short, 1–4½ cm long, hairy like the stem. Upper *inflorescences* forming a rather lax panicle, composed of more or less long-peduncled cymes, leafless or with a few small leaves; lower ones axillary. *Peduncles* terete, longer than the petioles, 3–16 cm long, hairy like the stem, cymosely *ca* 25-flowered. *Pedicels* *ca* 3 mm long, hairy. *Bracts* ovate, *ca* 5 mm long, rounded, often shallowly split at the apex, hirsute beneath, caducous. *Sepals* subequal in form, broadly ovate, rounded at the apex, *ca* 4 mm long, fulvous-hirsute, sepal 3 with one, two inner sepals with two glabrous margins. *Corolla* funnel-shaped, *ca* 13 mm long, white, tube violet mauve, dark purple inside; limb distinctly 5-lobed, lobes ovate, *ca* 4 mm long; midpetaline bands hirsute with a glabrous wing on either side along the whole length, basal portion of corolla glabrous; inside sparsely hirsute above the base of the stamens. Filaments with dilated base, glabrous. Ovary glabrous, 2-celled. *Fruit* (unripe?) ovoid, *ca* 12 mm long, pink, 1-seeded.

Distr. *Malaysia*: Malay Peninsula (Kelantan and Trengganu).

Ecol. Edges of secondary forest.

24. *Argyreia corneri* HOOGL. *Blumea* 7 (1952) 192, f. 1, m–q.

Stems twining, to 15 m or more, terete, strigose. *Leaves* ovate, 3½–7 by 2–4 cm, obtuse or rounded at the base, acuminate at the apex; upper surface glabrous except the strigose midrib, lower surface densely light-yellowish sericeous; midrib and 5–6 nerves on either side prominent beneath, minor nervation reticulate, inconspicuous; petiole 1–2½ cm, strigose. *Peduncles* axillary, terete, short, 10–18 mm, densely sericeous, cymosely 1–5-flowered, usually 1-flowered. *Pedicels* *ca* 4–6 mm, sericeous. *Bracts* lanceolate, *ca* 4 mm long, sericeous, caducous. *Sepals* broadly ovate, broadly acute to rounded at the apex, densely sericeo-tomentose outside, one margin of sepal 3 and both margins of sepals 4 and 5 less densely hairy or partly glabrous; three outer sepals *ca* 8½ mm, two inner ones *ca* 6½ mm long. *Corolla* funnel-shaped, *ca* 2½ cm long, pale pinkish white outside, rose-pink inside; tube not distinct; limb distinctly 5-lobed, lobes ovate-oblong, *ca* 15 mm long; midpetaline bands hirsute upwards with a glabrous wing along the whole length, rest of corolla glabrous. Filaments dilated and glandular hairy at the base. Ovary glabrous, 2-celled. *Fruit* unknown.

Distr. *Malaysia*: Malay Peninsula (Pahang).

25. *Argyreia oblongifolia* OOSTSTR. *Blumea* 5 (1943) 376, f. 2, a-c.

Stems twining; young branches terete, very shortly greyish appressed-pilose, adult ones angular, glabrescent. *Leaves* oblong to narrowly oblong with subparallel margins, 5-10 by 1½-3 cm; rounded at the base; attenuate towards the obtusish, mucronulate apex; chartaceous or thinly coriaceous, on both sides sparsely appressed-pilose in youth, soon glabrous; midrib prominent beneath; nerves 7-8 on either side hardly conspicuous; minor nervation inconspicuous; petiole 1½-3 cm long, slender, shortly appressed-pilose. *Inflorescences* axillary, pilose like the branches; *peduncles* straight, patently erect, 2½-7 cm long, umbellately cymose at the apex with 2-5 branches. Pedicels 2-3 mm. Bracts minute, occasionally a foliaceous bract in the cyme. *Sepals* subequal, shortly appressed-pilose outside; two outer ones ovate-triangular, three inner ones broadly ovate-triangular, all attenuate towards an acutish apex, *ca* 3½-4 mm long; sepal 3 with one, sepals 4 and 5 with two glabrous margins. *Corolla* funnel-shaped, *ca* 15 mm long, deeply 5-lobed, white; tube *ca* 5-6 mm long, gradually widened towards the limb, glabrous; lobes oblong-ovate, *ca* 9 mm long; midpetaline bands sericeous outside, margins glabrous. Filaments glabrous. Ovary glabrous, 2-celled. *Fruit* ovoid, up to 15 mm long (mature?), nodding, reddish.

Distr. *Malaysia*: Borneo (W. Kutai).

Ecol. In primary forest, *ca* 1600 m.

26. *Argyreia glabra* CHOISY in ZOLL. Syst. Verz. 2 (1854) 128, 130; OOSTSTR. *Blumea* 5 (1943) 373, as to the name only; *ibid.* 7 (1952) 174.—*Rivea glabra* HALLIER f. Bull. Herb. Boiss. 6 (1898) 714.

Stems twining, shortly appressed-pilose. *Leaves* ovate, 5-8 by 2-4 cm; base rounded, apex acute; appressed-pilose on both sides with short, rigid hairs, more densely beneath than above; midrib and *ca* 10-11 nerves on either side prominent beneath; minor nerves indistinct beneath; petiole 1-1½ cm, pilose like the stems. *Peduncles* in the upper leaf-axils, angular, *ca* 5 cm long, densely appressed-pilose with short, fulvous hairs, as are the branches of it and the pedicels, umbellately cymose, few- to several-flowered. Pedicels up to 5 mm long. Bracts ovate, obtuse, *ca* 4-5 mm long, densely appressed-pilose. *Sepals* densely appressed-pilose with fulvous hairs; three outer ones ovate-elliptic, obtuse, *ca* 6 mm long; two inner ones ovate, rounded, a little shorter. *Corolla* 5-fid; tube at least 10 mm long, widened above, glabrous; lobes ovate, *ca* 15 mm long, patent to reflexed; midpetaline bands sericeous. Filaments dilated and densely pilose at the base. Ovary glabrous, 2-celled. *Fruit* unknown.

