

CONVOLVULACEAE

旋花科 xuan hua ke

Fang Rhui-cheng¹; George Staples²

Herbs or shrubs, usually with twining or climbing stems or erect, often with milky juice. Leaves alternate, simple, entire, dissected, or compound, absent in parasitic species. Flowers solitary, axillary or in cymes, racemes, panicles, umbels, or capitula, bisexual, actinomorphic, usually 5-merous, often showy. Sepals free, often persistent, sometimes enlarged in fruit. Corolla sym-petalous, funnelform, campanulate, salverform, or urceolate; limb subtire or deeply lobed. Stamens alternating with corolla lobes, adnate to corolla; filaments filiform, equal or unequal in length; anthers introrse, laterally and longitudinally dehiscent; pollen smooth or finely spiny. Disc ringlike or cupular. Ovary superior, mostly 2-carpellate, 1- or 2-loculed, rarely 3- or 4-loculed; ovules basal, erect. Styles 1 or 2, terminal (gynobasic in *Dichondra*) or very short or absent; stigma entire or 2- (or 3)-lobed, rarely peltate. Fruit a capsule, dehiscent by valves, circumscissile, or irregularly shattering, less often a berry or nutlike. Seeds usually trigonous, smooth or pubescent.

About 58 genera and 1650 species: widely distributed in tropical, subtropical, and temperate regions; 20 genera and 129 species in China.

Aniseia biflora (Linnaeus) Choisy and *A. stenantha* (Dunn) Ling, recognized in the Fl. Reipubl. Popularis Sin., are here treated as *Ipomoea biflora* and *I. fimbriosepala*, respectively, because both have pantoporate and spinulose pollen. Strictly speaking, *Aniseia* is a neotropical genus of about five species, of which *A. martinicensis* (Jacquin) Choisy is widely naturalized as a common weed in rice paddies in Thailand and other southeast Asian countries. It will probably be found in S China eventually.

The family is important in China for food plants (*Ipomoea batatas* (Linnaeus) Lamarck and *I. aquatica* Forsskål), several ornamentals (*Ipomoea*), several medicinal plants (*Erycibe*, *Ipomoea*, *Cuscuta*, *Merremia*, *Dichondra*, *Evolvulus*), and numerous noxious weeds (*Cuscuta*, *Calyptegia*, *Convolvulus*).

Fang Rhui-cheng & Huang Shu-hua in Wu Cheng-yih, ed. 1979. Convolvulaceae. Fl. Reipubl. Popularis Sin. 64(1): 1–153.

Pollen aperture type and surface ornamentation are important characters in the classification of Convolvulaceae at the generic level and above. The most critical feature of the pollen is whether the grain surface is spiny or not. This distinction separates the eight tribes recognized by Austin (Ann. Missouri Bot. Gard. 60: 306–412. 1973) into two rather cohesive groups. A low magnification (20 ×) is adequate for discerning the presence or absence of minute spines on the surface.

For the successful identification of Convolvulaceae, both flowering and fruiting material should be collected. The first key to genera requires adequate fertile material with both flowers and fruit, and requires use of a pollen character. The second key may be used as an aid to identification where material is lacking flowers or fruit, but in some instances it is still partially dependent upon having both flowers and fruit.

Key 1

- 1a. Plants parasitic, leafless, with haustoria; flowers in clusters or short racemes; corolla inside usually with 5 fimbriate scales opposite sepals 20. *Cuscuta*
- 1b. Plants not parasitic, with green leaves; flowers and corolla not as above (scales present in *Lepistemon* but flowers in ± umbellate cymes).
 - 2a. Pollen pantoporate, finely spiny.
 - 3a. Fruit dehiscent by 4 (or more) valves, sometimes tardily so.
 - 4a. Corolla urceolate; filaments dilated basally into a concave scale, scales arched over ovary 16. *Lepistemon*
 - 4b. Corolla campanulate, funnelform, or salverform; filaments basally pubescent or glandular, not forming scales 15. *Ipomoea*
 - 3b. Fruit indehiscent, or at length eroding or irregularly breaking open.
 - 5a. Calyx greatly enlarged, completely enclosing fruit; leaves (and often sepals and corolla lobes) with minute blackish glandular dots abaxially; fruit wall at length eroding between septa, lantern-shaped 19. *Stictocardia*
 - 5b. Calyx enlarged, either reflexed from fruit or not fully enclosing it; leaves (and sepals and corolla lobes) without blackish dots; fruit an indehiscent or irregularly shattering berry.
 - 6a. Flowers few to many in cymes or capitula; corolla mostly membranous or transparent, limb spreading to recurved, subtire, 5-lobed to deeply 5-parted; twining or trailing herbs, scandent shrubs, or lianas; sepals usually reflexed from fruit, often colored adaxially ... 18. *Argyriaea*
 - 6b. Flowers solitary, nodding; corolla waxy, limb erect, subtire or shallowly 5-dentate; slender woody twiners (in China); sepals ± enclosing fruit 17. *Blinkworthia*
 - 2b. Pollen grains with various aperture types, never finely spiny.
 - 7a. Ovary deeply 2-lobed; styles 2, gynobasic 1. *Dichondra*

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- 7b. Ovary not deeply 2-lobed; styles, if present, terminal.
- 8a. Styles absent; stigma 1, \pm conical, 5–10-ridged; corolla deeply 5-lobed, each lobe 2-lobulate apically 4. *Erycibe*
- 8b. Styles present, sometimes very short; neither stigma nor corolla as above.
- 9a. Outer 2 or 3 or all 5 sepals much enlarged in fruit and falling off with fruit as a dispersal unit; fruit indehiscent; seeds 1.
- 10a. Herbaceous twiners; corolla glabrous outside or lobes with a minute apical tuft of hairs; all 5 sepals \pm equally elongated in fruit or inner sepals slightly less so 7. *Dinetus*
- 10b. Woody climbers; corolla pubescent outside on midpetaline bands; outer 2 or 3 sepals greatly elongated in fruit, inner sepals much less so.
- 11a. Flowers mostly less than 8 mm, white, in \pm crowded panicles; bracteoles minute, scalelike; fruiting sepals with a single midvein and reticulate secondary veins 5. *Poranopsis*
- 11b. Flowers 10–35(–50) mm, blue, violet, or white, in racemes or few-branched panicles; bracteoles sepal-like, forming a secondary calyx (calycle) immediately below calyx; fruiting sepals with 7, 9, or 11 parallel longitudinal veins 6. *Tridynamia*
- 9b. Sepals enlarged in fruit or not, remaining attached to pedicel when fruit dehisces; fruit dehiscent by valves or breaking irregularly; seeds usually 4 (or less by abortion).
- 12a. Styles 2, free or united basally.
- 13a. Plants erect or sprawling, never twining; bracts tiny, not enlarged in fruit; styles 2-cleft; stigmas terete, filiform or slightly clavate 2. *Evolvulus*
- 13b. Plants climbing; 1 bract greatly enlarged, winglike in fruit; styles entire; stigmas peltate or reniform, rather deeply lobed 3. *Neuropeltis*
- 12b. Style 1, entire or with 2 minute branches concealed by stigmas.
- 14a. Stigmas \pm globular; calyx enlarged in fruit, often enclosing it.
- 15a. Herbs prostrate; leaves linear, oblong-linear, lanceolate-elliptic, or oblanceolate to spatulate, base hastate, \pm clasping stem; inner 3 sepals tapering into slender points apically; pollen pantoporate 13. *Xenostegia*
- 15b. Herbs twining or woody climbers (sometimes prostrate); leaves variously shaped, usually wider, bases rarely clasping (except some *Merremia hirta*); inner sepals tapering into slender points apically; pollen colpate or rugate.
- 16a. Stems terete or striate, not winged; fruit a 4-valved capsule or shattering irregularly 12. *Merremia*
- 16b. Stems (and often petioles, peduncles) winged; fruit with a thickened circumscissile lid that separates from \pm papery and tardily shattering endocarp 14. *Operculina*
- 14b. Stigmas elliptic, ovate-oblong, oblong, ovate, or linear, usually \pm flattened; calyx not enlarged in fruit or outer 3 sepals somewhat enlarged, inner sepals less so.
- 17a. Bracts or bracteoles prominent, sepal-like or leaflike, persistent in fruit.
- 18a. Corolla pale yellow or whitish, center purple; bracts oblong-lanceolate, attached visibly below calyx; capsule pilose 8. *Hewittia*
- 18b. Corolla pinkish, lavender, or white, center often paler; bracteoles sepal-like, broadly ovate or elliptic, attached just below and closely enclosing calyx; capsule glabrous 10. *Calystegia*
- 17b. Bracts inconspicuous, scalelike, linear or subulate, deciduous or persistent in fruit.
- 19a. Stigmas linear or clavate; hairs 2-armed or simple; pollen ellipsoid, 3-colpate 11. *Convolvulus*
- 19b. Stigmas elliptic or oblong; hairs stellate (3- or more armed); pollen globose, usually 5-zonocolpate 9. *Jacquemontia*

Key 2

- 1a. Plants parasitic, leafless, with haustoria; flowers 2–9 mm, in dense clusters or short racemes; corolla inside usually with 5 fimbriate scales opposite sepals 20. *Cuscuta*
- 1b. Plants not parasitic, with well-developed leaves; inflorescences and corolla not as above (scales present in *Lepistemon* but entire, \pm fused to filaments, flowers 10–22 mm (less than 8 mm in *Poranopsis*), in \pm umbellate cymes).
- 2a. Styles 2, free or joined partway.
- 3a. Robust lianas; 1 bract greatly enlarged in fruit, winglike, decurrent along peduncle so fruit is

- inserted at center 3. *Neuropeltis*
- 3b. Creeping herbs; bracts always inconspicuous.
- 4a. Ovary and fruit deeply 2-lobed; styles gynobasic, joined at base, unbranched 1. *Dichondra*
- 4b. Ovary entire, not 2-lobed; styles terminal, free, each 2-branched 2. *Evolvulus*
- 2b. Style 1 or absent.
- 5a. Style absent; stigma \pm conical, 5–10-ridged; fruit a slightly fleshy berry, much longer than inconspicuous sepals 4. *Erycibe*
- 5b. Style present, longer than stigma (usually much longer); stigma 2-lobed; fruit dry or if \pm fleshy then sepals conspicuous, often brightly colored.
- 6a. Specimen in flower (fruit needed at couplets 15, 18).
- 7a. Stigmas 2, clearly longer than wide, ovate-oblong, elliptic, oblong, clavate, cylindrical, to linear.
- 8a. Bracts or bracteoles prominent, sepal-like or leaflike, persistent in fruit.
- 9a. Corolla pale yellow or whitish, center purple; bracts oblong-lanceolate, attached visibly below calyx; capsule pilose 8. *Hewittia*
- 9b. Corolla pinkish, lavender, or white, center often paler; bracteoles broadly ovate, sometimes saccate, closely enclosing calyx; capsule glabrous 10. *Calystegia*
- 8b. Bracts and bracteoles inconspicuous, scalelike, linear or subulate, often deciduous.
- 10a. Stigmas linear, cylindrical, or clavate; hairs 2-armed or simple, always present; pollen ellipsoid, 3-colpate 11. *Convolvulus*
- 10b. Stigmas elliptic or oblong; hairs stellate (3- or more rayed), sometimes absent; pollen globose, usually 5-zonocolpate 9. *Jacquemontia*
- 7b. Stigma 1, ca. as thick as wide, \pm capitate or shallowly 2-globose (ellipsoid in *Dinetus*).
- 11a. Ovary 1-locular; flowers in bracteate racemes or panicles, lower bracts often cordate.
- 12a. Herbaceous twiners; corolla glabrous outside or lobes with a minute apical tuft of hairs 7. *Dinetus*
- 12b. Woody climbers; corolla pubescent outside on midpetaline bands.
- 13a. Flowers less than 8 mm, white, in \pm crowded panicles; sepals \pm equal; bracteoles minute, scalelike 5. *Poranopsis*
- 13b. Flowers 10–35(–50) mm, blue, violet, or white, in racemes or few-branched panicles; sepals unequal; bracteoles sepal-like, forming a secondary calyx (calycle) immediately below calyx 6. *Tridynamia*
- 11b. Ovary 2(–4)-locular; flowers in relatively few-branched cymes, umbel-like or capitulate; bracts not cordate (except some *Argyreia*), often minute and/or soon falling.
- 14a. Corolla urceolate; filaments dilated basally into a concave scale, scales arched over ovary 16. *Lepistemon*
- 14b. Corolla campanulate, funnelform, or salverform; filaments basally pubescent or glandular, not forming scales.
- 15a. Leaves (and often sepals and corolla lobes) with small dark glandular dots; fruiting sepals leathery, apex rounded 19. *Stictocardia*
- 15b. Leaves (sepals, corolla lobes) without glandular dots; fruiting sepals not leathery, apex often acute.
- 16a. Flowers solitary, nodding; corolla waxy, limb erect, subentire or shallowly 5-dentate; slender \pm woody twiners (in China) 17. *Blinkworthia*
- 16b. Flowers few to many in cymes or capitula; corolla mostly membranous or transparent, limb spreading or recurved, subentire, 5-lobed to deeply 5-parted; twining or trailing herbs, scandent shrubs, or lianas.
- 17a. Pollen spiny.
- 18a. Fruit a fleshy, mealy, or leathery berry, indehiscent or breaking up irregularly; adaxially sepals and berry often brightly colored 18. *Argyreia*
- 18b. Fruit a capsule, usually 4- (or 6)-valved, woody and seemingly indehiscent in *I. aquatica*; adaxially sepals and fruit green or brown 15. *Ipomoea*
- 17b. Pollen smooth.
- 19a. Inner 3 sepals tapering into slender points apically; leaves linear, oblong-linear, lanceolate-elliptic, or oblanceolate to spatulate, base hastate, \pm clasping stem; pollen pantoporate; herbaceous, stems prostrate or tips twining 13. *Xenostegia*
- 19b. Inner sepals not tapering into slender points apically; leaves

- variously shaped, usually wider, bases rarely clasping
(except some *M. hirta*); pollen colpate or rugate; woody
or herbaceous, often climbing, sometimes prostrate.
- 20a. Stems terete or striate, not winged; corolla much longer
than calyx, usually yellow, less often lilac, pink, reddish,
white, or white with red center 12. *Merremia*
- 20b. Stems (and often petioles, peduncles) winged; corolla
ca. 2 × as long as calyx, white with yellow center 14. *Operculina*
- 6b. Specimen in fruit (flowers needed at couplets 25, 32–36).
- 21a. Stems (and often petioles, peduncles) winged; fruit with a thickened circumscissile lid
that separates from ± papery and tardily shattering endocarp 14. *Operculina*
- 21b. Stems terete or striate, not winged; fruit dehiscent or indehiscent but without a thickened
circumscissile lid.
- 22a. Fruit indehiscent.
- 23a. Stems prostrate, fistulose, growing in water or in very wet situations 15. *Ipomoea*
- 23b. Stems climbing or prostrate, not fistulose, growing on land.
- 24a. Calyx enlarged, ≤ length of fruit; adaxial surface of sepals often brightly
colored (except *Blinkworthia*, some *Argyreia*); fruit fleshy, mealy,
or leathery 18. *Argyreia*
- 25a. Flowers solitary, nodding; corolla waxy, limb erect, subentire or
shallowly 5-dentate; fruiting sepals ± enclosing berry, adaxially
brownish 17. *Blinkworthia*
- 25b. Flowers few to many in cymes or capitula; corolla membranous
or transparent, limb spreading to recurved, subentire, 5-lobed, to
deeply 5-parted; fruiting sepals usually reflexed from berry, adaxially
often colored 18. *Argyreia*
- 24b. Calyx greatly enlarged, clearly longer than fruit; adaxial surface of sepals
greenish or brownish; fruit papery to thinly woody.
- 26a. Leaves (and often sepals and corolla lobes) with minute blackish
glandular dots abaxially; fruit with 4 or less seeds, wall at length
eroding between septa, lantern-shaped 19. *Stictocardia*
- 26b. Leaves (and sepals and corolla lobes) without blackish dots; fruit
1-seeded, wall not eroding and becoming lantern-shaped.
- 27a. Herbaceous twiners; all 5 sepals ± equally elongated in fruit or
inner sepals slightly less so 7. *Dinetus*
- 27b. Woody climbers; outer 2 or 3 sepals greatly elongated in fruit,
inner sepals much less so.
- 28a. Bracteoles minute, scalelike; fruiting sepals with a single
midvein and reticulate secondary veins 5. *Poranopsis*
- 28b. Bracteoles sepal-like, forming a secondary calyx (calycle)
immediately below calyx; fruiting sepals with 7, 9, or 11
parallel longitudinal veins 6. *Tridynamia*
- 22b. Fruit a 4- or more-valved capsule.
- 29a. Bracts or bracteoles enlarged, surrounding capsule and sepals.
- 30a. Inflorescences usually 1-flowered; each flower closely subtended by
2 leafy, often strongly convex bracteoles 10. *Calystegia*
- 30b. Inflorescences with several flowers surrounded by an involucre of bracts 15. *Ipomoea*
- 29b. Bracts and bracteoles not enlarged, not surrounding calyx and capsule, some-
times deciduous.
- 31a. Capsule 8-valved (in Chinese species); hairs stellate, 3- or more rayed,
rarely absent 9. *Jacquemontia*
- 31b. Capsule usually 4-valved (6-valved in some *Ipomoea*); hairs simple or
2-armed.
- 32a. Stigmas linear, cylindric, clavate, or ovate-oblong and complanate.
- 33a. Pedicel with 2 persistent leafy bracts; outer 3 sepals enlarged in
fruit; corolla pale yellow or whitish, center darker; stigmas ovate-
oblong, complanate 8. *Hewittia*
- 33b. Pedicel without bracts or bracts minute scales; sepals not enlarged

- in fruit, persistent; corolla red, rose, pink, or whitish, center paler; stigmas linear, cylindric, or clavate 11. *Convolvulus*
- 32b. Stigmas capitate, 2-globular (3-globular in some *Ipomoea*).
- 34a. Pollen spiny, pantoporate.
- 35a. Corolla urceolate; filaments dilated basally into a concave scale, scales arched over ovary 16. *Lepistemon*
- 35b. Corolla campanulate, funnelform, or salverform; filaments basally pubescent, glandular, or glabrous, not dilated into scales 15. *Ipomoea*
- 34b. Pollen smooth, 3–12-colpate, polyrugate, or pantoporate.
- 36a. Herbs prostrate, tips often twining; inner 3 sepals tapering into slender points apically; leaf bases hastate, basal lobes dentate; pollen pantoporate 13. *Xenostegia*
- 36b. Herbs twining or prostrate, or woody climbers; inner 3 sepals not tapering into points apically; leaf bases not as above; pollen 3–12-colpate or polyrugate 12. *Merremia*

1. DICHONDRA J. R. & G. Forster, Char. Gen. Pl. 39, t. 20. 1776.

马蹄金属 ma ti jin shu

Herbs creeping or sprawling. Leaves petiolate; stipules minute; leaf blade reniform to circular, margin entire. Flowers solitary, axillary, pedicellate, hidden among leaves; bracts minute. Sepals joined basally, ± equal, becoming enlarged in fruit. Corolla campanulate, ± equal to calyx, lobed to middle or below. Stamens included; pollen not spiny. Ovary deeply 2-lobed, each lobe with 2 ovules. Styles 2, gynobasic, free, filiform; stigmas capitate. Capsule irregularly 2-valved or indehiscent, apically rounded, truncate, emarginate, or deeply 2-lobed. Seeds 1 or 2 per lobe, subglobose, smooth.

Fourteen species: most in North and South America, with two species in New Zealand, one in Australia, and one widespread; one species in China.

Tharp and Johnston (Brittonia 13: 346–360. 1961) have identified specimens from China that were previously called *Dichondra repens* as *D. micrantha* Urban. According to their taxonomic concepts, genuine *D. repens* J. R. & G. Forster is confined to Australia and New Zealand.

1. *Dichondra micrantha* Urban, Symb. Antill. 9: 243. 1924.

马蹄金 ma ti jin

Dichondra repens var. *micrantha* (Urban) Lu.

Herbs perennial. Stems prostrate, freely branching, sparsely pubescent, rooting at nodes. Petiole 2–3.5 cm; leaf blade reniform to nearly circular, 0.8–1.5(–2.5) cm in diam., abaxially sparsely appressed pilose, adaxially glabrous. Pedicel erect, shorter than petiole, sharply recurved apically. Calyx broadly campanulate; lobes obovate-oblong to spatulate, 1.5–2 mm, becoming enlarged to 2.5 mm, margin densely pubescent.

Corolla yellow, ca. 2 mm, 5-lobed to middle, glabrous. Stamens equal. Ovary pilose. Styles free, slightly unequal. Capsule subglobose, 2–2.6 mm, membranous, sparsely pubescent. Seeds yellow to brown, glabrous. $2n = 24^*$, 30.

Grasslands on mountain slopes, roadsides; 1300–2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, ?Qinghai, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan including Ryukyu Islands, S Korea, Thailand; North America, Pacific Islands, South America].

The whole plant is used for treating diarrhea.

2. EVOLVULUS Linnaeus, Sp. Pl. ed. 2. 391. 1762.

土丁桂属 tu ding gui shu

Herbs, subshrubs, or shrubs. Stems never twining. Leaves petiolate or sessile; leaf blade entire. Flowers 1 to few, pedicellate or sessile in leaf axils, or several in terminal spikes or capitula; bracts tiny. Sepals free, equal or subequal. Corolla rotate, funnelform, or salverform; limb ± entire to 5-lobed, midpetaline bands often pilose outside. Stamens included or exerted; pollen globose, rugate, not spiny. Disc cupular or absent. Ovary glabrous or pilose, 2-loculed; ovules 2 per locule. Styles 2, filiform, free or united basally, each 2-cleft; stigma filiform, terete or slightly clavate. Capsule globose or ovoid, usually 4-valved. Seeds 1–4, smooth or minutely tuberculate, glabrous.

About 100 species: all native to North America (S United States) and South America, with two widely naturalized in the tropical and subtropical regions of the eastern hemisphere; two species in China.

Van Oostroom's (Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 14: 1–267. 1934) monograph of *Evolvulus* is by and large accepted today.

- 1a. Leaves oblong, elliptic, spatulate, or circular; peduncles present; sepals lanceolate, apex acute or acuminate; corolla pale blue or white 1. *E. alsinoides*
 1b. Leaves nearly circular; peduncles absent; sepals ovate-oblong to oblong, apex obtuse or acute; corolla white or yellowish 2. *E. nummularius*

1. *Evolvulus alsinoides* (Linnaeus) Linnaeus, Sp. Pl. ed. 2. 392. 1762.

土丁桂 tu ding gui

Herbs perennial. Stems several to numerous, prostrate or ascending, slender, with appressed and spreading hairs. Leaves petiolate or subsessile, 0.7–2.5 cm × 5–10 mm. Cymes 1- to few flowered; peduncles filiform, 2.5–3.5 cm; bracts linear-subulate to linear-lanceolate, 1.5–4 mm. Sepals lanceolate, 3–4 mm, villous. Corolla rotate, 7–10 mm in diam. Stamens included; filaments filiform, adnate to base of corolla tube. Ovary glabrous. Styles 2, free. Capsule globose, 4-valved. Seeds 4 or fewer, black, smooth. Fl. and fr. year round. $2n = 26$.

Sandy soil, dry slopes, cultivated areas, maritime areas, grasslands, thickets, roadsides; 0–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bangladesh, Cambodia, India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam; Africa, Australia, North America, Pacific Islands, South America].

The whole plant is used medicinally.

- 1a. Leaves ovate-cordate or circular, densely pale brown villous 1c. var. *rotundifolius*
 1b. Leaves linear, oblong, elliptic, lanceolate, or spatulate, ± appressed pilose or adaxially glabrous.
 2a. Leaves 7–25 × 5–10 mm, apex obtuse to emarginate, mucronulate 1a. var. *alsinoides*
 2b. Leaves 5–13 × 1.5–4 mm, apex acute or acuminate 1b. var. *decumbens*

1a. *Evolvulus alsinoides* var. *alsinoides*

土丁桂 (原变种) tu ding gui (yuan bian zhong)

Convolvulus alsinoides Linnaeus, Sp. Pl. 1: 157. 1753; *Evolvulus chinensis* Choisy; *E. pudicus* Hance ex Walpers.

Leaves oblong, elliptic, or spatulate, 0.7–2.5 cm × 5–10 mm, ± densely appressed pilose or adaxially subglabrous, apex obtuse to emarginate, mucronulate. Fl. and fr. year round.

Common weed, sandy soil, dry slopes, cultivated areas, grasslands, thickets, roadsides; 800–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bangladesh, Cambodia, India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam; Africa].

1b. *Evolvulus alsinoides* var. *decumbens* (R. Brown) van Ooststroom, Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 14: 38. 1934.

银丝草 yin si cao

Evolvulus decumbens R. Brown, Prodr. 144. 1810; *E. sinicus* Miquel.

Leaves lanceolate to linear, 5–13 × 1.5–4 mm, ± appressed pilose, apex acute or acuminate. Basal leaves sometimes wider, apex ± obtuse. Fl. May–Jan, fr. Jun–Oct.

Grasslands; 100–1800 m. Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Jiangxi, Taiwan, Yunnan [Indonesia, Malaysia, New Guinea, Thailand, Vietnam; Australia, Pacific Islands].

The whole plant is used medicinally.

1c. *Evolvulus alsinoides* var. *rotundifolius* Hayata ex van Ooststroom, Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 14: 31. 1934.

圆叶土丁桂 yuan ye tu ding gui

Evolvulus alsinoides (Linnaeus) Linnaeus f. *rotundifolia* (Hayata ex van Ooststroom) T. Yamamoto.

Leaves ovate-cordate or circular, 7–13 × 6–10 mm, densely pale brown villous, base cordate to rounded, apex obtuse, mucronulate. Fl. May–Aug.

Maritime areas; below 100 m. Taiwan [Japan (Ryukyu Islands), Philippines].

2. *Evolvulus nummularius* (Linnaeus) Linnaeus, Sp. Pl. ed. 2. 391. 1762.

短梗土丁桂 duan geng tu ding gui

Convolvulus nummularius Linnaeus, Sp. Pl. 1: 157. 1753; *Evolvulus yunnanensis* S. H. Huang.

Herbs perennial. Stems several, rooting at nodes, prostrate, 20–40 cm, slender, ± villous or scabrous. Leaves distichous; petiole 2–4 mm; leaf blade nearly circular, 1.3–1.7 × 1.2–1.4 cm, glabrous or appressed pilose abaxially, base cordate to rounded, apex rounded or emarginate; lateral veins 2 or 3 pairs. Peduncle absent or very short. Pedicel 2.5–3 mm, densely villous. Flowers 1 or 2 per leaf axil. Sepals persistent, oblong-ovate to oblong, 3–4 × 2–3 mm, outer 2 slightly longer than inner ones, pilose abaxially, margin ciliate. Corolla broadly campanulate or subrotate, ca. 6 mm; limb ca. 7–8 mm in diam., 5-lobed. Stamens inserted at middle of corolla tube; filaments ca. 1.5 mm, glabrous basally; anthers oblong. Ovary globose. Style lobes linear, ca. 3 mm; stigmas minutely capitate. Capsule ovoid, 2–3 mm in diam. Seeds 2–4, brown, ovoid-triangular, ca. 1 × 0.5 mm, minutely tuberculate. $2n = 24$.

Roadsides; ca. 1000 m. Yunnan (Luxi Xian) [naturalized in India and Malaysia; Africa, native in North and South America].

This is the first record of this species from China. *Evolvulus yunnanensis* S. H. Huang is here reduced to synonymy for the first time.

3. NEUROPELTIS Wallich in Roxburgh, Fl. Ind. 2: 43. 1824.

盾苞藤属 dun bao teng shu

Lianas, woody. Leaves petiolate, papery or leathery, margin entire. Inflorescences axillary, racemose, or subpaniculate toward apices of branches; bracts initially small, 1 bract becoming much enlarged in fruit, scarious, reticulate veined; bracteoles minute. Sepals 5, subequal. Corolla white or reddish, rotate to broadly campanulate, deeply 5-lobed. Stamens 5, adnate to base of corolla tube, exerted or included; filaments pubescent at base or glabrous; pollen not spiny. Ovary partly or fully 2-loculed, pubescent, 4-ovuled. Styles 2, free, short; stigmas peltate or reniform, ± lobed. Capsule small, glabrous, 4-valved. Seed 1, globose, smooth, glabrous.

About 11 species: seven in western Africa and four in Asia; one species in China.

1. *Neuropeltis racemosa* Wallich in Roxburgh, Fl. Ind. 2: 44. 1824.

盾苞藤 dun bao teng

?*Erycibe integripetala* Merrill & Chun; *Neuropeltis integripetala* (Merrill & Chun) C. Y. Wu; *Sinomerrillia bracteata* H. H. Hu.

Climbers large, woody. Young stems mostly brown tomentose; mature stems glabrescent. Petiole 1–1.5 cm; leaf blade elliptic to elliptic-oblong, 6–12 × 2–6.5 cm, leathery, base broadly cuneate to attenuate into petiole, apex acute or short acuminate; lateral veins 7–10 pairs, subglabrous.

Inflorescences 1–6 per axil, racemose; axes brown tomentose; bracts ovate to ovate-lanceolate, 2–3 mm, mucronulate, 1 broadly elliptic to circular in fruit, enlarging to 3–4.5 cm, glabrous except along veins. Sepals unequal, densely pubescent abaxially; outer 2 circular or slightly wider than long, 2–2.5 mm; inner 3 wider than long, 1.8–2 mm. Corolla white, broadly campanulate, ca. 5 mm, deeply 5-lobed; lobes incurved, longer than tube, pilose outside, apex obtuse. Filaments ca. 3 mm. Ovary ovoid, pubescent; stigma ca. 1 mm wide. Capsule subglobose, 5–6 mm in diam. Fl. Jun-Dec, fr. to Apr.

Forests, thickets; 400–1100 m. Hainan, S Yunnan [Indonesia, Malaysia, Myanmar, Thailand].

4. ERYCIBE Roxburgh, Pl. Coromandel 2: 31, t. 159. 1798.

丁公藤属 ding gong teng shu

Stranglers, woody or scandent shrubs. Stems lenticellate, young parts glabrous or reddish tomentose, hairs 2-armed or stellate (or ?simple). Leaves petiolate, entire, leathery or papery. Inflorescences terminal or axillary, racemose or paniculate; bracts early deciduous, usually minute. Flowers small, fragrant. Sepals free, persistent, subequal, leathery, usually pubescent abaxially. Corolla white or yellow, deeply 5-lobed; tube short, glabrous outside; lobes of limb 2-lobulate apically, midpetaline bands densely appressed pubescent outside; lateral lobules rather thin, glabrous, with distinct or indistinct venation. Stamens included; filaments triangular or laterally concave; anthers obtuse or acuminate apically, cordate basally, sometimes truncate to retuse at both ends; pollen not spiny. Ovary globose or ellipsoid, 1-loculed, 4-ovuled. Stigma sessile, ± conical, with 5–10 longitudinal, straight or spirally twisted ridges. Fruit a slightly fleshy berry. Seed 1.

Approximately 67 species: mainly in tropical Asia, Australia, Japan, and Malesia; ten species in China.

Two accounts of the genus established the taxonomic concepts adopted here: How (Sunyatsenia 6: 221–230. 1946) provided keys, descriptions, and lists of specimens examined; Hoogland (Blumea 7: 342–361. 1953) nomenclaturally revised the entire genus, including Chinese taxa described up to that time.

- 1a. Branchlets and abaxial surface of leaves ± densely rust colored or brownish pubescent.
 - 2a. Corolla ca. 12 mm, lobules fimbriate; leaves 6.5–18 cm, with 5–9 pairs of lateral veins (Hainan, Guangdong, Guangxi) 1. *E. hainanensis*
 - 2b. Corolla 7.5–9.5 mm, lobules entire; leaves 2.5–9 cm, typically with 3 or 4 pairs of lateral veins (Yunnan) 2. *E. expansa*
- 1b. Branchlets glabrous or pubescent; leaves glabrous or sparsely pubescent.
 - 3a. Panicles often terminal, rarely axillary; inflorescences often longer than leaves, 5–24 cm.
 - 4a. Corolla lobules erose-dentate; leaves oblong, lanceolate-oblong, or elliptic, 7–18 cm, abaxially sparsely pubescent with 2-armed hairs or subglabrous, lateral veins 6 or 7 pairs 3. *E. subspicata*
 - 4b. Corolla lobules ± entire or undulate; leaves oblong-lanceolate, 5–9 cm, glabrous, lateral veins 3 or 4 pairs 4. *E. myriantha*
 - 3b. Panicles or racemes terminal and axillary; axillary inflorescences usually much shorter than leaves, 1.5–11 cm.
 - 5a. Inflorescences racemose, axillary, few flowered, 1.5–2 cm 5. *E. oligantha*
 - 5b. Inflorescences paniculate or racemose, terminal or axillary, many flowered, 2–11 cm or longer.

- 6a. Leaf blade papery or rigidly so.
 7a. Leaf blade elliptic or oblong-elliptic; corolla lobules oblong-ovate, margin crenulate; ovary globose 9. *E. sinii*
 7b. Leaf blade broadly elliptic; corolla lobules oblong-elliptic, margin entire or undulate; ovary columnar 10. *E. henryi*
 6b. Leaf blade leathery or thickly so.
 8a. Leaf blade elliptic or obovate, 6.9–9 cm, apex obtuse, acute, or short acuminate; corolla lobules undulate 8. *E. obtusifolia*
 8b. Leaf blade ovate-elliptic or oblong-elliptic, 7–15 cm, apex ± abruptly acuminate; corolla lobules erose.
 9a. Fruit ellipsoid; corolla lobules obovate to subcuneate; leaves usually with 5–7 pairs of lateral veins 6. *E. elliptilimba*
 9b. Fruit subglobose; corolla lobules obcordate; leaves usually with (7 or) 8(–10) pairs of lateral veins 7. *E. schmidtii*

1. *Erycibe hainanensis* Merrill, Philipp. J. Sci. 21: 353. 1922.

毛叶丁公藤 mao ye ding gong teng

Erycibe bachmaense Gagnepain.

Shrubs scandent, 5–15 m tall; axial parts densely reddish or brownish tomentose, hairs simple or 2-armed. Branches terete, ca. 5 mm in diam. Petiole 5–10 mm; leaf blade elliptic to oblong-elliptic, 6.5–18 × 3.5–8 cm, abaxially densely pubescent especially along midvein, adaxially sparsely pubescent or glabrous, base obtuse to rounded, apex abruptly acuminate to acuminate; lateral veins 5–9 pairs. Inflorescences axillary or terminal, paniculate, 4–12 cm, densely flowered. Pedicel robust, 2–3 mm. Sepals circular-reniform, 3–4 mm, densely reddish tomentose abaxially, margin ciliate. Corolla white or greenish yellow, ca. 1.2 cm; lobules broadly obovate, 3.5–4 mm, margin fimbriate. Filaments ca. 2 mm, base dilated; anthers deltoid, ca. 1 mm, apex cuspidate. Stigma capitate, 5-ridged. Fruit yellow, ellipsoid, 2–2.8 cm, apex with paler caplike scar. Fl. Apr–Aug, fr. Apr–Dec.

Forests, streamsides, steep hillsides, ravines, clay soil, sandy loam; 200–1100 m. Guangdong, S Guangxi, Hainan [Vietnam].

2. *Erycibe expansa* Wallich ex G. Don, Gen. Hist. 4: 392. 1838.

锈毛丁公藤 xiu mao ding gong teng

Erycibe paniculata Roxburgh var. *expansa* (Wallich ex G. Don) Choisy; *E. ferruginea* C. Y. Wu; *E. ferruginosa* Griffith.

Climbers, to 5 m tall. Stems striate, rust-colored stellate pubescent, glabrescent. Petiole 3–7 mm; leaf blade elliptic-obovate, 2.5–9 × 1.5–5 cm, abaxially ± reddish hirsute, adaxially glabrous, glossy, base obtuse to cuneate, apex short acuminate or cuspidate; lateral veins 3(–5) pairs, slightly prominent abaxially. Inflorescences terminal, paniculate, 4–16(–30) cm. Pedicel 1–2 mm. Flowers fragrant. Sepals ovate, 2.5–3 mm, densely stellate hirsute abaxially, glabrescent in fruit. Corolla white, 7.5–9.5 mm, midpetaline bands densely appressed pubescent abaxially; lobules elliptic-oblong, rather thick, margin entire. Stamens 2.2–2.5 mm; anthers acuminate. Ovary ca. 0.8 × 1 mm, glabrous. Stigma conical, 5-ridged. Fruit ellipsoid, ca. 12 × 6 mm, glabrous. Fr. Nov.

Open thickets; 1000–1200 m. Yunnan (Marlipo Xian) [India, Malaysia, Myanmar, Thailand].

The type of *Erycibe ferruginea* (Feng 13400) is a very good match for *E. expansa*, a species not previously known to occur north of peninsular Myanmar. The former is here reduced to synonymy for the first time. Further collections of *E. expansa* are desirable, since it is apparently rare in China and very little is known about it.

3. *Erycibe subspicata* Wallich ex G. Don, Gen. Hist. 4: 392. 1838.

锥序丁公藤 zhui xu ding gong teng

Shrubs scandent, 3–6(–10) m tall; axial parts rust-colored pubescent with 2-armed hairs, later glabrescent. Branchlets terete. Petiole 6–10 mm, rust-colored pubescent; leaf blade oblong, lanceolate-oblong, or elliptic, 7–18 × 2.5–5.5 cm, abaxially sparsely pubescent with 2-armed hairs, or subglabrous, adaxially glabrous and glossy, base cuneate or subrounded, apex cuspidate, rarely acuminate; lateral veins 6 or 7 pairs. Inflorescences mostly terminal, elongated, narrowly paniculate, 7–20 cm, densely rust-colored pubescent. Pedicel ca. 4 mm. Sepals broadly elliptic to nearly circular, subequal, 3–3.5 mm, densely rust-colored pubescent abaxially. Corolla white, red, or purple; lobules semicircular, ca. 9 mm, margin erose-dentate. Filaments flat, ca. 1 mm; anthers conical. Fruit black, ellipsoid-oblong, 2–2.3 × ca. 1 cm, ± apiculate. Fl. Oct–Nov.

Dense forests, thickets, steep rock faces in ravines; 300–1300 m. S Guangxi, S and SE Yunnan [Cambodia, NE India, Laos, Myanmar, Thailand, Vietnam].

4. *Erycibe myriantha* Merrill, Lingnan Sci. J. 13: 70. 1934.

多花丁公藤 duo hua ding gong teng

Shrubs scandent, 4–7 m tall; axial parts ± densely rust-colored pubescent. Branches terete, subglabrous; branchlets indistinctly angulate, ca. 2 mm in diam. Petiole 3–9 mm; leaf blade oblong-lanceolate, 5–9 × 2–4 cm, papery, glabrous, base cuneate, apex acuminate; lateral veins 3 or 4 pairs, prominent abaxially. Inflorescences terminal, paniculate, loose, 5–24 cm, many flowered. Sepals obovate or circular, ca. 3 mm, densely yellow-orange velutinous abaxially. Corolla white, ca. 8 mm; lobules oblong-obovate, margin ± entire or undulate, midpetaline bands rust-colored woolly. Stamens ca. 2.5 mm; filaments dilated basally; anthers ovoid, apex acuminate. Ovary ellipsoid. Stigma conical, with ridges. Fruit brown, ellipsoid, 1.3–1.5 × 1–1.2 cm. Fl. Jul–Dec, fr. Mar–Apr.

• Forests, thickets, stream banks, dry and sandy soils; 400–600 m. Guangdong, Hainan.

5. *Erycibe oligantha* Merrill & Chun, *Sunyatsenia* 5: 175. 1940.