Distr. *Malaysia*: Lesser Sunda Islands (Lombok).

Ecol. In forests.

27. *Argyreia luzonensis* (HALLIER f.) OOSTSTR. *Blumea* 5 (1943) 379, note; *ibid.* 6 (1950) 342.—*Rivea luzonensis* HALLIER f. Bull. Herb. Boiss. 6

(1898) 714, t. 19.—*Rivea glabrata* ELMER, Leaf. Philip. Bot. 1 (1908) 334.

Stems twining, terete, in dry state longitudinally wrinkled, sparsely appressed-pilose, greyish-brown. *Leaves* broadly to narrowly ovate, or oblong, 7-18 by 3½-13 cm, truncate or subcordate at the base, attenuate or acuminate at the apex, glabrous above, or with some scattered hairs, sparsely pilose with appressed hairs beneath; nerves 6-7 on either side of midrib; minor nervation reticulate with subparallel secondary veins; petiole 1½-4(-8) cm, sparsely appressed-pilose. *Peduncles* axillary, slender, 7-20 cm, sparsely appressed-pilose, or more densely so towards the apex, cymosely branched at the apex, with many (rarely few) flowers in an umbellate cyme. Pedicels 1-2 mm, densely appressed-pubescent. Bracts lanceolate to narrowly oblong, obtuse, 3-7 mm long, appressed-pubescent outside, caducous. *Sepals* equal in length or outer ones a little shorter, ovate-oblong, obtuse, sometimes acutish, *ca* 5-6 mm long, densely greyish or whitish appressed-pilose outside; sepal 3 with one thin glabrous margin; two inner sepals with two thin glabrous margins. *Corolla* funnel-shaped, *ca* 2½-3 cm long, reddish; limb distinctly 5-lobed, *ca* 4 cm diam.; lobes ovate, midpetaline bands appressed-sericeous, their tips penicillate, tube and margins of lobes glabrous. Filaments glandular-papillose. Ovary glabrous, 2-celled. *Fruit* globose, *ca* 1 cm or slightly more in diam., purple or pinkish red; sepals slightly enlarged in fruit, inner ones with red margins; fruiting pedicels up to 8 mm, but often shorter; seed 1, globose.

Distr. *Malaysia*: Philippines (Luzon).

Ecol. Common in thickets and forests, especially along mountain streams at low and medium altitudes, ascending to 1500 m (MERRILL).

Use. The stems are used for tying purposes (ELMER).

Vern. *Busilád, sabaltukon, Tag., deno(k)dokto, Ig., tauid-tauid, Neg., Philippino wire, E.*

28. *Argyreia kunstleri* (PRAIN) PRAIN ex OOSTSTR. *Blumea* 5 (1943) 382, 383; HOOG. *Blumea* 7 (1952) 187, f. 1, h-l.—*Lettsomia kunstleri* PRAIN. J. As. Soc. Beng. 63, 2 (1894) 100.—*Lettsomia curtisii* PRAIN l.c.—*A. curtisii* (PRAIN) PRAIN ex OOSTSTR. l.c. 367.

Stems twining, up to 30 m, young parts fulvous-strigose, sometimes with additional, short, slightly patent hairs. *Leaves* ovate to broadly ovate, 6-15 by 3-10 cm, obtuse to rounded and often shortly attenuate at the base, acuminate at the apex; upper surface glabrous except on the midrib, lower surface densely to sparsely fulvous-hirsute, most densely so on the nerves; midrib and 7-11 nerves on either side prominent beneath, minor nervation reticulate, inconspicuous; petiole 1-5 cm, hairy like the stem. *Peduncles* axillary, terete, longer than petioles, 5-20 cm, hairy like the stem, cymosely 3-30-flowered. Pedicels *ca* 3 mm. Bracts linear-lanceolate, *ca* 5 mm long, slightly hirsute beneath, caducous. *Sepals* unequal, two outer ones broadly ovate with rounded apex, *ca* 4½ mm

long, hirsute at least in the basal half outside; two inner sepals transverse-elliptic, *ca* 6 mm long, often incised at the apex, most deeply so in fruit, glabrous outside or sparsely hirsute at the base. *Corolla* funnel-shaped, 15–18 mm long, whitish or pinkish outside, bright red inside; tube broad, limb distinctly 5-lobed, lobes ovate, *ca* 5 mm long; midpetaline bands hirsute with a glabrous wing on either side along the whole length. Filaments dilated at the base, glabrous. Ovary glabrous, 2-celled. *Fruit* ovoid, *ca* 15 mm long, deep red, 1-seeded.

Distr. *Malaysia*: Malay Peninsula.

Ecol. Open jungle, up to 700 m.

29. *Argyreia rubicunda* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 426; OOSTSTR. *Blumea* 5 (1943) 371, as to the name and synonyms only; *ibid.* 7 (1952) 173; HOGL. *Blumea* 7 (1952) 187.—*Convolvulus rubicundus* WALL. Cat. (1828) no 1409, *nom. nud.*—*Lettsomia rubicunda* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 195.

Stems twining, densely tomentose as are the petioles and the inflorescences, with light fulvous hairs. *Leaves* elliptic or sometimes ovate-elliptic, 8–16 by 4–10 cm, base rounded, apex shortly acuminate, or obtuse with a short acumen, thinly coriaceous, glabrous above or slightly hairy on the midrib, short-pilose to tomentose beneath, more densely so on the nerves; midrib and 7–9 nerves on either side prominent beneath; petiole short and stout, up to 5 cm. *Peduncles* axillary, slender, terete, 8–15 cm, in fruit up to 20 cm, cymosely branched at the apex, several- to many-flowered; cyme 6–12 cm diam. Bracts small, caducous. Pedicels 2–4 mm long, thick. Two outer *sepals* strongly concave, orbicular or slightly broader than long, rounded at the apex, 6–7 mm long, densely light fulvous tomentose outside, glabrous inside; sepal 3 transverse-elliptic, 6 mm long, outside tomentose with one glabrous margin; two inner sepals transverse-elliptic, 6 mm long, outside densely sericeous with two glabrous margins. *Corolla* funnel-shaped to campanulate, deeply 5-lobed, pink (PRAIN); lobes ovate-oblong (?), with lanceolate, densely hairy midpetaline bands and glabrous margins. *Fruit* ovoid, *ca* 14 mm long, pinkish white (GRIFFITH) or purplish red (MANGAY), at the base enclosed by the cupular to shortly funnel-shaped calyx, 1-seeded; fruiting calyx *ca* 8 mm high, *ca* 12–13 mm diam., tomentose outside.

Distr. *Malaysia*: Malay Peninsula (Negri Sembilan, Malacca).

Vern. *Akar pèra bèntak*, *akar saga molek*.

30. *Argyreia parviflora* (RIDLEY) OOSTSTR. *Blumea* 5 (1943) 382; *ibid.* 7 (1952) 174.—*Lettsomia parviflora* RIDLEY, Kew Bull. (1925) 86.—*A. glabra* (non CHOISY) OOSTSTR. *Blumea* 5 (1943) 373.

Stems twining, glabrous or nearly so. *Leaves* ovate to elliptic, 6–12 by 3½–8½ cm, thinly coriaceous; base rounded or slightly retuse, apex obtusish or acutish or shortly acuminate, glabrous on both sides or nearly so; midrib prominent

beneath, sulcate above; nerves 5–8 on either side, not or ± distinctly prominent beneath, minor nerves parallel, distinctly visible beneath; petiole rather short, 1½–4 cm, glabrous or nearly so. *Peduncle* terete, often curved at its base, 3–15 cm, glabrous or shortly appressed-pilose, mainly towards the apex, umbellately cymose, up to 6-flowered. Pedicels as long as or longer than the calyx, 5–9 mm, in fruit 10–18 mm, shortly appressed-pilose. Bracts at base of cyme linear, up to 12 mm long, sparsely pilose, upper ones shorter. *Sepals* slightly unequal, sparsely appressed-pilose with very short hairs; 2 outer ones ovate-triangular, obtuse, *ca* 5 mm long, 3 inner ones orbicular to transverse-elliptic with rounded to emarginate apex; sepal 3 with one, sepals 4 and 5 with two narrow, glabrous, reddish margins, all 6–6½ mm long. *Corolla* deeply 5-lobed (only one not fully expanded corolla could be examined), white, tube *ca* 5–6 mm long, lobes oblong, *ca* 12–13 mm long, consisting of the midpetaline band with a narrow, thin, glabrous wing on either side along the whole length; midpetaline band glabrous except for the apical portion. Filaments sparsely pilose at the base; ovary glabrous, probably 2-celled. *Fruit* ellipsoid, *ca* 15 mm long, its base enclosed by the cupular calyx.

Distr. *Malaysia*: Sumatra.

Vern. *Akar dèdaup kèjil*, Palembang.

31. *Argyreia erinacea* OOSTSTR. *Blumea* 5 (1943) 374, f. 3, f–g; *ibid.* 7 (1952) 175.

Stems twining, tall; young branches densely set with appressed or subpatent, greyish or fulvous, strigillose hairs, glabrescent. *Leaves* ovate to elliptic, sometimes narrower, 7–13 by (2½–) 4½–11 cm, subcoriaceous; base rounded to truncate or slightly retuse to subcordate, apex obtuse to shortly acuminate, mucronulate; upper surface glabrous or sparsely strigillose on midrib and basal lateral nerves, lower surface strigillose; midrib and 6–7 nerves on either side prominent beneath; minor nervation indistinct; petiole 2½–6 cm, strigillose. *Peduncles* axillary, 3–11 cm, densely strigillose, umbellately cymose at the apex. Pedicels up to 4 mm. Bracts minute, caducous. Two outer *sepals* broadly ovate-triangular, obtuse, *ca* 4½ mm long, densely strigillose; sepal 3 orbicular, 5–6 mm long, strigillose, one glabrous margin excepted; two inner sepals orbicular to transverse-elliptic, rounded at the apex, *ca* 5 mm long, strigillose, the broad lateral margins excepted. *Corolla* deeply 5-lobed, white with pale purple inside; tube *ca* 6–7 mm long, glabrous; lobes oblong or ovate-oblong, up to 17 mm long; midpetaline bands sericeo-strigillose, margins glabrous. Filaments with thickened glabrous base. Ovary glabrous, 2-celled. *Fruit* ellipsoid, obtuse, up to 12 mm long, red; seed 1. Fruiting pedicels and branches of cyme reflexed.

Distr. *Malaysia*: Borneo (Mt Kinabalu).

Ecol. In forests, 850–1500 m.

32. *Argyreia micrantha* OOSTSTR. *Blumea* 5 (1943) 375, f. 3, a–e.—Fig. 60a–b.

Stems twining, up to 12 m high; young branches densely pilose with appressed pale greyish, fulvous or olivaceous, very short and stiff hairs, making the impression of being farinose. *Leaves* ovate-oblong to elliptic-oblong, 7-12 by 2½-6 cm, chartaceous; base rounded, apex acute to acute-acuminate, mucronulate, olive-coloured beneath in dry state, much darker above, sparsely strigillose on both sides, glabrescent; midrib and 7-9 nerves on either side prominent beneath; minor nerva-

glabrous; limb ca 2 cm diam.; lobes oblong, ca 8-10 mm long, reflexed; midpetaline bands sericeo-strigillose, margins glabrous. *Stamens* white; filaments inserted at the mouth of the tube, glabrous at the base. *Ovary* glabrous, 2-celled. *Fruit* unknown.