疏花丁公藤 shu hua ding gong teng

Shrubs scandent; axial parts subglabrous. Branchlets striate, gray. Petiole 6–10 mm; leaf blade elliptic or narrowly ovate, 8–16 × 4–8 cm, thin leathery, abaxially glabrous, base broadly cuneate, apex rounded or abruptly acuminate; lateral veins 8 or 9 pairs. Inflorescences axillary, racemose, 1.5–2 cm, red-brown sericeous, few flowered; bracteoles ca. 1 mm. Pedicel ca. 3 mm. Sepals circular, concave, 2–3 mm in diam., appressed pubescent abaxially, ciliate. Corolla white to pale yellow, ca. 7 mm; lobules oblong-ovate, subentire, midpetaline bands appressed rust-colored pubescent. Anthers ovoid or oblong-ovoid, ca. 1.5 mm, apex acuminate. Ovary glabrous. Stigma capitate, 5-sulcate. Fruit ellipsoid, ca. 2.2 cm, glabrous, apex mucronulate. Fl. Apr-Jul, fr. Apr-Feb.

• Dense forests, shaded slopes of ravines; 400–500 m. Hainan.

6. *Erycibe elliptilimba* Merrill & Chun, *Sunyatsenia* 2: 45. 1934.

九来龙 jiu lai long

Shrubs scandent, to 20 m tall. Branchlets rather densely hirsute, striate when mature, to 8 cm in diam. Petiole 2–2.5 cm; leaf blade broadly elliptic to oblong-elliptic, 9–15 × 4.5–7.5 cm, thick leathery, glabrous, base broadly cuneate, apex abruptly short acuminate; lateral veins 5–7 pairs, indistinct midvein slightly raised abaxially and ± sunken adaxially. Inflorescences 1–3 together, axillary, racemose or narrowly paniculate, 1.5–11 cm, many flowered, rust-colored pubescent with 2-armed hairs. Pedicel 2–4 mm. Sepals nearly circular, 3–4 mm, densely pubescent abaxially. Corolla white, ca. 1.3 cm; lobules obovate to subcuneate, 3.5–5 mm, margin slightly emarginate, Stamens ca. 3 mm; anthers lanceolate, base cordate, apex acute-acuminate. Ovary 1.3–1.6 mm, glabrous; stigma conical, 5-ridged. Fruit black, ellipsoid, ca. 2 cm, smooth, with a paler apical scar. Fl. Jul-Oct, fr. Oct-Apr.

Roadsides, dry slopes, forests, seashores, sandy soils, loam, clay; 0–600 m. Guangdong, Hainan [Cambodia, Laos, Thailand, Vietnam].

The stems and leaves are poisonous and not to be confused with those of *Erycibe obtusifolia* Benth.

7. *Erycibe schmidtii* Craib, *Bot. Tidsskr.* 32: 352. 1916.

光叶丁公藤 guang ye ding gong teng

Erycibe semipilosa Gagnepain.

Shrubs scandent. Branchlets terete, ± angular, lenticellate, appressed puberulent, glabrescent. Petiole 1–3.5 cm, puberulent to glabrescent; leaf blade ovate-elliptic or oblong-elliptic, 7–12 × 2.5–6 cm, leathery, glabrous, base broadly cuneate to obtuse, apex ± acuminate; lateral veins (7 or) 8(–10) pairs, indistinct. Inflorescences terminal or axillary, racemose or

paniculate, 2–7 cm, ± densely rust-colored puberulent with 2-armed hairs. Pedicel 2–5 mm. Outer 2 sepals nearly circular, 3–4 mm, almost glabrous; inner ones ± elliptic, ca. 5 mm, ± densely rust-colored velutinous abaxially, ciliolate. Corolla white, ca. 8 mm, midpetaline bands abaxially densely sericeous; lobules obcordate, margin erose. Filaments 1.5–2 mm, dilated basally; anthers conical, 2–2.5 mm, apex long acuminate. Ovary terete, ca. 2 mm. Stigma peltate. Fruit dark, subglobose, ca. 2 cm in diam., glabrous.

Dense forests; 300–1200 m. S Yunnan [NE India, Thailand, Vietnam].

Erycibe schmidtii has been misidentified as *E. glaucescens* Wallich ex Choisy (= *E. laevigata* Wallich ex Choisy), which is not known to occur in China.

The stem is used medicinally.

8. *Erycibe obtusifolia* Benth., *Fl. Hongk.* 236. 1861.

丁公藤 ding gong teng

Erycibe versatilihirta C. Y. Ma.

Lianas woody, 4–20 m, glabrous except for inflorescences. Stems to 5 cm in diam.; branchlets distinctly striate-angular. Petiole 0.8–1.2 cm; leaf blade elliptic or obovate, 6.9–9 × 2.5–4 cm, leathery, base cuneate, apex obtuse, acute, or short acuminate; lateral veins 4–6 pairs, slightly raised abaxially. Inflorescences terminal or axillary, 4–15 cm. Pedicel 4–6 mm. Sepals circular, ca. 3 mm in diam., ± dull yellow pubescent abaxially with 2-armed hairs, glabrescent. Corolla white, 8–10 mm; lobules broadly elliptic, undulate. Stamens unequal, apex acuminate; filaments ca. as long as anthers. Ovary ellipsoid (drum-shaped), glabrous. Stigma conical, spirally ridged. Fruit red to yellow, ovoid-ellipsoid, 1.4–2 cm.

Dense forests, thickets, streamsides, steep slopes, hilltops, sandy soil, silt, rocky areas; 100–1200 m. C and SE Guangdong, Guangxi, Hainan [Vietnam].

As noted by Hoogland (see above), the specimens from Hong Kong have an obtuse to rounded leaf apex, while those from other parts of China are more variable.

The stem is used medicinally.

9. *Erycibe sinii* F. C. How, *Sunyatsenia* 6: 226. 1946.

瑶山丁公藤 yao shan ding gong teng

Shrubs scandent. Branchlets distinctly striate, appressed pilose, glabrescent. Petiole 1–1.2 cm; leaf blade elliptic or oblong-elliptic, 6–9 × 2.5–4.3 cm, papery, abaxially sparsely strigillose and finely spotted, adaxially glabrous, base cuneate, apex abruptly acute; lateral veins 5–7 pairs, veinlets indistinct. Inflorescences terminal or axillary, racemose or paniculate, 8–10 cm, densely appressed brownish pubescent. Pedicel ca. 2 mm. Sepals circular, 2–3 mm, densely appressed red-brown sericeous. Corolla ca. 7.5 mm, midpetaline bands red-brown sericeous outside; lobules oblong-ovate, ca. 3 mm, margin crenulate. Filaments very short, dilated basally; anthers ovate-oblong, apex abruptly acuminate. Ovary globose, gla-

brous. Stigma capitate, 5-ridged. Fruit not seen. Fl. Jun.

- Guangxi.

Hoogland (see above, p. 358), who did not examine the type material of *Erycibe sinii*, suggested from the description that it might be conspecific with *E. schmidtii*.

10. *Erycibe henryi* Prain, J. Asiat. Soc. Bengal 73(2): 15. 1904.

台湾丁公藤 tai wan ding gong teng

Erycibe acutifolia Hayata.

Shrubs climbing. Branchlets striate. Petiole 1.5–3 cm, puberulent; leaf blade broadly elliptic, 5–7 × 3–4.5 cm, rigidly papery, glabrous, base cuneate, apex abruptly acuminate or

cuspidate; lateral veins 4–6 pairs. Inflorescences terminal or axillary, paniculate, ± conical, 2–15 cm, ± brownish appressed pubescent. Pedicel 4–13 mm. Sepals elliptic-circular, 2–3 mm, pubescent abaxially. Corolla white, 8–10 mm; lobules oblong-elliptic, margin entire or undulate, involute, midpetaline bands rust-colored appressed pubescent abaxially. Stamens ca. 2 mm; filaments ca. as long as anthers; anthers triangular, apex acuminate to caudate. Ovary columnar (drum-shaped), glabrous. Stigma depressed conical, wider than ovary, 5-ridged. Fruit black, ellipsoid, ca. 1.8 × 1 cm, glabrous. Fl Jun-Sep, fr. Mar-Apr.

Thickets, secondary forests, sandstone cliffs; 0–300 m. Taiwan [S Japan including Ryukyu Islands].

5. PORANOPSIS Roberty, Candollea 14: 26. 1952.

白花叶属 bai hua ye shu

Lianas, dull yellow or grayish villous or sericeous, glabrescent. Leaves simple, petiolate, cordate-ovate, papery, rugulose, abaxially densely pubescent; venation pedate or nearly palmate. Inflorescences axillary (or terminal) bracteate panicles; bracteoles 2, scalelike, basal to calyx. Pedicel filiform. Flowers tiny, often fragrant, fascicled. Sepals free, quincuncial, unequally enlarged, outer 3 greatly enlarged, inner 2 slightly so; midvein 1, secondary veins reticulate. Corolla white, ± funnelliform, less than 8 mm; limb 5-lobed, outside villous apically, inside glabrous. Stamens included or exerted; anthers ellipsoid, longitudinally dehiscent; pollen 3-colpate, not spiny. Disc ringlike or absent. Pistil included; ovary unilocular; ovules 4. Style simple (nearly absent in 1 species); stigma 2-globose. Fruit papery, indehiscent. Seed 1, smooth.

Three species: Bhutan, China, India, ?Laos, Myanmar, Nepal, Pakistan, N Thailand, Vietnam; all three species in China.

Fang Rhui-cheng believes that *Poranopsis* should be reduced to synonymy of *Porana*.

Poranopsis paniculata is grown as an ornamental in many tropical places, including S Yunnan.

1a. Plants in flower.

2a. Style very short, stigma subsessile; stamens ± equal 2. *P. paniculata*

2b. Style longer than ovary; stamens unequal.

3a. Longest stamens exerted from corolla 1. *P. discifera*

3b. Longest stamens included within corolla 3. *P. sinensis*

1b. Plants in fruit.

4a. Outer 3 sepals ovate-cordate to nearly circular; fruit glabrous or with a few hairs near apex only 3. *P. sinensis*

4b. Outer 3 sepals ovate to elliptic-oblong; fruit uniformly puberulent.

5a. Sepals ± shiny, glabrous adaxially; fruit trichomes simple, septate 1. *P. discifera*

5b. Sepals opaque, puberulent adaxially; fruit trichomes 2-armed 2. *P. paniculata*

1. *Poranopsis discifera* (C. K. Schneider) Staples, Novon 3: 200. 1993.

搭棚藤 da peng teng

Porana discifera C. K. Schneider in Sargent, Pl. Wilson. 3(2): 358. 1916; *Cardiochlamys discifera* (C. K. Schneider) C. Y. Wu.

Climbers; indumentum yellowish to rust colored. Stems appressed pubescent, glabrescent. Petiole 2.1–5 cm; leaf blade broadly ovate-cordate to nearly circular, 5.8–13 × 4–10.5 cm, smooth to slightly rugulose, abaxially densely villous. Panicles crowded; bracts ovate, leaflike, small to very small. Pedicel 3–5 mm, elongating in fruit. Sepals lanceolate-ovate, flat or concave, ± equal, 1–1.5 mm; inner 2 falcate, villous abaxially.

Fruiting calyx spreading, pale tan to brownish; outer 3 sepals ovate-oblong to elliptic-oblong, 1.5–2.2 × 0.7–1.3 cm, ± puberulent abaxially, margin free. Corolla white or cream, campanulate-funnelform; limb 3–5 mm in diam., 5-lobed, outside dull yellow villous distally. Stamens unequal, 3 exerted; filaments basally pubescent. Disc ringlike. Ovary velutinous. Style longer than ovary. Fruit dark brown, globose-obovoid, 4–6(–8) × 3–5 mm, dull yellow pilose, apiculate. Seed reddish to black-brown, globose, ca. 3 mm in diam., smooth, glabrous or puberulent, glabrescent. Fl. Sep-Dec, fr. Dec-Apr.

Often on calcareous soils, clearings of evergreen forests, thickets, scrub jungle, river banks, roadsides, margins of cultivated land; 300–1800 m. Sichuan, Yunnan [NE India, ?Laos, N Myanmar, N Thailand, Vietnam].

2. *Poranopsis paniculata* (Roxburgh) Roberty, Candollea 14: 26. 1952.

圆锥白花叶 yuan zhui bai hua ye

Porana paniculata Roxburgh, Pl. Coromandel 3: 31. pl. 235. (1815) 1819; *Dinetus paniculatus* (Roxburgh) Sweet.

Climbers; indumentum grayish to dull yellow. Stems puberulent, glabrescent. Petiole 2.6–10.8 cm; leaf blade cordate-circular, 7.5–16.5 × 5.3–15 cm, smooth to rugulose, abaxially silvery villous. Panicle crowded; bracts cordate. Pedicel 2–4 mm, elongating in fruit. Flowers (4–)5–6(–7) mm. Sepals lanceolate-linear, flat or concave, equal, 1–2 mm, tomentose-villous abaxially. Fruiting calyx tan, reddish, or pale brown, loosely clasping; outer 3 sepals elliptic-oblong to narrowly ovate, 1.6–2.2(–2.4) cm × 7–9 mm, puberulent, margin free. Corolla white to cream, narrowly funnelform; limb (3–)5–7 mm in diam., 5-lobed. Stamens included, ± equal; filaments glabrous. Disc absent or ringlike. Ovary glabrous. Style obsolete; stigma subsessile. Fruit tan to brownish with darker lines, globose-ellipsoid, 5–6(–7) × 4–5 mm, pubescent, apiculate. Seeds dark brown, globose-ellipsoid, 4–6 × 3–5 mm, glabrous. Fl. Oct-Dec, fr. Mar-Apr. $2n = 26$.

Various soils, forests, thickets, scrub, open plains, often around human habitation; 0–2000 m. Xizang, Yunnan [Bhutan, India, Myanmar, Nepal, Pakistan].

Widely though sparingly cultivated in tropical and subtropical regions, including Yunnan. A single seemingly indigenous collection from the Chinese side of the border between Xizang and Arunachal Pradesh, NE India, has been seen.

3. *Poranopsis sinensis* (Handel-Mazzetti) Staples, Novon 3: 200. 1993.

白花叶 bai hua ye

Cardiochlamys sinensis Handel-Mazzetti, Akad. Wiss. Wien Sitzungsber., Math.-Naturwiss. Kl., Abt. 1, 57: 241. 1920; *Porana henryi* Verdcourt.

Climbers; indumentum dull yellow. Stems sericeous, glabrescent. Petiole 1.6–4.9 cm; leaf blade ovate-cordate, 6.3–9.5 × 3.6–7.8 cm, smooth or rugulose, dull yellow to reddish pubescent. Panicle lax; bracts ovate-oblong. Pedicel 3–6 mm, elongating to 8 mm. Flowers 4.5–6(–7) mm. Sepals broadly ovate to linear-filiform, equal, 1–2 mm, tomentose abaxially. Fruiting calyx tan to brown, clasping; outer 3 sepals ovate-cordate to nearly circular, (1.2–)1.4–1.9 × (1.2–) 1.5–1.7 cm, sparsely puberulent abaxially, margin adherent below middle. Corolla white to cream, campanulate-funnelform; limb 4–6(–7) mm in diam., subentire, dull yellow sericeous outside. Stamens unequal, 2 reaching throat, 3 included; filaments villous basally. Disc ringlike or absent. Ovary glabrous or sparsely villous. Style longer than ovary. Fruit tan brownish with darker lines, ellipsoid-obovoid, 3.5–6 × 2.5–4 mm, glabrous or sparsely pubescent, apiculate. Seeds brownish to black, ellipsoid-globose, 3–4 × ca. 3 mm, glabrous. Fl. Oct-Dec, fr. Nov-Feb.

• Calcareous and schistaceous soils, dry slopes, scrub, rocky cliffs, river banks; 300–2000 m. Sichuan, Yunnan.

6. TRIDYNAMIA Gagnepain, Notul. Syst. (Paris) 14: 26. 1950.

三翅藤属 san chi teng shu

Lianas, ± tomentose-villous, glabrescent. Leaves simple, petiolate, cordate, rigidly papery or ± leathery, abaxially densely pubescent or glabrous; venation pectate. Inflorescences axillary (or terminal) bracteate racemes or panicles; bracteoles 3, sepal-like, basal to calyx. Flowers showy, fascicled. Sepals free, quincuncial, unequally enlarged, papery, with (7 or) 9 (or 11) longitudinal veins basally, veins prominent abaxially; outer 2 or 3 sepals greatly enlarged, inner ones slightly so. Corolla white or blue-violet, campanulate to broadly funnelform, 1–3.5(–5.5) cm; limb ± 5-lobed, outside pubescent apically, inside glabrous. Stamens included or exerted; filaments basally pilose or glabrous; anthers sagittate, versatile; pollen 3-colpate, not spiny. Disc 5-lobulate or absent. Pistil included or exerted; ovary unilocular; ovules 4. Style 1, threadlike; stigma 2-lobed, wrinkled. Fruit tightly enclosed in calyx, papery, indehiscent, apiculate. Seed 1, glabrous.

Four species: China, India, Laos, Malaysia, Myanmar, Thailand, Vietnam; two species in China.

Fang Rhui-cheng believes that *Tridynamia* is not sufficiently distinct from *Porana*.

- 1a. Plants whitish to yellowish tomentose; corolla white; outer 3 sepals greatly elongated in fruit 1. *T. megalantha*
1b. Plants rust-colored or dull yellow velutinous or glabrous; corolla blue-violet, pale blue, or rose, rarely white; outer 2 sepals greatly elongated in fruit 2. *T. sinensis*

1. *Tridynamia megalantha* (Merrill) Staples, Novon 3: 201. 1993.

大花三翅藤 da hua san chi teng

Porana megalantha Merrill, Lingnan Sci. J. 14: 53, fig. 18. 1935; *P. spectabilis* Kurz var. *megalantha* (Merrill) How.

Climbers; indumentum whitish to yellowish. Stems glabrous; young parts tomentose. Petiole 1.2–4(–7) cm; leaf blade ovate, elliptic, or nearly circular, 7.8–15(–19.7) × 5–9.3(–12.5) cm, abaxially tomentose, adaxially subglabrous to tomentose, base cordate. Bracts ovate; bracteoles unequal. Pedicel 7–10 mm. Flowers 3–4.5(–5) cm. Sepals unequal, narrowly oblong to linear, flat; outer 3 sepals 7–8 mm, tomentose; inner 2 smaller. Fruiting calyx tan, oblong, tomen-

tellous, coarsely reticulate; outer 3 sepals basally tightly clasping, thickened, distally flat, winglike, 5.5–7.5 × 1–1.8 cm; inner 2 smaller. Corolla white, broadly funnellform; limb 2.7–4.6 cm in diam., shallowly 5-lobed. Stamens unequal, 1.1–1.7 cm. Disc absent. Pistil included; ovary ovoid, glabrous. Style 1.7–1.8 cm, pilose basally. Fruit obovoid-ellipsoid, slender, ca. 10 × 6 mm, pilose. Seeds dark brown, 8–10 × 5–6 mm, wrinkled. Fl. year round with peaks in Jun-Aug and Nov-Dec, fr. year round with peaks in Jun-Aug and Jan-Mar.

Often on calcareous soils, roadsides, grassy savannas, forest margins, scrub, hillsides; 0–900 m. Guangdong, Guangxi, Hainan, Yunnan [NE India, Laos, Malaysia, Myanmar, Thailand, Vietnam].

The whole plant is used medicinally.

2. *Tridynamia sinensis* (Hemsley) Staples, *Novon* 3: 201. 1993.

大果三翅藤 da guo san chi teng

Climbers; indumentum reddish or dull yellow. Stems glabrous; young parts velutinous. Petiole 2.7–6.2 cm; leaf blade ovate to nearly circular, (4.4–)8.5–13.2 × (1.9–)6.1–10 cm, abaxially velutinous or glabrous, adaxially subglabrous. Bracts ovate-lanceolate; bracteoles unequal, persistent but not enlarging. Pedicel 1–1.6 cm. Flowers 8–10 mm. Sepals unequal, oblong; outer 2 sepals 4–5 mm, ± velutinous; inner 3 smaller, curved around ovary. Fruiting calyx tan to pale brown, oblong to spatulate; outer 2 sepals 6.5–7.8 × 0.9–1.4(–1.8) cm, sparsely velutinous, base tightly clasping, thickened, apex flat, winglike. Corolla blue-violet, pale blue, rose to white, bowl-shaped, outside velutinous; limb (1–)1.6–2.3(–3) cm in diam., ± 5-lobed; lobes reflexed. Stamens equal or unequal, (0.7–)1.1–1.2 cm; filaments not colared basally. Disc 5-lobulate or absent. Pistil exerted; ovary ovoid-conical, velutinous apically. Style (0.5–)0.9–1.1 cm, pubescent basally; stigma 2-globose. Fruit dark brown, reddish apically, ellipsoid-obovoid, 1–1.1 cm × 6–8 mm, ruminant, pilose, glabrous basally. Seeds dark brown to black, 9–10 × 6–8 mm, smooth or faintly striate.

Two varieties with overlapping ranges along a broad zone in Guangxi and Guizhou provinces, where intermediates occur.

On conglomerates, frequently limestone soils, scrub and open areas, roadsides, thickets, forests, stream banks, slopes, lava beds, rock cliffs; 100–2500 m. Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan [NE Vietnam].

- 1a. Stems and leaves abaxially rust-colored (to dull yellow) velutinous or tomentose; leaf blade broadly ovate to nearly circular, base cordate; flowers mostly 1.9–2.3(–3) cm in diam.

- 2a. var. *sinensis*
 1b. Stems and leaves glabrous or sparsely pubescent; leaf blade typically narrowly ovate, base rounded to emarginate, rarely truncate to shallowly cordate; flowers mostly 1–2(–2.7) cm in diam.
 2b. var. *delavayi*

2a. *Tridynamia sinensis* var. *sinensis*

大果三翅藤 (原变种) da guo san chi teng (yuan bian zhong)

Porana sinensis Hemsley in F. B. Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 197. 1890; *P. esquirolii* H. Léveillé; *Vatica cordata* H. H. Hu.

Climbers, pubescent. Leaf blade broadly ovate, elliptic-ovate to nearly circular, 8.5–13.2 × 6.1–10 cm, abaxially rusty (to dull yellow) velutinous or tomentose, adaxially subglabrous, base cordate or shallowly cordate, apex acuminate or cuspidate. Corolla blue-violet or pale blue to white; tube 8–10 mm; limb 1.9–2.3(–3) cm in diam. Stamens exerted, equal, 1.1–1.2 cm. Disc absent. Fl. Apr–Sep, fr. May–Dec.

On rich, moist, sometimes rocky, conglomerate soils, thickets, forests, stream banks, slopes, rock cliffs; 100–2500 m. Guangdong, Guangxi, Guizhou, S Hunan [NE Vietnam].

2b. *Tridynamia sinensis* var. *delavayi* (Gagnepain & Courchet) Staples, *Novon* 3: 201. 1993.

近无毛三翅藤 jin wu mao san chi teng

Porana delavayi Gagnepain & Courchet, *Notul. Syst. (Paris)* 3: 153. 1915; *P. confertifolia* C. Y. Wu; *P. sinensis* Hemsley var. *delavayi* (Gagnepain & Courchet) Rehder.

Climbers, glabrous or sparsely pubescent. Leaf blade narrowly ovate to elliptic-ovate, (4.4–)8–14.2 × (1.9–)4.1–9.2 cm, abaxially glabrous to sparsely velutinous, especially along veins, adaxially glabrous, base rounded to emarginate, rarely truncate to shallowly cordate, apex attenuate-acuminate to apiculate. Corolla violet, dark blue, or purple, with a white throat (rarely rose-pink); tube 6–9(–10) mm; limb 1–2(–2.7) cm in diam., subtire to 5-lobed. Stamens ± exerted, equal or unequal, 7–12 mm. Disc 5-lobulate or absent. Fl. Apr–Oct, fr. Jun–Dec.

• On dry, rocky, frequently limestone soils, thickets, scrub and open situations along streams, roadsides, cliffs, rock ledges, lava beds; 400–2200 m. Gansu, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

7. *DINETUS* Buchanan-Hamilton ex Sweet, *Brit. Fl. Gard.* 2: t. 127. 1825.

飞蛾藤属 fei e teng shu

Dinetopsis Roberty.

Twiners, herbaceous. Leaves simple, petiolate, cordate, herbaceous, margin entire (lobed in 1 species), venation pectate; veins raised abaxially, often winged. Inflorescences solitary or paired, axillary, bracteate racemes or panicles; bracteoles usually minute scales (sepal-like in *D. duclouxii*), basal to calyx. Pedicel filiform. Flowers often fragrant. Sepals free and quincuncial or short connate basally and valvate distally, equally enlarged or outer 3 larger, reflexed or clasping, with (5 or) 7 or 9 (or 11) longitudinal veins basally. Corolla funnellform or nearly salverform, entire to 5-lobed, glabrous except for an apical tuft of hairs. Stamens included; filaments glabrous or basally pilose; anthers linear to sagittate; pollen 3-colpate, not spiny. Disc ringlike, 5-lobed, or

absent. Pistil included; ovary unilocular; ovules 2. Style often jointed proximally; stigma ellipsoid, entire or slightly 2-lobed. Fruit papery, indehiscent. Seed 1, often longitudinally keeled, smooth, glabrous.

Eight species: Bhutan, China, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam; six species in China.

Fang Rhui-cheng considers *Dinetus* as a synonym of *Porana*.

- 1a. Fruiting sepals ± unequal, loosely clasping fruit; corolla 1.5–4 cm, rose, pink, lavender, blue, or violet (to yellowish or white).
 - 2a. Bracteoles 3, immediately below calyx, ± sepal-like; plants ± sticky glandular 3. *D. duclouxii*
 - 2b. Bracteoles 2, part way down pedicel, minute, scalelike; plants pubescent or glabrous, never sticky glandular.
 - 3a. Corolla funnellform, 1.7–2.3 cm, tube widening from base upward; fruiting sepals flat 1. *D. decorus*
 - 3b. Corolla nearly salverform, 3–4.5 cm; tube cylindric, with a basal swelling; fruiting sepals concave 4. *D. grandiflorus*
- 1b. Fruiting sepals ± equal, reflexed at maturity (clasping in *D. dinetoides*); corolla (not known in *D. truncatus*) typically less than 1 cm, white, with divided limb.
 - 4a. Leaves pubescent on both sides; corolla campanulate; fruiting sepals 6–10 × 1.5–3 mm, sometimes ciliate 2. *D. dinetoides*
 - 4b. Leaves subglabrous adaxially; corolla funnellform; sepals 9–21 × 2.5–5 mm.
 - 5a. Fruit ellipsoid, apex acute or apiculate 5. *D. racemosus*
 - 5b. Fruit broadly obovoid to rhomboid, apex truncate or depressed 6. *D. truncatus*

1. *Dinetus decorus* (W. W. Smith) Staples, Novon 3: 199. 1993.

白藤 bai teng

Porana decora W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 197. 1914; *P. mairei* Gagnepain; *P. mairei* var. *holosericea* C. Y. Wu; *P. microsepala* Handel-Mazzetti.

Herbs perennial; indumentum silvery white. Stems glabrescent. Petiole 2.5–8.4 cm; leaf blade broadly ovate-cordate, 8–14 × 4.8–10 cm, abaxially subglabrous to ± shiny grayish white sericeous, adaxially glabrous to sparsely strigillose. Panicle pendent, 21–33 cm; bracts cordate, sessile, to 4 × 2 cm, ± deciduous; bracteoles 2, filiform, ca. 3 mm. Pedicel 0.8–1.2 cm. Flowers 1.7–2.3 cm. Sepals lanceolate to subulate, equal, 2–3 mm, ± golden sericeous abaxially, apex recurved. Fruiting calyx loosely clasping; sepals tan to purplish brown, oblong to ± spatulate, flat, unequal, glabrous, outer 3 sepals 2.3–3.1 cm × 6–8 mm, inner 2 smaller. Corolla rose-pink or purplish to white, slender funnellform to nearly salverform; limb 1.5–1.8 cm in diam., subentire, apical hair tufts golden. Stamens unequal, 5–8 mm, glabrous; anthers hastate. Disc absent. Ovary ovoid-conical. Stigma broadly ellipsoid-oblong, emarginate. Fruit tan, reddish, or purple-brown, obovoid, 6–7 × 4–5 mm, glabrous, apiculate. Seed reddish tan, globose to ellipsoid, 4–5 × ca. 4 mm. Fl. Jun-Sep, fr. Oct-Dec.

Forests in river valleys, steep often rocky slopes; 1300–3500 m. S Sichuan, Yunnan [NE India, ?N Myanmar].

2. *Dinetus dinetoides* (C. K. Schneider) Staples, Novon 3: 199. 1993.

蒙自飞蛾藤 meng zhi fei e teng

Porana dinetoides C. K. Schneider in Sargent, Pl. Wilson. 3: 360. 1916. *P. brevisepala* C. Y. Wu & S. H. Huang; *P. dinetoides* var. *mienningsensis* S. H. Huang; *P. megathyrsa* C. Y. Wu.

Herbs perennial; indumentum yellowish. Stems tomentose-pilose, glabrescent. Petiole 2.3–7 cm; leaf blade cordate to broadly ovate-cordate, 5.8–11 × 4.3–8.7 cm, abaxially tomentose, densest along veins, adaxially ± sericeous. Panicle 18–35 cm; bracts ovate; bracteoles 2, minute scales. Pedicel 4–5 mm. Flowers 4–7 mm. Sepals narrowly navicular, 1–2 mm, short connate basally, margin reddish sericeous or glabrous abaxially. Fruiting calyx clasping; sepals spatulate to linear-oblong, ± equal, 6–10 × 1.5–3 mm, sometimes ciliate. Corolla white, campanulate; limb 4–6 mm, entire. Stamens unequal, 2 (or 3) reaching throat; filaments pilose basally; anthers sagittate. Disc ringlike. Ovary conical. Stigma ellipsoid-globose, emarginate. Fruit tan to brownish, ellipsoid-ovoid, rarely obovoid, 6–8 × 4–5 mm, glabrous, apiculate. Seed brownish, ellipsoid, ca. 3 × 2 mm. Fl. Jul-Oct, fr. Nov.

Forest margins and grassy slopes in mountainous areas; 1200–2200 m. Sichuan, Yunnan [NE India, ?N Myanmar].

3. *Dinetus duclouxii* (Gagnepain & Courchet) Staples, Novon 3: 199. 1993.

三列飞蛾藤 shan lie fei e teng

Porana duclouxii Gagnepain & Courchet, Notul. Syst. (Paris) 3: 153. 1915; *P. duclouxii* var. *lasia* (C. K. Schneider) Handel-Mazzetti; *P. lobata* C. Y. Wu; *P. lutingensis* Lingelsheim; *P. triserialis* C. K. Schneider; *P. triserialis* var. *lasia* C. K. Schneider.

Herbs perennial; indumentum sticky glandulose. Stems tomentose to glabrous. Petiole 2.2–7 cm; leaf blade broadly ovate to variously lobed or incised, 6.4–11.5 × 4.3–9.6 cm, glabrous to ± sticky; veinlets minutely pustulate abaxially. Panicle or raceme 8–17(–40) cm; bracts ovate to linear-subulate; bracteoles 3, at base of calyx, sepal-like, unequal, enlarged in fruit. Pedicel 6–11 mm. Flowers 2.2–3.5 cm. Sepals triangular-ovate to linear-subulate, outer 3 sepals 3–8 mm. Fruiting calyx clasping; sepals tan to purple-brown, narrowly ovate to elliptic, outer 3 sepals 1.9–3.7 × 0.7–1.3 cm, inner 2

smaller. Corolla blue, reddish, purplish, yellow, or white, salverform to narrowly funnelform; limb 1.7–3.4 cm in diam., 5-parted. Stamens unequal, 5–10 mm; filaments villous basally; anthers linear. Disc \pm 5-lobed, or absent. Ovary ovoid. Stigma oblong-obovoid, \pm 2-lobed. Fruit yellowish to brown, globose-ellipsoid, 5–8 \cdot 5–7 mm, glabrous, apiculate. Seed reddish to black-brown, \pm globose, 5–6 mm, scaly at first, glabrescent. Fl. May-Dec, fr. Sep-Dec.

• Roadsides, field margins, meadows, stream banks, hillsides, sometimes on calcareous soils; 100–4000 m. W Hubei, Sichuan, Yunnan.

4. *Dinetus grandiflorus* (Wallich) Staples, Novon 3: 199. 1993.

藏飞蛾藤 zang fei e teng

Porana grandiflora Wallich in Roxburgh, Fl. Ind., 2: 41. 1824; *Dinetopsis grandiflora* (Wallich) Roberty.

Herbs perennial; indumentum dull yellow to golden. Stems \pm puberulent. Petiole 2.8–8.5(–14) cm; leaf blade \pm cordate, rarely subhastate, (8.7–)10.3–12.5(–17.1) \cdot (5.3–)7.2–9(–13) cm, subglabrous to velutinous. Racemes 1 (or 2), pendent; bracts subulate-linear; bracteoles 2, golden pilose. Pedicel 0.6–1.6 cm. Flowers 3–4.5 cm. Sepals subulate-triangular, equal, 3.5–6 mm, marginally (or entirely) golden sericeous abaxially. Fruiting calyx loosely clasping; sepals tan to brown, narrowly ellipsoid-oblong, concave, unequal, glabrous, outer 3 sepals 3.2–4.2 \cdot 0.9–1.6 cm, inner 2 smaller. Corolla mauve or rose-purple, with a white eye, \pm salverform; tube cylindric, swollen basally; limb 2.8–4.4 cm in diam., shallowly 5-lobed, hair tufts golden. Stamens equal, inside basal swelling of corolla tube; filaments pubescent basally; anthers linear. Disc absent. Ovary ovoid-globose; stigma ellipsoid. Fruit greenish tan with darker lines, broadly obovoid to globose, (1–)1.4–1.6 \cdot 0.9–1.3 cm, glabrous, apiculate. Seed dark brown, ellipsoid, ca. 11 \cdot 9.5 mm. Fl. Jun-Sep, fr. Jul-Nov.

Thickets of moist N- or W-facing, deciduous or cloud forests, watercourses, ravines; 1700–2600 m. S Xizang (Bingmu Xian, Nyalam Xian) [Bhutan, NC India, Nepal].

Dinetus grandiflorus, the largest-flowered and most attractive species of *Dinetus*, is distributed along the S flank of the Himalayas. Its distribution barely extends into China at the border region between Nepal and Xizang.

5. *Dinetus racemosus* (Wallich) Sweet, Brit. Fl. Gard. 2: pl. 127. 1825.

飞蛾藤 fei e teng

Porana racemosa Wallich in Roxburgh, Fl. Ind., 2: 41. 1824; *P. gagnepainiana* H. Lévéille; *P. racemosa* var. *tomentella* C. Y. Wu; *P. racemosa* var. *violacea* C. Y. Wu.

Herbs annual; indumentum yellowish to silvery. Stems glabrescent. Petiole 2.9–7.7 cm; leaf blade deeply cordate, 6–16.7 \cdot 3.3–9.4 cm, abaxially puberulent to tomentellous, adaxially strigose. Panicle 13–45 cm; lowermost bracts cordate, prominently veined in fruit; bracteoles 2, minute scales. Pedicel 4–7 mm. Sepals lanceolate-linear, equal, 1–2 mm, glabrous to silvery or golden pubescent abaxially. Fruiting calyx reflexed, tan to purplish; sepals spatulate to oblanceolate, flat or slightly concave, equal, 0.9–1.4(–1.8) cm \cdot 2.5–4(–5) mm, puberulent or glabrous abaxially, glabrous adaxially, apex rounded-obtuse, apiculate. Corolla white, yellow in tube, funnelform, (7–)8–11 mm; limb (0.6–)0.8–1.2(–1.3) cm in diam., 5-parted. Stamens included, unequal, 1.5–2.5 mm; filaments pilose basally. Disc absent. Pistil included; ovary ovoid. Stigma ellipsoid to clavate, apex emarginate. Fruit tan, sometimes brown-purple striate, slenderly ellipsoid-obovoid, 5–7(–9) \cdot 3–4(–5) mm, glabrous, apex acute or apiculate. Seed reddish to dark brown, ellipsoid-globose, 3–5 \cdot 2.5–4 mm. Fl. summer-fall, fr. fall-winter. $2n = 28$.

Various soil types, often weedy around human habitations and disturbed sites, thickets, forests, scrub, watercourses, hillsides; 100–3200 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam].

The whole plant is used medicinally.

6. *Dinetus truncatus* (Kurz) Staples, Novon 3: 200. 1993.

毛果飞蛾藤 mao guo fei e teng

Porana truncata Kurz, J. Bot. 11: 136. 1873; *P. racemosa* Roxburgh var. *sericocarpa* C. Y. Wu.

Herbs annual; indumentum yellowish. Stems sparsely sericeous, glabrescent. Petiole 3.8–6.4 cm; leaf blade broadly ovate-cordate, 8.3–9.5 \cdot 5.6–6.9 cm, sparsely stellate, adaxially glabrous or sparsely strigose; veins \pm sericeous with simple hairs abaxially. Inflorescences and flowers unknown. Infructescence a lax raceme or panicle, 15–23 cm; bracts cordate. Pedicel deflexed, (0.7–)1–1.1(–1.5) cm. Fruiting calyx spreading; sepals purplish tan to brownish, slenderly elliptic to oblong, equal, (1–)1.7–2.1 cm \cdot (3–)4–5 mm, glabrous or sparsely pubescent, apex obtuse to rounded, mucronulate. Fruit straw colored to rusty brown, angles often darker, pendent, inflated, broadly obovoid to rhomboid, \pm 5-angled, 4–6(–8) \cdot 4–6.5(–8) mm, glabrous or puberulent, truncate or depressed-concave apically. Seed yellowish to dark red-brown, ellipsoid to \pm globose, 3–5 \cdot (2–)3–4 mm, smooth to coarsely wrinkled. Fl. unknown, fr. Oct-Dec.

Sandy, silty, or clay soils, damp forest clearings, roadsides, thickets, fallow cultivated land; 700–2500 m. Anhui, Guangdong, Guangxi, Jiangxi, Yunnan [E Myanmar, N Thailand].

8. HEWITTIA Wight & Arnott, Madras J. Lit. Sci., ser. 1, 5: 22. 1837.

猪菜藤属 zhu cai teng shu

Herbs twining or prostrate. Leaves petiolate, base usually cordate, margin entire, angular, or lobed. Inflorescences axillary, 1- to few-flowered cymes; bracts 2, leaflike, borne well below calyx, persistent. Sepals 5, apex acute; outer 3 ovate, slightly enlarged

in fruit; inner 2 much smaller. Corolla campanulate or funnelform; limb shallowly 5-lobed. Stamens included; filaments dilated basally, adnate to corolla tube, free distally, filiform; pollen not spiny. Disc ringlike. Pistil included; ovary 1-loculed or imperfectly 2-loculed apically, 4-ovuled. Style 1, filiform; stigmas 2, ovate-oblong, complanate. Capsule globose, 4-valved, pilose. Seeds 4 or fewer.

One species: tropical regions in Africa and Asia, naturalized in Jamaica.

1. Hewittia malabarica (Linnaeus) Suresh, An Interpretation of Van Rheede's Hortus Malabaricus. 88. 1988.

猪菜藤 zhu cai teng

Convolvulus malabaricus Linnaeus, Sp. Pl. 1: 155. 1753; *C. bicolor* Vahl; *C. bracteatus* Vahl; *C. scandens* Milne; *C. sublobatus* Linnaeus f.; *Hewittia bicolor* (Vahl) Wight & Arnott; *H. scandens* (Milne) Mabberley; *H. sublobata* (Linnaeus f.) Kuntze; *Shuterea bicolor* (Vahl) Choisy; *S. sublobata* (Linnaeus f.) House.

Herbs perennial. Stems herbaceous; axial parts ± densely pubescent, twining or prostrate, 1–2 m, occasionally rooting at nodes. Petiole 1–6 cm; leaf blade ovate, 3–10 × 3–8 cm, appressed pilose or subglabrous, sometimes yellow glandular ?dotted, margin ciliate, base cordate, hastate, or truncate, margin entire or 3-lobed, apex acuminate, acute, or mucronate.