*Distr. Malaysia:* Borneo (Mt Kinabalu).

*Ecol.* In the jungle, at ca 1500 m.

*Note.* The infructescence and fruit described in *Blumea* 5 (1943) 376 appear to belong to 31. *A. erinacea* OOSTSTR..

**33. *Argyreia discolor* OOSTSTR. *Blumea* 7 (1952) 175.**

Stems twining; branches terete, densely and more or less appressedly pilose with short, fulvous hairs. *Leaves* ovate, 6-8 by 3-5 cm, subcordate at the base, attenuate towards the obtusish apex, subcoriaceous, upper surface green, glabrous or with some strigillose hairs on the midrib; lower surface purple, sparsely pilose with slightly curved hairs, more densely so on the midrib and the 6-7 nerves on either side; petiole 2-2½ cm, sulcate above, pilose like the branches. *Inflorescences* axillary, densely umbellately cymose at the apex; *peduncle* 4-7 cm, strigose-tomentose as are the branches of it, the pedicels and the minute bracts; pedicels 1-3 mm. *Sepals* strigose-tomentose outside, two outer ones broadly ovate-triangular, obtuse, ca 3½ mm long; sepal 3 orbicular to transverse-elliptic, ca 4 mm long, with one glabrous margin; two inner sepals orbicular to transverse-elliptic, ca 4 mm long, with two glabrous margins. *Corolla* 5-partite, purple, paler tipped; tube ca 6 mm long, glabrous; lobes ovate-oblong, obtuse, up to ca 17 mm long; midpetaline bands sericeous, margins glabrous; filaments inserted at the mouth of the tube, with thickened base. *Ovary* glabrous, 2-celled. *Fruit* unknown.

*Distr. Malaysia:* Br. N. Borneo.

*Ecol.* At ca 1500 m.

**34. *Argyreia cinerea* OOSTSTR. *Blumea* 5 (1943) 374, f. 3, n-s.—*Rivea glabra* HALLIER f. var.; KOORDERS, Minah. (1898) 545.**

Stems twining, up to 15-20 m high; young branches densely pale greyish pubescent or shortly tomentose as are the petioles, peduncles and inflorescences; adult branches glabrescent. *Leaves* elliptic-oblong, elliptic or ovate-elliptic, 6-13 by 3½-10 cm; at the base rounded, slightly cordate, or shortly contracted into the petiole; narrowed towards the obtusish, obtuse, or shortly apiculate, mucronulate apex; upper surface strigillose, lower surface with very short, crisped hairs; midrib and 9-12 nerves on either side prominent beneath, flat or slightly sulcate above; minor nervation reticulate; petiole 1½-6 cm. *Peduncles* axillary, much exceeding the petioles, straight or slightly curved, 4½-15 cm, umbellately cymose at the apex, with 3-5 branches. *Pedicels* 1-2 mm. Lower bracts oblong-lanceolate, 7-15 mm long, upper ones 2-3 mm. Two exterior *sepals* broadly ovate-triangular or semi-orbicular, obtuse to rounded, three interior ones orbicular to transverse-elliptic;

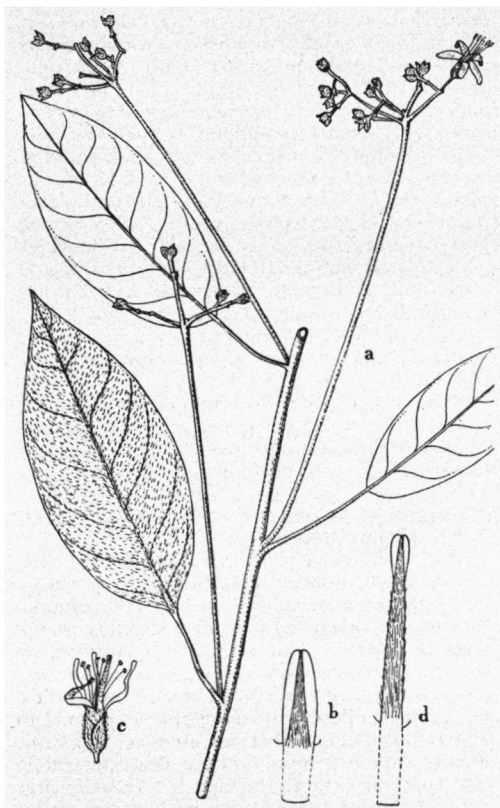


Fig. 60. a-b. *Argyreia micrantha* OOSTSTR. a. Flowering branch, × ½, b. corolla-lobe, × 1½, c-d. *Argyreia caudata* OOSTSTR., c. flower, × ½, d. corolla-lobe, × 1½.

tion indistinct; petiole 2-3½ cm, pilose like the branches. *Peduncles* axillary, straight, patently erect, terete, 3-12 cm, pilose, umbellately cymose at the apex, with 3-6 branches. *Pedicels* 2½-5 mm, angular to sulcate, pilose. *Bracts* caducous. *Sepals* equal, ca 3 mm long, shortly pilose outside; two outer ones broadly ovate-triangular to suborbicular, obtuse; sepal 3 broadly triangular to orbicular, obtuse, with one glabrous margin; two inner sepals transverse-elliptic, broadly rounded at the apex, their lateral margins glabrous. *Corolla* deeply 5-lobed, purple; tube cylindrical, ca 4-5 mm long,



all 2½–3 mm long, densely pale greyish pubescent to shortly tomentose outside, sepal 3 with one, sepals 4 and 5 with two glabrous lateral margins. *Corolla* small, deeply 5-lobed, white; tube cylindrical, 2½–3½ mm long; lobes oblong, ca 5½–6 mm long, reflexed; midpetaline bands sericeous outside, margins glabrous. Filaments inserted at the mouth of the tube, at the base flattened and with a few very short hairs. Ovary glabrous, 2-celled. *Fruit* ellipsoid, up to 9 mm long, reddish purple.