Inflorescences often 1-flowered; peduncle 1.5–10 cm; bracts oblong-lanceolate, 0.7–1.5 cm, pubescent, acuminate. Pedicel 2–4 mm. Sepals unequal, pubescent abaxially; outer 3 broadly ovate, 0.9–1.5 cm × 6–9 mm, to 1.7 cm in fruit; inner 2 oblong-lanceolate, smaller. Corolla pale yellow or whitish, with a purple center, 2–2.5 cm, midpetaline bands densely pilose. Stamens ca. 9 mm; filaments minutely papillate basally; anthers ovoid-deltoid. Ovary villous. Capsule enclosed by persistent calyx, depressed globose, 8–10 mm in diam., pilose. Seeds dull black, ovoid-trigonous, 4–6 mm, glabrous except for pubescent hilum. Fl. and fr. year round. $2n = 30$.

Sunny places in thickets, roadsides, forest clearings, river banks, plantations, often on sandy soil; 0–600 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Asia, North America (naturalized in Jamaica), Pacific Islands].

9. JACQUEMONTIA Choisy, Mém. Soc. Phys. Genève 6: 476. 1833.

小牵牛属 xiao qian niu shu

Herbs or woody twiners, rarely erect, hairs usually stellate, rarely glabrous. Leaves petiolate, often cordate, margin entire, rarely dentate or lobed. Inflorescences axillary, often umbelliform or capitate cymes, less often scorpioid cymes, dense terminal spikes, or capitula, or solitary flowers; bracts linear, subulate (in China), or leaflike. Sepals equal or outer 3 often larger. Corolla blue, lilac, or pink, rarely white, funnelform or campanulate, with 5 distinct midpetaline bands; limb 5-toothed or subentire. Stamens included; filaments adnate to corolla basally; anthers ellipsoid; pollen globose, usually 5-zonocolpate, not spiny. Disc small or absent. Pistil included; ovary 2-loculed; ovules 2 per locule. Style 1, filiform; stigmas 2, elliptic or oblong, flat, rarely linear or globose. Capsule globose, 4- or 8-valved. Seeds 4 or fewer, smooth or minutely papillate, glabrous or velutinous, abaxial edges often with a narrow scarious wing.

Approximately 120 species: mainly in North and South America, a few species also in Africa and Asia; one species in China.

1. Jacquemontia paniculata (N. L. Burman) H. Hallier, Bot. Jahrb. Syst. 16: 541. 1893.

小牵牛 xiao qian niu

Herbs twining. Stems terete, 0.25–2 m, pubescent when young, glabrescent. Petiole 1–6 cm, pubescent; leaf blade lanceolate, ovate or ovate-oblong, 1.5–8 × 0.5–5 cm, ± villous or glabrous adaxially, base cordate or rounded to cuneate, apex acuminate, mucronulate; lateral veins 5–8 pairs. Inflorescences umbelliform-cymose, loose to dense; peduncle 0.3–4 cm; bracts subulate. Pedicel 3–5 mm, pubescent. Sepals unequal, ± acuminate apically, pilose to glabrous abaxially; outer 3 ovate to ovate-lanceolate, 5–7 × ca. 4 mm; inner 2 smaller. Corolla lilac, pale purple, pink, or white, funnelform, 0.8–1.2 cm; limb shallowly 5-lobed, glabrous or lobes sparsely pubescent apically. Filaments subequal, pubescent basally; anthers oblong. Ovary glabrous. Style ca. 8 mm; stigmas oblong. Capsule globose, 3–4 mm in diam., 8-valved. Seeds brownish yellow to purplish black, 1.5–2 mm, minutely tuberculate, glabrous, edges narrowly winged. $2n = 18$.

Thickets, grassy areas, forest clearings, roadsides, often on dry

soils; 0–600 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia, Pacific Islands].

- 1a. Leaves 3–8 × 2–5 cm, ovate or ovate-oblong; inflorescences often many flowered 1a. var. *paniculata*
- 1b. Leaves 1.5–3 × 0.5–0.7 cm, lanceolate; inflorescences 1–3-flowered 1b. var. *lanceolata*

1a. Jacquemontia paniculata var. paniculata

小牵牛 (原变种) xiao qian niu (yuan bian zhong)
Ipomoea paniculata N. L. Burman, Fl. Indica 50. 1768; *Convolvulus parviflorus* Vahl; *C. violaceus* Vahl; *Jacquemontia parviflora* (Vahl) Roberty.

Leaf blade ovate or ovate-oblong, 3–8 × 2–5 cm, base cordate or rounded to truncate, apex acuminate, mucronulate, rarely acute or obtuse. Inflorescences often many flowered.

Thickets, grassy areas, forest clearings, roadsides, often on dry

soils; 0–600 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia, Pacific Islands].

Fang and Huang (Fl. Reipubl. Popularis Sin. 64(1): 46. 1979) incorrectly listed *Jacquemontia violacea* (Vahl) Choisy, based on *Convolvulus violaceus* Vahl, as a synonym for *J. paniculata*. *Jacquemontia violacea* is a synonym of *J. pentantha* (Jacquin) G. Don, a West Indian species introduced to Asia as an ornamental but not known to be in China.

1b. *Jacquemontia paniculata* var. *lanceolata* S. H. Huang, Fl. Reipubl. Popularis Sin. 64(1): 163. 1979.

披针叶小牵牛 pi zhen ye xiao qian niu

Leaf blade lanceolate, 1.5–3 cm × 5–7 mm, base cuneate, apex acuminate. Inflorescences 1–3-flowered. Fl. Apr, fr. unknown.

- Hainan.

10. CALYSTEGIA R. Brown, Prodr. 483. 1810, nom. cons.

打碗花属 da wan hua shu

Fang Rhui-cheng¹; Richard K. Brummitt²

Herbs prostrate or erect to twining to several meters tall, rhizomatous [or woody at base]. Leaves sessile to petiolate, oblong to hastate or sagittate [or rarely pedate]. Inflorescences axillary, 1-flowered [or few-flowered] cymes; bracteoles 2, sepal-like, inserted immediately below calyx, ovate and sometimes saccate, enclosing calyx [or remote from calyx and subulate or leaf-shaped], persistent. Sepals subequal, persistent. Corolla white, pink [or pale yellow], funnelform, with 5 distinct midpetaline bands, glabrous. Stamens included, equal. Pollen globose, pantoporate, not spiny. Ovary 1-loculed, 4-ovuled. Style 1, included in corolla; stigmas 2, clavate. Capsule globose, glabrous, indehiscent. Seeds 4, smooth or minutely tuberculate.

Approximately 70 intergrading subspecific taxa which can be arbitrarily combined into about 25 species: mostly temperate but sparingly extending to the tropics; six species in China.

Nearly all taxa in *Calystegia* intergrade geographically into neighboring taxa with the exception of the widespread coastal species, *C. soldanella* (Linnaeus) R. Brown. Almost half of the genus is endemic in California, U.S.A., and the exceptions noted in the generic description in brackets [] all refer to the Californian endemics. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically.

- 1a. Leaves reniform; bracteoles ca. as long as or shorter than sepals; plants of seashores 1. *C. soldanella*
- 1b. Leaves not reniform; bracteoles longer than sepals; plants mostly of inland habitats.
 - 2a. Corolla 2–3.5 cm; leaves with abruptly spreading, usually acutely 2-angled lobes 2. *C. hederacea*
 - 2b. Corolla 4–7 cm; leaves unlobed to distinctly lobed with lobes entire to occasionally acutely 2-angled.
 - 3a. Plants trailing or suberect to climbing; leaves oblong to narrowly triangular with lobes seldom more than 1/3 length of midvein, if present at all; corolla pink.
 - 4a. Stems appressed pubescent to villous; petiole usually less than 1.2 cm and less than 1/4 length of leaf blade; leaves without basal lobes to shortly hastate at base 3. *C. pellita*

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- 4b. Stems glabrous to pubescent; petiole usually more than 1.2 cm and 1/5–2/3 as long as midvein; leaves distinctly lobed at base 4. *C. pubescens*
- 3b. Plants climbing; leaves triangular with lobes 1/3–1/2 length of midvein; corolla pink or white.
 - 5a. Corolla pink; leaf sinus with divergent sides 5. *C. sepium*
 - 5b. Corolla usually white; leaf sinus with parallel sides 6. *C. silvatica*

1. *Calystegia soldanella* (Linnaeus) R. Brown, Prodr. 483. 1810.

肾叶打碗花 shen ye da wan hua

Convolvulus soldanellus Linnaeus, Sp. Pl. 1: 159. 1753; *Calystegia reniformis* R. Brown; *C. soldanelloides* Makino; *Convolvulus asarifolius* Salisburys; *C. maritimus* Lamarck; *C. reniformis* (R. Brown) Poiret.

Plants glabrous. Stems prostrate, to 1 m, scarcely twining

or not. Petiole longer than leaf blade; leaf blade reniform, slightly fleshy, sinus divergent or shortly parallel sided, apex rounded to emarginate, sometimes mucronate. Lower peduncles usually exceeding leaves, upper peduncles often shorter; bracteoles ovate to nearly circular, usually shorter than calyx, apex obtuse or retuse. Corolla pink, 3–5(–5.5) cm. Stamens (1.8–)2.1–2.7(–3) cm; anthers (3–)4–5.5(–6) mm. Fl. May–Jul, fr. Jul–Sep. $2n = 22$.

Sandy seashores, coastal dunes; sea level. Fujian, Hebei, Jiangsu, Liaoning, Shandong, Taiwan, Zhejiang [Japan (including Ryukyu Is-

lands), Korea, Russia; Africa, Asia, Australia, Europe, North America, Pacific Islands, South America].

2. *Calystegia hederacea* Wallich in Roxburgh, Fl. Ind. 2: 94. 1824.

打碗花 da wan hua

Calystegia abyssinica Engler; *C. acetosifolia* (Turczaninow) Turczaninow, *C. hederacea* Wallich var. *elongata* Liou & Ling; *Convolvulus acetosifolius* Turczaninow; *C. calystegioides* Choisy; *C. wallichianus* Sprengel; *Volvulus hederaceus* (Wallich) Kuntze.

Plants glabrous. Stems erect when young, later shoots prostrate or twining, to 1 m. Petiole 1–5 cm; leaf blade sagittate, triangular to narrowly triangular, 2–8 × 2–7 cm including lobes; lobes abruptly spreading, with 2 (or 3) acute angles, sinus with divergent sides. Lower peduncles exceeding leaves, upper peduncles shorter; bracteoles ± ovate, 0.7–1.4(–1.8) cm × (4–)6–10(–12) mm, flat, apex acute to ± obtuse. Corolla pale pink or occasionally whitish or purplish, 2–3.5 cm. Stamens 1.1–1.6(–1.9) cm; anthers 3–4 mm. Fl. Mar–Sep, fr. Jun–Sep. $2n = 22, 30$.

Fields, wasteland, roadsides, river banks, often on sandy soils; 100–3500 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Afghanistan, India, Japan, Korea, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Russia, Tajikistan; NE Africa, rarely introduced in North America].

Only one collection has ever been made in Africa, from Ethiopia, and only two or three collections have been seen from North America.

3. *Calystegia pellita* (Ledebour) G. Don, Gen. Hist. 4: 296. 1837.

藤长苗 teng chang miao

Plants appressed pubescent to villous. Stems prostrate to weakly climbing, or ± erect, to 1 m. Petiole 1–12 mm; leaf blade narrowly triangular to oblong, 3–7 × as long as wide, unlobed to slightly hastate or with short lobes less than 1/4 length of midvein, sparsely pubescent to villous. Peduncle not exceeding leaves, pubescent; bracteoles 1.3–2.4 × 1–1.8 cm, apex acute to obtuse. Corolla pink, 4.4–5.5 cm. Stamens 2.5–3.3 cm; anthers 5(–6) mm. $2n = 22$.

Grassy places, mountain slopes, sometimes a weed of cultivation; 300–700(–1700) m. Anhui, Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, ?Nei Mongol, Shandong [Korea, ?Mongolia, Russia].

1a. Leaves 0.8–2 cm wide, 4–7 × as long as wide; major lateral veins 4–9 pairs
..... 3b. subsp. *longifolia*

1b. Leaves 1.5–3 mm wide, 3–4 × as long as wide; major lateral veins 3–5 pairs.

2a. Stems prostrate to weakly climbing leaves mostly narrowly triangular, base truncate to slightly hastate or weakly lobed 3a. subsp. *pellita*

2b. Stems ± erect; leaves broadly oblong, base truncate 3c. subsp. *stricta*

3a. *Calystegia pellita* subsp. *pellita*

藤长苗 (原变种) teng chang miao (yuan bian zhong)

Convolvulus pellitus Ledebour, Fl. Altaic. 1: 223. 1829; *Calystegia dahurica* (Herbert) Choisy; *C. dahurica* var. *pellita* (Ledebour) Choisy; *Convolvulus dahuricus* Herbert.

Stems prostrate to weakly climbing. Leaves mostly narrowly triangular, 1.5–3 cm wide, ca. 3 × as long as wide, base truncate to slightly hastate or weakly lobed; major lateral veins 3–5 per side.

Heilongjiang, ?Nei Mongol [?Mongolia, Russia].

A seldom-collected taxon with very few collections from China; most collections are from eastern Russia from Irkutskaya to Primorsk. One early specimen at Kew, labelled “Gehol, Chine/ Mongolie Orientale, Abbé David,” cannot be placed with certainty in the provincial scheme for modern China. In 1955, the former province of Jehol was divided among Hebei, Liaoning, and Nei Mongol and it is unclear to which of these provinces the Abbé David specimen should correctly be referred. Based on our very limited knowledge of this subspecies range, one would expect it to occur in Nei Mongol, and this province has been listed with a question mark. More collections are needed for this taxon.

3b. *Calystegia pellita* subsp. *longifolia* Brummitt, Kew Bull. 35: 331. 1980.

长叶藤长苗 chang ye teng chang miao

Stems prostrate to weakly climbing. Leaves oblong, mostly 0.8–2 cm wide, 4–7 × as long as wide, base rounded to weakly hastate; major lateral veins 4–9 pairs. Fl. Jun–Aug, fr. Aug–Sep.

Mountains, stream banks, cultivated land. Anhui, Hebei, Jiangsu, Jilin, Liaoning, Shandong [Korea].

This is the plant referred to as *Calystegia subvolubilis* by Liou and Ling (Fl. Ill. Nord Chine p. 21, t. 6. 1931).

3c. *Calystegia pellita* subsp. *stricta* Brummitt, Kew Bull. 35: 331. 1980.

直立藤长苗 zhi li teng chang miao

Stems ± erect, with crowded leaves. Leaves broadly oblong, 1.5–2.5 cm wide, 3–4 × as long as wide, base truncate; major lateral veins 3 or 4 per side. Fl. Jun–Jul.

Mountains. Jilin [N Korea, E Russia].

4. *Calystegia pubescens* Lindley, J. Hort. Soc. London 1: 70. 1846.

柔毛大碗花 rou mao da wan hua

Calystegia dahurica f. *anestia* (Fernald) Hara; *C. japonica* Choisy; *C. japonica* f. *albiflora* (Makino) Hara; *C. japonica* var. *albiflora* Makino; *Convolvulus pellitus* Ledebour f. *anestius* Fernald; *Volvulus japonicus* (Thunberg) Farwell var. *pubescens* (Lindley) Farwell.

Stems trailing or usually climbing, to several meters tall, glabrous to sparsely pubescent. Petiole 1–6 cm; leaf blade narrowly triangular to oblong, glabrous to sparsely pubescent, ± parallel sided at middle, weakly to strongly lobed at base but lobes not more than 1/3 length of midvein. Peduncles not exceeding leaf, glabrous or pubescent toward base; bracteoles 1.5–2.1(–2.4) × 0.8–1.4 cm, usually glabrous and obtuse. Corolla pink or rarely white, 4.2–6.7 cm. Stamens 2.4–3.2 cm; anthers 4.5–6 mm. Fl. Aug. $2n = 22$.

Waste places, grassy or shrubby hillsides, sometimes a weed of cultivation. Beijing Shi, Heilongjiang, Hebei, Hubei, Jiangsu, ?Jilin, Liaoning, Shandong, Zhejiang [Japan, Korea; double-flowered form introduced in Europe and North America].

The name *Calystegia pubescens* was given to a double-flowered form cultivated in Britain that is now naturalized in Europe and North America, which was originally collected near Shanghai. Normal-flowered plants from this area were referred by Liou and Ling (Fl. Ill. Nord Chine p. 27. 1931) as *C. japonica* Choisy, but *C. pubescens* is the earlier name. In North America, *Calystegia pubescens* is commonly introduced and has often been misidentified as *C. hederacea* Wallich.

Plants intermediate between *Calystegia pubescens* and *C. hederacea*, from Japan, where they probably are sympatric, have been named as *Convolvulus japonicus* Thunberg (= *Calystegia sepium* var. *japonica* (Thunberg) Makino, non *Calystegia japonica* Choisy). Their status is in doubt.

5. *Calystegia sepium* (Linnaeus) R. Brown subsp. *spectabilis* Brummitt, J. Linn. Soc., Bot. 64: 73. 1971.

欧旋花 ou xuan hua

Calystegia dahurica (Herbert) G. Don; ?*Calystegia sepium* (Linnaeus) R. Brown var. *integrifolia* Liou & Ling; *Convolvulus dahuricus* Herbert.

Stems climbing to several meters tall, glabrous or pubescent. Petiole 2–8 cm; leaf blade ± triangular with basal lobes 1/3–1/2 as long as the midvein, glabrous to sparsely pubescent; sinus with divergent sides. Peduncles not exceeding leaf; bracteoles to 3 × 2.2 cm, keeled to somewhat saccate at base and slightly overlapping, apex acute to ± obtuse. Corolla pink, (4.5–)5.5–6.5 cm. Stamens (2.2–)2.5–3 cm; anthers 5.5–6.5 mm. Fl. Jun–Aug, fr. Sep.

Waste places, river banks. Beijing Shi, ?Heilongjiang, Jilin,

Liaoning, ?Tianjin Shi [Japan, ?Korea, Russia; introduced in N Europe].

Calystegia sepium is a widespread and highly polymorphic species with a number of subspecies recognized in temperate parts of the northern and southern hemispheres.

Calystegia sepium subsp. *spectabilis* was described from a plant naturalized in northern Europe, the native provenance of which is uncertain. The relationships of this to the plants from China and northern Russia, and also to *C. pulchra* Brummitt & Heywood, which was also described from a plant naturalized in northern Europe, are uncertain. The material from China and adjacent Russia is relatively uniform. It has larger and more inflated bracteoles and larger flowers than most subspecies of *C. sepium*, in this respect coming close to *C. silvatica* (Kitaibel) Grisebach, but it is apparently always pink flowered. A similarity to *C. sepium* subsp. *appalachiana* Brummitt, from the eastern U.S.A., should also be noted.

Calystegia sepium subsp. *spectabilis* intergrades into *C. pubescens* in N Korea and N Japan, and intermediates with *C. pellita* (Ledebour) G. Don are found in N China.

Calystegia dahurica (Herbert) G. Don is probably referable here, but the provenance of the original plant is unknown. No type specimen has been traced, and the name can only be typified by a rather inadequate original illustration.

6. *Calystegia silvatica* (Kitaibel) Grisebach subsp. *orientalis* Brummitt, Kew Bull. 35: 332. 1980.

鼓子花 gu zi hua

Stems climbing to several meters tall, glabrous. Petiole 2–8 cm; leaf blade ± triangular with basal lobes 1/3–1/2 as long as midvein, glabrous; sinus with parallel sides. Peduncles sometimes paired in leaf axils, not exceeding leaf; bracteoles ± overlapping each other, saccate, apex ± acute to ± obtuse. Corolla white or rarely pinkish, 4.3–6(–7.2) cm; stamens 2.3–3.3 cm; anthers (2.5–)3–5(–5.5) mm.

• Roadsides, fields, streamsides, forest margins; 100–2600 m. Anhui, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang.

This subspecies could be equally referred to *Calystegia sepium*. It shows a marked affinity with *C. silvatica* subsp. *fraterniflora* (Mackenzie & Bush) Brummitt (C and E U.S.A.) in its often paired peduncles, the flower buds drying blackish in herbarium specimens, and the parallel-sided leaf sinus. It differs from European *C. silvatica* subsp. *silvatica* in having more acute and less overlapping bracteoles, and usually shorter corollas, stamens, and anthers.

11. CONVULVULUS Linnaeus, Sp. Pl. 1: 153. 1753.

旋花属 xuan hua shu

Plants annual or perennial, prostrate, erect, or strangling or twining herbs, or cushionlike or erect shrubs; axial parts usually pubescent, hairs simple or 2-armed. Leaves simple, petiolate or sessile, margin entire or ± lobed. Flowers axillary, peduncled, solitary or in various kinds of inflorescences. Sepals equal or unequal, middle sepal asymmetric (exposed 1/2 similar to outer 2 sepals, enclosed 1/2 similar to inner 2 sepals), persistent, not enlarged. Corolla funnellform or campanulate; limb shallowly lobed or entire, with 5 ± distinct midpetaline bands. Stamens included, inserted at corolla base; filaments dilated basally, filiform apically; pollen ellipsoid, 3- (or 4)-colpate, not spiny. Disc ringlike or cupular. Pistil included; ovary 2-loculed; ovules 2 per locule. Style 1, filiform; stigmas 2, linear, cylindric, or clavate. Capsule 2-loculed, 4-valved or irregularly dehiscent. Seeds 1–4, black or brown, often verruculose, pubescent, rarely glabrous.

Approximately 250 species; widely distributed; eight species in China.

A workable and profusely illustrated account relevant to several Chinese taxa is that of Sa'ad (The *Convolvulus* Species of the Canary Isles,

the Mediterranean Region and the Near and Middle East. Utrecht. 1967). *Convolvulus bryoniifolius* Sims, described from plants grown in England from seed that supposedly originated "in China," was referred by Sa'ad (p. 211) to the synonymy of *C. althaeoides* Linnaeus, a Mediterranean and Macaronesian species. The provenance for the seed must have been in error.

- 1a. Twining herbs; leaves sagittate, cordate, or hastate basally, petiolate or sessile.
 - 2a. Leaves petiolate, leaf blade ovate-oblong to ovate, 10–40 mm wide; outer sepals retuse apically 7. *C. arvensis*
 - 2b. Leaves sessile or basal leaves with petioles to 5 mm, leaf blade linear to linear-oblong, 3–5 mm wide; outer sepals acuminate-cuspidate apically 8. *C. steppicola*
- 1b. Shrubs, subshrubs, or prostrate, erect, or ascending herbs; leaves attenuate or decurrent basally, rarely rounded, sessile to sessile.
 - 3a. Shrubs or subshrubs, often with densely straggling branches; twigs spinescent.
 - 4a. Sepals glabrous or sparsely pubescent, unequal, outer 2 broadly ovate-circular, base cordate, distinctly wider than inner ones 1. *C. gortschakovii*
 - 4b. Sepals hirsute to tomentose-villous, outer 2 neither cordate basally nor distinctly wider than inner ones.
 - 5a. Stems 20–50 cm tall, with short spreading flowering branches often ending in 1 or 2 spines; flower buds often ± reflexed. 2. *C. fruticosus*
 - 5b. Stems 4–10(–15) cm tall, forming a ± compact cushion, flowering branches without spines, other twigs with hard spines; flower buds never reflexed 3. *C. tragacanthoides*
 - 3b. Perennial herbs; stems erect, prostrate, or ascending, not spinescent.
 - 6a. Stems erect; leaves and sepals glabrous or ± appressed pilose abaxially; most cymes long pedunculate, much longer than leaves; sepals apically ± obtuse, mucronulate 4. *C. pseudocantabricus*
 - 6b. Stems prostrate or ascending; leaves and sepals densely silvery or golden sericeous; cymes short, hidden amongst leaves; sepals apically acute or acuminate.
 - 7a. Leaves linear or linear-oblong, 1–4 mm wide; flower usually solitary; corolla 0.8–1.5 cm 5. *C. ammannii*
 - 7b. Leaves oblong to oblong-oblong, 5–25 mm wide; flowers 3 or 4 together, rarely 1 or 5; corolla 1.5–2.5 cm 6. *C. lineatus*

1. *Convolvulus gortschakovii* Schrenk in Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 18. 1841.

鹰爪柴 ying zhao chai

Convolvulus pungens Karelin & Kirilov.

Subshrubs or cushion shrubs, 10–20(–30) cm tall; branches densely straggling, divaricate, densely silvery sericeous; twigs with short hard spines. Leaves sessile, lanceolate, oblanceolate, or linear-lanceolate, densely silvery sericeous, base attenuate, apex acute to obtuse. Pedicel 1–2 mm. Flowers solitary, axillary, on short branches. Sepals unequal, 0.8–1.2 cm, sparsely pilose or glabrous abaxially, or ciliate distally; outer 2 broadly ovate-circular, base cordate; inner 3 narrower. Corolla rose, funnelform, 1.7–2.2 cm, mid-petaline bands densely hirsute. Stamens included, slightly unequal; filaments glabrous; anthers sagittate. Disc ringlike. Ovary conical, long pubescent. Stigmas linear. Capsule ellipsoid-ovoid, ca. 6 mm, apex sparsely pubescent. Fl. May–Jun.

Sandy or pebbly deserts, stony dry slopes. Gansu, Nei Mongol, Ningxia, Shanxi, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, ?Uzbekistan].

2. *Convolvulus fruticosus* Pallas, Reise Russ. Reich. 2: 734. 1773.

灌木旋花 guan mu xuan hua

Shrubs or dwarf shrubs, 20–50 cm tall, with densely straggling divaricate branches; branches densely appressed pilose; twigs sometimes with short hard spines, lower leaves

sometimes clustered on short shoots. Leaves sessile, linear-spatulate to linear, rarely oblong-obovate, 2.2–3.5(–4.5) cm × 4–7 mm, densely appressed pilose, base decurrent, apex acute to obtuse. Pedicel 2–6 mm. Flowers axillary, solitary or 2–4 in a cyme, on a short lateral branch often ending in 1 or 2 spines. Sepals variable, lax; outer 2 oblong or obovate, 8–10 mm, hirsute abaxially; inner 3 ovate, glabrous, mucronate. Corolla narrowly funnelform, (1.3–)1.7–2.6 cm, mid-petaline bands densely brown pubescent outside. Stamens included, unequal; anthers sagittate, retuse apically. Disc ringlike. Ovary conical, pubescent. Stigmas linear. Capsule ovoid-acute, 5–7 mm, pubescent distally. Fl. Apr–Jul, fr. Jul.

Gravelly or sandy soils, deserts, mountains, plains; 1400–2000 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, S Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

3. *Convolvulus tragacanthoides* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 5: 201. 1832.

刺旋花 ci xuan hua

Convolvulus fruticosus Pallas f. *tianschanica* Palibin; *C. spinifer* M. Popov.

Subshrubs forming ± compact cushions, silvery sericeous, 4–10(–15) cm tall. Stems densely branched; twigs hard, spinescent; flowering branches more elongate, not spinescent. Leaves sessile, linear, rarely oblanceolate, 0.5–2 cm × 1–4 mm, base attenuate, apex rounded. Pedicel 2–5 mm. Flowers 2–6, terminal, rarely solitary, paired spines absent. Sepals elliptic or oblong-obovate, 5–8 mm, abaxially dull yellow tomentose-villous, apex short acuminate. Corolla pink, funnelform,

1.5–2.5 cm, midpetaline bands densely pubescent; limb shallowly 5-lobed. Stamens unequal; filaments dilated basally. Ovary pubescent. Stigmas linear. Capsule globose, 4–6 mm, pubescent apically. Seeds ovoid, glabrous. Fl. May-Jul.

Dry pebbly and stony soils, deserts, rock crevices. Gansu, Hebei, Nei Mongol, Ningxia, Shanxi, Sichuan, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan].

Sa'ad (l.c., p. 77) used *Convolvulus spinifer* M. Popov for this distinctive species, but Grigor'ev (Fl. URSS 19: 15. 1953) placed this name in synonymy with *C. tragacanthoides* Turczaninow, the earlier name.

4. *Convolvulus pseudocantabricus* Schrenk in Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 21. 1841.

直立旋花 zhi li xuan hua

Convolvulus askabadensis Bornmüller & Sintenis in Bornmüller; *C. dianthoides* Karelin & Kirilov; *C. pseudocantabricus* Schrenk subsp. *dianthoides* (Karelin & Kirilov) Vvedensky.

Herbs perennial, 30–70 cm tall, of broomlike habit. Rootstock woody. Stems erect, much branched basally, densely appressed pilose. Leaves sessile, linear to linear-lanceolate; basal leaves 2–3.5 cm × ca. 4 mm; cauline leaves 2.5–5 cm × 2–3 mm, abaxially ± appressed pilose, adaxially glabrous, base attenuate, apex acute. Inflorescences long-pedunculate axillary cymes on main stems, solitary on branchlets; peduncle 3–7 cm; bracts linear, to 1.5 cm. Pedicel 2–6 mm. Sepals obovate, oblong, or oblong-elliptic, ± unequal; inner ones 4–7 mm; outer 2 shorter, glabrous, apex ± obtuse, mucronulate. Corolla red or rose, funnellform, 1.5–2.3 cm, midpetaline bands pubescent distally. Stamens included, slightly unequal; filaments glabrous; anthers oblong, apex obtuse. Disc cupular. Ovary glabrous. Stigmas linear. Capsule ovoid-obovoid, 6–8 mm, glabrous. Seeds often 1, dark brown, ca. 3.5 × 3 mm, hirsute. Fl. May-Jul, fr. Jun-Jul.

Steppes, forests, foothills, limestone rock, stony mountain slopes. Xinjiang [NE Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

Sa'ad (l.c., pp. 100–104) recognized two varieties in *Convolvulus pseudocantabricus*, var. *pseudocantabricus* (sepals oblong, ca. 7 mm, acute, outer 2 ca. as long as inner ones) and var. *dianthoides* (Karelin & Kirilov) Sa'ad (sepals obovate, 4–5 mm, obtuse, mucronulate, outer 2 usually shorter than inner ones) but cited no Chinese specimens. It is not clear to which of these varieties the Chinese material ought to be assigned, as no material was available for study by Staples. The species is included here based on the account of Fang and Huang (1979).

5. *Convolvulus ammannii* Desrousseau in Lamarck, Encycl. 3: 549. 1789.

银灰旋花 yin hui xuan hua

Herbs perennial, with a short woody rootstock. Stems few to several, prostrate or ascending, 2–10(–15) cm; branches ± densely silvery sericeous. Leaves sessile, linear or linear-oblong, 1–2 cm × 1–4 mm, ± densely silvery sericeous, base attenuate, apex acute. Pedicel 0.5–7 cm. Flowers solitary, subterminal. Sepals slightly unequal, 3.5–7 mm, ± sericeous abaxially; outer 2 oblong or oblong-elliptic, apex acute or acuminate; inner ones wider, elliptic, apex acuminate. Corolla pale rose or whitish with pink-purple lines,

funnellform, 0.8–1.5 cm; limb shallowly 5-lobed, midpetaline bands pubescent. Stamens included, unequal; filaments glabrous. Disc ringlike. Ovary ovoid, pilose apically. Stigmas linear. Capsule ovoid-ellipsoid, 6–8 mm, apiculate, apiculum pilose. Seeds 2 or 3, reddish, ovoid, smooth, beaked. Fl. Jun-Aug, fr. Jul-Aug.

Loess soils, ravines, clay banks, on dry grassy slopes, roadsides; 1200–3400 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, W Sichuan, Xinjiang, E Xizang [Kazakhstan, Korea, ?Kyrgyzstan, Mongolia, Russia].

6. *Convolvulus lineatus* Linnaeus, Syst. Nat. ed. 10. 923. 1759.

线叶旋花 xian ye xuan hua

Convolvulus spicifolius Desrousseau.

Herbs perennial, with thick rhizomes, 3–20(–40) cm tall. Stems several, prostrate or ascending; branches densely silvery or golden sericeous. Apical leaves sessile, basal leaves petiolate; leaf blade oblanceolate to oblong-oblong, 4–6 × 0.5–2.5 cm, ± shiny silvery or golden sericeous, base gradually attenuate, decurrent, apex acute or obtuse. Flowers (1–)3 or 4 (or 5), axillary or subterminal. Sepals unequal, 6–12 mm, ± densely sericeous, base convex, apex flat, reflexed; outer 2 oblong to lanceolate-linear; inner ones wider, apex acuminate. Corolla rose or white, funnellform, 1.5–2.5 cm, midpetaline bands densely yellowish sericeous. Stamens included, unequal; filaments glabrous; anthers oblong-sagittate. Disc ringlike, glabrous. Ovary pubescent. Stigmas linear. Capsule oblong-ovoid, ± appressed pubescent. Seeds blackish, ca. 3 mm, short pubescent. Fl. Apr-Aug, fr. Jul-Aug. $2n = 30$.

Waste areas, fields, roadsides, sandy hills, bare stony soils, sometimes in saline meadows, semi-desert steppes, dry steppes, rocky deserts; 300–1300 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan; N Africa, SW Asia, E and S Europe].

Sa'ad (l.c. pp. 128–130) recognized two varieties of *Convolvulus lineatus*. The Chinese specimens are referable to the type variety.

7. *Convolvulus arvensis* Linnaeus, Sp. Pl. 1: 153. 1753.

田旋花 tian xuan hua

Convolvulus arvensis var. *angustatus* Ledebour; *C. arvensis* var. *crassifolius* Choisy; *C. arvensis* var. *linearifolius* Choisy; *C. arvensis* var. *sagittatus* Ledebour; *C. arvensis* var. *sagittifolius* Turczaninow; *C. chinensis* Ker Gawler; *C. sagittifolius* (Fischer) Liou & Ling.

Herbs perennial, with ± woody rhizomes. Stems prostrate or twining, to 1 m tall, glabrous or sparsely pubescent. Petiole 0.3–2 cm; leaf blade ovate-oblong to ovate, 1.5–5 × 1–4 cm, glabrous or pubescent, base hastate, sagittate, or cordate, apex obtuse, mucronulate; prominently 3-veined basally, upper parts pinnately veined. Inflorescences axillary, cymose, 1–3-flowered; peduncle 3–8 cm; bracts 2, linear, ca. 3 mm. Pedicel ca. 4 × as long as calyx. Sepals unequal, 3.5–5 mm; outer 2 broadly oblong to obovate, shorter, abaxially sparsely pubescent or glabrous, margin ± ciliate, apex retuse; inner ones ovate-circular, margin membranous, apex obtuse or retuse.

Corolla white or pink, broadly funnelform, 1.5–2.6 cm, mid-petaline bands pubescent outside distally; limb shallowly 5-lobed. Stamens included, unequal; filaments minutely scaly basally. Disc cupular. Ovary ovoid, glabrous or sparsely pubescent. Stigmas cylindric. Capsule ovoid to subglobose, 5–8 mm, glabrous. Seeds 4 or fewer, dark brown or black, ovoid, 3–4 mm, tuberculate. Fl. Jun–Aug, fr. Jun–Sep. $2n = 24, 48, 50$.

Cultivated areas, wasteland, roadsides, grassy slopes; 600–4500 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang [Asia, Europe, North America, South America].

8. *Convolvulus steppicola* Handel-Mazzetti, Symb. Sin. 7: 810. 1936.

草坡旋花 cao po xuan hua

Herbs perennial, with a thick woody rootstock. Stems

terete, diffuse, twining, to 1.5 m, densely yellowish tomentose. Petiole 0–5 mm; leaf blade linear to linear-oblong, 2–3.2 cm × 3–5 mm, base sagittate, margin often undulate-crenate or subentire, apex acute. Bracteoles 2, above middle of pedicel, lanceolate. Pedicel 1.5–5.5 cm. Flowers 1 or 2 together, axillary. Sepals unequal, 5–6 mm, acuminate-cuspidate apically; outer 2 lanceolate-elliptic, sericeous; inner ones broadly ovate, margin ciliate, glabrescent. Corolla funnelform, ca. 1.2 cm, midpetaline bands appressed villous; limb 5-lobed. Stamens included; filaments ca. 4 mm, glabrous; anthers linear, ca. 2.5 mm, base sagittate. Disc ringlike. Ovary glabrous. Stigmas linear. Capsule globose, ca. 8 mm in diam., glabrous, apiculate. Seeds dark brown, ovoid, 3–4 mm, minutely tuberculate. Fl. Apr–May, fr. May.

• Grasslands, steppes; ca. 1600 m. N Yunnan (Jinshajiang Valley).

12. *MERREMIA* Dennstedt ex Endlicher, Gen. Pl. 1: 1403. 1841, nom. cons.

鱼黄草属 yu huang cao shu

Skinneria Choisy; *Spiranthera* Bojer.

Herbs or shrubs, often twining, sometimes prostrate. Leaves usually petiolate, rarely sessile, margin entire, dentate, or palmately or pedately lobed or compound. Flowers axillary, solitary or in few- to many-flowered, variously branched cymose inflorescences; bracts usually small. Sepals variable in shape, often convex, subequal or outer 2 smaller, persistent, often enlarged in fruit. Corolla often yellow or white, sometimes with a darker center, funnelform or campanulate, usually glabrous, or midpetaline bands ± sericeous, sometimes only at apex; limb entire or ± 5-angled. Stamens included, often unequal; anthers often spirally twisted; filaments dilated basally, filiform distally; pollen 3–12-colpate or polyrugate, not spiny. Disc ringlike. Pistil included; ovary (imperfectly 2–)4-loculed, 4-ovuled. Style 1, filiform; stigmas 2-globular. Capsule 1–4-loculed, usually 4-valved or ± irregularly dehiscent. Seeds 4 or fewer, glabrous or pubescent to villous especially at margin.

Approximately 80 species: tropical regions of Africa, Asia, Australia, North and South America; 19 species in China.

The generic name *Merremia* was published as a *nomen nudum* by Dennstedt (Schlüssel Hortus Malab. 12, 23, 34. 1818). Several modern floras attribute the valid publication of the name to H. Hallier (Bot. Jahrb. Syst. 16: 581. 1893), but Endlicher (1841) actually validated the name.

Merremia is often confused with *Ipomoea*, which has pantoporate, spiny pollen, straight anthers and very few species with yellow corollas. It is also confused with *Operculina*, which consistently has a fruit with a circumscissile lid that detaches first, leaving a fragile endocarp that shatters irregularly. The distribution of hairs on the corolla is taxonomically important in *Merremia*; this is most easily discerned on mature flower buds.