Distr. *Malaysia*: North Celebes.

Ecol. In forests at 300–400 m.

Vern. *Wuliliten*, Tontemboan.

35. *Argyreia osyrensis* (ROTH) CHOISY in DC. Prod. 9 (1845) 334; OOSTSTR. *Blumea* 7 (1952) 177, f. 2, a–c.—*Ipomoea osyrensis* ROTH, Nov. Pl. Spec. (1821) 117.—*Lettsomia aggregata* Roxb. var. *osyrensis* CLARKE in HOOK. f. Fl. Br. Ind. 4 (1883) 192.

Stems twining, terete, densely white, greyish or pale brown tomentose. *Leaves* ovate or broadly ovate, 4–12 by 4–10 cm; base cordate, apex subacute; lower surface densely tomentose to shortly lanate, upper surface less tomentose (or glabrous); midrib and 7–11 nerves on either side rather prominent beneath; petiole 2–5 cm, tomentose, grooved. *Peduncles* 2½–6 cm, densely tomentose; flowers in a capitate inflorescence at the end of the peduncle. Pedicels very short or none. Bracts broadly obovate to spatulate or orbicular, truncate, ca 8–12 mm long, tomentose outside, glabrous inside, subsistent. Two outer *sepals* obovate to spatulate, obtuse, 9–10 mm long; sepal 3 oblong, obtuse, ca 8 mm long; two inner sepals oblong, obtuse, 5½–6 mm long, all tomentose outside and glabrous inside. *Corolla* tubular-campanulate, 12–15 mm long, deeply 5-lobed, pink; tube 6–7 mm long, glabrous; lobes narrowly ovate, emarginate, ca 8 mm long, with a hairy midpetaline band and narrow glabrous margins. *Stamens* and *style* exerted; filaments dilated and hairy at the base. Ovary glabrous, 2-celled. *Fruit* globose, 6–8 mm diam., red, 2–1-seeded, surrounded by the enlarged concave sepals, which are red within; seeds subglobose.

Distr. Deccan Peninsula, Ceylon, Burma, Indo-China, Siam, Tenasserim, in *Malaysia*: N. Sumatra (Atjeh).

Ecol. In dry open places.

Note. The name *Argyreia aggregata* (ROXB.) CHOISY, Mém. Soc. Phys. Genève 6 (1833) 427, under which name this species has been mentioned by VAN OOSTSTROOM in *Blumea* 5 (1943) 380, refers to specimens with a glabrous upper leaf-surface. Such specimens appear to be confined to the Deccan Peninsula. They are, most probably, not specifically distinct.

36. *Argyreia pseudorubicunda* OOSTSTR. *Blumea* 7 (1952) 173.—*A. rubicunda* (non CHOISY) OOSTSTR. *Blumea* 5 (1943) 371.

Stems twining, up to 5 m high, more or less densely and shortly appressed-pilose, later on

glabrous. *Leaves* ovate-oblong, ovate or elliptic, 6½–16 by 3½–10 cm, base rounded or slightly cordate, apex obtuse to acute; subcoriaceous, glabrous above, or with some hairs on midrib, more or less densely appressed-pilose beneath; midrib and 6–10 nerves on either side prominent beneath; petiole 2–10 cm, pilose like the stems. *Peduncles* 5–20 cm, pilose like the stems, cymosely ramified at the apex, many-flowered. Pedicels 1–4 mm, in fruit up to 10 mm. Bracts minute, 1–2 mm long, caducous, rarely a casual foliaceous bract in the cyme. Two outer *sepals* ovate-triangular, obtuse, 5 mm long, appressed-pilose outside or partly glabrescent, glabrous inside; sepal 3 orbicular or somewhat transverse-elliptic, 5–6 mm long, appressed-pilose with one glabrous margin, two inner sepals transverse-elliptic, strongly concave, 5–6½ mm long, appressed-pilose with 2 glabrous margins. *Corolla* deeply 5-lobed, pinkish purple; tube cylindrical, ca 6 mm long, glabrous, lobes linear or linear-lanceolate, reflexed, ca 16–18 mm long, appressed-sericeous outside, at the apex with 2 small glabrous lobules. Filaments with a large tooth at the glabrous base. Ovary glabrous, 2-celled. *Fruit* ellipsoid, ca 15 mm long, pink.

Distr. *Malaysia*: Sumatra.

Ecol. Thickets, secondary and primary forests, 360–800 m.

Note. The density of the indumentum of stems, lower surface of leaves and inflorescences appears to be variable; it varies from densely pilose or nearly tomentose to nearly glabrous.

37. *Argyreia caudata* OOSTSTR. *Blumea* 5 (1943) 379, f. 3, h–m.—Fig. 60c–d.

Stems twining, up to 10 m high; branches terete, shortly greyish tomentose, solid. *Leaves* narrowly ovate to ovate-lanceolate, or ovate to elliptic, 7–16 by 2–12 cm; base rounded, or slightly cordate, apex acuminate, often with a linear acumen, or shortly cuspidate; lower surface more or less densely pilose with short, soft hairs, upper surface less densely pilose with more stiff hairs; midrib and 9–10 nerves on either side prominent beneath; minor nervation more or less distinct; petiole 2–8 cm long, shortly tomentose. *Inflorescences* approximate at the end of the branches in an elongate, narrow panicle; peduncles 1–8 cm, tomentose. Pedicels 4–5 mm, angular, thickened in fruit. Bracts lanceolate or narrowly lanceolate, apex caudate. Two outer *sepals* broadly ovate to elliptic, shortly to long and narrowly acuminate, 8–10 mm long; sepal 3 ovate, shortly acuminate, ca 7½–9 mm long; two inner sepals ovate to elliptic, obtuse, but shortly cuspidate, ca 6–7 mm long, all pilose outside, glabrous inside. *Corolla* deeply 5-lobed, rose-purple; tube ca 8 mm long, glabrous; lobes linear, ca 18–20 mm long, appressed-sericeous to strigillose outside, winged towards the apex with glabrous wings. Filaments thickened and verrucose at the base. Ovary glabrous, 2-celled. *Fruit* ellipsoid or subglobose, ca 10–12 mm long, purple-red.

Distr. *Malaysia*: Borneo.

Ecol. In the jungle, 800–1500 m.

38. *Argyrela bohollensis* (MERR.) OOSTSTR. *Blumea* 6 (1950) 345.—*Lettsomia bohollensis* MERR. Philip. J. Sc. 29 (1926) 485.

Stems twining, terete or upwards slightly angular, glabrous, pale greyish-brown. *Leaves* ovate or ovate-oblong, 4–10 by 1½–7 cm, rounded or very slightly cordate at the base, acute to shortly acuminate at the apex, thinly coriaceous, in dry state greyish or olivaceous, glabrous, or with a few hairs on the nerves, mainly on the midrib beneath; nerves 8–10 on either side of the midrib; petiole 2–3½ cm, glabrous. *Peduncles* in the upper leaf-axils, cymosely 1–3(–5)-flowered, 2–7½ cm, glabrous or with some hairs. *Pedicels* of central flower ca 8–10 mm, of lateral flowers often shorter, glabrous. Bracts narrowly triangular, with incurved apex, ca 2 mm long, glabrous. *Sepals* glabrous, coriaceous; 2 outer ones broadly ovate-triangular, obtuse, 5 mm long, sepal 3 broadly ovate, obtuse, 5 mm long, with one broad thin margin; two inner sepals broader than long, broadly rounded, concave, ca 4 mm long, with two broad thinner margins. *Corolla* with deeply divided limb; lobes linear, reflexed and twisted, ca 18 mm long, densely sericeous outside, at the apex with 2 triangular glabrous lobules; tube cylindrical, ca 8 mm long, glabrous. Filaments geniculate near their thick, broadened base, pubescent. Ovary glabrous, 2-celled. 'Young fruits oblong-ellipsoid, glabrous, ca 1 cm long' (MERRILL).

Distr. *Malaysia*: Philippines (Bohol).

Ecol. In openings in the forest and along streams, 300–600 m.

Note. A fruiting specimen collected in Luzon, Prov. of Tayabas, Kinataktan, by ORO, For. Bur. 30672, Herb. N.Y., much resembles this species, but has the sepals appressed-pilose outside; fruit ellipsoid, 12–14 mm long, pink.

39. *Argyrela barnesii* (MERR.) OOSTSTR. *Blumea* 6 (1950) 343.—*Rivea barnesii* MERR. Bur. Govt Lab. Publ. 17 (1904) 40.—*Rivea cinerea* ELM. Leaf. Philip. Bot. 1 (1908) 335.

KEY TO THE VARIETIES

- 1. Bracts lanceolate, acuminate. Sepals 7–8 mm long . . . . . *var. barnesii*
- 1. Bracts linear, with a long and linear to filiform acumen. Sepals ca 5 mm long. . . . . *var. urdanetensis*

*var. barnesii*.  
Stems twining, terete, young parts densely pubescent to tomentose, adult parts glabrescent. *Leaves* ovate-oblong, ovate or broadly ovate, 6–18 by 3½–13 cm, rounded or cordate at the base, shortly to long-acuminate or caudate and mucronulate at the apex, more or less densely and softly pilose to tomentose on both sides, sometimes nearly glabrous above; nerves 7–9(–12) on either side of the midrib; petiole 2–5 cm, densely pubescent. *Peduncles* axillary, 2–14 cm long, one to many-flowered, pubescent like the stem. *Pedicels* much shorter than or nearly as long as the sepals, elongated in fruit. Bracts lanceolate, acuminate, lower ones ca 1–2 cm long, pubescent

on both sides. *Sepals* nearly equal in length, 7–8 mm long; two outer ones ovate to broadly elliptic, obtuse or mucronulate, pubescent to tomentose outside; sepal 3 broadly elliptic to orbicular, obtuse or truncate, with one glabrous margin; two inner sepals orbicular, emarginate, with two glabrous margins. *Corolla* 5-parted, lavender; lobes linear, ca 20 by 3–4 mm, densely sericeous outside towards the base, at the apex with 2 triangular glabrous lobules; tube ca 9 mm long, glabrous. Filaments with a tooth above the base, glabrous. Ovary glabrous, 2-celled. *Fruit* ellipsoid, up to 1½(–2) cm long, purple, at the base enclosed by the slightly enlarged sepals; seed 1, ellipsoid, 1 cm long.

Distr. *Malaysia*: Philippines (Luzon, Mindoro, Guimaras Isl., Samar, Leyte, Mindanao).

Ecol. In forests at low and medium altitudes forming tangled masses over the tops of trees and larger shrubs.

Use. The stems are used for tying purposes.

Vern. *Quahal, guahal*, Ig..

Note. The density of the indumentum is extremely variable in this species; the leaves are densely tomentose on both surfaces or much less pilose to glabrous above and sparsely pilose beneath; the same is found in the density of the indumentum on stems and inflorescences.

*var. urdanetensis* (ELMER) OOSTSTR. *Blumea* 6 (1950) 344.—*Rivea urdanetensis* ELM. Leaf. Philip. Bot. 7 (1915) 2605.

*Sepals* smaller, 5 mm long. *Corolla*-lobes glabrous in their basal portion instead of pilose to the base. Bracts narrower, linear, with a long and linear to filiform acumen.

Distr. *Malaysia*: Philippines (Mindanao).

Ecol. In forests, 600 m.

Vern. *Cawilan, kaulilan*, Man..

40. *Argyrela apoensis* (ELMER) OOSTSTR. *Blumea* 6 (1950) 344.—*Rivea apoensis* ELM. Leaf. Philip. Bot. 7 (1915) 2604.