- 1a. Leaves ± palmately (3–)5–7-lobed or palmately compound, with 5 leaflets.
 - 2a. Leaves palmately compound, leaflets 5, entire 6. *M. quinata*
 - 2b. Leaves ± palmately lobed, lobes entire, undulate-lobate, to dentate.
 - 3a. Leaves palmately divided nearly to base, lobes 5 or 7; corolla white, throat purple-red 7. *M. dissecta*
 - 3b. Leaves palmately angled or lobed; corolla yellow.
 - 4a. Leaves palmately 5–7-angled or -lobed nearly to middle; outer sepals 14–18 mm, hirsute abaxially; anthers spirally twisted 8. *M. vitifolia*
 - 4b. Leaves deeply 3-lobed to below the middle; outer sepals 6–7 mm, glabrous; anthers straight 14. *M. caloxantha*
- 1b. Leaves entire, irregularly coarsely crenate or serrulate, sometimes 3-lobed.
 - 5a. Corolla glabrous outside.
 - 6a. Peduncle very short or absent; flowers 1–3 per axil; leaves reniform to broadly ovate, 0.5–3.5 mm 5. *M. emarginata*
 - 6b. Peduncle distinct; flowers and leaves not as above.
 - 7a. Sepals acuminate or subulate, subequal.
 - 8a. Corolla pink, pale purplish, or white, 1.2–1.9 cm; sepals 5–7 mm, subulate-mucronate; leaves ovate-cordate, 3–13 × 1.7–7.5 cm, apex attenuate or caudate 9. *M. sibirica*
 - 8b. Corolla pale yellow, ca. 3 cm; sepals 10–15 mm, acuminate; leaves oblong-elliptic

- to ovate-lanceolate, 1.8–5 × 0.8–2.5 cm, apex rounded to acute 10. *M. collina*
- 7b. Sepals rounded, obtuse (and apiculate in *M. hainanensis*), or emarginate, outer 2 clearly shorter than inner ones (± unequal in *M. gemella*).
- 9a. Inner sepals 8–10 mm; corolla 1.8–2.2 cm.
- 10a. Pedicel terete; outer 2 sepals abaxially smooth; petiole 1.5–3 cm; Hainan 3. *M. hainanensis*
- 10b. Pedicel verruculose apically; outer 2 sepals verruculose abaxially; petiole 3–8 mm; Guangxi 17. *M. verruculosa*
- 9b. Inner sepals 5–7 mm; corolla 0.6–1.5(–2) cm.
- 11a. Sepal margins purplish; leaves linear, oblong-lanceolate, ovate-oblong, or ovate, entire, base truncate, rounded, ± auriculate, or hastate 4. *M. hirta*
- 11b. Sepal margins not colored; leaves ovate or ovate-cordate, entire, coarsely crenate, or 3-lobed, base cordate or broadly cordate.
- 12a. Outer sepals glabrous, all sepals broadly obovate to spatulate or oblong, apex emarginate and distinctly mucronate, mucro directed outward; corolla 0.6–1 cm; stems, petioles, and pedicels tuberculate 1. *M. hederacea*
- 12b. Outer sepals usually ± pilose abaxially, all sepals broadly obovate to ± circular, apex emarginate, not or only slightly mucronulate; corolla 1.5–2 cm; stems, petioles, and pedicels without tubercles 2. *M. gemella*
- 5b. Corolla with midpetaline bands densely sericeous outside at least apically, sometimes throughout.
- 13a. Pedicel with a thick lobed ring immediately below calyx; stems and leaves densely pubescent or mealy, especially when young; extreme S Taiwan 19. *M. similis*
- 13b. Pedicel without a thick lobed ring below calyx; stems and leaves glabrous, or tomentose and later glabrescent; mainland or Hainan (*M. umbellata* rare in Taiwan).
- 14a. Corolla lilac, pink, or white; seeds glabrous.
- 15a. Leaves rhombic, rhombic-ovate, or nearly circular, base cuneate; corolla narrowly campanulate, 3.5–4 cm 11. *M. yunnanensis*
- 15b. Leaves cordate, base cordate; corolla funnelform, 2–2.5 cm 16. *M. longipedunculata*
- 14b. Corolla yellow or white; seeds pubescent, at least on margins (unknown in *M. caloxantha*).
- 16a. Outer 2 sepals shorter than inner ones.
- 17a. Inflorescences lax cymes, usually 2- to several flowered, rarely flowers solitary; outer sepals elliptic, glabrous; plants with tubers 13. *M. hungaiensis*
- 17b. Inflorescences dense umbelliform or corymbose cymes, flowers few to many; outer sepals broadly ovate or broadly elliptic to nearly circular; tubers absent.
- 18a. Leaves usually nearly circular, rarely broadly ovate; inflorescence a many-flowered corymbiform cyme; corolla 1.4–2(–3.2) cm, yellow, midpetaline bands densely sericeous 18. *M. boisiana*
- 18b. Leaves usually ovate or ovate-oblong to oblong-lanceolate; inflorescence a few- to many-flowered umbelliform cyme; corolla 2.5–5.5 cm, white (or ?yellow), midpetaline bands pubescent only at apex 12. *M. umbellata*
- 16b. All sepals ± equal.
- 19a. Woody climber, pubescent to tomentose (older parts glabrous); corolla 1.4–2(–3.2) cm, midpetaline bands sericeous throughout their length 18. *M. boisiana*
- 19b. Herbaceous twiner, subglabrous or glabrescent (petioles pilose apically); corolla 3–4 cm, midpetaline bands hairy at apex only.
- 20a. Leaf blade deeply 3-lobed, 3–3.5 cm; petiole 1.3–2.2 cm; sepals 6–7 mm, all obovate 14. *M. caloxantha*
- 20b. Leaf blade entire, cordate, 5–7 cm; petiole 3–6 cm; sepals ca. 10 mm, outer 2 elliptic, inner 3 obovate 15. *M. cordata*

1. *Merremia hederacea* (N. L. Burman) H. Hallier, Bot. Jahrb. Syst. 18: 118. 1894.

篱栏网 li lan wang

Evolvulus hederaceus N. L. Burman, Fl. Indica 77. t. 30, f. 2. 1768; *Convolvulus acetosellifolius* Desrousseaux; *C. chryseides* (Ker Gawler) Sprengel; *C. dentatus* Vahl;

C. flavus Willdenow; *C. lapathifolius* Sprengel; *Ipomoea acetosellifolia* (Desrousseaux) Choisy; *I. chryseides* Ker Gawler; *I. dentata* (Vahl) Roemer & Schultes; *I. subtriflora* Zollinger & Moritzi; *Lepistemon glaber* Handel-Mazzetti; *L. muricatum* Spanoghe; *Merremia chryseides* (Ker Gawler) H. Hallier; *M. convolvulacea* Dennstedt ex H. Hallier.

Herbs, twining or prostrate; axial parts often minutely

tuberculate. Stems glabrous or sparsely hirsute, rooting at nodes. Petiole 0.5–5 cm, glabrous or pubescent; leaf blade cordate-ovate, 1.5–7.5 × 1–5 cm, subglabrous to sparsely puberulent, base cordate or broadly cordate, margin entire, irregularly crenate, or 3-lobed. Inflorescences (1-) or few to many flowered, umbelliform, cymose in fruit; peduncle (0.3–)0.8–5 cm, thicker than petiole; bracts early deciduous, narrowly obovate. Pedicel 2–5 mm. Sepals broadly obovate to spatulate or oblong, reflexed in fruit, unequal; outer 2 sepals 3.5–4 mm; inner 3 ca. 5 mm, glabrous, apex emarginate and distinctly mucronate, mucro directed outward. Corolla yellow, campanulate, 6–10 mm, outside glabrous, inside villous basally. Stamens ca. as long as corolla; filaments sparsely villous basally. Ovary globose, glabrous; stigma globose. Capsule depressed globose or broadly conical, 5–6 mm, reticulate (but not coarsely) wrinkled. Seeds trigonous-globose, 2.5–3.5 mm, puberulent to glabrous or woolly along angles and at hilum. $2n = 30^*$.

Scrub, grassy roadsides in tropical areas; 100–800 m. Fujian, Guangdong, Guangxi, Hainan, Jiangxi, Taiwan, Yunnan [?Bangladesh, Cambodia, India, Indonesia, Japan (Ogasawara and Ryukyu Islands), Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, N Australia, Pacific Islands].

Used medicinally for treating acute tonsillitis.

2. *Merremia gemella* (N. L. Burman) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

金花鱼黄草 jin hua yu huang cao

Convolvulus gemellus N. L. Burman, Fl. Indica 46, t. 21. 1768; *Ipomoea gemella* (N. L. Burman) Roth; *I. polyantha* Miquel.

Herbs, twining or prostrate; axial parts smooth, appressed yellowish pubescent. Stems often rooting at nodes and internodes. Petiole 1.5–6 cm, rarely minutely tuberculate; leaf blade often ovate, 2.5–6.5 × 1.5–4.3 cm, glabrous or short pilose, base broadly cordate, proximal margin entire, undulate or coarsely crenate, sometimes 3-lobed, apex ± attenuate, mucronulate. Inflorescences umbelliform or forked with short racemelike branches, few flowered; peduncle 2.5–10 cm; bracts early deciduous, minute. Pedicel 3–6 mm. Sepals broadly obovate to ± circular, ± unequal, margin scariosus, emarginate, slightly mucronulate or not, slightly enlarged in fruit; outer 2 abaxially ± pilose, 4–6 mm; inner 3 subglabrous, 6–7 mm. Corolla yellow, campanulate to funnelform, 1.5–2 cm, midpetaline bands dark, glabrous outside; limb shallowly 5-lobed; lobes emarginate and mucronulate. Filaments pubescent basally. Ovary glabrous. Capsule depressed-globose, ca. 7 mm, coarsely wrinkled. Seeds trigonous, dark gray or brownish puberulent. $2n = 58$.

Thickets, roadsides, waste places; 0–200 m. Taiwan [?Cambodia, Indonesia, ?Laos, Malaysia, ?Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia].

3. *Merremia hainanensis* H. S. Kiu, Fl. Hainan. 3: 587. 1974.

海南山猪菜 hai nan shan zhu cai

Herbs twining. Stems dull yellow hirsute. Petiole 1.5–3 cm, sparsely villous; leaf blade ovate, 3.5–7.5 × 2–4 cm, gla-

brous, base cordate, margin entire, apex acute or acuminate, mucronulate. Inflorescences few to many flowered; peduncle 2–3.5 cm, glabrous; bracts persistent, ovate, concave, 3–4 mm, apex acuminate. Pedicel slender, 0.5–1.5 cm. Sepals unequal, glabrous, apex obtuse, apiculate; outer 2 elliptic, ca. 9 mm; inner ones oblong, ca. 1 cm. Corolla pale yellow, broadly funnelform, 1.8–2 cm, midpetaline bands brown veined, outside glabrous. Stamens included; filaments ca. 1 cm, slightly dilated basally, fimbriately scaled; anthers twisted, 3–4 mm. Ovary ovoid-conical, ca. 2 mm, glabrous. Style ca. 3 mm. Capsule unknown.

• Forests on mountain slopes. Hainan.

4. *Merremia hirta* (Linnaeus) Merrill, Philipp. J. Sci. 7: 224. 1912.

毛山猪菜 mao shan zhu cai

Convolvulus hirtus Linnaeus, Sp. Pl. 1: 159. 1753; *C. caespitosus* Roxburgh; *C. reptans* Linnaeus, p.p.; *Ipomoea linifolia* Blume; *I. philippinensis* Choisy; *Lepistemon decurrens* Handel-Mazzetti; *Merremia caespitosa* (Roxburgh) H. Hallier; *M. decurrens* (Handel-Mazzetti) H. S. Kiu; *Skinneria caespitosa* (Roxburgh) Choisy.

Herbs, twining or prostrate. Stems rooting at nodes or internodes, spreading hirsute to glabrous. Petiole 1–5(–20) mm; leaf blade linear, oblong-lanceolate, ovate-oblong, or ovate, 1.9–6 × 0.5–2.5 cm, sparsely appressed hirsute or glabrous, base truncate, rounded, ± auriculate to hastate, margin entire, apex obtuse, acute or slightly emarginate and mucronulate. Inflorescences 1–4(–8)-flowered; peduncle filiform, 1.5–3.5(–7.5) cm, glabrous or sparsely pubescent basally; bracts persistent, ovate, 1–2 mm, glabrous. Pedicel 5–10 mm, glabrous. Sepals elliptic or elliptic-oblong, unequal; outer 2 sepals 3–5 mm; inner 3 ca. 6 mm, margin purplish, apex obtuse. Corolla pale yellow or whitish, broadly funnelform, 0.9–1.1(–1.8) cm, midpetaline bands dark veined, glabrous outside. Stamens included; filaments dilated and pubescent basally. Ovary glabrous. Capsule broadly ovoid to globose, 6–7 mm, thinly papery, glabrous. Seeds brownish black, trigonous-ellipsoid, ca. 3 mm, glabrous or sparsely floccose at margin and hilum.

Open grasslands, cultivated fields, roadsides, thickets, forest margins; 0–1000 m. Guangdong, Guangxi, Taiwan, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam; N Australia].

Used medicinally to treat arthritis.

5. *Merremia emarginata* (N. L. Burman) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

肾叶山猪菜 shen ye shan zhu cai

Evolvulus emarginatus N. L. Burman, Fl. Indica 77. 1768; *Convolvulus reniformis* Roxburgh; *Ipomoea reniformis* (Roxburgh) Choisy.

Herbs perennial, prostrate; axial parts sparsely hirtellous or glabrescent. Stems rooting at nodes, becoming tuberculate. Petiole 0.2–3.7 cm; leaf blade reniform to broadly ovate, 0.5–3.5 × 0.6–3.5 mm, glabrous or sparsely appressed pilose,

base cordate, margin entire or coarsely crenate, apex obtuse to broadly rounded or slightly emarginate. Inflorescences subsessile, 1(–3)-flowered; bracts unequal, ovate to linear, pubescent, apex acute. Pedicel 2–4 mm. Sepals obovate to circular or subquadrate, ± pubescent abaxially, margin long ciliate; outer 2 sepals 2.5–3 mm, apex obtuse, hoodlike and distinctly mucronate; inner 3 sepals 3–6 mm, deeply emarginate. Corolla yellow, tubular-campanulate, 5–9 mm, midpetaline bands distinctly 5-veined, purplish tinged outside, inside pubescent basally; limb slightly 5-lobed. Filaments pubescent basally. Ovary glabrous. Capsule enclosed by persistent calyx, brown-black, ± globular, 5–6 mm, longitudinally grooved, glabrous, apiculate. Seeds grayish brown, ca. 2.5 mm, glabrous. $2n = 30$.

Weedy in fields, roadsides, grasslands, on clay to sandy soils, forest floors; 0–200 m. Guangdong, Hainan [India, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand; Africa].

6. *Merremia quinata* (R. Brown) van Ooststroom, J. Arnold Arbor. 29: 417. 1948.

指叶山猪菜 zhi ye shan zhu cai

Ipomoea quinata R. Brown, Prodr. 486. 1810; *Convolvulus quinatus* (R. Brown) Sprengel; *I. pentadactylis* Choisy.

Herbs twining; axial parts ± hirsute with erect yellowish hairs, or glabrous. Stems slender, to 2 m. Petiole 1–2.5 cm; leaf blade palmately compound; leaflets 5, linear, lanceolate, or oblong-elliptic, 1.5–4.2 cm × 2.5–15 mm, often glabrous, sometimes hirsute along midvein and margin abaxially, base attenuate, margin entire, apex obtuse and mucronulate. Pedicel 3–6(–9) mm. Flowers 1 or 2; peduncle shorter to longer than leaves, glabrous or hirsute basally; bracts ovate-deltate, 3–4 mm, apex acuminate. Sepals elliptic to ovate-oblong, unequal; outer 2 sepals 8–10 mm; inner ones ca. 1.5 cm, glabrous, apex obtuse, mucronulate. Corolla white, campanulate or funnel-form, ca. 4 cm. Filaments inserted 6–7 mm above base of corolla. Ovary glabrous. Capsule ovoid, 1–1.3 cm, apex ± acuminate. Seeds oblong, 4–6 mm, pale yellow pubescent.

Open mountain slopes. Guangxi, Hainan, Hong Kong, Taiwan, Yunnan [Indonesia, Myanmar, New Guinea, Philippines, Thailand; N Australia].

Van Ooststroom (Fl. Malesiana, ser. I., 4: 447. 1953) expressed doubt that plants occurring in Myanmar, S China, and southeast Asia are conspecific with those in New Guinea and Australia. We apply the name provisionally, pending consideration of the range of variation in populations throughout the region, and examination of type specimens for the names involved.

7. *Merremia dissecta* (Jacquin) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

多裂鱼黄草 duo lie yu huang cao

Convolvulus dissectus Jacquin, Obs. Bot. 2: 4. 1767; *Ipomoea dissecta* (Jacquin) Persoon; *I. sinuata* Ortega; *Operculina dissecta* (Jacquin) House.

Twining, semi-woody; axial parts ± yellowish spreading hirsute. Stems woody basally, tuberculate, glabrescent, herbaceous when young. Petiole 2.5–7 cm; leaf blade palmately

5–7-divided nearly to base; segments lanceolate, middle 2.5–10 × 0.5–3 cm, lateral ones smaller, glabrous or pubescent along veins abaxially, margin coarsely dentate to irregularly pinnately lobed, apex mucronulate. Inflorescences 1- to several flowered; peduncle 5–10 cm. Pedicel 1.5–2 cm, thicker distally, minutely tuberculate, glabrous. Sepals ovate-lanceolate, subequal, 2–2.5 cm, enlarged and leathery in fruit, glabrous, margin narrowly scarious, apex acute, mucronulate. Corolla white, with purple-red throat, funnel-form, midpetaline bands distinct. Anthers spirally twisted. Ovary glabrous. Capsule globose, glabrous, 2-loculed. Seeds black, glabrous. $2n = 30$, 32.

Cultivated and escaped. Guangdong [India, Indonesia, Myanmar, Pakistan, Sri Lanka, Thailand; native in North and South America].

8. *Merremia vitifolia* (N. L. Burman) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

掌叶鱼黄草 zhang ye yu huang cao

Convolvulus vitifolius N. L. Burman, Fl. Indica 45. 1768; *C. angularis* N. L. Burman; *Ipomoea vitifolia* (N. L. Burman) Blume; *I. vitifolia* var. *angularis* (N. L. Burman) Choisy.

Herbs twining or prostrate; axial parts spreading hirsute with yellowish hairs, or glabrous. Stems purplish, terete, striate when old, to 4 m. Petiole 1–3(–19) cm; leaf blade circular in outline, (2.5–)5–18 × (2.5–)4–15.5 cm, base cordate, palmately (3–)5–7-angled or lobed; lobes broadly triangular or ovate-lanceolate, ± yellowish appressed hirtellous, abaxially more densely so, margin coarsely serrate or subentire, apex acuminate to obtuse. Inflorescences 1–3- or several flowered; peduncle 2–5(–15) cm; bracts subulate, 1.5–2 mm. Pedicel 1–1.6 cm, thicker distally. Sepals oblong or ovate-oblong, 1.4–1.8 cm, enlarged in fruit, ± leathery, ± shiny, pitted ad-axially, pellucid glandular, apex obtuse or ± acute; outer 2 hirsute abaxially; inner ones glabrous. Corolla yellow, paler in tube, funnel-form, 2.5–5.5 cm, glabrous outside; limb ± 5-angled. Stamens ca. 1.1 cm; anthers spirally twisted. Ovary glabrous. Capsule straw colored, ± globose, ca. 1.2 cm, papery. Seeds black-brown, trigonous-ovoid, ca. 7 mm, gla-brous.

Roadsides, thickets, forests; (100–)400–1600 m. Guangdong, Guangxi, Hainan, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

Used medicinally to treat bladder infections and stomach aches.

9. *Merremia sibirica* (Linnaeus) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

北鱼黄草 bei yu huang cao

Herbs twining, subglabrous. Stems striate. Petiole 2–7 cm; leaf blade ovate-cordate, 3–13 × 1.7–7.5 cm, base cordate, margin entire or undulate, apex attenuate-acuminate or caudate. Inflorescences (1–)3–7(–20)-flowered; peduncle often shorter than petiole, 1–6.5 cm, angular or narrowly winged; bracts linear, small. Pedicel 3–15 mm, thicker distally. Sepals elliptic, subequal, 5–7 mm, glabrous, distinctly subulate-mucronate. Corolla pink, pale purplish, or occasionally white, campanulate, 1.2–1.9 cm, glabrous; limb 5-lobed, lobes deltate or nearly circular. Stamens included; anthers not twisted. Ovary glabrous. Capsule ± globose, broadly ovoid, or

conical-ovoid, 5–14 mm, apex rounded or acute. Seeds ellipsoid-trigonous or oblong-trigonous, 3–8 mm, glabrous, puberulent, scurfy-scaly, or with swollen-based hairs, apex obtuse or acute.

Roadsides, open sunny places; 600–2900 m. Anhui, Gansu, NW Guangxi, Guizhou, Hebei, Hunan, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Mongolia, NE Russia].

Used medicinally to treat trauma and external infections.

- 1a. Seeds glabrous; capsule broadly ovoid or subglobose.
- 2a. Seeds 3–4 mm; capsule subglobose, apex rounded 9a. var. *sibirica*
- 2b. Seeds 4–7 mm; capsule broadly ovoid, apex acute 9b. var. *macrosperma*
- 1b. Seeds with indumentum; capsule conical-ovoid.
- 3a. Seeds 6–8 mm, densely covered by swollen-based hairs; capsule 0.9–1.4 cm high; corolla pink 9c. var. *vesiculosa*
- 3b. Seeds 3–4 mm, whitish puberulent or ± densely scaly; capsule mostly smaller; corolla white or pale purplish.
- 4a. Seeds densely scurfy-scaly; corolla often white 9d. var. *trichosperma*
- 4b. Seeds densely whitish puberulent; corolla pale purplish 9e. var. *jiuhuaensis*

9a. *Merremia sibirica* var. *sibirica*

北鱼黄草 (原变种) bei yu huang cao (yuan bian zhong)

Convolvulus sibiricus Linnaeus, Mant. Pl. 2: 203. 1771; *Ipomoea sibirica* (Linnaeus) Persoon.

Corolla pink. Capsule subglobose, apex rounded. Seeds 3–4 mm, glabrous.

Roadsides, fields, grassy or shrubby mountain slopes; 600–2800 m. Anhui, Gansu, NW Guangxi, Guizhou, Hebei, Hunan, Jiangsu, Jilin, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Mongolia, NE Russia].

9b. *Merremia sibirica* var. *macrosperma* C. C. Huang, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 112. 1965.

大籽鱼黄草 da zi yu huang cao

Corolla color unknown. Capsule broadly ovoid, apex acute. Seeds 4–7 mm, glabrous.

- Forests; 2000–2800 m. Sichuan, Yunnan.

9c. *Merremia sibirica* var. *vesiculosa* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 111. 1965.

囊毛鱼黄草 nang mao yu huang cao

Corolla pink. Capsule conical-ovoid, 0.9–1.4 mm. Seeds 6–8 mm, with dense swollen-based hairs.

- Scrub in valleys; 2400–2900 m. SW Sichuan, NW Yunnan.

9d. *Merremia sibirica* var. *trichosperma* C. C. Huang, Rep.

Stud. Pl. Trop. Subtrop. Yunnan 1: 112. 1965.

毛籽鱼黄草 mao zi yu huang cao

Corolla often (?always) white. Capsule conical-ovoid, 8–10 mm. Seeds ca. 4 mm, with dense scurfy scales.

- Forests, mixed valley forests; 600–2800 m. Hebei, Jilin, Liaoning, Shaanxi, Sichuan, Yunnan.

9e. *Merremia sibirica* var. *jiuhuaensis* B. A. Shen & X. L. Liu, Bull. Bot. Res., Harbin 7(3): 83. 1987.

九华北鱼黄草 jiu hua bei yu huang cao

Inflorescences 7–20-flowered. Corolla pale purplish. Capsule 5–6 mm. Seeds ca. 3.5 mm, ± densely whitish puberulent. Fl., fr. Oct.

- Thickets; 800–1000 m. Anhui (Jiuhua Shan).

10. *Merremia collina* S. Y. Liu, Guihaia 4: 199. 1984.

丘陵鱼黄草 qiu ling yu huang cao

Herbs perennial, ± twining; axial parts ± densely hirsute. Stems prostrate, tips twining. Petioles 3–8 mm; leaf blade oblong-elliptic to ovate-lanceolate, 1.8–5 × 0.8–2.5 cm, sparsely hirsute, more densely so along veins, ciliate, base rounded, shallowly cordate or broadly cuneate, margin entire, apex rounded to acute, mucronulate. Inflorescences usually 1(–3)-flowered; peduncle ca. 5 mm; bracts ovate. Sepals lanceolate, subequal, 1–1.5 cm, ± hirsute to glabrous abaxially, apex acuminate. Corolla pale yellow, funnellform, ca. 3 cm, glabrous; limb shallowly 5-lobed. Stamens included, unequal; filaments fimbriate-scaly basally; anthers twisted. Ovary glabrous. Capsule ovoid or globose, ca. 1 cm. Seeds trigonous-ovoid, glabrous. Fl. Sep-Oct, fr. Oct-Dec.

- Hillside thickets; ca. 100 m. Guangxi (Yongning Xian).

11. *Merremia yunnanensis* (Courchet & Gagnepain) R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 74. 1979.

蓝花土瓜 lan hua tu gua

Herbs perennial, with fusiform tubers; axial parts densely pubescent. Stems twining, striate. Petiole 0.4–2 cm; leaf blade rhombic, rhombic-ovate, or nearly circular, 3–10.5 × 1.5–10 cm, densely dull yellow sericeous, glabrescent, base cuneate, margin entire, apex abruptly acuminate or acute, rarely obtuse and mucronulate. Inflorescences 1- to many flowered; peduncle 2–12.5 cm; bracts scalelike, 2–3 mm, pubescent. Pedicel 7–10 mm, thicker than peduncle, glabrous. Sepals unequal; outer 2 obovate-oblong, 0.8–1.2 cm, abaxially pubescent, mucronulate; inner ones obovate or elliptic, 1.3–1.4 cm, apex obtuse. Corolla lilac or pink to white, narrowly campanulate, 3.5–4 cm; limb shortly 5-lobed; lobes dull yellow ciliate, mucronulate. Stamens unequal; filaments dilated basally, pubescent. Ovary glabrous. Capsule oblong, 7–9 mm. Seeds black, ca. 5 mm, glabrous.

- Grassy, shrubby mountain slopes, thickets, forests; 1400–3000 m. Sichuan, Yunnan.

In the original description, the corolla of *Merremia yunnanensis* was said to be pale blue, but it is described here as lilac, pink, or white. Specimens at A and K, apparently this species, have labels indicating corolla colors as pale yellow, pale yellow tinged rose, canary yellow, or even blue (*Wilson 4183* at K). Yellow or white corollas are common in *Merremia*, but lilac, pink, and rose are unusual, and blue is unheard of. Such a wide variation of corolla color in a single species is anomalous in the genus and warrants further investigation. Until a critical study is made, the original concept for *M. yunnanensis* is here maintained. It is possible that some early collections have incorrect label data with respect to flower color.

- 1a. Corolla pink to white; leaves rhombic or rhombic-ovate 11c. var. *pallescens*
- 1b. Corolla lilac; leaves broadly rhombic to nearly circular.
 - 2a. Leaf blade densely dull yellowish sericeous 11a. var. *yunnanensis*
 - 2b. Leaf blade subglabrous or sparsely sericeous 11b. var. *glabrescens*

11a. *Merremia yunnanensis* var. *yunnanensis*

藍花土瓜 (原变种) lan hua tu gua (yuan bian zhong)

Ipomoea yunnanensis Courchet & Gagnepain, Notul. Syst. (Paris) 3: 151. 1915; *I. yunnanensis* var. *uniflora* C. Y. Wu.

Leaf blade rhombic or rhombic-ovate, 3–9 × 1.5–4.5 cm, densely dull yellowish sericeous. Peduncle 2–10 cm. Corolla lilac.

- Grassy, shrubby mountain slopes, pine forest floors; 1400–3000 m. Sichuan, Yunnan.

11b. *Merremia yunnanensis* var. *glabrescens* (C. Y. Wu) R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 74. 1979.

近无毛藍花土瓜 jin wu mao lan hua tu gua

Ipomoea yunnanensis var. *glabrescens* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 119. 1965.

Leaf blade rhombic or rhombic-ovate, to 10.5 × 5 cm, subglabrous or sparsely sericeous. Peduncle slender, 8–12.5 cm. Corolla lilac.

- Shrubby mountain slopes, 1800–2300 m. Yunnan.

11c. *Merremia yunnanensis* var. *pallescens* (C. Y. Wu) R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 76. 1979.

红花土瓜 hong hua tu gua

Ipomoea yunnanensis var. *pallescens* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 120. 1965.

Leaf blade broadly rhombic to nearly circular. Peduncles often paired, 7–12 cm. Corolla pink to white.

- Thickets, forests; 1800–2600 m. Sichuan, Yunnan.

12. *Merremia umbellata* (Linnaeus) H. Hallier subsp. *orientalis* (H. Hallier) van Ooststroom, Fl. Malesiana, ser. 1, 4(4): 449. 1953.

山猪菜 shan zhu cai

Merremia umbellata var. *orientalis* H. Hallier, Verslag Staat Lands Plantentuin Buitenzorg 132. 1895 (1896).

Herbs twining or prostrate; axial parts puberulent or glabrous, with milky sap. Stems striate, rooting at nodes. Petiole 1–4(–6) cm; leaf blade ovate, ovate-oblong, or oblong-lanceolate, 3.5–13.5 × 1.3–10 cm, softly whitish puberulent, adaxially more densely so, base cordate, rarely hastate, margin entire, apex emarginate, acute to acuminate. Inflorescences umbelliform cymes, few to many flowered; peduncle (0.5–)2–5(–12) cm; bracts early deciduous, lanceolate, minute. Pedicel 1–2(–3) cm. Sepals strongly concave, slightly unequal; outer 2 broadly elliptic or nearly circular, 0.8–1.4 cm, abaxially pubescent, rounded or emarginate; inner ones usually slightly longer, margin scarious. Corolla white or yellow, funnellform, 2.5–5.5 cm, midpetaline bands with a strip of whitish pubescence apically; limb slightly lobed. Stamens included; anthers not twisted. Ovary glabrous or sparsely pubescent apically. Capsule conical-ovoid, 0.7–1.3 cm × 7–8 mm, glabrous or sparsely pubescent apically, apiculate. Seeds ca. 5 mm, densely spreading long pubescent.

Roadsides, forested valleys, thickets; 0–1600 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [?Bangladesh, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; E Africa, N Australia, Pacific Islands].

Used in Guangxi for treating infections.

Ooststroom (*Blumea* 3: 341–342. 1939) compared and contrasted the two varieties (later elevated to subspecies) of *Merremia umbellata*. Subspecies *umbellata* is distributed throughout the American tropics (Mexico, Central America, the West Indies, and South America as far south as Paraguay) and in western tropical Africa. It is a more robust plant, typically with more and larger flowers per inflorescence, corollas always yellow, capsules subglobose, with broader ovate valves, and seeds pubescent to shortly tomentose, the hairs only slightly longer on the margins.

Merremia umbellata is clearly recognizable in North and South America, Malaysia, tropical Africa, and the Pacific Islands, but the situation is not so clear on mainland Asia. The limits of *M. umbellata* adopted here and in Fl. Reipubl. Popularis Sin. are the same, but these encompass a much greater variation in flower size, color, and number per inflorescence, and density and in distribution of indumentum than do other regional floras that have circumscribed the species more narrowly. Further study of sect. *Xanthips* in mainland Asia is needed before a clearer concept of *M. umbellata* and its relatives in that section can be reached.

13. *Merremia hungaiensis* (Lingelsheim & Borza) R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 76. 1979.

山土瓜 shan tu gua

Herbs perennial, twining, with globose or ovoid tubers. Stems striate, glabrous. Petiole 0.8–3.5 cm, pubescent; leaf blade elliptic, ovate, oblong, or narrowly elliptic to linear, 2.5–11.5 × (0.4–)0.7–5 cm, glabrous, sparsely ciliate only at base, base obtuse, cuneate, or shallowly cordate, margin entire or minutely erose, apex obtuse, emarginate, acuminate, or acute, mucronulate. Inflorescences lax dichasial cymes, 2- to several flowered, rarely flowers solitary; peduncle 2–6 cm, glabrous; bracts scalelike, ca. 1 mm. Pedicel 0.5–2 cm, thicker

than peduncle, glabrous. Sepals elliptic, unequal, outer 2 sepals 0.7–1.4 cm, inner ones 1.2–1.5 cm, glabrous. Corolla yellow, funnellform, 3.5–6 cm, midpetaline bands pubescent apically. Stamens slightly unequal; filaments pubescent basally. Ovary conical, glabrous. Capsule oblong, 1–1.3 cm. Seeds 5.5–7 mm, densely dark brown tomentose.

• Grassy, shrubby mountain slopes, pine forest floors, roadsides, thickets; 1200–3200 m. Guizhou, Sichuan, Yunnan.

Fang and Huang (Fl. Reipubl. Popularis Sin. 64: 76. 1979) listed *Ipomoea kingii* sensu Diels (Notes Roy. Bot. Gard. Edinburgh 7: 142. 1912) as to the specimen *Forrest 2569*, not of Prain (J. Asiat. Soc. Bengal 13(2): 108. 1895), as a misapplied name for *Merremia hungaiensis*. Species delimitation in sect. *Xanthips* of *Merremia* is confused, and Chinese species need to be compared carefully with material of other parts of Asia. A thorough taxonomic revision of *Merremia* in Asia is much desired.

- 1a. Leaf blade elliptic, ovate, or oblong,
2.5–11.5 × 1.2–5 cm 13a. var. *hungaiensis*
1b. Leaf blade narrowly elliptic to linear,
5–10 × 0.4–1.5(–3) cm 13b. var. *linifolia*

13a. *Merremia hungaiensis* var. *hungaiensis*

山土瓜 (原变种) shan tu gua (yuan bian zhong)

Ipomoea hungaiensis Lingelsheim & Borza, Repert. Spec. Nov. Regni Veg. 13: 389. 1914; *I. wilsonii* Gagnepain, not House; *Merremia wilsonii* Verdcourt.

Leaf blade elliptic, ovate, or oblong, 2.5–11.5 × 1.2–5 cm.

• Grassy, shrubby mountain slopes, pine forest floors; 1200–3200 m. Guizhou, Sichuan, Yunnan.

13b. *Merremia hungaiensis* var. *linifolia* (C. C. Huang) R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 77. 1979.

线叶山土瓜 xian ye shan tu gua

Ipomoea hungaiensis var. *linifolia* C. C. Huang, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 119. 1965.

Leaf blade narrowly elliptic to linear, 5–10 × 0.4–1.5 (–3) cm.

• Roadsides, thickets; 1200–2500 m. Sichuan, Yunnan.

The roots are used externally to treat scabies.

14. *Merremia caloxantha* (Diels) Staples & R. C. Fang, Novon 5: 109. 1995.

美花鱼黄草 mei hua yu huang cao

Ipomoea caloxantha Diels, Notes Roy. Bot. Gard. Edinburgh 5: 203. 1912.

Herbs perennial, prostrate (and ?twining), 1–3 m, almost completely glabrous. Petiole 1.3–2.2 cm, pilose apically; leaf blade deeply 3-lobed, 3–3.5 × 2–2.5 cm, base cordate; basal lobes entire or undulate-lobate, median lobe longest, lanceolate, long attenuate. Inflorescences 3–5-flowered; peduncle 2.5–4.5

cm; bracts 2, minute scales. Pedicel 6–13 mm. Sepals obovate, concave, subequal, 6–7 mm, glabrous, margin thinner, sometimes recurved above middle, apex rounded to emarginate, mucronulate. Corolla bright yellow, broadly funnellform, 3–4 cm, midpetaline bands hairy at apex only. Stamens unequal; anthers straight. Pistil equal to longest stamens, included; ovary broadly ovoid, 2-locular, glabrous; ovules 4. Stigma 2-globose. Fruit unknown. Fl. Sep.

• Dry exposed rocky slopes; ca. 1400 m. Yunnan (Yongping Xian).

Known only from the type collection, made by George Forrest in 1905 in the valley of the Mekong at “the crossing of the Teng-yueh and Dalifu road.” On first sight, the deeply trilobate leaves of *Merremia caloxantha* suggest *M. gemella* and *M. hederacea* of sect. *Merremia*. However, the anthers that remain straight at dehiscence, the much larger corollas, and the corolla pubescence confined to the apex of the weakly delineated midpetaline bands indicate that this species may belong to sect. *Xanthips*. Further collections are needed to elucidate its relationships.

15. *Merremia cordata* C. Y. Wu & R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 163. 1979.

心叶山土瓜 xin ye shan tu gua

Herbs twining. Stems striate, glabrescent. Petiole 3–6 cm, pilose distally; leaf blade cordate, 5–7 × 3.5–5.5 cm, base cordate, margin entire or undulate, apex abruptly acuminate or long acuminate. Inflorescences 3–9-flowered; peduncle 6–16 cm, glabrescent; bracts scalelike, 1–1.5 mm. Pedicel 1–2.5 cm, glabrous. Sepals subequal, ca. 1 cm, margin scarious, glabrous; outer 2 elliptic; inner ones obovate, emarginate and with mucro. Corolla yellow, funnellform, 3.5–4 cm, with distinct midpetaline bands with a tuft of hairs apically; limb shallowly 5-lobed; lobes triangular. Stamens unequal; filaments papillate pubescent basally. Ovary conical. Capsule ± globose. Seeds brown, woolly on margin.

• Roadside and riverside thickets; 1400–1800 m. Sichuan, Yunnan.

16. *Merremia longipedunculata* (C. Y. Wu) R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 77. 1979.

长梗山土瓜 chang geng shan tu gua

Ipomoea longipedunculata C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 117. 1965.

Herbs climbing, ca. 1.7 m tall; axial parts mostly glabrous. Stems twisted. Petiole 5–15 cm; leaf blade cordate, basal leaves ca. 15 × 14 cm, upper leaves 5–6 × 4–5 cm, sparsely puberulent to glabrescent, base cordate, margin undulate, short ciliate, apex long acuminate. Inflorescences 6–17-flowered; peduncle 6–12 cm, pale yellowish villous distally; bracts and bracteoles persistent, ca. 2.5 mm. Pedicel 1.5–3 cm, thickened distally, pale yellow villous. Sepals purple-brown, elliptic, unequal; outer 2 ca. 7 × 5 mm; inner ones ca. 9 × 6 mm, abaxially glabrous or pale yellow villous, margin scarious, apex rounded or emarginate. Corolla white or pale rose, funnellform, 2–2.5 cm; limb with 5 short triangular lobes, pilose

apically. Stamens included, inserted below middle of corolla tube; filaments pilose basally; anthers oblong, ca. 3 mm. Ovary glabrous. Capsule brown, ± globose, ca. 1.2 cm. Seeds black, 5–6 mm, glabrous.

• Open fields, thickets in valleys; 500–1000 m. Guangxi, Guizhou, Yunnan.

17. *Merremia verruculosa* S. Y. Liu, Bull. Bot. Res., Harbin 7(2): 133. 1987.

疣萼鱼黄草 you e yu huang cao

Herbs twining. Stems ca. 2 m, axillary buds and lower stems grayish white pubescent, glabrescent distally. Petiole 3–8 mm, pubescent; leaf blade cordate or ovate, 1.5–5 × 1–3.5 cm, adaxially sparsely puberulent, base cordate, margin entire, apex short acuminate, mucronulate. Inflorescences 1–4-flowered; peduncle slender, 1–2.2 cm, whitish pubescent basally; bracts ovate, glabrous. Pedicel 5–7 mm, thicker apically, verruculose. Sepals unequal; outer 2 oblong to ovate-oblong, 5–7 mm, abaxially verruculose, apex rounded to shallowly emarginate; inner 3 oblong to obovate-oblong, 8–10 mm, apex deeply emarginate or irregularly 2-lobed. Corolla yellow, funnellform, 1.8–2.2 cm, midpetaline bands distinct, ?glabrous. Stamens included, subequal; filaments with scalelike fimbriate appendages basally; anthers spirally twisted. Ovary ovoid, glabrous. Capsule unknown. Fl. Sep-Oct.

• Thickets on hillsides; ca. 100 m. Guangxi (Yongning Xian).

18. *Merremia boisiana* (Gagnepain) van Ooststroom, Blumea 3: 343. 1939.

金钟藤 jin zhong teng

Twining woody; axial parts glabrous or grayish yellow tomentose. Stems terete, fistulose. Petiole 4.5–12 cm; leaf blade nearly circular, rarely broadly ovate, 9.5–15.5 × 7–14 cm, glabrous or puberulent along veins abaxially, base cordate, margin entire, apex abruptly acuminate or cuspidate. Inflorescences corymbose cymes, many flowered; peduncle 5–24(–35) cm, terete and glabrous basally, slightly applanate distally, dull yellow pubescent, sometimes entirely grayish yellow tomentose; bracts early deciduous, narrowly triangular, 1.5–2 mm, densely yellowish pubescent. Pedicel 1–2 cm, enlarged in fruit. Sepals ± equal or outer ones slightly shorter, 6–13 mm; outer 2 broadly ovate, abaxially dull yellow pubescent; inner 3 nearly circular, glabrous, apex obtuse. Corolla yellow, broadly funnellform or campanulate, 1.4–2 (–3.2) cm, midpetaline bands yellowish sericeous outside; limb undulate. Stamens included; filaments with 2 longitudinal pubescent lines below insertion; anthers belatedly twisted. Ovary conical, glabrous. Capsule brown, fading to yellow apically, conical-ovoid, 1–1.2 cm, glabrous. Seeds broadly trigonous-ovoid, ca. 5 mm, densely scaly pubescent along angles.