Stems twining, sparsely appressed-pilose, glabrescent. *Leaves* ovate, 6–10 by 3½–6 cm, base truncate or slightly cordate, apex acute to acuminate, upper surface glabrous, lower appressed-pilose, especially along the nerves; nerves 6–8 on either side of midrib; petiole 2–3 cm, appressed-pilose. *Peduncles* in the upper leaf-axils, up to 9 cm long, appressed-pilose towards their apex with yellowish-grey hairs; cymes umbellate, few-flowered. *Pedicels* 2–4 mm, rather densely appressed-pilose. Bracts 8–12 mm long, linear to filiform, with a narrow acumen, hairy beneath, glabrous above. *Sepals* nearly equal in length, ca 6½ mm long, densely appressed-pilose outside; 2 outer ones elliptic-oblong, obtuse, mucronulate; sepal 3 broader, with one glabrous margin; two inner sepals broadly ovate to orbicular, with two glabrous margins. *Corolla* 5-parted, whitish outside, purplish or violaceous inside; tube ca 11 mm long, glabrous; lobes linear, recurved and twisted, ca 24 by 3 mm; midpetaline bands sericeous outside towards the apex, and there with two gla-

brous wings. Filaments with slightly dilated, thick, papillose base. Ovary glabrous, 2-celled. *Fruit* unknown.

Distr. *Malaysia*: Philippines (Mindanao).

Ecol. In forests, ca 450 m, forming dense tangled masses.

Vern. *Dalumosip*, Bag.

Note. Closely related to 39. *A. barnesii* and possibly only a variety of that species.

41. *Argyreia congesta* OOSTSTR. *Blumea* 7 (1952) 176, f. 2, d-f.

Stems twining, densely appressed-pilose to tomentose, with fulvous hairs. *Leaves* narrowly ovate or ovate, 8-17 by 3½-9 cm, rounded at the base, attenuate towards the acute or acuminate apex; lower surface densely appressed-pilose with straight or slightly curved hairs, or almost tomentose in youth, upper surface less densely hairy with more rigid hairs; midrib and 8-10 nerves on either side distinctly visible on both sides; petiole 3-8 cm, grooved, pilose like the stem. *Peduncles* axillary, terete, rather slender, 4-10 cm, densely pilose; flowers in a small, dense, more or less capitate cyme; branches of cyme very short. Pedicels 2-4 mm. Bracts subsistent, broadly obovate, rounded to truncate at the apex, ca 10-12 mm long, densely appressed-pilose outside, glabrous inside. *Sepals* concave, elliptic-oblong, obtuse; two outer ones ca 8 mm long, outside pilose like the bracts, inside glabrous; sepal 3 slightly oblique, ca 7 mm long, outside pilose with one glabrous margin; two inner sepals ca 6½ mm long, nearly glabrous. *Corolla* deeply 5-fid, pink, the lobes with white tips; tube ca 5 mm long, glabrous; lobes linear, ca 17 mm long, densely hairy outside, with 2 glabrous lobules at the apex. Filaments inserted at the mouth of the tube, glabrous. Ovary glabrous, 2-celled. *Fruit* unknown.

Distr. *Malaysia*: Br. N. Borneo.

42. *Argyreia celebica* OOSTSTR. *Blumea* 5 (1943) 377, f. 2, f-g.—Fig. 61 b.

Stems twining, 15-25 m high; branches terete, greyish brown, glabrous. *Leaves* oblong-lanceolate to narrowly ovate-oblong, 7-14 by 3-5½ cm; rounded or shortly attenuate at the base; gradually attenuate towards the acutish apex, glabrous on both sides; midrib prominent beneath, nerves 6-7 on either side prominent beneath, curved; minor nervation indistinct; petiole 1½-4½ cm, glabrous. *Peduncles* straight or slightly curved, 2½-9 cm, glabrous, with 2-4, sometimes with more fruits at the apex. Fruiting pedicels up to 10 mm long, slightly angular or sulcate, thickened and often curved towards the apex. *Sepals* below the fruit broadly ovate-triangular or semi-orbicular, equal, ca 3-4 mm long, appressed-pilose outside, the reddish margins of sepals 3 and 4 excepted. *Fruits* often nodding, ellipsoid, up to 1¼ cm long (mature?), red; seed 1, ellipsoid.

Distr. *Malaysia*: N. Celebes.

Ecol. In primary forests and in clearings, 500-1000 m.

Vern. *Kunit*, *panhap*, Manado.

43. *Argyreia crispa* OOSTSTR. *Blumea* 7 (1952) 172, f. 1.—Fig. 61 a.

Stems twining, densely pilose with short, sub-patent hairs as are the petioles and the inflorescences. Branches terete or subangular towards the apex. *Leaves* ovate to ovate-oblong, 8-13 by 4-8 cm, subcordate at the base, acute or obtusish at the apex, glabrous above, pilose beneath, mainly on the nerves; midrib flat above or slightly impressed, prominent beneath, 5-7 nerves on either side prominent beneath, minor nervation indistinct; petiole 2-6 cm, terete at the base, more or less flattened towards the apex. *Fruiting peduncles* 8-22 cm long, terete, corymbosely branched at the apex. Pedicels 3-5 mm. Bracts caducous. *Fruiting sepals* unequal; three outer ones ovate, obtuse, ca 10 mm long, pilose outside, glabrous inside, with strongly crisped margins; two inner sepals ovate-oblong, obtuse, ca 8-9 mm long, flat or slightly concave, outside pilose in the middle portion, and with broad glabrous margins. *Fruit* ellipsoid, 12-14 mm long, purplish-red; seed 1, ellipsoid.

Distr. *Malaysia*: N. Sumatra.

Ecol. Edges of, and in, first growth jungle, 1000-1200 m.

Note. See under 46. *A. robinsonii* (RIDLEY) OOSTSTR.