Forests; 100–1300 m. Guangxi, Hainan, Yunnan [Indonesia, Laos, Vietnam].

Superficially similar to *Ipomoea sumatrana* in the dried state, but easily distinguished from it by the non-spiny pollen, pubescent mid-

petaline bands on the corolla, and the peduncle typically longer than the subtending leaf. Living plants are immediately separable at anthesis because *Merremia boisiana* has a yellow corolla (in Chinese specimens), whereas *I. sumatrana* has a greenish white corolla with a rose-pink center.

1a. Branchlets, petioles, leaves, peduncles, and pedicels glabrous or dull yellow pubescent; outer sepals 6–7 mm; corolla 1.4–2 cm

..... 18a. var. *boisiana*

1b. Branchlets, petioles, leaves, peduncles, and pedicels grayish yellow tomentose; outer sepals 10–13 mm; corolla ca. 3.2 cm

..... 18b. var. *fulvopilosa*

18a. *Merremia boisiana* var. *boisiana*

金钟藤 (原变种) jin zhong teng (yuan bian zhong)

Ipomoea boisiana Gagnepain, Notul. Syst. (Paris) 3: 141. 1915.

Branchlets, petioles, leaves, peduncles, and pedicels glabrous or dull yellow pubescent. Outer sepals 6–7 mm. Corolla 1.4–2 cm.

Moist areas in forests; 100–700 m. Guangxi, Hainan, Yunnan [Indonesia, Laos, Vietnam].

The stem is used medicinally to treat anemia.

18b. *Merremia boisiana* var. *fulvopilosa* (Gagnepain) van Ooststroom, Blumea 3: 344. 1939.

黄毛金钟藤 huang mao jin zhong teng

Ipomoea boisiana Gagnepain var. *fulvopilosa* Gagnepain, Notul. Syst. (Paris) 3: 142. 1915; *I. boisiana* var. *rufopilosa* Gagnepain; *Merremia boisiana* var. *rufopilosa* (Gagnepain) C. Y. Wu.

Branchlets, petioles, leaves, peduncles, and pedicels grayish yellow tomentose. Outer sepals 1–1.3 cm. Corolla ca. 3.2 cm.

Forest margins, shaded areas in valleys, riversides; 500–1300 m. S Guangxi, SE Yunnan [Vietnam].

Gagnepain's protologue and also van Ooststroom's diagnosis for *Merremia boisiana* var. *fulvopilosa* (Blumea 3: 344. 1939) state that this variety is distinguished by the rufous pilose to tomentose indumentum, the shorter and more crowded inflorescence branches, and the circular to transversely elliptic, glabrous sepals that are 5–7 mm. Chinese specimens differ significantly in these characters, and it is possible that they are a different taxon.

The entire plant is used medicinally to treat arthritis.

19. *Merremia similis* Elmer, Leafl. Philip. Bot. 1: 335. 1908.

红花姬旋花 hong hua ji xuan hua

?*Convolvulus distillatorius* Blanco; ?*Merremia distillatoria* (Blanco) Merrill, p.p.

Climbers or sprawlers, perennial. Axial parts densely gray or rust-colored pubescent or mealy when young, later glabrescent. Stems terete, fistulose. Petiole 3–17 cm; leaf blade broadly ovate to circular, 8.5–18(–20) × 8–16(–20) cm, densely rust or grayish tomentose when young, later glabrescent adaxially, base cordate, apex abruptly acuminate. Peduncle to 30(–60 ?) cm, branched near apex. Pedicel thickened distally, with a thick lobed ring below sepals, 2–3 cm, 4–4.5 cm in fruit. Sepals obovate to broadly elliptic or circular, concave, ± equal, 1.5–1.8 cm, glabrous, margin membranous, apex obtuse or slightly retuse. Fruiting sepals to 2 cm, forming a cup around capsule. Corolla reddish (white with a tinge of red, according to Elmer's protologue), broadly funnelform, 3–4 cm, midpetaline bands pubescent apically; limb slightly 5-lobed. Stamens 1.6–1.8 cm; filaments with 2 lines of hairs below insertion; anthers spirally twisted. Ovary conical, glabrous. Style ca. 2.8 cm. Fruit ovoid, 1.5–1.8 cm; valves at first brown-black,

13. XENOSTEGIA D. F. Austin & Staples, Brittonia 32: 533. 1980.

地旋花属 de xuan hua shu

Merremia sect. *Halliera* O'Donnell.

Herbs perennial, prostrate or tips ± twining. Leaves petiolate, linear, oblong-linear, lanceolate-elliptic, or oblanceolate to spatulate, base ± hastate; basal lobes ± clasping stem, dentate or entire, apex acute to emarginate, mucronate, or tridentate. Inflorescences axillary, cymose, 1(–3)-flowered. Sepals oblong or oblong-ovate, ± equal to unequal, acute or obtuse; inner 3 narrower, apically tapering into slender points, all enlarged in fruit. Corolla pale yellowish or whitish, often with a purplish center, broadly funnelform or campanulate. Anthers not twisted at dehiscence; pollen globose, pantoporate, not spiny. Pistil included; ovary 2-loculed, 4-ovuled. Style 1, filiform; stigmas 2-globular. Capsule 4-valved, glabrous or pubescent apically. Seeds 1–4, brownish to black, ovoid-trigonus.

Two species: tropical regions of Asia, Africa, and Australia; one species in China.

1. *Xenostegia tridentata* (Linnaeus) D. F. Austin & Staples, Brittonia 32: 533. 1980.

地旋花 de xuan hua

Convolvulus tridentatus Linnaeus, Sp. Pl. 1: 157. 1753; *Evolvulus tridentatus* (Linnaeus) Linnaeus; *Ipomoea tridentata* (Linnaeus) Roth; *Merremia hastata* H. Hallier; *M. tridentata* (Linnaeus) H. Hallier; *M. tridentata* subsp. *hastata* (H. Hallier) van Ooststroom.

Herbs repent or twining, with a stout root. Stems wiry, to 4 m, ± angular to narrowly winged, glabrous. Petiole 1–3 mm or absent; leaf blade narrowly oblong, linear-oblong, to linear, dilated toward base, 2.5–8 cm × 4–15 mm, subglabrous, base hastate, ± clasping stem, basal lobes dentate, gradually attenuate to apex, apex acute or obtuse, mucronulate.

later straw colored. Seeds black, ca. 6 mm, tomentose-villous.

Taiwan (Hengchun Peninsula) [Philippines].

Chang Ching-en (Fl. Taiwan 4: 385. 1978) recorded *Merremia similis* from the extreme southern portion of Taiwan on the Hengchun Peninsula. This is the first record of the species outside the Philippines.

Van Ooststroom (Blumea 3: 360–361. 1939) has discussed the ambiguity surrounding the taxon Blanco described as *Convolvulus distillatorius*, and whether it was indeed identical with the one Merrill had before him when he made the combination *Merremia distillatoria*. Specimens cited by Merrill disagree in several points with Blanco's original description. Van Ooststroom therefore set aside this ambiguous name and took up Elmer's later-published *M. similis*, for which the typification and original description are quite clear. The correct application of binomial requires further study, including access to types not presently available.

Cymes 1–3-flowered; peduncle (1–)5–6 cm, slender, pubescent basally, glabrescent distally; bracts minute, subulate. Pedicel 6–8 mm. Sepals ovate-lanceolate, equal in length or outer 2 shorter, 6–8 mm, glabrous, apex attenuate-acuminate forming a sharp point. Corolla pale yellowish or white, with or without a maroon to brown center, funnelform, ca. 1.6 cm, glabrous outside. Stamens included, ± equal; filaments sparsely pubescent basally; anthers ellipsoid-sagittate. Ovary glabrous. Capsule globose or ovoid, papery. Seeds blackish, 3–4 mm, glabrous, apex acute. Fl. and fr. year round.

Sandy fields near the coast, cultivated areas, wasteland, roadsides, forest openings; 0–300 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [?Bangladesh, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, New Guinea, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; Africa, N Australia].

14. OPERCULINA S. Manso, Enum. Subst. Bras. 16. 1836.

盒果藤属 he guo teng shu

Herbs twining, often with winged stems, peduncles, and petioles. Leaves petiolate, angular or palmate, base often cordate, margin entire. Flowers axillary, solitary or in few-flowered cymes; bracts deciduous, often foliose. Sepals often enlarged in fruit, margin becoming irregularly lacerate. Corolla broadly funnelform, rarely campanulate or nearly salverform, glabrous or midpetaline bands pubescent outside. Stamens included (exserted in 1 sp.); filaments adnate to corolla tube basally, filiform distally; anthers often spirally twisted at dehiscence; pollen 3-colpate, not spiny. Disc ringlike. Ovary 2-loculed, 4-ovuled, glabrous. Style

filiform, included; stigma 2-globose. Fruit circumscissile in or above middle, distal portion lidlike, ± fleshy, separating from papery endocarp, which shatters irregularly. Seeds 4 or fewer, trigonous or globular, glabrous or angles pilose.

About 15 species: worldwide in the tropics; one species in China.

1. Operculina turpethum (Linnaeus) S. Manso, Enum. Subst. Bras. 16. 1836.

盒果藤 he guo teng

Convolvulus turpethum Linnaeus, Sp. Pl. 1: 155. 1753; *Argyrea alulata* Miquel; *Convolvulus anceps* Linnaeus; *Ipomoea anceps* (Linnaeus) Roemer & Schultes; *I. turpethum* (Linnaeus) R. Brown; *I. turpethum* var. *anceps* (Linnaeus) Miquel; *Merremia turpethum* (Linnaeus) Bojer; *Operculina turpethum* var. *heterophylla* H. Hallier; *Spiranthera turpethum* (Linnaeus) Bojer.

Herbs perennial. Roots fleshy, long, much branched. Stems reddish, to 4 m, narrowly 3–5-winged, ± angular, glabrous or densely pilose-tomentose on young parts. Petiole 2–10 cm, often winged; leaf blade cordate-circular, ovate, broadly ovate, ovate-lanceolate, or lanceolate, 4–14 × 3.5–14 cm, abaxially pubescent, adaxially appressed pilose to glabrous, base cordate, truncate or obtuse, margin entire or undulate, apex acute or acuminate, mucronulate. Inflorescences cymose, often 2-flowered; peduncles 0.5–3 cm, usually

terete; bracts 2, oblong to ovate-oblong, 1–2.5 cm, concave, pubescent. Pedicel 1.5–2 cm, striate-angular, clavate, to 4 cm in fruit. Sepals ovate to broadly ovate, unequal; outer 2 sepals 1.5–2 cm, abaxially pubescent; inner 3 shorter, subglabrous. Corolla white, sometimes with a yellowish base inside, broadly funnelform, 3.5–4 cm, glabrous, minutely yellowish glandular outside; limb 5-lobed. Filaments pubescent basally; anthers twisted. Fruit enclosed in cupular calyx, depressed globose, ca. 1.5 cm in diam. Seeds dull black, ovoid-trigonous, ca. 6 mm, glabrous. Fl. and fr. year round. $2n = 30$.

Stream banks, roadsides, grassy fields, wasteland, dry slopes, clay and sandy soils, scrub bordering valleys; 0–500 m. Guangdong, Guangxi, Hainan, Taiwan, S Yunnan [?Bangladesh, Cambodia, India, Indonesia, Japan (Ryukyu Islands), ?Laos, Malaysia, Myanmar, Nepal, New Guinea, ?Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; E Africa, Australia, introduced in North and South America (West Indies), Pacific Islands].

The leaves and roots are used medicinally.

15. IPOMOEA Linnaeus, Sp. Pl. 1: 159. 1753.

番薯属 fan shu shu

Calonyction Choisy; *Exogonium* Choisy; *Mina* Llave & Lexarza; *Pharbitis* Choisy; *Quamoclit* Miller.

Herbs or shrubs, often twining, sometimes prostrate, erect, or floating. Leaves petiolate, entire, lobed, or divided. Inflorescences mostly axillary, cymose, 1- to many flowered, rarely paniculate; bracts various. Flowers small to large. Sepals persistent, equal to unequal, ± enlarged in fruit. Corolla variously colored, rarely yellow, funnelform, campanulate, or salverform; limb 5-lobed to entire, midpetaline bands well defined. Stamens included or exerted; filaments filiform, usually unequal, dilated and pubescent basally; anthers ovate or linear, longitudinally dehiscent, not twisted; pollen globular, pantoporate, finely spiny. Disc ringlike. Ovary 2–4-loculed, 4- or 6-ovuled. Style 1, filiform, included or exerted; stigma capitate, or 2- or 3-globulose. Capsule globose or ovoid, 4- or 6-valved. Seeds 4(–6) or fewer, glabrous or pubescent.

Approximately 500 species: widely distributed in tropical to warm temperate regions, especially of North and South America; 29 species in China.

The following are cultivated in China and may escape from gardens in the south: *Ipomoea quamoclit* Linnaeus (= *Quamoclit pennata* (Desrousseau) Bojer), *I. hederifolia* Linnaeus (widely misidentified as *Quamoclit coccinea* (Linnaeus) Moench or *I. coccinea* Linnaeus), *I. ×sloteri* (House) van Oostroom (= *Quamoclit ×sloteri* House), and *I. tricolor* Cavanilles. These have been included in the key to species and given no further treatment.

Ipomoea fulvicoma Hance was originally described from Hong Kong, but no material of the species was available for study. *Ipomoea lancunosa* Linnaeus was reported from Zhejiang by Chiu et al. (Acta Bot. Yunnan. 16: 231–234. 1994), but its occurrence has not been verified by us, and the species has not been included here.

The generic concept for *Ipomoea* in this flora differs from that followed in the Fl. Reipubl. Popularis Sin. in that *Pharbitis*, *Calonyction*, *Quamoclit*, and *Mina* are recognized as infrageneric taxa, following D. F. Austin (Taxon 28: 359–361. 1979; emended, 29: 501–502. 1980) and most other twentieth century floras. In any case, cultivated species including those referable to *Quamoclit* and *Mina* that were treated in the Fl. Reipubl. Popularis Sin. account are mostly omitted in the Flora of China.

- 1a. Sepals distinctly awned at or below apex; corolla salverform with a long narrow tube; stamens and pistil mostly exerted.
- 2a. Corolla longer than 4.5 cm, white or purplish; outer sepals 5–12 mm (excluding awn), inner sepals 7–15 mm (excluding awn).
- 3a. Corolla white, tube slightly widened apically or not, 7–12 cm; stamens and style exerted 21. *I. alba*
- 3b. Corolla purplish, tube distinctly widened apically, 3–6 cm; stamens and style scarcely exerted or not 22. *I. turbinata*

- 2b. Corolla 3–4.5 cm, scarlet, rarely pure white; outer sepals 2–4.5 mm (excluding awn), inner sepals 3–6 mm (excluding awn).
- 4a. Leaves cordate, entire, angled, or palmately lobed, not pinnately parted *I. hederifolia*
- 4b. Leaves linear-lanceolate, linear, or filiform, pinnately parted.
- 5a. Leaf segments ca. 3–7 on either side of midvein, linear or linear-lanceolate *I. xsloteri*
- 5b. Leaf segments more numerous, linear or filiform *I. quamoclit*
- 1b. Sepals rounded to acuminate, emarginate, or mucronulate but never awned at or near apex; corolla mostly funnelform, or campanulate, sometimes salverform; stamens and pistil mostly included, sometimes exerted.
- 6a. Corolla ca. 10 cm or longer, salverform with a long and narrow tube, white or with greenish midpetaline bands; seeds long pubescent at least on margin; plants large twiners.
- 7a. Stamens inserted near mouth of corolla tube; sepals subequal or outer sepals slightly longer than inner sepals 29. *I. aculeata*
- 7b. Stamens inserted near base of corolla tube; sepals equal or outer 2 shorter than inner ones 28. *I. violacea*
- 6b. Corolla usually less than 10 cm, funnelform or campanulate, rarely salverform and then not longer than ca. 7 cm; seeds pubescent or glabrous; plants large to small twiners, or prostrate or erect.
- 8a. Sepals hairy abaxially or with fimbriate or ciliate margin.
- 9a. Peduncles very short (≤ 1.5 cm) or absent; corolla to 1.9 cm.
- 10a. Herbs erect to decumbent; leaf blade cuneate and attenuate basally 4. *I. polymorpha*
- 10b. Herbs twining or prostrate; leaf blade cordate basally.
- 11a. Ovary and capsule pubescent; pedicel absent or very short, to 3 mm; outer sepals linear-acuminate from an ovate base; corolla pink or purplish, 7–9 mm 1. *I. eriocarpa*
- 11b. Ovary and capsule glabrous; pedicel 8–15 mm; outer 3 sepals deltate-lanceolate, base auriculate; corolla white, 12–19 mm 2. *I. biflora*
- 9b. Peduncles mostly longer, well developed; corolla mostly longer than 2 cm.
- 12a. Flowers clustered at peduncle apex (capitate), subtended by 1 or more involucre bracts.
- 13a. Leaves palmately divided nearly to base; bracts oblong; outer sepals lanceolate, apex acute; corolla funnelform, white 9. *I. pes-tigridis*
- 13b. Leaves entire; bracts navicular; outer sepals elliptic-spatulate, apex obtuse; corolla salverform, pink or purple 10. *I. pileata*
- 12b. Flowers clustered at apex of peduncle or not, not distinctly involucre.
- 14a. Sepals 4–5 mm or less 14. *I. obscura*
- 14b. Sepals ca. 5 mm or longer.
- 15a. Erect shrubs or scandent subshrubs; sepals elliptic or ovate to circular, apex rounded, obtuse, or emarginate.
- 16a. Sepals 13–15 mm, apex obtuse or emarginate; corolla 5.5–6.5 cm; scandent subshrubs; leaves ovate-cordate, lateral veins ca. 14 pairs 26. *I. soluta*
- 16b. Sepals 5–6 mm, apex rounded; corolla 7–9 cm; erect shrubs; leaves ovate or ovate-oblong, lateral veins 7–9 pairs 27. *I. carnea*
- 15b. Twiners or prostrate; sepals narrower, apex usually acute or acuminate, rarely obtuse.
- 17a. Sepals long attenuate, or long and linear-acuminate apically, herbaceous; corolla bluish aging to pinkish.
- 18a. Outer sepals lanceolate basally, with a long linear acumen, spreading hirsute basally 7. *I. nil*
- 18b. Outer sepals lanceolate to broadly lanceolate basally, long and gradually attenuate apically, appressed hairy 8. *I. indica*
- 17b. Sepals acute, acuminate, or obtuse apically, mucronulate or not, not long attenuate, herbaceous, membranous, or leathery; corolla reddish, purplish, lilac to pink, or white.
- 19a. Outer sepals 5–10 mm, mucronulate, glabrous to pilose abaxially, margin ciliate or fimbriate; corolla 1.5–4 cm.
- 20a. Plants with subterranean tubers; stems mostly prostrate, rarely twining, rooting at nodes, thick 11. *I. batatas*
- 20b. Plants without tubers; stems mostly twining, thinner 12. *I. triloba*
- 19b. Outer sepals 10–16 mm, not mucronulate, purplish bristly or hirsute abaxially, margin neither ciliate nor fimbriate; corolla 5–7 cm.
- 21a. Plants \pm purplish or blackish bristly on stems, petioles, inflorescences, and abaxial side of sepals; leaves deeply 3–7-lobed, lobe margin undulate-serrate 23. *I. setosa*

- 21b. Plants ± hirsute; leaves entire or shallowly 3-lobed, lobe margin entire.
 - 22a. Plants densely yellowish hirsute; stamens less than 6 mm, filaments glabrous basally; ovary 2-loculed; stigma 2-lobed 5. *I. hirtifolia*
 - 22b. Plants short pubescent mixed with longer retrorse hirsute hairs; stamens unequal, longest stamens reaching middle of corolla tube, filaments pubescent basally; ovary 3-loculed; stigma 3-lobed 6. *I. purpurea*
- 8b. Sepals glabrous, sometimes muricate or dentate on veins.
 - 23a. Outer sepals with 3 dentate keels 3. *I. fimbriosepala*
 - 23b. Outer sepals not keeled or dentate.
 - 24a. Sepals ca. 1.4 cm or longer.
 - 25a. Sepals subequal, gradually linear-acuminate apically 8. *I. indica*
 - 25b. Sepals unequal, outer sepals rounded-obtuse apically, inner sepals acute apically 20. *I. wangii*
 - 24b. Sepals less than 1.4 cm.
 - 26a. Leaves palmately lobed to palmately compound.
 - 27a. Leaves palmately parted to base; pseudostipules (small leaves of axillary shoot) often present 19. *I. cairica*
 - 27b. Leaves palmately lobed to or mostly below middle, but not to base; pseudostipules absent.
 - 28a. Stems twining; sepals rounded or obtuse apically, not mucronulate.
 - 29a. Sepals ± equal or outer 2 shorter, ± circular, broadly elliptic, occasionally oblong, concave; corolla funnelform 24. *I. mauritiana*
 - 29b. Sepals unequal, outer 2 longer, ovate to oblong, ± flat; corolla ± salverform 23. *I. setosa*
 - 28b. Stems prostrate, rooting at nodes; inner sepals oblong to elliptic-oblong, distinctly mucronulate.
 - 30a. Leaves herbaceous, thin, middle lobe acute or subacute; corolla pink, purple, or white; subterranean tubers present; plants cultivated, occasionally escaping 11. *I. batatas*
 - 30b. Leaves fleshy, middle lobe obtuse or emarginate; corolla white with a pale yellow tube and a dark red center; without subterranean tubers; plants of sandy seashores 18. *I. imperati*
 - 26b. Leaves not palmately divided.
 - 31a. Plants large, woody, glabrous twiners; flowers in axillary panicles, fundamental units cymose 25. *I. sumatrana*
 - 31b. Plants smaller, mostly herbaceous twiners, or prostrate plants, glabrous or pubescent; flowers in few- to several-flowered axillary cymes, or solitary in leaf axils.
 - 32a. Corolla ± salverform 16. *I. marginata*
 - 32b. Corolla funnelform to campanulate.
 - 33a. Corolla to 2.5 cm 14. *I. obscura*
 - 33b. Corolla ca. 3 cm or longer.
 - 34a. Plants of marshy places or aquatic, often cultivated for food (stems and leaves eaten); stems usually repent and rooting, or floating, thick, fistulose 15. *I. aquatica*
 - 34b. Plants terrestrial; stems twining or repent.
 - 35a. Stems mostly (or at least partly) twining.
 - 36a. Sepals distinctly mucronulate, outer concave; corolla pink or pink-purple, with a darker center 13. *I. littoralis*
 - 36b. Sepals without a mucro, outer flat; corolla blue, with a paler or white center *I. tricolor*
 - 35b. Stems prostrate or trailing, mostly rooting at nodes, rarely twining, usually thick.
 - 37a. Leaves herbaceous, attenuate toward acute or obtuse apex; plants with subterranean tubers, cultivated for edible tubers 11. *I. batatas*
 - 37b. Leaves ± leathery or fleshy, apex mostly obtuse to broadly rounded, or emarginate; plants without subterranean tubers.

- 38a. Corolla white or yellowish, with a dark red center; leaves linear, lanceolate, oblong, or ovate (often on the same plant), apex obtuse or emarginate 18. *I. imperati*
- 38b. Corolla purple or reddish purple; leaves \pm reniform, circular, elliptic, ovate or quadrangular to oblong, apex deeply 2-lobed or emarginate 17. *I. pes-caprae*

1. *Ipomoea eriocarpa* R. Brown, Prodr. 484. 1810.

毛果薯 mao guo shu

Convolvulus eriocarpus (R. Brown) Sprengel; *C. hispidus* Vahl; *C. sessiliflorus* (Roth) Sprengel; *Ipomoea hispida* (Vahl) Roemer & Schultes; *I. horsefieldiana* Blume; *I. sessiliflora* Roth.

Herbs annual, twining or prostrate, with \pm retrorsely or spreading hispid axial parts. Stems 1–2 m. Petiole 1.5–6.5 cm; leaf blade lanceolate-ovate or oblong-ovate, 3–9 \times 1.5–3.5 cm, base cordate, margin entire, apex long attenuate, sometimes acute, appressed hispid; lateral veins 6 or 7 pairs. Cymes axillary, sessile or nearly so, usually 1–3-flowered; bracts linear-lanceolate, 3–8 mm, abaxially pilose. Pedicel very short or absent. Sepals ovate, \pm equal, 7–9 mm, abaxially densely hirsute, apex linear-acuminate; inner sepals slightly narrower. Corolla pink or purplish, rarely white, campanulate, 7–9 mm, midpetaline bands densely hirsute outside; limb triangular-lobed. Stamens included. Ovary hirsute, 2-loculed, 4-ovuled. Stigma capitate, 2-lobed. Capsule \pm globose, 5–6 mm in diam., spreading hirsute, apiculate. Seeds gray-brown, 2.5–4 mm, glabrous, minutely reticulate. $2n = 30$.

Thickets, grassy slopes, open places, floodplains; 500–1100 m. Sichuan, Yunnan [Cambodia, India, Indonesia, Kashmir, Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, N Australia].

2. *Ipomoea biflora* (Linnaeus) Persoon, Syn. Pl. 1: 183. 1805.

毛牵牛 mao qian niu

Convolvulus biflorus Linnaeus, Sp. Pl. ed. 2., App. 1668. 1763; *Aniseia biflora* (Linnaeus) Choisy; *A. calycina* (Roxburgh) Choisy; *C. calycinus* Roxburgh; *C. hardwickii* Sprengel; *C. plebeius* (R. Brown) Sprengel; *C. ser* Sprengel; *C. sinensis* Desrousseaux; *Ipomoea calycina* (Roxburgh) Benth ex C. B. Clarke; *I. cynanchifolia* C. B. Clarke, p.p.; *I. hardwickii* (Sprengel) Hemsley; *I. plebeia* R. Brown; *I. sinensis* (Desrousseaux) Choisy; *I. timorensis* Blume.

Herbs annual, scandent or twining, with \pm grayish hirsute axial parts. Stems 1–2 m. Petiole 1.5–8 cm; leaf blade cordate or deltate-cordate, 4–9.5 \times 3–7 cm, hirsute-villous, base cordate, margin entire, rarely slightly 3-lobed, apex acuminate; lateral veins 6 or 7 pairs. Inflorescences 1–3-flowered; peduncle (0–)3–15 mm; outer 3 bracts linear-lanceolate, small. Pedicel 0.8–1.5 cm. Sepals slightly enlarged in fruit; outer 3 deltate-lanceolate, 8–10 \times 4–5 mm, abaxially grayish hirsute-villous, ciliate, adaxially subglabrous, base auriculate; inner 2 linear-lanceolate, ca. as long as or longer than outer 3. Corolla white, narrowly campanulate, 1.2–1.9 cm; limb shallowly lobed, midpetaline bands pubescent. Stamens ca. 3 mm;

anthers ovoid-deltoid, base sagittate. Ovary conical, glabrous. Capsule \pm globose, ca. 9 mm in diam., glabrous. Seeds ovoid-triangular, ca. 4 mm, puberulent to tomentellous, margin sometimes white woolly.

Valleys, mountain slopes, roadsides, forests, usually in dry places; 200–1800 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Taiwan, Yunnan [India, Indonesia, Japan (Ryukyu Islands), ?Myanmar, Vietnam; E Africa, N Australia].

The taxonomy of the cordate-sepal, small-flowered ipomoeas in China needs further study. The Fl. Reipubl. Popularis Sin. account differs from other twentieth century floras in recognizing one, *Aniseia biflora*, instead of two species. The Chinese taxon has pantoporate, spinulose pollen grains, however, which indicates that it is a species of *Ipomoea*. The five known neotropical species of *Aniseia* all have nonspinulose, colpate pollen grains. The two issues not resolved in this account are whether one or two species should be recognized in China, and what names are to be applied to them.

Twentieth century floras for Africa, Asia, and Malesia recognize two species of small-flowered *Ipomoea* with cordate sepals: *I. plebeia* and *I. sinensis*. Several authors have pointed out that the original description of the Linnaean *Convolvulus biflorus* is ambiguous, and in the absence of any type specimen (at the herbaria LINN or S), they have reduced *C. biflorus* to the synonymy of Robert Brown's clearly defined and typified *I. plebeia*. Chinese specimens called *I.* (or *Aniseia*) *biflora* come very near to what has been called *I. plebeia* in contemporary African and Malesian floras.

Ipomoea sinensis, which occurs through much of the Old World tropics, is distinguished primarily by having peduncles to 4.5 cm long. The Fl. Reipubl. Popularis Sin. placed it in synonymy of *Aniseia biflora*. For the time being, the epithet *biflora*, which is well established in the Chinese literature, is here maintained to a single highly variable taxon defined much as in the Fl. Reipubl. Popularis Sin. A careful study of the entire complex of cordate-sepal *Ipomoea* needs to be undertaken, however, to sort out the identities and nomenclature for the taxa involved.

The whole plant has several medicinal uses.

3. *Ipomoea fimbriosepala* Choisy in A. de Candolle, Prodr. 9: 359. 1845.

齿萼薯 chi e shu

Aniseia hastata Meissner; *A. stenantha* (Dunn) Ling ex R. C. Fang & S. H. Huang; *A. stenantha* var. *macrostephana* Y. H. Zhang; *Ipomoea setifera* Poir. var. *fimbriosepala* (Choisy) Fosberg; *I. stenantha* Dunn.

Herbs twining, with glabrous or hirsute axial parts. Stems glabrous or nodes hirsute. Petiole 1–5 cm, sometimes minutely tuberculate; leaf blade cordate-sagittate to narrowly hastate, 5–12 \times 1–6 cm, glabrous, apex acuminate, mucronulate; lateral veins 5 or 6 pairs. Inflorescences axillary, 1- to few flowered; peduncle 5(–9) cm or shorter; bracts 2, \pm ovate, 0.5–1.5 cm, glabrous. Pedicel angular, 1.3–3.5 cm. Sepals unequal; outer 3 larger, attenuate-ovate to lanceolate, 1.5–2.2 cm, margin in-

curved, apex mucronate, strongly 3-keeled abaxially, keels toothed basally, glabrous. Corolla purplish to red, with a darker center, narrowly funnellform, 2.5–4 cm, glabrous. Stamens included; filaments pilose below middle. Ovary conical, glabrous. Style filiform, ca. 5 mm; stigma capitate, 2-lobed. Capsule pale brown outside, whitish inside, ovoid to globose, 1–1.5 cm. Seeds black-brown, ovoid, ca. 5 mm, densely tomentellous.

Grasslands. Fujian, Guangdong, Zhejiang [New Guinea; Africa, North America (Mexico), Pacific Islands, South America].

Ipomoea fimbriosepala is very similar in all respects to *I. setifera* Poirét, which is reported to have corollas 6–7 cm long and wider leaves. Chinese specimens come nearer to the descriptions for the former species. Fosberg (Smithsonian Contr. Bot. 36: 24. 1977) reduced *I. fimbriosepala* to a variety of *I. setifera*, but Austin (Fl. Venezuela 8(3): 159. 1982) maintained it as a distinct species. *Ipomoea stanantha* is placed here in the synonymy of *I. fimbriosepala* for the first time.

4. *Ipomoea polymorpha* Roemer & Schultes, Syst. Veg. 4: 254. 1819.

羽叶薯 yu ye shu

Convolvulus defloratus Choisy; *C. nolaniiflorus* Zippelius ex Spanoghe; *C. robertianus* Sprengel; *Ipomoea heterophylla* R. Brown; *I. pumila* Spanoghe; *I. tashiroi* Matsumura.

Herbs annual. Stems erect to decumbent, simple or branched basally, 8–60 cm; branchlets densely pilose, ± glabrescent. Petiole 0.5–7 mm, sparsely pilose; leaf blade entire, coarsely dentate, or irregularly pinnatifid with few segments, usually 3-cleft; middle segment linear-lanceolate, 2–2.5 cm × 2–3 mm; lateral segments broadly linear, 4–8 × 1–2 mm, sparsely pilose and ciliate, base cuneate and attenuate. Flowers solitary, axillary; bracts linear, 1–2 cm, villous. Peduncles and pedicels very short or absent. Sepals with a distinct midvein, 8–10 mm, pubescent, apex long acuminate; outer ovate-lanceolate, entire or with 1 or 2 teeth at margin; inner ones lanceolate. Corolla red-purple or rarely white, tubular-funnelform, ca. 1.3 cm, glabrous. Stamens included. Ovary and style glabrous. Capsule enclosed in calyx, globose, ca. 5 mm, 2-loculed, 4-valved. Seeds ca. 3 mm, gray-brown tomentellous.

Grasslands, sandy seashores; below 100 m. Hainan, Taiwan [Cambodia, ?India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, New Guinea, Philippines, Vietnam; Africa, NE Australia].

5. *Ipomoea hirtifolia* R. C. Fang & S. H. Huang, Fl. Xizang. 4: 28. 1985.

粗毛薯藤 cu mao shu teng

Herbs twining, with ± densely yellowish hirsute axial parts. Stems sparsely retrorse hirsute. Petiole 3–4 cm; leaf blade cordate, 4.5–5.5 × 3.5–4 cm, yellowish hirsute, apex acuminate. Inflorescences axillary, 1–5-flowered; peduncles ca. as long as petioles; bracts lanceolate, 7–10 mm. Pedicel ca. 1.5 cm. Sepals lanceolate-ovate, subequal, ca. 1.5 cm, abaxially sparsely hirsute, apex acuminate. Corolla reddish purple, funnellform, ca. 5 cm, glabrous outside. Stamens included, very short; filaments glabrous basally; anthers ellipsoid, ca. 4 mm. Disc ringlike. Pistil included; ovary conical, acuminate, 2-loculed, 4-ovulate. Style filiform; stigma 2-globose. Fruit

unknown. Fl. Jul.

• Growing over shrubs in a valley; ca. 2100 m. Xizang (Gyirong Xian).

Seemingly distinguished from other species of *Ipomoea* by the dense, yellowish hirsute indumentum on all vegetative parts and short glabrous filaments. The fruits of this species are as yet unknown, and when they are discovered it may prove that this is actually an *Argyreia*. A number of yellowish hirsute species of *Argyreia* with purple-red flowers are known from the Indian subcontinent and northern Myanmar that could well range into Xizang. Only further collections will illuminate the true generic relationships of this species.

6. *Ipomoea purpurea* (Linnaeus) Roth, Bot. Abh. 27. 1787.

圆叶牵牛 yuan ye qian niu

Convolvulus purpureus Linnaeus, Sp. Pl. ed. 2. 1: 219. 1762; *Ipomoea chanetii* H. Léveillé; *I. hispida* Zuccarini; *Pharbitis hispida* Choisy; *P. purpurea* (Linnaeus) Voigt.

Herbs annual, twining; axial parts short pubescent and long retrorse hirsute. Stems 2–3 m. Petiole 2–12 cm; leaf blade circular-ovate or broadly ovate, 4–18 × 3.5–16.5 cm, ± strigose, base cordate, margin entire or ± 3-lobed, apex acute or ± abruptly acuminate. Inflorescences 1–5-flowered; peduncle 4–12 cm; bracts linear, 6–7 mm, spreading hirsute. Pedicel recurved before and after anthesis, 1.2–1.5 cm. Sepals subequal, 1.1–1.6 cm, spreading hirsute abaxially in basal 1/2; outer 3 oblong, apex acuminate; inner 2 linear-lanceolate. Corolla red, reddish purple, or blue-purple, with a fading to white center, funnellform, 4–6 cm, glabrous. Stamens included, unequal; filaments pubescent basally. Pistil included; ovary glabrous, 3-loculed. Stigma 3-lobed. Capsule subglobose, 9–10 mm in diam., 3-valved. Seeds black or straw colored, ovoid-trigonal, glabrous or hilum sparsely pilose. $2n = 30, 32$.

Waysides, hedges, fields; 0–2800 m, cultivated or escaped. Most provinces of China [Indonesia, Nepal, Pakistan, Philippines, Sri Lanka; native of North and South America, introduced and naturalized worldwide].

The seeds are used medicinally.

7. *Ipomoea nil* (Linnaeus) Roth, Catal. Bot. 1: 36. 1797.

牵牛 qian niu

Convolvulus nil Linnaeus, Sp. Pl. ed. 2. 1: 219. 1762; *C. hederaceus* Linnaeus; *Ipomoea hederacea* (Linnaeus) Jacquén; *I. nil* var. *setosa* (Blume) Boerlage; *I. scabra* Forsskål; *I. setosa* Blume; *I. trichocalyx* Steudel; *I. vaniotiana* H. Léveillé; *Pharbitis nil* (Linnaeus) Choisy.

Herbs annual, twining, with retrorsely hirsute axial parts. Stems 2–5 m. Petiole 2–15 cm; leaf blade broadly ovate or nearly circular, 4–15 × 4.5–14 cm, hirtellous, base cordate, margin entire or ± 3- (or 5)-lobed, apex acuminate. Inflorescences axillary, 1- to few flowered; peduncle 1.5–18.5 cm; bracts linear or filiform, 5–8 mm, spreading hirtellous. Pedicel 2–7 mm. Sepals lanceolate, ± equal, 1–2.5 cm, abaxially spreading hirsute, subglabrous apically, with a linear acumen, hairs swollen based. Corolla pale to bright blue with whitish tube, fading to pinkish in age, funnellform, 5–6(–8) cm, gla-

brous. Stamens included, unequal. Pistil included; ovary glabrous, 3-lobed. Stigma 3-lobed. Capsule straw colored, ovoid to ± globose, 8–10 mm in diam., glabrous. Seeds black, ovoid-triangular, 5–6 mm, gray puberulent. $2n = 30^*$.

Thickets on mountain slopes, waysides, fields, hedges; 0–1600 m. Cultivated or escaped. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [?Japan (Ryukyu Islands), Kashmir, Myanmar, Nepal, New Guinea, Pakistan, Sri Lanka, Thailand; native of South America, now nearly circumtropical].

The seeds have a number of local medicinal uses.

8. *Ipomoea indica* (J. Burman) Merrill, Interpr. Herb. Amboin. 445. 1917.

变色牵牛 bian se qian niu

Convolvulus indicus J. Burman, Index Univ. Herb. Amb. 7: 6. 1755; *C. acuminatus* Vahl; *C. congestus* (R. Brown) Sprengel; *Ipomoea acuminata* (Vahl) Roemer & Schultes; *I. amoena* Blume; *I. cataractae* Endlicher; *I. cathartica* Poirlet; *I. congesta* R. Brown; *I. insularis* (Choisy) Steudel; *I. kiuninsularis* Masamune; *I. learii* Paxton; *I. mutabilis* Lindley; *Parasitipomoea formosana* Hayata; *Pharbitis acuminata* (Vahl) Choisy; *P. acuminata* var. *congesta* (R. Brown) Choisy; *P. cathartica* (Poirlet) Choisy; *P. indica* (J. Burman) R. C. Fang; *P. insularis* Choisy; *P. learii* (Paxton) Lindley.

Herbs twining or sometimes prostrate, with ± densely retrorse pilose axial parts. Stems 3–6 m, sometimes rooting at nodes. Petiole 2–18 cm; leaf blade ovate or circular, 5–15 × 3.5–14 cm, abaxially densely short, soft, pubescent, adaxially ± sparsely pubescent, base cordate, margin entire or ± 3-lobed, apex acuminate or abruptly acuminate. Inflorescences dense umbellate cymes, several flowered; peduncle 4–20 cm; bracts linear, sometimes lanceolate. Pedicel 2–5(–8) mm. Sepals subequal, 1.4–2.2 cm, gradually linear-acuminate apically, glabrous to appressed pilose; outer 3 lanceolate to broadly lanceolate; inner 2 narrowly lanceolate. Corolla bright blue or bluish purple, aging reddish purple or red, with a paler center, funnellform, 5–8 cm, glabrous. Stamens included. Pistil included; ovary glabrous. Stigma 3-lobed. Capsule ± globose, 1–1.3 cm in diam. Seeds ca. 5 mm. $2n = 30^*$.

Coastal habitats, moist forests, weedy; 0–500 m. Guangdong, Nanhai Zhudao, Taiwan [Indonesia, Japan, Malaysia, Myanmar, New Guinea, Pakistan, Philippines, Sri Lanka; Pacific Islands, native of South America, now circumtropical as a cultivated and naturalized plant].

Fosberg (Bot. Not. 129: 35–38. 1976) has sorted out the complicated nomenclature for this pantropical species and established that *Ipomoea indica* is the correct name for it.

9. *Ipomoea pes-tigridis* Linnaeus, Sp. Pl. 1: 162. 1753.

虎掌藤 hu zhang teng

Convolvulus pes-tigridis (Linnaeus) Sprengel; *Ipomoea capitellata* Choisy; *I. hepaticifolia* Linnaeus.

Herbs annual, twining, with spreading hispid axial parts.

Stems 0.5–3 m. Petiole 2–8 cm; leaf blade circular or transversely elliptic in outline, 2–10 × 3–13 cm, palmately deeply divided; segments (3–)5–9, elliptic or oblong, tapered at both ends, densely pubescent, apex mucronate. Inflorescences capitate, few flowered; peduncle 4–11 cm; bracts hirsute; outer involucral bracts oblong to linear-oblong, 2–2.5 cm; inner bracts smaller. Pedicel obsolete. Sepals lanceolate, slightly unequal, 1–1.4 cm, hirsute on both sides. Corolla white, funnellform, 3–4 cm, midpetaline bands sparsely pubescent. Stamens included; filaments glabrous. Pistil included; ovary 2-lobed, glabrous. Stigma 2-lobed. Capsule ovoid, ca. 7 mm, 4-valved. Seeds ellipsoid, ca. 4 mm, gray tomentellous. $2n = 28, 30$.

Thickets, roadsides, seashores; 0–400 m. Guangdong, S Guangxi, Hainan, Taiwan, S Yunnan [Cambodia, Indonesia, Kashmir, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia, Pacific Islands].

10. *Ipomoea pileata* Roxburgh, Fl. Ind. 2: 94. 1824.

帽苞薯藤 mao bao shu teng

Convolvulus pileatus (Roxburgh) Sprengel.

Herbs annual, twining, with ± densely retrorse hispid-pilose axial parts. Stems 1–2 m. Petiole 1.5–6 cm; leaf blade cordate-ovate, 2.5–9 × 2.5–7.5 cm, pilose, more densely so abaxially, base cordate, margin entire, apex acuminate or attenuate. Inflorescences capitate, few to several flowered; peduncle 1.5–7 cm; involucral bracts navicular, tapered at both ends, 2.7–5.5 cm, outside densely pubescent, inside long hirtellous; bracteoles oblong-spatulate, much smaller, villous. Sepals subequal, 8–10 mm; outer 3 elliptic-spatulate; inner 2 narrower, lanceolate, villous, apex obtuse. Corolla pink or purple, salverform, 2.5–3 cm; tube cylindrical; limb with deltate lobes, midpetaline bands pilose. Stamens inserted near middle of corolla tube. Ovary glabrous. Capsule ± globose, 5–6 mm in diam. Seeds dark brown, 3–4 mm, glabrous or short pubescent.

Edges of forests, clearings on mountain slopes, roadsides, grasslands; 100–1000 m. Guangdong, Guangxi, Hainan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Philippines, Sri Lanka, Thailand, Vietnam; Africa].

11. *Ipomoea batatas* (Linnaeus) Lamarck, Encycl. 2: 465. 1793.

番薯 fan shu

Convolvulus batatas Linnaeus, Sp. Pl. 1: 154. 1753; *Batatas edulis* (Thunberg ex Murray) Choisy; *C. candicans* Solander ex Sims; *C. edulis* Thunberg ex Murray; *Ipomoea batatas* var. *edulis* (Thunberg ex Murray) Makino; *I. batatas* var. *lobata* Gagnepain & Courchet; *I. edulis* (Thunberg ex Murray) Makino; *I. fastigiata* Sweet.

Herbs annual, with ellipsoid, fusiform, or elongated subterranean tubers; sap milky; axial parts glabrous or pilose. Stems prostrate or ascending, rarely twining, green or purplish, much branched, rooting at nodes. Petiole 2.5–20 cm; leaf blade broadly ovate to circular, 4–13 × 3–13 cm, margin entire or palmately 3–5(–7)-lobed, herbaceous; lobes broadly ovate to linear-lanceolate, sparsely pilose or glabrous. Inflorescences 1- or 3–7-flowered; peduncle 2–10.5 cm, stout, angular; bracts

early deciduous, lanceolate, 2–4 mm. Pedicel 2–10 mm. Sepals oblong or elliptic, ± unequal, glabrous or pilose abaxially, margin ciliate, apex acute, mucronulate, outer 2 sepals 7–10 mm, inner 3 sepals 8–11 mm. Corolla pink, white, pale purple to purple, with a darker center, campanulate to funnelliform, 3–4 cm, glabrous. Stamens included. Pistil included; ovary pubescent or glabrous. Capsule rarely produced, ovoid or depressed globose. Seeds glabrous. $2n = 84, 90^*$.

Cultivated throughout China, sometimes persisting from cultivation, but doubtfully naturalized [Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia, North America, Pacific Islands, South America, cultivated worldwide].

Ipomoea batatas is a productive and adaptable crop. Its tubers are an important source of food, starch, and raw material for producing alcohol. The stems and leaves can be used as livestock forage. In ancient Chinese texts, the name now used for “sweet potato” refers to *Dioscorea alata* Linnaeus, and not this species.

12. *Ipomoea triloba* Linnaeus, Sp. Pl. 1: 161. 1753.

三裂叶薯 shan lie ye shu

Batatas triloba (Linnaeus) Choisy; *Convolvulus trilobus* (Linnaeus) Desrousseaux; *Ipomoea blancoi* Choisy.

Herbs annual. Stems twining or prostrate, glabrous or nodes sparsely pubescent. Petiole 2.5–6 cm, glabrous, sometimes tuberculate; leaf blade broadly ovate to circular in outline, 2.5–7 × 2–6 cm, glabrous or sparsely pilose, base cordate, margin entire or coarsely dentate to deeply 3-lobed. Inflorescences dense umbellate cymes, 1- to several flowered; peduncle 2.5–5.5 cm, glabrous, angular, verruculose distally; bracts lanceolate-oblong, minute. Pedicel 5–7 mm, ± angular, glabrous, verruculose. Sepals slightly unequal, 5–8 mm, glabrous or sparsely pilose abaxially, margin fimbriate, apex obtuse or acute, mucronulate; outer 2 oblong, slightly shorter; inner 3 elliptic-oblong. Corolla pink or pale purple, funnelliform, 1.5–2 cm, glabrous; limb obtusely 5-lobed. Stamens included. Pistil included; ovary pubescent. Stigma 2-lobed. Capsule ± globular, 5–6 mm, bristly pubescent, apiculate, 2-loculed, 4-valved. Seeds dark brown, ca. 3.5 mm, glabrous. $2n = 30$.

Roadsides or fields; 0–800 m. Anhui, Guangdong, S Shaanxi, Taiwan, Zhejiang [Indonesia, Japan (Ryukyu Islands), Malaysia, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; North America (native to the West Indies), Pacific Islands, now a circumtropical weed].

13. *Ipomoea littoralis* (Linnaeus) Blume, Bijdr. 713. 1825.

南沙薯藤 nan sha shu teng

Convolvulus littoralis Linnaeus, Syst. Nat. (ed. 10) 924. 1759; *C. denticulatus* Desrousseaux; *Ipomoea denticulata* (Desrousseaux) Choisy, non R. Brown.

Herbs perennial. Stems prostrate, rooting at nodes, or twining, slender, mostly glabrous. Petiole 0.5–7 cm; leaf blade ovate to oblong, occasionally circular or reniform, 1–10 × 1–7.5 cm, glabrous or nearly so, base cordate, margin entire or minutely undulate to angular, or ± 3-lobed, apex acute, obtuse or emarginate, mucronulate. Inflorescences usually 1- (less often few) flowered; peduncle 0.1–3 cm; bracts early de-

ciduous, 1–2 mm. Pedicel 1–4 cm, glabrous. Sepals unequal, glabrous; outer 2 concave, oblong-elliptic, 6–10 mm, apex acute to obtuse; inner 3 elliptic to nearly circular, 0.8–1.2 cm. Corolla pink or pink-purple, with a darker center, funnelliform, 3–4.5 cm, glabrous. Stamens included; filaments unequal, glandular pubescent on basal 1/2. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule depressed-globose, ca. 9 mm in diam. Seeds black, ovoid, 3.5–4 mm, glabrous. $2n = 30, 60$.

Sandy seashores, coastal thickets, forest floors; 0–100 m. Nanhai Zhudao, Taiwan [Cambodia, India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, N Australia, Pacific Islands].

Long confused with *Ipomoea gracilis* R. Brown, a distinct species that is endemic to Australia; the nomenclature, distribution, and ethnobotanical significance of *I. littoralis* have been discussed by Austin (Econ. Bot. 45: 251–256. 1991).

According to Xing et al. (Guihaia 14: 151–156. 1994) and Huang et al. (Taiwania 39: 1–26. 1994), *Ipomoea gracilis* R. Brown occurs on the South China Sea Islands (Nanhai Zhudao); however, material was not available for study. It is likely that the plants collected belong to *I. littoralis*, and not *I. gracilis*.

14. *Ipomoea obscura* (Linnaeus) Ker Gawler, Bot. Reg. 3: t. 239. 1817.

小心叶薯 xiao xin ye shu

Convolvulus obscurus Linnaeus, Sp. Pl. ed. 2., 2: 220. 1762; *Ipomoea insuavis* Blume; *I. luteola* R. Brown.

Herbs twining; axial parts glabrous, spreading pubescent, or almost woolly. Stems thinly angular, 1–2 m. Petiole 1.5–3.5 cm; leaf blade cordate-circular or ovate, occasionally reniform, 2–8 × 1.6–8 cm, glabrous or sparsely pilose, base cordate, margin entire or minutely undulate, apex attenuate, acute. Inflorescences 1–3-flowered; peduncle almost filiform, 1.4–4 cm; bracts subulate, ca. 1.5 mm. Pedicel 0.8–2 cm, subglabrous, thickened and recurved in fruit distally. Sepals reflexed in fruit, elliptic-ovate, subequal, 4–5 mm, glabrous or ± pubescent, mucronulate, outer ones whitish margined. Corolla white or pale yellow, with darker midpetaline bands and a purple center, funnelliform, 2–2.5 cm. Stamens included; filaments very unequal. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule conical-ovoid or ± globose, 6–8 mm in diam., apiculate. Seeds black-brown, 4–5 mm, densely gray-brown tomentellous. $2n = 30$.

Weedy in thickets, open forests, sandy places, seashores; 0–1600 m. Guangdong, Hainan, Nanhai Zhudao, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, New Guinea, ?Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; E Africa, N Australia, Pacific Islands].

15. *Ipomoea aquatica* Forsskål, Fl. Aegypt.-Arab. 44. 1775.

蕹菜 weng cai

Convolvulus repens Vahl; *Ipomoea repens* Roth; *I. reptans* Poiret; *I. subdentata* Miquel.

Herbs annual, terrestrial and repent or floating; axial parts glabrous. Stems terete, thick, hollow, rooting at nodes. Petiole 3–14 cm, glabrous; leaf blade variable, ovate, ovate-lanceolate, oblong, or lanceolate, 3.5–17 × 0.9–8.5 cm, glabrous or rarely

pilose, base cordate, sagittate or hastate, occasionally truncate, margin entire or undulate, apex acute or acuminate. Inflorescences 1–3(–5)-flowered; peduncle 1.5–9 cm, base pubescent; bracts squamiform, 1.5–2 mm. Pedicel 1.5–5 cm. Sepals unequal, glabrous; outer 2 ovate-oblong, 7–8 mm, margin whitish, thin, apex obtuse, mucronulate; inner 3 ovate-elliptic, ca. 8 mm. Corolla white, pink, or lilac, with a darker center, funnellform, 3.5–5 cm, glabrous. Stamens unequal, included. Pistil included; ovary conical, glabrous. Stigma 2-lobed. Capsule ovoid to globose, ca. 1 cm in diam., woody, tardily dehiscent or indehiscent. Seeds densely grayish pubescent, sometimes glabrous. $2n = 30^*$.

Marshy habitats: ditches, ponds, rice paddies, waste areas. C to S China, native and cultivated [Bangladesh, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia, Pacific Islands, South America].

Commonly cultivated as a pot herb, *Ipomoea aquatica* is adapted to a warm, moist climate and cannot survive frost. Several races are recognized (without formal taxonomic designation) based on growing conditions (terrestrial vs. aquatic) and plant and flower color (greenish plants with white flowers vs. purplish tinged plants with lilac flowers). The plants have minor medicinal uses and also are used for forage.

16. *Ipomoea marginata* (Desrousseau) Verdcourt, Kew Bull. 42: 658. 1987.

毛苕薯 mao jing shu

Convolvulus marginatus Desrousseau in Lamarck, Encycl. Meth. 3: 558. 1792; *C. verrucosus* (Blume) D. Dietrich; *Ipomoea sepiaria* Koenig ex Roxburgh; *I. subtrilobans* Miquel; *I. verrucosa* Blume.

Herbs perennial, with a stout root and spreading hirsute or glabrous axial parts. Stems twining or prostrate, 1–3 m. Petiole 1–3 cm, sometimes minutely tuberculate; leaf blade often purple or purple spotted, elliptic-ovate or reniform to circular, apical leaves sometimes sagittate or hastate, 2–6 × 2–5 cm, glabrous, ciliolate marginally, base deeply cordate or hastate, margin entire or minutely undulate, apex attenuate or ± abruptly acuminate. Inflorescences few to several flowered; peduncle 2–8 cm, thick, often applanate, verruculose distally; bracts persistent, ovate or oblong, ca. 2 mm. Pedicel 5–6 mm, sparsely verruculose. Sepals ovate or elliptic-oblong, equal or inner 3 longer, 4–7 mm, glabrous, apex obtuse; outer 2 verruculose, margin thinner. Corolla white or purple, with a darker center, ± salverform, 2.5–4 cm; lobes 5, apiculate. Stamens included. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule depressed-globose, 6–7 mm, glabrous. Seeds pale grayish white tomentellous, margin often with longer cobwebby hairs.

Coastal or saline soils, thickets, grasslands, fields and waste areas. Hainan, Taiwan [India, Indonesia, Laos, Malaysia, Myanmar, New Guinea, ?Pakistan, Sri Lanka, Thailand, Vietnam; Africa, N Australia, Pacific Islands].

Ipomoea marginata has often been misidentified as *I. maxima* (Linnaeus f.) Sweet.

17. *Ipomoea pes-caprae* (Linnaeus) R. Brown in Tuckey, Narr. Exped. Zaire 477. 1818.

厚藤 hou teng

Convolvulus pes-caprae Linnaeus, Sp. Pl. 1: 159. 1753; *C. bilobatus* Roxburgh; *C. brasiliensis* Linnaeus; *C. maritimus* Desrousseau; *Ipomoea biloba* Forsskål; *I. brasiliensis* (Linnaeus) G. Meyer; *I. brasiliensis* (Linnaeus) Sweet; *I. maritima* (Desrousseau) R. Brown; *I. pes-caprae* var. *emarginata* H. Hallier; *I. pes-caprae* subsp. *brasiliensis* (Linnaeus) Oostroom.

Herbs perennial, glabrous, with a thick tap root. Stems 5–30 m, prostrate, sometimes twining, rooting at nodes. Petiole 2–10 cm; leaf blade ovate, elliptic, circular, reniform or ± quadrate to oblong, 3.5–9 × 3–10 cm, rather thick, 2-glandular abaxially, base broadly cuneate, truncate, or shallowly cordate, margin entire, apex emarginate or deeply 2-lobed, mucronulate. Inflorescences 1- to several flowered; peduncle stout, 4–14 cm; bracts early deciduous, broadly deltate, 3–3.5 mm. Pedicel 2–2.5 cm. Sepals unequal, ± leathery, glabrous, apex obtuse, mucronulate; outer 2 ovate to elliptic, 5–8 mm, wider; inner 3 nearly circular and concave, 7–11 mm. Corolla purple or reddish purple, with a darker center, funnellform, 4–5 cm. Stamens included. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule ± globular, 1.1–1.7 cm, glabrous, leathery. Seeds black, trigonous-globose, 7–8 mm, densely brownish tomentose. $2n = 30^*$.

Sandy seashores, open fields near seashores; 0–100 m. Fujian, Hainan, Taiwan, Zhejiang [Cambodia, Indonesia, Japan including Ryukyu Islands, Malaysia, Myanmar, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Australia, North America, Pacific Islands, South America; pantropical littoral species].

According to Xing et al. (Guihaia 14: 151–156. 1994), *Ipomoea pes-caprae* occurs on the South China Sea Islands (Nanhai Zhudao), but no material was available for this account.

Although van Oostroom (Blumea 3: 532–539. 1940) recognized two subspecies based on the depth of apical lobing of the leaf blades, none is accepted here. The change in growing conditions can produce variation in leaf lobing on the same plant.

Useful as a medicinal plant (for treating colds, arthritis, and back pain), forage crop, and as a sand binder in coastal areas.

18. *Ipomoea imperati* (Vahl) Grisebach, Cat. Pl. Cub. 203. 1866.

假厚藤 jia hou teng

Convolvulus imperati Vahl, Symb. Bot. 1: 17. 1790; *Batatas acetosifolia* (Vahl) Choisy; *B. littoralis* (Linnaeus) Choisy; *Convolvulus acetosifolius* Vahl; *C. littoralis* Linnaeus; *C. sinuatus* Petagna; *C. stoloniferus* Cirillo; *Ipomoea acetosifolia* (Vahl) Roemer & Schultes; *I. carnosus* R. Brown; *I. littoralis* (Linnaeus) Boissier; *I. stolonifera* (Cirillo) J. F. Gmelin.

Herbs perennial, glabrous. Stems trailing, to 5 m, rooting at nodes. Petiole 0.5–4.5 cm; leaf blade variable, often linear, lanceolate, oblong, or ovate on same plant, 1.5–3 × 0.8–2 cm, rather fleshy, base truncate or shallowly cordate, margin entire, undulate, or 3–5-lobed; middle lobe ovate to oblong, lateral lobes smaller, apex obtuse or emarginate to 2-lobed. Flowers usually solitary, occasionally 2 or 3 together; peduncle ca. 2 cm; bracts deltate, ca. 2 mm. Pedicel 0.7–1.5 cm, stout. Sepals oblong, unequal, ± leathery, glabrous, apex obtuse or acute,

mucronulate; outer 2 sepals 7–11 mm; inner ones to 1.5 cm. Corolla white, with a pale yellow tube and a dark red center, funnellform, 3.5–4 cm, glabrous. Stamens included. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule ± globose, ca. 1 cm, smooth, glabrous. Seeds ca. 8 mm, tomentose, margin with longer hairs. $2n = 30$.

Coastal sandy beaches, dunes, grasslands; 0–100 m. Fujian, Guangdong, S Guangxi, Hainan, Taiwan [Indonesia, Japan (Ogasawara and Ryukyu Islands), Malaysia, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia, Europe, North America, Pacific Islands; a pantropical and warm temperate littoral species].

La Valva and Sabato (Taxon 32: 110–114. 1983) have established that *Ipomoea stolonifera* (Cirillo) J. F. Gmelin, the name by which this species has long been known, is illegitimate, because it is based on the same type as the earlier *Convolvulus sinuatus* Petagna. Unfortunately, the latter epithet cannot be taken up in *Ipomoea* because of the later *I. sinuata* Ortega.

19. *Ipomoea cairica* (Linnaeus) Sweet, Hort. Brit., ed. 1, 287. 1827.

五爪金龙 wu zhao jin long

Herbs perennial, twining, with a tuberous root; axial parts ?glabrous. Stems to 5 m, thinly angular, ± tuberculate or smooth. Petiole 2–8 cm, base with leafy pseudostipules; leaf blade palmately 5-parted to base; lobes entire or minutely undulate, apex acute or obtuse, mucronulate, basal pair usually again lobed or parted; middle lobe larger, ovate, ovate-lanceolate, or elliptic, (2.5–)4–5 × (0.5–)2–2.5 cm. Inflorescences 1- or several flowered; peduncle 2–8 cm; bracts and bracteoles early deciduous, squamiform, small. Pedicel 0.5–2 cm, sometimes verruculose. Sepals unequal; outer 2 sepals 4–6.5 mm; inner ones 5–9 mm, glabrous, abaxially ± verruculose, margin paler, scarious. Corolla pink, purple, or reddish purple, with a darker center, rarely white, funnellform, (2.5–) 5–7 cm. Stamens included, unequal. Ovary glabrous. Stigma 2-lobed. Capsule ± globose, ca. 1 cm. Seeds black, ca. 5 mm, densely tomentose, margin with longer hairs. $2n = 30^*$.

Origin unknown, now distributed nearly pantropically: Africa, Asia, Pacific Islands, South America.

- 1a. Middle lobe of leaf blade 4–5 × 2–2.5 cm; corolla 5–7 cm 19a. var. *cairica*
1b. Middle lobe of leaf blade 2.5–3.3 × 0.5–1 cm; corolla 2.5–3.5 cm 19b. var. *gracillima*

19a. *Ipomoea cairica* var. *cairica*

五爪金龙 (原变种) wu zhao jin long (yuan bian zhong)

Convolvulus cairicus Linnaeus, Syst. Nat. (ed. 10) 2: 922. 1759; *C. tuberculatus* Desrousseaux; *Ipomoea palmata* Forsskål; *I. stipulacea* Jacquin; *I. tuberculata* (Desrousseaux) Roemer & Schultes.

Middle lobe of leaf 4–5 × 2–2.5 cm. Corolla 5–7 cm.

Thickets, roadsides, waste places, cultivated areas, sunny meadows in lowlands; 100–600 m. Fujian, Guangdong, Guangxi,

Hainan, Taiwan, Yunnan [India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Pacific Islands, South America].

The entire plant is used for treating external infections.

19b. *Ipomoea cairica* var. *gracillima* (Collett & Hemsley) C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 120. 1965.

纤细五爪金龙 qian xi wu zhao jin long

Ipomoea palmata Forsskål var. *gracillima* Collett & Hemsley, J. Linn. Soc., Bot. 31: 97. 1890; *I. gracillima* (Collett & Hemsley) Prain.

Middle lobe of leaf 2.5–3.3 × 0.5–1 cm. Corolla 2.5–3.5 cm.

Stony grassy slopes, sunny mountainsides; 1700–2000 m. NW Yunnan [Myanmar].

20. *Ipomoea wangii* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 118. 1965.

大萼山土瓜 da e shan tu gua

Herbs climbing, glabrous. Stems terete, thinly angular. Petiole 4.5–9 cm; leaf blade circular-cordate, 6–14 × 4–10 cm, base narrowly cordate, entire, apex abruptly acuminate; lateral veins 6 or 7 pairs, arcuate ascending. Inflorescences few flowered; peduncle 1–2 cm. Pedicel 2–3 cm, thickened apically. Sepals narrowly ovate, unequal, glabrous; outer ones 1.5–1.7 × 1–1.2 cm, apex rounded-obtuse; inner ones 1.7–1.9 cm, apex acute. Corolla funnellform, ca. 7.7 cm, glabrous. Stamens included. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule unknown. Fl. Nov.

- Thickets, waysides; ca. 900 m. Yunnan.

21. *Ipomoea alba* Linnaeus, Sp. Pl. 1: 161. 1753.

月光花 yue guang hua

Calonyction aculeatum (Linnaeus) House; *C. aculeatum* var. *lobatum* (H. Hallier) C. Y. Wu; *C. album* (Linnaeus) House; *C. bona-nox* (Linnaeus) Bojer; *C. bona-nox* var. *lobata* H. Hallier; *C. speciosum* Choisy; *Convolvulus aculeatus* Linnaeus; *Ipomoea aculeata* (Linnaeus) Kuntze; *I. aculeata* var. *bona-nox* (Linnaeus) Kuntze; *I. bona-nox* Linnaeus.

Herbs annual or perennial, twining, usually glabrous, rarely puberulent. Stems to 10 m, terete, smooth or with soft prickles, sap milky. Petiole 5–20 cm; leaf blade ovate to ± circular in outline, 10–20 × 5–16 cm, base cordate, margin entire, angular to 3-lobed, apex acuminate, mucronulate. Inflorescences helicoid cymes, rarely dichasial, 1- to several flowered; peduncle stout, terete, 1–24 cm; bracts early deciduous, small. Pedicel 7–15 cm, clavate distally, enlarged in fruit. Flowers nocturnal, fragrant. Sepals elliptic to ovate, ± leathery, glabrous; outer 3 sepals 5–12 mm, apex with a stout spreading awn 4–9 mm; inner 2 sepals 7–15 mm, mucronate. Corolla white, with greenish bands, salverform; tube 7–12 cm, ca. 5 mm in diam.; limb 7–12 cm in diam., shallowly 5-undulate. Stamens exserted; filaments inserted in apical 1/2 of corolla tube, glabrous; anthers sagittate basally. Pistil ex-

serted; ovary narrowly conical, glabrous. Stigma 2-lobed. Capsule ovoid, 2.5–3 cm, apiculate. Seeds white, brown, or black, ca. 10 × 7–8 mm, glabrous. $2n = 28^*$, 30^* , 38^* .

Wet forests, watercourses, disturbed areas, cultivated and also naturalized sporadically. Guangdong, Guangxi, Hainan, Jiangsu, Jaingxi, Shaanxi, Sichuan, Yunnan, Zhejiang [naturalized in Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand; Pacific Islands, native in North and South America].

The whole plant is used in treating snakebite.

22. *Ipomoea turbinata* Lagasca, Gen. Pl. 10. 1816.

丁香茄 ding xiang qie

Calonyction longiflorum Hasskarl; *C. muricatum* (Lin-naeus) G. Don; *C. speciosum* Choisy var. *muricatum* (Lin-naeus) Choisy; *Convolvulus colubrinus* Blanco; *C. muricatus* Linnaeus; *Ipomoea bona-nox* Linnaeus var. *purpurascens* Ker Gawler; *I. muricata* (Linnaeus) Jacquin.

Herbs annual, twining; axial parts often tuberculate, glabrous or nearly so; sap milky. Stems 2–10 m. Petiole 4–12 cm; leaf blade cordate, 7–18 × 6.5–15 cm, base cordate, margin entire, apex acute or caudate-acuminate. Inflorescences 1- to few flowered; peduncle 3–6 cm; bracts oblong, ca. 8 mm, scarious. Pedicel 1–2 cm, thicker apically, much thickened in fruit. Flowers nocturnal. Sepals oblong to ovate, ± equal, fleshy, glabrous, distinctly enlarged in fruit and eventually reflexed; outer 2 sepals 6–8 mm, apex attenuate into a thick, suberect awn ca. 4 mm; inner 3 sepals 7–8 mm, apex obtuse or emarginate, awn shorter. Corolla pale purple, salverform, 5–7.5 cm; tube 3–6 cm, flaring apically; limb funnelliform to rotate, 3–5 cm in diam., shallowly 5-lobed. Stamens slightly exerted or not; filaments inserted in apical part of corolla tube, base sparsely short pubescent; anthers large, base cordate. Pistil slightly exerted or not; ovary glabrous. Stigma 2-lobed. Capsule ovoid, 1.8–2 cm, mucronate. Seeds black, trigonous, 9–10 mm, glabrous. $2n = 30$.

Thickets, floodlands; 600–1200 m. Cultivated in Henan, Hubei, Hunan, escaped in S Yunnan [India, Indonesia, Japan, Kashmir, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Vietnam; Africa, North America, South America].

Gunn (Brittonia 24: 150–168. 1972) discussed the nomenclature of *Ipomoea turbinata*, which was treated in Fl. Reipubl. Popularis Sin. as *Calonyction muricatum*, presented evidence refuting the generic status for *Calonyction*, and recognized the latter as a section of *Ipomoea*.

Gunn reported that the young seeds, fruits, and thickened pedicels of *Ipomoea turbinata* are eaten as a vegetable in China and Sri Lanka, and the species is cultivated in India for its edible pedicels or as an ornamental for its nocturnal flowers. In China, the leaves are used in treating stomachaches and the seeds for treating trauma.

23. *Ipomoea setosa* Ker Gawler, Bot. Reg. 4: t. 335. 1818.

刺毛月光花 ci mao yue guang hua

Batatas setosa (Ker Gawler) Lindley; *Calonyction pavonii* (Choisy) H. Hallier; *C. setosum* (Ker Gawler) H. Hallier; *Convolvulus setosus* (Ker Gawler) Sprengel; *Ipomoea pavonii* Choisy; *I. setosa* Ker Gawler var. *pavonii* (Choisy) House.

Herbs annual, twining; axial parts with swollen-based purplish bristles. Stems to 5 m. Petiole 8–15 cm; leaf blade ± circular to broadly ovate in outline, 10–20 cm, 3–7-lobed; margin of lobes undulate-serrate, apex acuminate. Inflorescences 3–12-flowered; peduncle to 20 cm. Pedicel ± clavate, not distinct from calyx base. Flowers nocturnal. Sepals ovate to oblong, unequal, 1–1.4 cm, apex obtuse; outer 2 longer, glabrous or abaxially purplish bristly as stems. Corolla bright purplish to pink, ± salverform; tube 5–6 cm, 4–5 mm in diam. basally, 1–1.2 cm apically; limb 5.5–7 cm in diam., 5-lobed. Stamens included; anthers cordate basally. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule ± globose or depressed globose, 1.5–2 cm in diam. Seeds oblong, brown woolly. $2n = 30$.

Dense forests or thickets in valleys; 1000–1300 m. Cultivated and sparingly escaped in Guangdong, S Yunnan [North America (Jamaica, Mexico), South America].

24. *Ipomoea mauritiana* Jacquin, Collectanea 4: 216. 1791.

七爪龙 qi zhao long

Herbs perennial, twining, with glabrous or minutely mucronate axial parts. Roots tuberous. Stems to 10 m, thinly angular. Petiole 3–11 cm; leaf blade circular in outline, 7–18 × 7–22 cm, usually palmately 5–7-divided to or beyond middle, rarely entire or shallowly lobed; segments lanceolate or elliptic, glabrous or sparsely pubescent along midvein, entire or irregularly undulate, apex acuminate or acute, mucronulate. Inflorescences few to many flowered; peduncle 2.5–20 cm; bracts early deciduous. Pedicel 0.9–2.2 cm. Sepals ± circular, oblong to broadly elliptic, concave, equal or outer 2 shorter, 7–12 mm, glabrous, apex obtuse. Corolla pink or reddish purple, with a darker center, funnelliform, 5–6 cm; limb 5–7 cm in diam., undulate. Stamens included. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule ovoid, 1.2–1.4 cm. Seeds dark brown, ca. 6 mm, woolly-sericeous with long, easily detached hairs. $2n = 30$.

Waste places, dwarf forests near seashores, thickets, montane forests, streamsides; 0–1100 m. Guangdong, Guangxi, Hainan, Taiwan, S Yunnan [Cambodia, Indonesia, Japan (Ogasawara and Ryukyu Islands), Laos, Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Pacific Islands].

The origin of *Ipomoea mauritiana* is unknown, but it may be in tropical America, where the nearest relatives occur.

Ipomoea mauritiana has often been misidentified as *I. digitata* (Linnaeus) Linnaeus, a West Indian endemic that does not occur in Asia.

The leaves and roots are used externally to treat tuberculosis and for the treatment of external and breast infections.

25. *Ipomoea sumatrana* (Miquel) van Ooststroom, Blumea 3: 571. 1940.

海南薯 hai nan shu

Lettsomia sumatrana Miquel, Fl. Ned. Ind., Suppl. 560. 1860; *Ipomoea rotundisepala* Hayata; *I. staphylina* Roemer & Schultes var. *malayana* Prain.

Climbers woody, with glabrous, sometimes verruculose axial parts. Stems twining or prostrate, to 20 m. Petiole 4.5–10

cm, scabrous; leaf blade broadly ovate, (3.5–)8–16 × (4–)7–13 cm, ± leathery, abaxially often pubescent, adaxially subglabrous, base shallowly cordate to truncate, margin entire, apex obtuse, acute, or short acuminate; lateral veins usually 11–14 pairs, prominent abaxially. Inflorescences paniculate, fundamentally cymose, 10–15 cm; peduncle 3–13 cm; basal bracts leafy; bracteoles early deciduous, ovate, 1–1.5 mm. Pedicel 7–10 mm. Sepals slightly unequal, glabrous; outer 2 broadly ovate, 3.5–5 mm, apex obtuse; inner 3 ± circular, 4.5–6 mm, apex broadly rounded or emarginate. Corolla lilac or greenish white, with a reddish purple tube inside, tubular-funnelform, 3–3.5 cm, glabrous. Stamens included, unequal; filaments inserted ca. 1.5 mm above base of corolla. Ovary conical, glabrous. Stigma 2-lobed. Capsule ovoid, 8–9 mm, apex ± acute. Seeds black-brown, ca. 4 mm, hilum with a tuft of long sericeous hairs.

Thickets, roadsides, forest margins; 100–900 m. SE Guangxi, Hainan, Taiwan, S Yunnan [Indonesia, Laos, Malaysia, ?Myanmar, Thailand].

Ipomoea sumatrana was treated in Fl. Reipubl. Popularis Sin. as *I. staphylina* Roemer & Schultes. The latter is a very closely related Indian species. Ooststroom (l.c. 572) recognized both species and separated *I. sumatrana* by having thicker leaf blades with 11–14 pairs of lateral veins, tubular-funnelform corollas 3–3.5 cm, and filaments inserted ca. 1.5 mm above corolla base, and *I. staphylina* by having thinner leaf blades with 7–8(–11) pairs of lateral veins, broadly funnelform to campanulate corollas ca. 2 cm, and filaments inserted ca. 2.5 mm above corolla base. The Chinese material agree much more closely with *I. sumatrana*. It is possible that *I. staphylina* occurs in SW China, but no specimens have been seen in herbaria outside of China.

26. *Ipomoea soluta* Kerr var. *alba* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 122. 1965.

白大花千斤藤 bai da hua qian jin teng

Subshrubs, scandent. Stems gray, terete, verruculose-lenticellate. Petiole 6.5–9 cm, densely puberulent; leaf blade ovate-cordate, 16–17 × 13–15 cm, abaxially pubescent, adaxially subglabrous, base cordate, margin entire; lateral veins ca. 14 pairs. Inflorescences several flowered; peduncle stout, shorter than petiole, densely puberulent; bracts early deciduous. Pedicel stout, 0.7–1.3 cm, densely pubescent. Sepals slightly unequal, ± leathery, abaxially densely pubescent; outer 2 elliptic, 1.3–1.4 cm, apex obtuse; inner 3 elliptic to nearly circular, 1.4–1.5 cm, apex emarginate. Corolla white, broadly funnelform, 5.5–6.5 cm; tube gradually narrowed toward base; limb shallowly 5-lobed; lobes semicircular. Stamens slightly unequal; filaments dilated basally, puberulent. Ovary narrowly conical. Stigma 2-lobed. Capsule unknown. Fl. Feb.

- Thickets on dry mountain slopes. Yunnan.

Ipomoea soluta var. *soluta*, which is distributed in India, Laos, Myanmar, and Thailand, is distinguished from var. *alba* by having purple instead of white corollas.

27. *Ipomoea carnea* Jacquin subsp. *fistulosa* (Martius ex Choisy) D. F. Austin, Taxon 26: 237. 1977.

树千牛 shu qian niu

Ipomoea fistulosa Martius ex Choisy in A. de Candolle, Prodr. 9: 349. 1845; *Batatas crassicaulis* Benthams; *I. crassicaulis* (Benthams) B. L. Robinson.

Shrubs, 1–3 m; axial parts puberulent, later glabrescent; sap milky. Branches terete or angular, stout, becoming sparsely lenticellate with age. Petiole 2.5–15 cm; leaf blade ovate or ovate-oblong, 6–25 × 4–17 cm, densely puberulent or adaxially subglabrous, base cordate or truncate, margin entire, apex acuminate, mucronulate; midvein 2-glandular abaxially at base, lateral veins 7–9 pairs. Inflorescences few to several flowered; peduncle stout, 5–10 cm; bracts early deciduous, ovate. Pedicel 1–1.5 cm. Sepals ovate or nearly circular, broadly rounded, abaxially puberulent, equal or inner ones longer, 5–6 mm. Corolla lilac or pink, darker inside, funnelform, 7–9 cm; tube and midpetaline bands mealy outside. Stamens included; filaments unequal; anthers linear, base sagittate. Pistil included; ovary puberulent. Style base puberulent; stigma 2-lobed. Capsule pale brown, ovoid, 1.5–2 cm, 4-valved, apiculate. Seeds black, ca. 1 cm, brown sericeous-pubescent. $2n = 30$.

Guangxi, Hainan, Taiwan [Cambodia, India, Indonesia, Japan (Ryukyu Islands), Myanmar, Nepal, New Guinea, Pakistan, Sri Lanka, Thailand; North America, Pacific Islands, South America].

Ipomoea carnea, which is native of tropical America, is cultivated in many parts of Asia and has become widely naturalized. The ± erect, shrubby subsp. *fistulosa* is preferred in cultivation, whereas subsp. *carnea*, which is more viny, is seldom seen outside its native range in Central and South America.

28. *Ipomoea violacea* Linnaeus, Sp. Pl. 1: 161. 1753.

管花薯 guan hua shu

Calonyction grandiflorum (Jacquin) Choisy; *C. jacquini* G. Don; *C. tuba* (Schlechtendal) Colla; *Convolvulus grandiflorus* Jacquin; *Convolvulus tuba* Schlechtendal; *Ipomoea glaberrima* Bojer ex Bouton; *I. grandiflora* (Jacquin) H. Hallier; *I. longiflora* R. Brown; *I. macrantha* Roemer & Schultes; *I. tuba* (Schlechtendal) G. Don.

Plants perennial, woody, twining, glabrous. Stems to 5 m, often longitudinally wrinkled. Petiole 3.5–11 cm; leaf blade circular or ovate, 5–16 × 5–14 cm, base deeply cordate; lobes rounded or rarely angular, apex acuminate, mucronulate; lateral veins 7 or 8 pairs. Inflorescences 1- to few flowered; peduncle often 2.5–4.5(–7) cm. Pedicel 1.5–3 cm, thickened and clavate in fruit. Flowers nocturnal. Sepals ± circular, equal or outer 2 shorter, 1.5–2.5 cm, thinly leathery, apex obtuse or emarginate, mucronulate, enlarged in fruit and reflexed. Corolla white, with green midpetaline bands, salverform, 9–12 cm; limb 8–10 cm in diam. Stamens included; filaments inserted near base of corolla tube. Pistil included; ovary glabrous. Stigma 2-lobed. Capsule pale brown, ovoid to ± globose, 2–2.5 cm, glabrous. Seeds black, 1–1.2 cm, densely short tomentose, edges with ca. 3 mm long sericeous hairs. $2n = 30$.

Beaches, seaside thickets, edges of brackish rivers and lagoons; near sea level to 100 m. Guangdong, Hainan, Nanhai Zhudao, Taiwan [Indonesia, Japan, Malaysia, New Guinea, Philippines, Sri Lanka, Thailand; Africa, N Australia, North America, Pacific Islands, South America].

29. *Ipomoea aculeata* Blume var. *mollissima* (Zollinger) H. Hallier ex van Ooststroom, Blumea 3: 574. 1940.