44. *Argyreia paucinervia* OOSTSTR. *Blumea* 6 (1950) 347, f. 1, a.—Fig. 62.

Stems twining, young parts appressed-pilose, soon glabrous, pale fulvous or greyish. *Leaves* oblong or narrowly oblong to lanceolate, 10-16 by 2-4 cm, acutely attenuate to cuneate at the base, gradually attenuate towards the obtusish apex, in youth very sparsely pilose beneath with short, appressed hairs, afterwards glabrous; glabrous above; midrib and 3-4 nerves on either side rather flat above and beneath; nerves ascending at sharp angles; petiole 1-2½ cm, with some short, appressed hairs, or glabrous. *Fruiting peduncles* in the upper leaf-axils, 2-3 cm long, with some appressed hairs, glabrescent, cymosely branched at the apex, with divaricate branches and 3-5 fruits. Bracts linear or narrowly spatulate, obtuse, 20-25 mm long (these bracts not inserted at the base of the branches of the cyme, but at the base of the pedicels). Fruiting pedicels 2-4 mm long. *Sepals* equal in length, ca 6-7 mm long; three outer ones ovate, obtusish at the apex; two inner ones broadly ovate, obtuse to emarginate or irregularly dentate at the apex, all sparsely appressed-hairy in the middle portion, or glabrous. *Fruit* globose, ca 1 cm diam., red; seed 1, globose.

Distr. *Malaysia*: Philippines (Luzon).

Ecol. Forest slopes, ca 1000 m.

45. *Argyreia samarensis* OOSTSTR. *Blumea* 6 (1950) 347, f. 1, b.—Fig. 61 c.

Stems twining; young parts hirsute, glabrescent, pale fulvous. *Leaves* broadly to narrowly ovate, (5-9)-14 by (2½)-4-9 cm, base broadly rounded to subcordate, apex acute or slightly acuminate; sparsely hirsute on both sides; midrib and 8-11



Fig. 61. a. *Argyreia crispera* OOSTSTR., fruiting branch,  $\times \frac{1}{2}$ , and fruit,  $\times 2\frac{1}{2}$ , b. *A. celebica* OOSTSTR., fruiting branch,  $\times \frac{1}{2}$ , c. *A. samarensis* OOSTSTR., fruiting branch,  $\times \frac{1}{2}$ .

nerves on either side slightly prominent beneath; petiole much shorter than blade, 2–5 cm, hirsute. *Fruiting peduncles* axillary, 4–10 cm long, hirsute, cymosely branched at the apex, bearing 3–8 fruits. Bracts caducous. *Fruiting pedicels* 5–10 mm long,



Fig. 62. *Argyreia paucinervia* OOSTSTR. Fruiting branch,  $\times 1/3$ .

hirsute, thickened above. Two outer *sepals* elliptic, obtuse, 9 mm long, hirsute outside; sepal 3 orbicular with rounded apex, 8 mm long, hirsute, with one glabrous margin; two inner sepals orbicular, rounded to slightly emarginate, 8 mm long, hirsute, with two glabrous margins. *Fruit* ellipsoid or ovoid, ca 18 mm long; seed 1, ellipsoid, ca 15 mm long.

Distr. *Malaysia*: Philippines (Samar).

46. *Argyreia robinsonii* (RIDLEY) OOSTSTR. *Blumea* 5 (1943) 381.—*Lettsomia robinsonii* RIDLEY, J. Fed. Mal. Stat. Mus. 8, 4 (1917) 65.

A twiner with appressed-hairy stems. *Leaves* lanceolate to ovate, 6–12 by  $2\frac{1}{2}$ – $7\frac{1}{2}$  cm, rounded or obtuse at the base, subacute at the apex, thinly coriaceous, glabrous above, appressed-hairy beneath; lateral nerves 8 on either side of the midrib, prominent beneath; petiole 1–8 cm, hairy. *Peduncles* 4–18 cm long, hairy. Cymes lax, many-flowered, 1–4 cm long. *Pedicels* 5 mm long. Bracts minute, ovate, acute. *Sepals* oblong, truncate, 4 mm long, glabrous. *Corolla* with a short, glabrous, campanulate, 8 mm long tube; the lobes sericeous outside, glabrous inside, white to purple, reflexed and oblong. Stamens long exserted, filaments filiform, anthers oblong; style slightly shorter than the stamens, stigma capitate (RIDLEY).

Distr. *Malaysia*: Sumatra (W. Coast).

Ecol. At 900 m.

Note. The type of this species is unknown to me. The specimens BANGHAM 840 and 1134 from N. Sumatra, mentioned by MERRILL (Contr. Arn. Arb. 8, 1934, 145) as conspecific, belong to 43. *A. crispa* OOSTSTR.

#### Doubtful

*Argyreia malabarica* CHOISY, *A. nellygherya* CHOISY, and *A. populifolia* CHOISY, mentioned by FERNANDEZ-VILLAR, Novissima Appendix (1880) 139, do not occur in the Philippine Islands.

*Argyreia roxburghii* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 419; OOSTSTR. *Blumea* 5 (1943) 383.

MIQUEL, Fl. Ind. Bat. 2 (1857) 586 mentions a specimen collected in the Moluccas by REINWARDT. This specimen is unknown to me; it is very doubtful that the species occurs in the Moluccas.

*Argyreia setosa* CHOISY, Mém. Soc. Phys. Genève 6 (1833) 425; OOSTSTR. *Blumea* 5 (1943) 383.

It is very doubtful that this species occurs in the island of Timor.

*Rivea hypocrateriformis* CHOISY and *Rivea ornata* CHOISY, both mentioned for Malaysia by BOERLAGE, Handl. Fl. Ned. Ind. 2 (1899) 513, do not occur there.

#### Excluded

*Rivea leucocarpa* ELMER, Leaf. Philip. Bot. 10 (1939) 3720, belongs to the genus *Ehretia* (Boraginaceae).