夜花薯藤 ye hua shu teng

Calonyction mollissimum Zollinger, Syst. Verz. 2: 128, 131. 1854; *C. mollissimum* var. *glabrior* Miquel; *Ipomoea mollissima* (Zollinger) H. Hallier; *I. mollissima* var. *glabrior* (Miquel) Boerlage; *I. yomae* Kurz.

Plants perennial, woody, twining, occasionally prostrate, pubescent, glabrescent. Stems terete or angular, smooth or with small hooks. Petiole slender, 3–10 cm; leaf blade ovate to circular, 5–14 × 3–10 cm, pubescent or subglabrous, base cordate, margin entire, undulate, or acutely angled, apex long acuminate, mucronulate. Inflorescences 1- to few flowered; peduncle 4–15 mm. Pedicel 0.7–1.5 cm, sometimes angular,

thicker distally, clavate in fruit, to 2 cm, recurved. Flowers nocturnal. Sepals slightly unequal, outer 2 longer, 1.2–1.8 cm, enlarged in fruit, broadly elliptic to circular, thinly leathery, apex rounded to emarginate, mucronulate. Corolla white, greenish outside, salverform, 12–17 cm; limb 8–10 cm in diam. Stamens minutely exerted; filaments inserted near mouth of tube, ca. 2 mm, base pubescent. Pistil slightly exerted; ovary glabrous. Stigma 2-lobed. Capsule at first enclosed by sepals that later reflex, ovoid, ca. 1.5 cm, apiculate, 4-valved. Seeds 6–8 mm, densely gray-brown woolly. Fl. Sep-Oct, fr. Sep-Oct.

Thickets, forests, roadsides; 0–1200 m. Hainan [Indonesia, Myanmar, Philippines, Thailand].

16. LEPISTEMON Blume, Bijdr. 722. 1825.

鳞蕊藤属 lin rui teng shu

Lepidostemon Hasskarl; *Nemodon* Griffith.

Herbs or woody twiners, usually pubescent. Leaves petiolate, ovate to circular, herbaceous, base cordate, margin entire or 3–5-lobed. Inflorescences axillary, dense, sessile or short-peduncled, ± umbellate cymes; bracts early deciduous, small. Sepals subequal, herbaceous or ± leathery, pubescent or glabrous, apex acute or obtuse. Corolla urceolate; limb shallowly 5-lobed, mid-petaline bands pubescent outside. Stamens included; filaments inserted near base of corolla, dilated basally into a large concave scale that arches over ovary; anthers narrowly elliptic to linear; pollen globular, pantoporate, finely spiny. Disc cupular and ± 5-lobed or ringlike. Pistil included; ovary glabrous or pubescent, 2-loculed; ovules 2 per locule. Style 1, very short; stigmas 2, capitate. Capsule globose, 4-valved. Seeds 4 or less, glabrous or puberulent.

About ten species: Africa, Asia, Australia; two species in China.

- 1a. Sepals lanceolate, 5–7.5 mm, attenuate acuminate, abaxially hirsute with ± erect yellowish hairs; leaves entire to shallowly 3–7-lobed 1. *L. binectariferum*
1b. Sepals ovate or ovate-lanceolate, 2.5–3 mm, obtuse or acute, abaxially sparsely appressed pilose with whitish gray hairs or subglabrous; leaves ± deeply 3–7-lobed 2. *L. lobatum*

1. *Lepistemon binectariferum* (Wallich) Kuntze, Rev. Gen. Pl. 1: 446. 1891.

鳞蕊藤 lin rui teng

Herbs twining, 1–3 m tall. Stems densely brown pilose, with spreading or retrorse hairs. Petiole 3–16 cm, pilose; leaf blade cordate-ovate, 5–18 × 5–15 cm, base deeply cordate, margin entire, angulate, or shallowly 3–7-lobed; lobes acute or acuminate, appressed pilose; young leaves tomentose. Cymes axillary, few to many flowered; peduncle short or absent. Pedicel ca. 7 mm, glabrous or pilose. Sepals lanceolate, subequal or inner shorter, 5–7.5 mm, slightly enlarged in fruit or not, herbaceous, hirsute abaxially, attenuate acuminate. Corolla white or yellowish white, urceolate, 1.2–1.5 cm; tube inflated basally, contracted apically, upper part of tube and midpetaline bands pubescent outside; limb spreading, shortly 5-lobed; scales at filament bases concave, papillose abaxially. Disc 5-lobed. Ovary glabrous or pubescent. Capsule globose to ovoid, 6–8 mm, apiculate. Seeds 4 or fewer, black, ovoid, 3–4 mm. Fl. Dec-Jan, fr. Jan.

Four varieties: China, NE India, throughout SE Asia, W Pacific; two varieties in China.

- 1a. Sepals abaxially with long erect yellowish hairs; ovary glabrous; seeds glabrous

- 1a. var. *binectariferum*
1b. Sepals abaxially with much shorter, less erect grayish hairs; ovary pubescent; seeds puberulent 1b. var. *trichocarpum*

1a. *Lepistemon binectariferum* var. *binectariferum*

鳞蕊藤 (原变种) lin rui teng (yuan bian zhong)

Convolvulus binectariferus Wallich in Roxburgh, Fl. Ind. 2: 47. 1824; *C. cephalanthus* Wallich; *C. flavescens* (Blume) D. Dietrich; *Ipomoea wallichii* (Choisy) Steudel; *Lepistemon flavescens* Blume; *L. wallichii* Choisy; *Vallis controversa* Sprengel.

Sepals hirsute abaxially with ± erect, yellowish hairs. Ovary glabrous. Seeds glabrous.

Forests. Hainan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

1b. *Lepistemon binectariferum* var. *trichocarpum* (Gagnepain) van Ooststroom, Blumea 5: 343. 1943.

毛果鳞蕊藤 mao guo lin rui teng

Lepistemon trichocarpum Gagnepain, Notul. Syst. (Paris) 3: 152. 1915; *Lepistemon obscurum* (Blanco) Merrill; ?*Polemonium obscurum* Blanco.

Sepals with much shorter, less erect, grayish hairs abaxially. Ovary pubescent. Seeds puberulent.

Hainan, Taiwan (Lanyu Island) [Indonesia, Japan (S Ryukyu Island), Philippines; Pacific Islands].

2. *Lepistemon lobatum* Pilger in Diels, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1029. 1926.

裂叶鳞蕊藤 lie ye lin rui teng

Herbs twining, with ± whitish gray hirsute axial parts. Petiole 5–10 cm; leaf blade broadly ovate-cordate, 5–8 × 4–8(–10) cm, ± pilose to glabrous, base deeply cordate, margin sinuately 3–5-lobed distally, apex obtuse or apiculate. Cymes many flowered; peduncle ca. 1 cm. Pedicel slender. Sepals

ovate or ovate-lanceolate, 2.5–3 mm, sparsely pilose to subglabrous abaxially, apex obtuse or acute. Corolla whitish green, 1.8–2.2 cm; tube inflated, slightly contracted distally; limb 1.5–1.8 cm in diam., margin subentire. Stamens included in tube; filaments filiform, ca. 3 mm; basal scales ovate-lanceolate or ovate-elliptic, ca. 2.5 × 3.5 mm, papillose-pilose abaxially; anthers ca. 2 mm. Disc ringlike, ca. 1 mm high. Style 1.5–2 mm; stigmas globose-capitate, papillose. Capsule with persistent calyx, ovoid, 6–7 mm high, glabrous. Seeds 4, dark brown, subovoid, ca. 4 mm, sparsely pale yellowish villous. Fl. Jul-Sep, fr. Aug-Sep.

• Valley forests, streamsides. Fujian, Guangdong, Guangxi, Hainan, Zhejiang.

17. *BLINKWORTHIA* Choisy, Mém. Soc. Phys. Genève 6: 430. t. 4. 1833.

苞叶藤属 bao ye teng shu

Shrubs or slender climbers. Stems villous or strigose. Leaves petiolate, linear or elliptic, sericeous or strigose. Flowers solitary, axillary, nodding; bracts 2–4, leaflike. Sepals 5, ovate-oblong to circular, ± equal, leathery, slightly enlarged in fruit. Corolla campanulate, waxy; limb erect, subentire or shallowly 5-dentate. Stamens included; anthers oblong; pollen globose, pantoporate, finely spiny. Disc ringlike. Pistil included; ovary conical, ± 2-loculed, glabrous. Style 1, filiform; stigma capitate, 2-lobed. Fruit a berry, enclosed by persistent calyx, glabrous. Seeds 1–4, glabrous.

Two species: China, Myanmar, N Thailand; one species in China.

1. *Blinkworthia convolvuloides* Prain, J. Asiat. Soc. Bengal 63(2): 91. 1894.

苞叶藤 bao ye teng

Blinkworthia discostigma Handel-Mazzetti.

Climbers or trailers, woody. Stems to 12 m long. Branches flexuous, slender, strigose or villous. Petiole 3–4 mm; leaf blade elliptic to oblong, 3–5 × 1–1.8 cm, leathery, abaxially strigose, adaxially glabrous, base rounded, apex obtuse and mucronulate. Pedicel curved, 8–10 mm, glabrous; bracte-

oles at middle, 3 or 4, spatulate, 5–6 mm, strigose abaxially. Sepals ovate to circular, 6–7 mm, sparsely strigose, base subcordate, margin translucent, apex obtuse. Corolla white, pale green, or yellow, 1.7–2 cm, with 5 distinct, ± fleshy, midpetaline bands. Stamens adnate to corolla tube for 1/2 their length; filaments filiform, base slightly dilated and verruculose; anthers longitudinally dehiscent. Pistil shorter than stamens. Berry ovoid, 8–10 mm in diam. Seeds 1–4, ovoid, glabrous.

Thickets, savanna forests; 400–600(–2500) m. S Guangxi, S Yunnan [Myanmar].

The roots and leaves are used locally for treating stomachaches.

18. *ARGYREIA* Loureiro, Fl. Cochinch. 1: 95, 134. 1790.

银背藤属 yin bei teng shu

Lettsomia Roxburgh; *Moorcroftia* Choisy.

Shrubs, scandent or lianas. Stems woody. Leaves petiolate, entire, sometimes silvery sericeous abaxially. Inflorescences axillary, rarely terminal, in cymes, or loose or compact capitula, few to many flowered; bracts persistent or early deciduous, small or large. Sepals persistent, herbaceous or ± leathery, pubescent abaxially, glabrous and often red adaxially, ± enlarged and reflexed in fruit. Corolla purple, red, pink, or white, campanulate, funnellform, or tubular; limb subentire to deeply 5-lobed, with 5 distinct, mostly pubescent midpetaline bands. Stamens inserted near base of corolla, included or exerted; filaments filiform, base dilated, often pubescent or glandular; pollen globular, pantoporate, finely spiny. Disc ringlike or cupular, margin entire or shallowly 5-lobed. Ovary 2- or 4-loculed, 4-ovuled, pubescent or glabrous. Style 1, filiform, included or exerted; stigma capitate, 2-lobed or 2-globular. Berry red, purplish, orange, or yellowish, globose or ellipsoid, fleshy, mealy, or leathery. Seeds 4 or fewer, rarely pilose at hilum.

About 90 species: mainly tropical Asia, with one species in Australia (Queensland); 22 species in China.

No monograph of *Argyreia* exists, and the mainland Asian species have not been studied for a contemporary flora or regional revision. A comparison of the Chinese material with those from regions to the south reveals that a profusion of names has developed for what appears to be a significantly smaller number of taxa. It was not possible to sort out the nomenclature for the species involved due to the lack of access to type material and the exceedingly complex literature dealing with *Argyreia*. Therefore, a conservative approach is taken, and nearly all of the taxa described from China are maintained, and possible conspecific taxa are pointed out.

The flowers of *Argyreia marlipoensis* are unknown. It has not been possible to place the species in a key that relies heavily on floral characters. One cultivated species, *A. nervosa*, is included in the key but not treated further.

- 1a. Corolla deeply 5-lobed; stamens exerted.
- 2a. Cymes capitate; bracts \pm persistent, broadly obovate, spatulate, or circular, abaxially tomentose; flowers sessile or nearly so 19. *A. osyrensis*
- 2b. Cymes not capitate; bracts early deciduous; flowers pedicellate.
- 3a. Leaf blade elliptic to ovate, usually silvery sericeous abaxially, base rounded or truncate, rarely shallowly cordate; fruiting sepals with recurved or crinkled apices 20. *A. acuta*
- 3b. Leaf blade broadly ovate to nearly circular, dull yellowish tomentose abaxially, base distinctly cordate, rarely subtruncate; fruiting sepals with flat or slightly revolute apices.
- 4a. Inflorescences usually 4–6-flowered; peduncle 1.5–2 cm; sepals ovate-oblong, 6–8 mm, subequal; Taiwan 21. *A. formosana*
- 4b. Inflorescences usually 9–40-flowered; peduncle 2.5–7 cm; sepals broadly ovate-circular, ca. 5 mm, unequal, outer 3 longer; Guangxi, Yunnan 22. *A. fulvocymosa*
- 1b. Corolla entire or shallowly lobed; stamens included.
- 5a. Bracts early deciduous.
- 6a. Leaf blade ovate to circular, base cordate.
- 7a. Bracts 3.5–5 cm, ovate, oblong, or elliptic; leaf blade densely sericeous-tomentose abaxially; corolla 6–6.5 cm *A. nervosa*
- 7b. Bracts 0.5–1 cm, linear to oblong; leaf blade sparsely strigose abaxially; corolla 2.8–5.5 cm.
- 8a. Sepals \pm equal, broadly elliptic to ovate, 9–11 mm, densely golden woolly abaxially; corolla funnelform, 2.8–4 cm, purple-red 1. *A. strigillosa*
- 8b. Sepals unequal, outer 3 shorter, ovate-oblong, 4–5 mm, abaxially \pm yellowish sericeous; corolla funnelform, flaring strongly from base, 4–5.5 cm, purple 2. *A. maymyo*
- 6b. Leaf blade ovate to ovate-elliptic, oblong to lanceolate, base broadly cuneate to rounded or truncate.
- 9a. Peduncle more than 10 cm.
- 10a. Leaf blade yellowish hispid or strigose abaxially; outer sepals elliptic, ca. 4 \times 3 mm, abaxially hispid; fruit 8–10 mm in diam., dark red 5. *A. henryi*
- 10b. Leaf blade densely silvery sericeous abaxially; outer sepals ovate, ca. 7 \times 5 mm, abaxially silvery sericeous; fruit 6–8 mm in diam., red 12. *A. splendens*
- 9b. Peduncle 0.5–7 cm.
- 11a. Leaf blade densely strigose adaxially 4. *A. velutina*
- 11b. Leaf blade glabrous or sparsely strigose adaxially.
- 12a. Corolla pale violet or pink, 5–6.5 cm; pedicel 5–15 mm; outer 2 sepals broadly elliptic, 8–10 mm, inner 3 oblong, shorter, slightly emarginate 3. *A. mollis*
- 12b. Corolla white, ca. 4.8 cm; pedicel ca. 2.5 mm; sepals all ovate-oblong, ca. 4.5 mm 13. *A. cheliensis*
- 5b. Bracts persistent.
- 13a. Bracts 2–13 mm.
- 14a. Inflorescences few to many flowered; lianas with stout stems; anthers sagittate, 4.5–5.5 mm.
- 15a. Leaf blade narrowly oblong or narrowly oblong-lanceolate; petiole 1–2 cm; peduncle 1–3 cm; filaments 1.7–2.2 cm 14. *A. monglaensis*
- 15b. Leaf blade ovate-circular; petiole 6.5–7 cm; peduncle 10.5–13 cm; filaments ca. 1.1 cm 18. *A. fulvovillosa*
- 14b. Flowers solitary; herbs or scandent shrubs with slender stems; anthers oblong, 2.5–4 mm.
- 16a. Leaf blade linear, 9–13 \times 0.7–1 cm; sepals ovate, ca. 10 \times 5–6 mm; corolla pale purple, 4–4.5 cm 15. *A. lineariloba*
- 16b. Leaf blade ovate to ovate-deltate, 3–4.5 \times 1.5–2.5 cm; sepals linear-lanceolate, outer ca. 20 \times 2–3 mm; corolla red, ca. 7 cm 16. *A. baoshanensis*
- 13b. Bracts 15–40 mm.
- 17a. Inflorescences long pedunculate, (3–)6–30 cm; bracts ligulate, attenuate-lanceolate, or elliptic, both ends acute, or apically attenuate.
- 18a. Inflorescences to 3-flowered; corolla urceolate-funnelform, 2.5–3.5 cm; sepals \pm equal, broadly ovate to elliptic 9. *A. monosperma*
- 18b. Inflorescences many flowered, capitate or cymose; corolla funnelform, 3.5–5.5 cm; sepals unequal, outer 3 ovate-lanceolate, lanceolate, ovate-oblong, to oblong.
- 19a. Indumentum brown or dull yellow, \pm hirsute; inflorescences capitate, dense; bracts sessile, elliptic to lanceolate, both ends acute; sepals lanceolate, ovate-oblong, to oblong 10. *A. capitiformis*
- 19b. Indumentum whitish villous; inflorescences cymose; bracts petiolate, ligulate, acuminate; outer 3 sepals ovate-lanceolate, inner 2 obovate-elliptic, obtuse 17. *A. mastersii*

- 17b. Inflorescences short pedunculate, mostly 1–2.5(–5) cm; bracts ovate-elliptic, broadly ovate, or ovate, obtuse or acute.
- 20a. Leaf base cordate; sepals ± equal, 1–1.2 cm; indumentum ashy or whitish 7. *A. wallichii*
- 20b. Leaf base cuneate, rounded, truncate, or shallowly cordate; sepals unequal, outer 3 larger, 1.2–1.7 cm; indumentum yellowish or pale brownish.
- 21a. Corolla 5–7 cm; style to 3.5 cm; fruit globose, 8–10 mm in diam. 8. *A. pierreana*
- 21b. Corolla 4.2–4.5 cm; style ca. 1.1 cm; fruit ellipsoid, 6–7 × ca. 5 mm 11. *A. eriocephala*

1. *Argyreia strigillosa* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 133. 1965.

细毛银背藤 xi mao yin bei teng

Shrubs scandent. Axial parts ± strigose, young ones densely so. Stems pale or dark brown, ± terete. Petiole ca. 6 cm; leaf blade nearly circular, ca. 12 × 11 cm or larger, sparsely strigose, base shallowly cordate, apex obtuse to acute; lateral veins 8–11 pairs. Cymes axillary, few to several flowered; peduncle 5–11 cm or more; bracts early deciduous, oblong-elliptic, ca. 1 cm. Pedicel 8–10 mm. Sepals broadly elliptic to ovate, ± equal, 9–11 × 5–6 mm, densely golden woolly abaxially, glabrous and black-brown (in dry specimens) adaxially, apex obtuse to acute. Corolla purple-red, funnellform, 2.8–4 cm, midpetaline bands sparsely whitish pilose-strigose; limb shallowly lobed. Stamens and pistil included; filaments ca. 1.4 cm, basally glandular pubescent; anthers oblong, ca. 3 mm. Disc ringlike, ca. 1 mm high. Ovary glabrous. Style ca. 1.4 cm. Fruit unknown. Fl. Oct–Nov.

- Streamside and roadside thickets; 1100–1600 m. S Yunnan.

This species is very similar to specimens from Thailand called *Argyreia thomsonii* (C. B. Clarke) Craib and may prove to be conspecific with it.

2. *Argyreia maymyo* (W. W. Smith) Raizada, Indian Forester 93: 754. 1967.

思茅银背藤 si mao yin bei teng

Lettsomia maymyo W. W. Smith, Rec. Bot. Surv. India 6: 38. 1914.

Climbers woody; axial parts ± yellowish pilose, later glabrescent. Stems terete. Petiole 6–9.5 cm; leaf blade broadly ovate-cordate, 10–16 × 10.5–13 cm, ± sparsely strigose, base shallowly cordate, apex abruptly acuminate. Inflorescences ± umbellate, 7–15-flowered; peduncle 15–22 cm; bracts early deciduous, attached near middle of pedicel, linear, ca. 5 mm. Pedicel 1–2 cm. Sepals ovate-oblong, unequal; outer 3 4–5 × ca. 2 mm; inner 2 larger, ± yellowish sericeous abaxially, glabrous adaxially, apex obtuse to rounded. Corolla purple, funnellform, flaring strongly from base, 4–5.5 cm; limb entire to shallowly lobed, midpetaline bands densely whitish sericeous-pilose, otherwise glabrous. Stamens and pistil included; filaments 2–2.5 cm, glandular basally; anthers oblong, 5–6 mm. Pistil capitate, 2-globose; ovary ovoid, glabrous. Style 2.6–3 cm. Fruit ellipsoid, 1–1.4 cm, projecting from persistent (but not enlarged) sepals. Fl. Oct.

Mountain forests; 1500–1800 m. Yunnan (Simao) [N Myanmar].

Argyreia maymyo was not recognized in the Fl. Reipubl. Popularis Sin. account. An examination of Chinese material called in that account *A. roxburghii* (Wallich) Arnott var. *ampla* (Wallich) C. B.

Clarke reveals that *A. maymyo* and *A. mastersii* (Prain) Raizada (as defined here) were included. The two species are readily separated by the ligulate bracts which are lacking in *A. maymyo* and so prominent in *A. mastersii*.

3. *Argyreia mollis* (N. L. Burman) Choisy, Mém. Soc. Phys. Genève 6: 421. 1833.

银背藤 yin bei teng

Convolvulus mollis N. L. Burman, Fl. Indica 44. t. 17. 1768; *Argyreia championii* Benthams; *A. obtecta* (Choisy) C. B. Clarke; *C. sericeus* Linnaeus; *Lettsomia championii* (Benthams) Benthams & J. D. Hooker; ?*Rivea obtecta* Choisy.

Lianas; axial parts ± densely appressed whitish or pale yellow pilose; young parts densely so. Stems twining, to 10 m tall. Petiole 1–6 cm; leaf blade elliptic to oblong, sometimes ovate or lanceolate, 4–15 × 1.5–7 cm, tapering at both ends, abaxially densely silvery white or dull yellow sericeous-tomentose, adaxially sparsely strigose or glabrous, apex acute or obtuse; lateral veins 9–18(–20) pairs. Cymes 1–5-flowered; peduncle 0.5–2.5(–4.5) cm; bracts early deciduous, obovate-oblong, apex obtuse. Pedicel 0.5–1.5 cm. Sepals subequal, densely sericeous-lanose abaxially, enlarged in fruit; outer 2 broadly elliptic, 8–10 mm, apex obtuse; inner 3 oblong, slightly emarginate. Corolla pale violet or pink, funnellform to campanulate, 5–6.5 cm, midpetaline bands appressed pubescent outside; limb ± entire, undulate. Stamens and pistil much shorter than corolla; filaments pilose basally. Ovary glabrous, 4-loculed. Berry red or orange-red, subglobose, 8–10 mm in diam. Seeds 4 or fewer, black, ca. 5 mm. Fl. Aug–Oct, fr. Nov–Feb.

Dense forests in valleys; 300–1800 m. Hainan [Cambodia, India (Andaman Islands), Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

The name *Argyreia obtusifolia* Loureiro (Fl. Cochinch. 134. 1790) was misapplied for *A. mollis* in Fl. Reipubl. Popularis Sin. and other regional floras, mostly because the protologue is too incomplete to know for certain to what taxon it applies. Loureiro's generic description, however, states explicitly that the corolla is deeply 5-parted and with oblong and reflexed lobes. That description clearly does not apply to *A. mollis*, which has a funnellform-campanulate, subentire corolla. Material from peninsular Malaysia, Thailand, and lower Myanmar, which is conspecific with that from S China, was recognized by Van Ooststroom and Hoogland (Fl. Malesiana 4: 496. 1953) as *A. mollis*. When not in flower, *A. mollis* can easily be confused with *A. acuta* Loureiro, but the latter has a fruiting calyx with navicular outer sepals corrugate or recurved at the apex, whereas *A. mollis* has semiglobose or bowl-shaped outer sepals with a uniform curvature to the apex.

4. *Argyreia velutina* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 129. 1965.

黄毛银背藤 huang mao yin bei teng

Shrubs scandent. Axial parts ± densely yellowish strigose, glabrescent with age. Branches subterete, becoming striate and densely verruculose. Petiole 2.5–3 cm; leaf blade elliptic to elliptic-ovate, 8–11 × 4–5 cm, leathery, abaxially densely yellowish sericeous-velutinous, adaxially densely strigose, base rounded, apex acute; lateral veins 8–12 pairs. Inflorescences unknown. Infructescences axillary, dichotomous cymes, 2–4-fruited; peduncle 2.5–3.5 cm, ± 4-angled. Pedicel to 5 mm in fruit. Sepals elliptic-oblong to narrowly elliptic, strongly concave, subequal, ± parchmentlike, 0.9–1.1 cm × 5–7 mm, sericeous-velutinous abaxially, glabrous adaxially, apex obtuse. Berry depressed globose, ca. 5 × 7 mm. Seeds 2, brownish, semiglobose, apex rounded; hilum nearly circular. Fr. Apr–May.

• Thickets; 1000–1600 m. S Yunnan (Menghai Xian, Pingbian Xian).

5. *Argyreia henryi* (Craib) Craib, Bull. Misc. Inform. Kew 1914: 9. 1914.

长叶银背藤 chang ye yin bei teng

Shrubs scandent. Stems angular, sparsely appressed hispid. Petiole 3–5 cm, sparsely hispid; leaf blade lanceolate or ovate to ovate-elliptic, 10–20 × 3.5–11 cm, abaxially sparsely hispid or yellowish strigose, adaxially glabrous, base rounded to shallowly cordate, apex acute to obtuse; lateral veins 6–9 pairs. Cymes axillary, many flowered; peduncle (11–)13–15(–19) cm; bracts and bracteoles early deciduous. Pedicel 6–9 mm, short hispid. Sepals hispid outside; outer 2 elliptic, ca. 4 × 3 mm, apex rounded; inner 3 ovate to circular, apex rounded or emarginate. Corolla whitish to lilac, funnel-form, 3.5–5.5 cm, midpetaline bands densely yellowish hirsute; limb shallowly 5-lobed. Stamens and pistil included; filaments villous basally. Ovary glabrous. Style ca. 2.5 cm; stigma 2-globular. Berry dark red, globose, 8–10 mm in diam., shiny. Seeds 4 or fewer, dark brown, 5–6 mm, smooth. Fl. Oct–Nov, fr. Nov–Feb.

Open forests in valleys, thickets, forest margins; 700–1000 m. S Yunnan [N Thailand].

- 1a. Leaf blade lanceolate to oblong-lanceolate, apex acute, abaxially sparsely hispid 5a. var. *henryi*
1b. Leaf blade ovate to ovate-elliptic, apex rounded to obtuse, mucronulate, abaxially yellowish strigose, slightly shiny
..... 5b. var. *hypochrysa*

5a. *Argyreia henryi* var. *henryi*

长叶银背藤 (原变种) chang ye yin bei teng (yuan bian zhong)

Ipomoea henryi Craib, Bull. Misc. Inform. Kew 1914: 423. 1911; *Lettsomia henryi* (Craib) Kerr.

Leaf blade lanceolate to oblong-lanceolate, abaxially sparsely hispid, apex acute.

Open forests in valleys; 1000 m. S Yunnan (Xishuangbanna Xian) [N Thailand].

5b. *Argyreia henryi* var. *hypochrysa* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 132. 1965.

金背长叶藤 jin bei chang ye teng

Leaf blade ovate to ovate-elliptic, abaxially yellowish strigose, slightly shiny, apex rounded to obtuse.

• Thickets, forest margins; 700–900 m. S Yunnan (Mengla Xian).

6. *Argyreia marlipoensis* C. Y. Wu & S. H. Huang, Fl. Reipubl. Popularis Sin. 64(1): 164. 1979.

麻栗坡银背藤 ma li po yin bei teng

Lianas. Stems dark brown, terete, densely verruculose, sparsely lenticellate and appressed hispid. Petiole 7–9 cm, shiny appressed hispid; leaf blade broadly ovate to circular, 10–14 × 9.5–12 cm, leathery, adaxially sparsely yellowish appressed hispid, base rounded or truncate, apex abruptly caudate-acuminate; lateral veins 7 or 8 pairs. Inflorescences unknown. Peduncle 7.5–12.5 cm in fruit. Sepals reddish purple, ovate, subequal, ca. 1.3 × 0.9 cm, thick, becoming enlarged, leathery, yellowish villous abaxially, glabrous adaxially, apex acute. Berry ovoid, ca. 1.5 cm. Seed 1, pale dull yellow, flattened ovoid, ca. 1 cm, smooth, glabrous. Fr. Nov.

• Forests on calcareous mountain slopes; ca. 1100 m. SE Yunnan (Marlipo Xian).

7. *Argyreia wallichii* Choisy, Mém. Soc. Phys. Genève 6: 422. 1833.

大叶银背藤 da ye yin bei teng

Lianas. Stems terete, ± ashy or whitish tomentose. Petiole 5–13 cm, tomentose; leaf blade broadly ovate to almost circular, 10–25 × 6–20 cm, abaxially ashy or whitish tomentose, adaxially glabrous or sparsely strigose, base cordate, apex acute; lateral veins 10–15 pairs, prominent adaxially. Inflorescences subcapitate cymes, 2.5–7 cm in diam., many flowered; peduncle to 2.5 cm; outer bracts 2.5–4 cm, ovate-elliptic, dull yellowish or grayish pubescent abaxially; inner bracts persistent, smaller. Sepals elliptic-oblong, ± equal, 1–1.2 cm × ca. 5 mm, villous abaxially; fruiting sepals enlarged, rose-red, shiny. Corolla whitish, pink, or purple, tubular-funnelform, 4–7 cm, midpetaline bands sparsely whitish villous; limb entire or shallowly lobed. Stamens and pistil included; filaments villous basally; anthers oblong, ca. 3.5 mm. Ovary glabrous. Style ca. 3 cm. Berry enclosed by calyx, red, globose, 8–9 mm in diam. Fl. Aug–Nov, fr. Nov–Mar. $2n = 30^*$.

Thickets, forests; 800–1500 m. S Guizhou, SW Sichuan, S Yunnan [Bhutan, NE India, Myanmar, Sikkim, N Thailand].

8. *Argyreia pierreana* Bois, Rev. Hort. 78: 560. 1906.

东京银背藤 dong jing yin bei teng

Argyreia liliiflora C. Y. Wu; *A. seguinii* (H. Léveillé) Vaniot ex H. Léveillé; *Convolvulus atropurpureus* Wallich; *C. sphaerocephalus* Roxburgh; *Ipomoea atropurpurea* (Wallich) Choisy; *I. sphaerocephala* (Roxburgh) D. Don; *Lettsomia atropurpurea* (Wallich) C. B. Clarke; *L. seguinii* H. Léveillé.

Lianas. Stems terete, young parts villous, mature stems puberulent or glabrous. Petiole 5–17 cm, pale dull yellow tomentose; leaf blade ovate to circular, 10–22 × 5.5–21 cm, glabrous adaxially, dull yellowish tomentose abaxially, base cuneate, rounded, or shallowly cordate, apex ± acute; lateral veins 10–15 pairs. Inflorescences subcapitate, cymose, 5–6 cm wide; peduncle 2–5 cm, densely dull yellow villous; bracts broadly ovate, 2–3.5 × 2–3 cm, apex obtuse or acute; inner bracts persistent, red, smaller, ± pubescent abaxially, glabrous adaxially. Pedicel ca. 7 mm. Sepals rose purplish, ovate to oblong, apex obtuse; outer 3 sepals 1.5–1.7 cm × ca. 8 mm; inner 2 smaller. Corolla purple, pink, or whitish, funnellform, 5–7 cm; limb 3–4 cm in diam., whitish villous outside. Stamens and pistil included; filaments verruculose at base, anthers oblong to sagittate. Ovary glabrous. Style jointed basally, to 3.5 cm. Berry surrounded by enlarged calyx, red, globose, 8–10 mm in diam. Seeds 4 or fewer, whitish, 4–5 mm, scurfy, glabrescent. Fl. Jul–Oct, fr. Oct–Feb.

Thickets; 500–1400 m. Guangxi, Guizhou, SE Yunnan [Laos, Vietnam].

The whole plant has several medicinal properties.

9. *Argyreia monosperma* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 127. 1965.

单籽银背藤 dan zi yin bei teng

Shrubs scandent. Stems angular, young parts densely appressed sericeous pubescent, older ones glabrescent. Petiole 2.5–9.5 cm; leaf blade broadly ovate-elliptic to circular, 6–17 × 3.5–12 cm, abaxially silvery or grayish sericeous, adaxially glabrous, base broadly cuneate, truncate or rounded, rarely obtuse, apex acute; lateral veins 8–12 pairs. Inflorescences axillary, few flowered; peduncle 4–14 cm; bracts attenuate-lanceolate, 2–3.3 cm × 5–8 mm, sericeous abaxially, persistent. Pedicel 4–13 mm, angular. Sepals broadly ovate to elliptic, ± equal, 7–11 × 5–9 mm, to 1.8 × 1 cm in fruit, densely sericeous abaxially, glabrous adaxially, apex acute. Corolla purple or pinkish, urceolate-funnelform, 2.5–3.5 cm, apex appressed sericeous outside, otherwise glabrous; limb shallowly lobed. Stamens and pistil included; filaments glandular pubescent basally; anthers oblong. Disc cupular, 0.5–1.5 mm high. Ovary glabrous. Stigma capitate, 2-lobed. Berry reddish purple, ellipsoid, 1.5–1.7 cm. Seed 1, reddish purple, ellipsoid, ca. 1.2 × 0.9 cm, shiny.

• Valley forests, open thickets; 1000–1800 m. Yunnan (Menghai Xian, Pingbian Xian).

10. *Argyreia capitiformis* (Poiret) van Ooststroom, Fl. Malesiana, ser. 1, 6(6): 941. 1972.

头花银背藤 tou hua yin bei teng

Convolvulus capitiformis Poiret, Encycl. Suppl. 3: 469. 1814; *Argyreia capitata* (Vahl) Choisy; *A. rufohirsuta* H. Léveillé; *A. verrucosohispida* Y. Y. Qian; *C. capitatus* Vahl; *Ipomoea capitata* (Vahl) Roemer & Schultes; *Lettsomia capitata* (Vahl) Blume; *L. capitiformis* (Poiret) Kerr; *L. peguensis* C. B. Clarke; *L. strigosa* Roxburgh.

Shrubs scandent, 10–15 m tall. Stems spreading hirsute, with brown or dull yellow hairs. Petiole 3–16 cm; leaf blade ovate to circular, rarely oblong-lanceolate, 8–18 × 4–13 cm, dull yellow hirsute, base cordate, apex acute or acuminate; lateral veins 13–15 pairs. Cymes capitate, dense; peduncle stout, 6–30 cm, spreading hirsute; bracts persistent, elliptic to lanceolate, 1.5–2.5 × ca. 1 cm, both ends acute, hirsute abaxially. Pedicel short or absent. Sepals lanceolate or ovate-oblong to oblong, densely hirsute abaxially, apex acuminate, outer 3 sepals 1.5–1.7 cm × 5–6 mm, inner 2 sepals 1–1.2 cm. Corolla pink to reddish purple, funnellform, 4.5–5.5 cm, hirsute outside; limb shallowly lobed or subentire. Stamens and pistil included; filaments ca. 1.5 cm, glandular pilose basally; anthers oblong, ca. 3.5 mm. Ovary ovoid, glabrous, 2-loculed. Style ca. 3 cm, jointed at base; stigma capitate, 2-lobed. Berries orange-red, globose, ca. 8 mm in diam. Seeds 4 or fewer, ovoid-trigonal, ca. 7 mm. Fl. Sep–Dec, fr. Feb.

Wasteland, disturbed areas near human habitation, dense valley forests, open forests and thickets; 100–2200 m. Guangxi, Guizhou, Hainan, Yunnan [Cambodia, NE India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

The leaves are used externally for treating trauma.

11. *Argyreia eriocephala* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 125. 1965.

毛头银背藤 mao tou yin bei teng

Shrubs scandent. Stems terete or striate; axial parts ± densely crisped villous, glabrescent with age. Petiole 7–14 cm; leaf blade ovate-circular to circular, 8.5–15 × 6–12 cm, papery, abaxially densely sericeous villous, adaxially glabrous, base truncate to shallowly cordate, apex abruptly acute; lateral veins 10–12 pairs. Cymes capitate, compact, ca. 4.5 × 4–6 cm; peduncle 1.5–2.5(–5) cm; bracts persistent, ovate, 1.7–3 × 0.7–1.5 cm, crisped villous abaxially, apex acute. Pedicel 4–6 mm, crisped pilose. Sepals elliptic-oblong, unequal, ± crisped villous abaxially, becoming enlarged and rose-red in fruit, outer 3 ca. 12 × 3 mm, inner 2 ca. 8 × 1.5 mm. Corolla rose colored, funnellform, 4.2–4.5 cm, midpetaline bands pilose; limb shallowly lobed. Stamens and pistil included; filaments ca. 1.5 cm, brownish glandular pilose basally; anthers oblong, ca. 3.5 mm. Disc ringlike. Ovary glabrous, conical, 2-loculed. Style ca. 1.1 cm, jointed at base; stigma capitate, 2-lobed. Fruit rose-red, ellipsoid, 6–7 × ca. 5 mm, apiculate. Seeds 4 or fewer, brownish, ellipsoid, ca. 5 mm. Fl. Sep.

• Forests, thickets; ca. 1300 m. S Yunnan.

12. *Argyreia splendens* (Hornemann) Sweet, Hort. Brit. ed. 1. 289. 1826.

亮叶银背藤 liang ye yin bai teng

Convolvulus splendens Hornemann, Hort. Bot. Hafn. suppl. 123. 1819; *Ipomoea splendens* (Roxburgh) Sims; *Lettsomia splendens* Roxburgh.

Shrubs scandent. Stems terete, gray tomentose or mature stems sparsely whitish pubescent or glabrescent. Petiole 5–15

cm, indumentum similar to stems; leaf blade ovate-oblong or elliptic, 12–27 × 5–15 cm, abaxially densely silvery sericeous, adaxially glabrous, base rounded to broadly cuneate or shallowly cordate, apex acute. Cymes axillary; peduncle 10.5–13.5 cm; bracts ovate, 5–6 × ca. 3.5 mm, densely silvery sericeous outside. Sepals deciduous, ovate, ca. 7 × 5 mm, silvery sericeous abaxially, apex obtuse, inner ones slightly smaller than outer. Fruiting calyx rose-red. Corolla pale purple, funnelform-campanulate, 4–5 cm; limb shallowly lobed, mid-petaline bands silvery sericeous. Stamens and pistil included; filaments villous basally; anthers oblong, ca. 4.5 mm. Disc ringlike, ca. 0.5 mm high. Ovary glabrous. Style ca. 3.2 cm, jointed at base; stigma capitate, 2-lobed. Berry red, globose, 6–8 mm in diam., enclosed by calyx. Seeds 4, brown, ovoid-triangular, 4–5 mm. Fr. Sep-Dec.

Forests, thickets; 1000–4000 m. W Yunnan [NE India, Myanmar, Thailand].

The epithet *splendens* has often been attributed to Roxburgh, either in Hort. Bengal. 13. 1814 (*a nomen nudum*), or in Fl. Ind. 2: 75. 1824. Hornemann's publication predates by five years the first publication of a description for *Lettsomia splendens*, so the epithet must be based on Hornemann's *Convolvulus splendens*.

13. *Argyreia cheliensis* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 126. 1965.

车里银背藤 che li yin bei teng

Shrubs scandent; axial parts ± yellowish puberulent. Young stems angular. Petiole 1.7–4 cm; leaf blade narrowly ovate to ± oblong, 7–10 × 3.5–4.5 cm, papery, abaxially densely sericeous-pilose, adaxially glabrous, base rounded, apex acute; lateral veins 10–13 pairs. Cymes axillary, corymbose, 4–9-flowered; peduncle (0.7–)3–7 cm; bracts deciduous, broadly ovate, ca. 5 × 4 mm, ± densely puberulent abaxially, glabrous adaxially, apex mucronulate. Pedicel ca. 2.5 mm. Sepals brown, ovate-oblong, ca. 4.5 × 2 mm, puberulent similar to bracts. Corolla white, funnelform, ca. 4.8 cm, mid-petaline bands sparsely pilose; limb shallowly lobed. Stamens and pistil included; filaments ca. 1.6 cm, glandular pilose basally; anthers oblong, ca. 4 mm. Disc ringlike, ca. 0.5 mm high. Ovary glabrous, 2-loculed. Fruit unknown. Fl. Sep.

• Thickets; ca. 900 m. S Yunnan (Jinghong Xian).

14. *Argyreia monglaensis* C. Y. Wu & S. H. Huang, Fl. Reipubl. Popularis Sin. 64(1): 164. 1979.

勐腊银背藤 meng la yin bei teng

Lianas 3–4 m tall. Stems terete, axial parts yellowish tomentose, young parts densely so, older stems grayish. Petiole 1–2 cm; leaf blade narrowly oblong or narrowly oblong-lanceolate, 6.5–12.5 × 2–3 cm, abaxially densely yellowish sericeous-tomentose, adaxially glabrous, base broadly cuneate or rounded, apex acute or acuminate; lateral veins 9–11 pairs. Cymes subcapitate, 7–9-flowered; peduncle 1–3 cm, angular; bracts ovate or ovate-triangular, 2–3.5 × 2–2.5 cm, densely yellowish tomentose abaxially, ?persistent. Sepals elliptic or ovate-oblong, unequal, tomentose similar to bracts, outer 3 ca. 13 × 6.5 mm, inner 2 ca. 9.5 × 3.5 mm. Corolla purple, tubular-funnelform, 3.8–5 cm, mid-petaline bands sparsely yellowish villous; limb 2.5–3 cm wide, entire or

slightly lobed. Stamens and pistil included, much shorter than corolla; filaments unequal, 1.7–2.2 cm, glandular pubescent basally; anthers sagittate, 4.5–5 mm. Disc ringlike, ca. 1 mm high. Ovary conical, glabrous. Style ca. 3.1 cm, jointed at base; stigma capitate, 2-lobed. Fruit unknown. Fl. Oct.

• Ravines, waysides. S Yunnan (Mengla Xian).

15. *Argyreia lineariloba* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 134. 1965.

线叶银背藤 xian ye yin bei teng

Shrubs scandent, 3–4 m. Axial parts densely strigose. Roots woody, ca. 1 cm in diam. Stems terete, slender, bristly. Petiole 6–12 mm; leaf blade linear, 9–13 cm × 7–10 mm, abaxially densely strigose, adaxially sparsely strigose, base attenuate, margin entire, apex acute. Pedicel 1–2 cm. Flower solitary, axillary; bracts 2 (or 3), subulate, 5–6 × 1.5–3 mm, densely strigose abaxially, persistent. Sepals ovate, ± equal, ca. 10 × 5–6 mm, strigose abaxially, apex acute. Corolla pale purple, tubular-funnelform, 4–4.5 cm, mid-petaline bands densely strigose outside; limb shallowly lobed. Stamens and pistil included; filaments ca. 1.4 cm, glandular pubescent basally; anthers oblong, ca. 4 mm. Disc ringlike, ca. 0.8 mm high. Ovary glabrous, 2-loculed, 4-ovuled. Style ca. 1.7 cm; stigma capitate, 2-globular. Fruit unknown. Fl. Sep.

• Grassy mountain slopes; ca. 1300 m. C Yunnan (Chuxiong Xian).

16. *Argyreia baoshanensis* S. H. Huang, Acta Phytotax. Sin. 24(1): 19. 1986.

保山银背藤 bao shan yin bei teng

Herbs(?) scandent, ca. 80 cm tall, with ± densely grayish strigose axial parts. Roots woody, ca. 1.5 cm in diam. Stems slender, ± terete. Petiole 3–4 mm or absent; leaf blade ovate to ovate-deltate, 3–4.5 × 1.5–2.5 cm, strigose, base cordate, margin entire or slightly undulate, apex obtuse or retuse. Pedicel ca. 8 mm. Flower solitary, axillary; bracts 1 or 2, linear-lanceolate, 0.8–1.2 cm × 1.5–2 mm, densely strigose abaxially, persistent. Sepals linear-lanceolate, ± equal; outer 3 ca. 20 × 2–3 mm, sparsely strigose abaxially, apex acute; inner 2 narrower. Corolla red, tubular-funnelform, ca. 7 cm, sparsely strigose outside; limb ca. 2.7 cm in diam., slightly lobed. Stamens and pistil included; stamens inserted at middle of corolla tube; filaments unequal, 1.2–1.5 cm, 2 filaments longer, base sparsely ciliate; anthers oblong, ca. 2.5 mm. Ovary conical. Style ca. 3.9 cm; stigma capitate, 2-lobed. Capsule enclosed by calyx, globose, ca. 4 mm in diam. Seeds 2, black-brown, ovoid, compressed. Fl. and fr. Jul.

• Wasteland, dry hot valleys, grassy slopes; ca. 1000 m. W Yunnan (Baoshan Xian).

17. *Argyreia mastersii* (Prain) Raizada, Indian Forester 93: 754. 1967.

叶苞银背藤 ye bao yin bei teng

Lettsomia mastersii Prain, J. Asiat. Soc. Bengal 63: 98.

1894.

Shrubs scandent. Stems terete, villous. Petiole 5–16 cm, villous; leaf blade broadly ovate to circular, 7–17 × 5.5–15 cm, abaxially ± whitish villous, adaxially strigose, base cordate, apex acute. Inflorescences cymose; peduncle 3–8 cm; bracts several, ligulate, ± petiolate, 2–2.4 cm × 3–5 mm, apex acuminate, persistent. Sepals unequal, ± spreading villous abaxially; outer 3 ovate-lanceolate, ca. 9 × 4 mm, apex acuminate; inner 2 obovate-elliptic, ca. 6 × 3.5 mm, apex obtuse. Corolla red-purple, funnellform, 3.5–4 cm, whitish hirsute outside; limb shallowly lobed. Stamens and pistil included; filaments ca. 1.7 cm, dilated and glandular pubescent at base; anthers oblong, ca. 3.5 mm. Disc ringlike, ca. 0.5 mm high. Ovary glabrous. Style ca. 2.4 cm; stigma capitate, 2-lobed. Berry enclosed by enlarged calyx, dark purple, ovoid-globose, ca. 1 cm. Seeds 4 or fewer, dark brown, ovoid-trigonous. Fl. Sep.

Open forests or thickets; 800–1300(–1800) m. S and SW Yunnan [NE India, N Myanmar, ?Thailand].

Argyreia mastersii was treated as *A. roxburghii* (Wallich) Arnott ex Choisy var. *ampla* (Choisy) C. B. Clarke in Fl. Reipubl. Popularis Sin. and other Chinese floras. A comparison of the type of *A. ampla* Choisy (Wallich Cat. no. 1420, microfiche seen) revealed that it is quite different from the Chinese plant, which agrees very well with Prain's description and with specimens labelled *A. mastersii* from Myanmar. Further study of these taxa and *A. hookeri* C. B. Clarke (Sikkim) is needed.

18. *Argyreia fulvovillosa* C. Y. Wu & S. H. Huang, Fl. Reipubl. Popularis Sin. 64(1): 164. 1979.

黄背藤 huang bei teng

Lianas 2–3 m tall, with ± densely yellowish pubescent axial parts. Stems terete. Petiole 6.5–7 cm; leaf blade ovate-circular, ca. 14 × 11–12.5 cm, abaxially densely dull yellowish villous, adaxially yellowish pubescent along mid-vein and lateral veins, base rounded or cordate, apex acute; lateral veins 11 or 12 pairs. Cymes many flowered, dense; peduncle 10.5–13 cm; bracts persistent, oblong or ovate-oblong, 1–1.3 cm × 5–8 mm, densely yellowish pubescent abaxially, apex obtuse. Sepals ovate-oblong, unequal, yellowish villous abaxially; outer 3 ca. 12 × 7 mm, apex obtuse or acute; inner 2 ca. 10 × 5.5 mm, apex acute. Corolla purple, broadly funnellform, ca. 4.5 cm, midpetaline bands sparsely villous; limb shallowly lobed. Stamens and pistil included, much shorter than corolla; filaments ca. 1.1 cm, densely villous basally; anthers sagittate, ca. 5.5 mm. Disc ringlike, ca. 1 mm high. Ovary conical, glabrous. Style ca. 3.3 cm, jointed at base; stigma capitate, 2-lobed. Fruit unknown. Fl. Nov.

- Forests, ravines; 900–1000 m. S Yunnan (Mengla Xian).

Argyreia fulvovillosa was said to very similar to *A. strigillosa*. Both come quite near to *A. thomsonii* Craib from Thailand, and all three may prove to be conspecific. Indumentum density and color are often unreliable to characterize species or even infraspecific taxa in the Convolvulaceae and could prove to be so in this case. However, the oblongish bracts borne near the middle of the pedicel are distinctive for this taxon or group of taxa.

19. *Argyreia osyrensis* (Roth) Choisy in A. de Candolle, Prodr. 9: 334. 1845.

聚花白鹤藤 ju hua bai he teng

Shrubs scandent. Stems terete; axial parts densely whitish, gray, or yellowish tomentose. Petiole 2–5 cm; leaf blade ovate or broadly ovate to nearly circular, 4–12 × 4–10 cm, abaxially densely gray tomentose, woolly, or villous, adaxially ± strigose-villous or glabrescent, base cordate, apex acute or obtuse; lateral veins 7–11 pairs. Cymes capitate; peduncle 2.5–6 cm; bracts ± persistent, broadly obovate, spatulate, or circular, 0.8–1.2 cm, tomentose abaxially, apex obtuse or truncate. Flowers sessile or subsessile. Sepals unequal, tomentose abaxially; outer 2 obovate or spatulate, 9–10 mm, apex obtuse; inner 3 oblong, 5.5–8 mm, apex obtuse, glabrous adaxially, apex obtuse. Fruiting sepals enlarged, red, concave. Corolla pink, tubular-campanulate, 1.2–1.5 cm; limb deeply 5-lobed; lobes narrowly ovate, emarginate, midpetaline bands pubescent. Stamens and pistil exerted; filaments pubescent basally. Ovary glabrous, 2-loculed. Berry enclosed by calyx, red, globose, 6–8 mm in diam. Seeds 1 or 2, ± globose, subglabrous.

SW Guangxi, Hainan, S Yunnan [?Bangladesh, ?Cambodia, India, Indonesia, Laos, ?Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

Two, weakly separable varieties may be recognized based on indumentum density; there is considerable intergradation between them.

- 1a. Leaf blade sparsely strigose-villous adaxially, densely gray tomentose or woolly abaxially 19a. var. *osyrensis*
- 1b. Leaf blade densely strigose-villous adaxially, densely gray villous abaxially 19b. var. *cinerea*

19a. *Argyreia osyrensis* var. *osyrensis*

聚花白鹤藤 (原变种) ju hua bai he teng (yuan bian zhong)

Ipomoea osyrensis Roth, Nov. Pl. Sp. 117. 1821; *Argyreia aggregata* (Roxburgh) Choisy; *Lettsomia aggregata* Roxburgh; *Lettsomia aggregata* var. *osyrensis* (Roth) C. B. Clarke.

Leaf blade densely gray tomentose or woolly abaxially, sparsely strigose-villous adaxially, hairs with distinct swollen bases. Fl. Aug, fr. Dec.

Forests, thickets; near sea level. Hainan [?Bangladesh, ?Cambodia, India, Indonesia, Laos, ?Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

Specimens from the Deccan region in India have adaxially glabrous leaves, whereas those from east Asia, including China, are uniformly sparse hairy adaxially.

19b. *Argyreia osyrensis* var. *cinerea* Handel-Mazzetti, Oesterr. Bot. Z. 87: 124. 1938.

灰毛白鹤藤 hui mao bai he teng

Leaf blade densely gray villous abaxially, densely strigose-villous adaxially, hairs crowded with bases not visible. Fl. Sep–Oct.

Open forests, thickets; 200–1600 m. SW Guangxi, S Yunnan [Myanmar, Thailand].

The roots and leaves are used medicinally.

20. *Argyreia acuta* Loureiro, Fl. Cochinch. 135. 1790.

白鹤藤 bai he teng

Argyreia festiva Wallich; *Lettsomia chalmersii* Hance; *L. festiva* (Wallich) Bentham & J. D. Hooker.

Shrubs scandent. Stems terete; axial parts silvery sericeous when young, later yellowish or glabrescent. Petiole 1.5–6 cm; leaf blade elliptic or ovate, 5–13.5 × 3–11 cm, abaxially silvery sericeous, adaxially glabrous, base rounded, slightly cordate, or truncate; lateral veins to 9 pairs. Cymes axillary or terminal; peduncle 3.5–8 cm, angular or compressed; bracts elliptic or obovate, 0.8–1.2 × 4–8 cm, silvery sericeous abaxially, apex obtuse, deciduous. Pedicel ca. 5 mm. Sepals ovate-oblong, unequal; outer ones 9–10 × 6–7 mm; inner ones 6–7 × 4–5 mm, silvery sericeous abaxially, apex obtuse, crinkled or recurved. Fruiting sepals red, navicular, apex recurved or corrugate. Corolla white, broadly funnelform, ca. 2.8 cm, silvery sericeous outside; limb deeply 5-lobed; lobes oblong, apex acuminate. Stamens short exserted; filaments ca. 1.5 cm; anthers oblong, ca. 4 mm. Pistil exserted; ovary glabrous, 2-loculed, 4-ovuled. Style ca. 2 cm; stigma capitate, 2-lobed. Berry enclosed by enlarged calyx, red, globose, ca. 8 mm in diam. Seeds 2–4, brown, ovoid-trigonous, ca. 5 mm. Fl. Aug–Oct, fr. Oct–Jan.

Open forests, thickets, streambanks; 0–200 m. Guangdong, Guangxi, Hainan [Laos, Vietnam].

The whole plant has several medicinal uses.

21. *Argyreia formosana* Ishigami ex T. Yamazaki, J. Jap. Bot. 44: 160. 1969.

台湾银背藤 tai wan yin bei teng

Ipomoea tomentosa Yamamoto.

Climbers woody, with ± yellowish pubescent axial parts. Stems striate; young parts densely sericeous, later glabrescent. Petiole 1.5–8 cm; leaf blade broadly ovate-cordate, 6–11 × 5–9 cm, abaxially densely yellowish white sericeous-tomentose, adaxially glabrous, base shallowly cordate to ± truncate, apex acute to acuminate; lateral veins 7–12 pairs, prominent abaxially. Inflorescences axillary, cymose, 4–6-flowered; peduncle 1.5–2 cm; bracts early deciduous, ovate, 4–6 mm. Pedicel 6–8 mm. Sepals ovate-oblong, slightly concave, subequal, 6–8 × 3–5 mm, densely sericeous abaxially, glabrous adaxially, apex rounded to obtuse. Corolla deeply 5-lobed; tube ca. 5 mm; lobes oblong, reflexed, 1.3–1.5 cm, densely pilose outside, glabrous inside. Stamens and pistil exserted; filaments ca. 1 cm; anthers 3–4 mm. Ovary ovoid, glabrous, 2-loculed. Style filiform, ca. 1.5 cm; stigma 2-lobed. Fruit reddish, globose. Seeds 4 or fewer, ovoid-trigonous. Fl. Oct, fr. Jan.

• Forests. S Taiwan (Kaohsiung, Pingtung Xian, “Ape’s Hill”).

Argyreia formosana was not treated in Fl. Reipubl. Popularis Sin. and was considered a synonym of *A. obtusifolia* Loureiro in the Flora of Taiwan (4: 348. 1978). Loureiro’s name has been widely misapplied

to various taxa in China and throughout southeast Asia, and the protologue is so vague that it is impossible to apply the name correctly. The Taiwanese specimens are quite distinct from all taxa called *A. obtusifolia* from mainland China and southeast Asia, and the prudent course seems to be to recognize them under Yamazaki’s name until a careful study can be undertaken.

22. *Argyreia fulvocymosa* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 135. 1965.

黄伞白鹤藤 huang san bai he teng

Shrubs scandent, with ± dense yellowish tomentose axial parts. Stems terete. Petiole 5–9 cm; leaf blade broadly ovate-circular to nearly circular, 12–15 × 10–15 cm, abaxially densely yellowish tomentose, adaxially densely strigose or glabrescent, base shallowly cordate, apex abruptly acute; lateral veins 12–14 pairs. Cymes axillary, 9–40-flowered; peduncle 2.5–7 cm, angular; bracts deciduous. Pedicel ca. 5 mm. Sepals broadly ovate-circular, unequal, ca. 5 × 4 mm, outer ones larger than inner, yellowish tomentose abaxially, glabrous adaxially, apex rotund. Corolla white or reddish purple, funnelform, ca. 2 cm, midpetaline bands densely yellowish-hirsute; limb deeply 5-lobed. Stamens and pistil slightly exserted; filaments slightly dilated and yellowish glandular pilose basally. Disc ringlike, ca. 1 mm high. Ovary glabrous. Berry ovoid, enclosed by enlarged calyx. Seeds 4 or fewer, black, ovoid-trigonous, smooth.

• Grassy mountain slopes, bamboo groves, forests; 700–1000 m. SW Guangxi, S Yunnan.

This species is very similar to *Argyreia maymyo* but appears to be distinct based on the shape and size of sepals.

- 1a. Cymes ca. 40-flowered; corolla often white; leaf blade ± rugulose and densely strigose adaxially 22a. var. *fulvocymosa*
1b. Cymes 9–15-flowered; corolla often reddish purple; leaf blade nearly smooth and glabrous adaxially 22b. var. *pauciflora*

22a. *Argyreia fulvocymosa* var. *fulvocymosa*

黄伞白鹤藤 (原变种) huang san bai he teng (yuan bian zhong)

Leaf blade ± rugulose and densely strigose with swollen-based hairs adaxially, veins sunken. Cymes ca. 40-flowered. Corolla often white. Fl. Aug, fr. Nov.

• Grassy mountain slopes, bamboo groves; 700–900 m. SW Guangxi, S Yunnan.

22b. *Argyreia fulvocymosa* var. *pauciflora* C. Y. Wu, Rep. Stud. Pl. Trop. Subtrop. Yunnan 1: 136. 1965.

少花黄伞白鹤藤 shao hua huang san bai he teng

Leaf blade nearly smooth and almost glabrous adaxially. Cymes 9–15-flowered. Corolla often reddish purple or white. Fl. Oct.

• Forests; ca. 1000 m. S Yunnan (Mengla Xian).

Flower color of *Argyrea fulvocymosa* var. *pauciflora* was recorded as red-purple in the holotype and white in the paratype, sug-

gesting that it may not be a reliable character to distinguish the two varieties.

19. STICTOCARDIA H. Hallier, Bot. Jahrb. Syst. 18: 159. 1894.

腺叶藤属 xian ye teng shu

Twiners woody or herbaceous. Leaves petiolate, ovate to circular, abaxially spotted with minute glands, as black dots in dried specimens, base usually cordate, margin entire. Cymes axillary, 1- to many flowered, peduncled; bracts early deciduous, small. Sepals ovate to elliptic or circular, equal or slightly unequal, much enlarged in fruit, \pm leathery, abaxially glandular punctate, margin membranous, apex obtuse to emarginate. Corolla funnellform, midpetaline bands \pm pilose and with minute glands. Stamens and pistil included; filaments filiform, inserted near corolla base; pollen globular, pantoporate, finely spiny. Disc ring-like. Ovary glabrous, 4-loculed; ovules 1 per locule. Style 1; stigma 2-globular. Fruit enclosed by enlarged calyx, globose; pericarp thin, eroding irregularly between septa to produce a lanternlike effect. Seeds 4 or fewer, pubescent.

Approximately 12 species: Africa, Asia; one species in China.

1. *Stictocardia tiliifolia* (Desrousseau) H. Hallier, Bot. Jahrb. Syst. 18: 159. 1894.

腺叶藤 xian ye teng

Convolvulus tiliifolius Desrousseau in Lamarck, Encycl. 3: 544. 1789 [1792]; *Argyrea tiliifolia* (Desrousseau) Wight; *Ipomoea tiliifolia* (Desrousseau) Roemer & Schultes; *Rivea tiliifolia* (Desrousseau) Choisy.

Twiners large, woody. Young branches pubescent, finally glabrescent. Petiole 3–14 cm; leaf blade broadly ovate or circular, 6–20 \times 5–20 cm, herbaceous, \pm pubescent or subglabrous, abaxially glandular punctate, base cordate, apex short acuminate or abruptly acuminate, mucronulate; lateral veins 7 or 8 pairs. Cymes 1–3-flowered; peduncle 1.5–7.5 cm; bracts deciduous, minute. Pedicel 2–3.5 cm. Sepals circular, subequal or inner ones shorter, 1–1.8 cm, pubescent or glabrous abaxially, minutely glandular punctate, enlarging to 4–5 cm in fruit, apex rounded or emarginate. Corolla reddish purple, with a dark center, funnellform, 8–10 cm; limb 8–10 cm in diam.;

midpetaline bands glandular punctate outside, sometimes pilose. Stamens unequal; filaments pubescent basally; anthers lanceolate, ca. 5 mm. Style filiform; lobes of stigma papillose. Fruit globose, 2–3.5 cm in diam. Seeds dark brown, 8–9 mm, pubescent. Fl. Oct–Nov, fr. Jan.

Seashore thickets, forests; below 100 m. Hainan, Taiwan [?Bangladesh, India, Indonesia, Japan (Ogasawara and Ryukyu Islands), Malaysia, ?Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; N Australia, North America (Central America, West Indies), Pacific Islands].

Stictocardia tiliifolia has been confused with *Ipomoea campanulata* Linnaeus (= *S. campanulata* (Linnaeus) Merrill), which is similar in general appearance and grows also along seacoasts. The glandular-dotted leaves, calyx, and corolla, and the non-capsular fruits enclosed in enlarged, leathery sepals are distinctive for *S. tiliifolia*.

The nomenclature for *Stictocardia tiliifolia* has been the subject of some disagreement, and of the two different interpretations recently proposed, Austin et al. (Brittonia 30: 195–198. 1978) and Gunn (Brittonia 24: 169–176. 1972), the former is here followed.

20. CUSCUTA Linnaeus, Sp. Pl. 1: 124. 1753.

菟丝子属 tu si zi shu

Fang Rhui-cheng¹; Lytton J. Musselman², Uzi Plitmann³

Herbs parasitic, yellow or reddish, glabrous. Stems twining, filiform, obtaining nourishment from hosts by haustoria. Leaves reduced to minute scales. Flowers sessile or short pedicellate, mostly in globular, spicate, racemose, or cymose clusters, 4- or 5-merous; bracts minute or absent. Calyx gamosepalous, \pm deeply lobed, or sepals free. Corolla white, pinkish, or cream colored, urceolate, tubular, globose or campanulate, inside with fimbriate or crenulate, membranous, infrastaminal scales at base of tube. Stamens as many as corolla lobes, inserted on corolla above scales, alternating with corolla lobes. Pollen smooth. Ovary 2-loculed; ovules 2 per locule. Styles 1 or 2; stigmas 2, subglobose or elongated, sometimes united. Capsule ovoid or globose, dry or sometimes fleshy, circumscissile or opening irregularly. Seeds 1–4, glabrous; embryo acotyledonous, filiform spiral-curved.

About 170 species: mainly in North and South America, several in Asia and Europe; 11 species in China.

Cuscuta is placed by some in a separate family, Cuscutaceae Dumortier.

1a. Styles 2, distinctly elongated; inflorescences compact cymose umbellules or glomerules; stems filiform; often parasitic on herbs.

2a. Stigmas clavate, \pm elongated.

3a. Flowers short pedicellate; sepals not thickened abaxially; style and stigmas much shorter than

ovary 10. *C. europaea*

- 3b. Flowers sessile; sepals thickened and fleshy abaxially; style and stigmas ca. as long as or longer than ovary 11. *C. approximata*
- 2b. Stigmas globose or capitate, not elongated.
- 4a. Capsule entirely enclosed by withered corolla, circumscissile; corolla lobes keeled 3. *C. chinensis*
- 4b. Capsule subtended by withered corolla, irregularly dehiscent; corolla lobes flat.
- 5a. Corolla lobes ovate or oblong, apex obtuse to rounded, often erect; corolla scales less than 1/2 as long as tube, deeply 2-cleft 1. *C. australis*
- 5b. Corolla lobes broadly triangular, apex acute or obtuse, often reflexed; corolla scales ca. as long as corolla tube, reaching throat, deeply fimbriate 2. *C. campestris*
- 1b. Style 1, or very short to absent; inflorescences racemose or spicate; stems stringy; often parasitic on shrubs.
- 6a. Style distinctly longer than stamens; stigma 2-lobed.
- 7a. Stigma lobes elongated or \pm square 4. *C. japonica*
- 7b. Stigma oval, slightly lobed, lobes ovate 5. *C. lupuliformis*
- 6b. Style very short or obsolete; stigma capitate or ligulate.
- 8a. Corolla scales nearly reaching throat 9. *C. macrolepis*
- 8b. Corolla scales reaching middle of tube.
- 9a. Stigma capitate, shallowly cleft 6. *C. monogyna*
- 9b. Stigma ligulate.
- 10a. Corolla tube more than $2 \times$ as long as calyx 7. *C. reflexa*
- 10b. Corolla tube to $2 \times$ as long as calyx 8. *C. gigantea*

1. *Cuscuta australis* R. Brown, Prodr. 491. 1810.

南方菟丝子 nan fang tu si zi

Cuscuta hygrophilae Pearson; *C. kawakamii* Hayata; *C. millettii* Hooker & Arnott; *C. obtusiflora* Kunth var. *australis* Engelm.

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long. Stamens inserted at sinus, shorter than lobes; scales shorter than tube, deeply 2-cleft, fimbriate. Ovary depressed globose. Styles 2, equal or unequal in length; stigmas globose. Capsule enclosed by persistent corolla, depressed-globose, 3–4 mm in diam., irregularly opening, not circumscissile. Seeds 4, brownish, ovoid, ca. 1.5 mm, scabrous.

Often on herbaceous or shrubby plants such as Fabaceae, Asteraceae (*Artemisia*), Verbenaceae (*Vitex*); 100–2000 m. Widespread in China: Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Asia, Australia, Europe].

The whole plant and the seeds have a number of medicinal uses.

According to Kamelin (in litt.), the specimens identified as *Cuscuta australis* require further study. Possibly two or three species are combined in this description, one of them, probably *C. cesatiana* Berthol, which perhaps represents the material from Xinjiang.

2. *Cuscuta campestris* Yuncker, Mem. Torrey Bot. Club 18: 138. 1932.

原野菟丝子 yuan ye tu si zi

Stems golden, thin, ca. 1 mm in diam. Inflorescences lateral, compact cymose glomerules, few to many flowered, subsessile; bracts scaly. Pedicel 1–2.5 mm. Calyx cupular, ca. as long as corolla tube; sepals 3–5, oblong or circular, often unequal, 0.8–1.8 mm, apex rotund. Corolla white or creamy white, cupular, ca. 2 mm; lobes persistent, erect, ovate or ob-

Cuscuta arvensis Beyrich ex Engelm.; *C. arvensis* var. *calycina* Engelm.; *C. pentagona* Engelm. var. *calycina* Engelm.; *C. pentagona* var. *subulata* Yuncker.

Stems yellowish green to yellow or orange, 0.5–0.8 mm in diam., smooth. Inflorescences lateral, usually compact globular clusters, 4–18-flowered, subsessile. Pedicel ca. 1 mm. Calyx cupular, enclosing corolla tube, ca. 1.5 mm; sepals 5, oval or circular, sometimes wider than long. Corolla white, short campanulate, ca. 2.5 mm, 4- or 5-lobed; lobes broadly triangular, apex acute or obtuse, often reflexed. Stamens shorter to longer than corolla lobes; anthers ovate, shorter than filaments; scales distinct, ovate, ca. as long as corolla tube, fimbriate. Ovary globose. Styles 2; stigma globose. Capsule depressed globose, ca. 3 mm in diam., ca. 2 mm high, with withered corolla at base, irregularly opening. Seeds 1–4, often 3 or 4, dull yellow, ovoid. $2n = 56$.

On *Allium fistulosum* Linnaeus. Fujian (Fuzhou Shi), Xinjiang [Africa, Asia, Australia, Europe, North America, Pacific Islands, South America].

3. *Cuscuta chinensis* Lamarck, Encycl. 2: 229. 1786.

菟丝子 tu si zi

Stems yellow, thin, ca. 1 mm in diam. Inflorescences

lateral, compact cymose glomerules, few to many flowered, subsessile; bracts and bracteoles scalelike. Pedicel ca. 1 mm. Calyx cupular; sepals triangular, ca. 1.5 mm, apex obtuse, partly thickened. Corolla white, urceolate, ca. 3 mm; lobes persistent triangular-ovate, apex acute or obtuse, reflexed. Stamens inserted at throat; scales oblong, reaching stamens, long fimbriate. Ovary subglobose. Styles 2, equal or unequal in length; stigma globose. Capsule enclosed by withered corolla, globose, ca. 3 mm in diam., circumscissile. Seeds 2–4, pale brown, ovoid, ca. 1 mm, scabrous. $2n = 28, 56$.

Fields, open mountain slopes, thickets, sandy beaches, often on plants of Fabaceae, Asteraceae, and Zygophyllaceae; 200–3000 m. Widespread in China [Afghanistan, Indonesia, Japan, Kazakhstan, Korea, Mongolia, Russia, Sri Lanka; Africa, SW Asia, Australia].

4. *Cuscuta japonica* Choisy, Zoll. Syst. Verz. Ind. Archip. Pflanz. 2: 130, 134. 1854.

金灯藤 jin deng teng

Stems yellow or often with purplish spots, slightly stout, 1–2 mm in diam., many branched. Inflorescences spicate, ca. 3 cm; bracts and bracteoles scalelike, broadly ovate, ca. 2 mm. Flowers subsessile. Calyx cupular, ca. 2 mm, deeply divided; sepals ovate to circular, equal or unequal, purplish tuberculate abaxially, apex acute. Corolla pink or greenish white, campanulate to tubular, 3–7 mm, shallowly 5-lobed; lobes erect or reflexed, ovate-triangular, much shorter than tube, apex obtuse. Stamens inserted at throat; anthers yellow, ovate-circular; filaments very short or absent; scales oblong, fimbriate, reaching middle of tube. Ovary globose, smooth. Style 1, longer than or as long as ovary; stigma elongated. Capsule ovoid, ca. 5 mm, circumscissile near base. Seeds 1–3, brown, 2–2.5 mm, smooth. Fl. Aug, fr. Sep.

On herbs and shrubs. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Japan, Korea, Russia, Vietnam].

The seeds are used medicinally.

According to Kamelin (in litt.), Chinese material identified as *Cuscuta japonica* requires further study. Possibly two species are combined in this description; one of them may be *C. engelmannii* Krock, which perhaps represents the material from Xinjiang.

Although *Cuscuta japonica* var. *fissistyla* Engelmann (= *C. upcraftii* Pearson) was recognized by Fang & Huang (1979), no material of this taxon was examined by the authors, and the variety is here excluded.

- 1a. Corolla 3–5 mm; lobes of stigma tongue-shaped 4a. var. *japonica*
1b. Corolla 4–7 mm; lobes of stigma ± square 4b. var. *formosana*

4a. *Cuscuta japonica* var. *japonica*

金灯藤 (原变种) jin deng teng (yuan bian zhong)

Cuscuta colorans Maximowicz; *C. japonica* var. *pani-*

culata Engelmann; *C. japonica* var. *thyrsoides* Engelmann; *C. reflexa* Roxburgh var. *densiflora* Benth.

Corolla 3–5 mm. Stigma lobes tongue-shaped.

On herbs and shrubs. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Japan, Korea, Russia, Vietnam].

4b. *Cuscuta japonica* var. *formosana* (Hayata) Yuncker, Mem. Torrey Bot. Club 18: 253. 1932.

台湾菟丝子 tai wan tu si zi

Cuscuta formosana Hayata, Icon. Pl. Formosan. 2: 124. 1912.

Corolla 4–7 mm. Stigma lobes quadrangular.

- Low elevations. Taiwan.

5. *Cuscuta lupuliformis* Krock, Fl. Siles. 1: 261, t. 36. 1787.

啤酒花菟丝子 pi jiu hua tu si zi

Cuscuta flava Sievers ex Ledebour.

Stems rust colored to reddish, stout, ca. 3 mm in diam., tuberculate. Inflorescences racemose-spicate; bracts oval or ovate. Flowers 3–5 mm, sessile or short pedicellate. Calyx greenish, brown in dry specimens, cupular; sepals ovate to broadly ovate, apex obtuse. Corolla pink to whitish, tubular, longer than calyx; lobes erect or ± reflexed, oblong-ovate, shorter than tube, minutely dentate. Stamens inserted just below throat, tips reaching sinus; filaments very short or absent; anthers oblong-ovate; scales at lower parts of tube, not reaching middle of tube, oval or ovate, entire or 2-cleft, short fimbriate, sometimes degenerate. Ovary subglobose or broadly ovoid. Style 1; stigma oval, 2-cleft. Capsule capped by withered corolla, ovoid or conical, 7–9 mm, circumscissile near base. Seeds pale to dark brown, ovoid, 2–3 mm; hilum linear. Fl. Jul, fr. Aug. $2n = 28$.

On trees, shrubs, perennial herbs. Gansu, Hebei, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Xinjiang [Mongolia; Asia, Europe].

6. *Cuscuta monogyna* Vahl, Symb. Bot. 2: 32. 1791.

单柱菟丝子 dan zhu tu si zi

Cuscuta astyla Engelmann.

Stems pinkish, deep purple tuberculate, stout, 1–2 mm in diam. Inflorescences loosely or densely spicate-paniculate; bracts ovate-circular or ovate-triangular, 1–2 mm, fleshy, apex acute. Flowers subsessile or pedicellate. Calyx cupular; sepals ovate-circular, equal, apex acute. Corolla rose to white, or purple late in anthesis, urceolate to tubular, or campanulate, 3–3.5 mm; lobes 5, ovate-circular, 1/2 length of tube, margin entire or minutely dentate, apex obtuse. Stamens inserted at throat; filaments ca. as long as anthers; anthers oval or oval-cordate; scales oblong, reaching middle of tube, ± 2-cleft, fimbriate. Ovary subglobose. Style 1, ca. 0.5 mm; stigma capitate, ca. as long as style, shallowly cleft. Capsule

ovoid-globose, ca. 4 mm, circumscissile. Seeds 1 or 2, dark brown, subcordate, 3–3.5 mm, smooth. $2n = 28$.

On trees, shrubs, perennial herbs. Xinjiang [Mongolia, Russia; SW Asia].

7. *Cuscuta reflexa* Roxburgh, Pl. Coromandel 2: 3, t. 104. 1798.

大花菟丝子 da hua tu si zi

Stems yellow or yellowish green, stout, 2–3 mm in diam., with brown spots. Inflorescences lateral, few to many flowered, in racemes or panicles 1.5–3 cm, branched; bracts and bracteoles scalelike. Pedicel 2–4 mm, together with peduncle, brown spotted or tuberculate. Calyx cupular; sepals 5, broadly ovate, equal, 2–2.5 mm, with a few tubercles abaxially, apex rotund. Corolla white or creamy, fragrant, tubular, 5–9 mm; lobes early deciduous, often reflexed, sometimes erect, triangular-ovate, shorter than tube. Stamens inserted at throat; filaments shorter than anthers or absent; anthers elliptic-ovate; scales oblong, reaching middle of tube, short and densely fimbriate. Ovary ovate-conical. Style 1, very short or absent; stigma divergent or erect, elongated, ligulate, longer than style. Capsule conical-globose, subquadrate when mature, 5–10 mm in diam., circumscissile. Seeds 1–4, dark brown, oblong, ca. 4 mm. $2n = 28, 32, 36, 42$.

On shrubs; 900–2800 m. Hunan, Sichuan, Xizang, Yunnan [Afghanistan, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Sikkim, Sri Lanka, Thailand].

- 1a. Flowers 5–9 mm; corolla tube ca. $2 \times$ as long as lobes; stamens with very short filaments; style very short 7a. var. *reflexa*
1b. Flowers ca. 6 mm; corolla tube $1-2 \times$ as long as lobes; stamens sessile at sinuses; stigma conical, almost sessile 7b. var. *anguina*

7a. *Cuscuta reflexa* var. *reflexa*

大花菟丝子 (原变种) da hua tu si zi (yuan bian zhong)

Cuscuta macrantha G. Don; *C. reflexa* var. *grandiflora* Engelm.

Flowers 5–9 mm. Corolla tube ca. $2 \times$ as long as lobes. Stamens with very short filaments. Style very short.

On shrubs; 900–2800 m. Hunan, Sichuan, Xizang, Yunnan [Afghanistan, India, Indonesia, Malaysia, Nepal, Pakistan, Sikkim, Sri Lanka, Thailand].

7b. *Cuscuta reflexa* var. *anguina* (Edgeworth) C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 226. 1883.

短柱头菟丝子 duan zhu tou tu si zi

Cuscuta anguina Edgeworth, Trans. Linn. Soc. London 20: 87. 1851; *C. reflexa* var. *anguina* (Edgeworth) Yuncker; *C. reflexa* var. *brachystigma* Engelm.

Flowers ca. 6 mm. Corolla tube $1-2 \times$ as long as lobes. Stamens sessile at sinuses. Stigma \pm erect, conical, short, almost sessile.

Yunnan (Dali Xian) [India, Myanmar, Sikkim].

Some specimens are intermediate between this variety and *Cuscuta reflexa* var. *reflexa*.

8. *Cuscuta gigantea* Griffith, Not. Pl. Asiat. 1: 243. 1847.

高大菟丝子 gao da tu si zi

Stems thin or stout. Inflorescences racemose, compact. Flowers 5–7 mm, short pedicellate. Calyx reaching middle of corolla; sepals circular-ovate. Corolla lobes reflexed, elliptic-ovate, shorter than corolla tube. Stamens inserted below sinus, subsessile; scales ovate, reaching middle of tube, 2-cleft, fimbriate. Ovary globose. Style 1, subulate; stigma ca. as long as or shorter than style, ligulate. Capsule subquadrate, circumscissile.

On *Tamarix*; ca. 3400 m. Xizang [Afghanistan, Tajikistan].

Chinese specimens were not seen.

9. *Cuscuta macrolepis* R. C. Fang & S. H. Huang, Fl. Xizang. 4: 33. 1985.

大鳞菟丝子 da lin tu si zi

Stems green, tinged with pale purple, 1–2 mm in diam., brown spotted. Inflorescences lateral, racemose, 1–2 cm, few flowered; bracts and bracteoles scalelike, ovate-circular. Pedicel 1.5–3 mm. Calyx cupular, 1.5–2.5 mm; sepals 5, triangular-ovate, unequal, ca. as long as tube, with a few dark brown tubercles abaxially. Corolla white, tinged with pale purple, tubular, 2.5–3.5 mm; lobes reflexed, triangular, shorter than tube. Stamens inserted below sinus, less than 1 mm; filaments shorter than anthers; anthers oblong; scales reaching base of filaments, short and densely fimbriate. Ovary conical. Style 1, very short; stigma short ligulate, crispate, together with style much shorter than ovary. Fruit unknown. Fl. Aug.

• In forests; 2600–2700 m. Xizang (Cona Xian).

According to Kamelin (in litt.), the specimens identified as *Cuscuta macrolepis* require further study because the taxon is very similar to *C. ruschanica* Junuss.

10. *Cuscuta europaea* Linnaeus, Sp. Pl. 1: 124. 1753.

欧洲菟丝子 ou zhou tu si zi

Cuscuta europaea var. *indica* Engelm.; *C. major* Bauhin.

Stems yellowish or reddish, filiform. Inflorescences lateral, compact glomerules, few to many flowered. Pedicel to 1.5 mm. Calyx cupular; sepals 4 or 5, triangular-ovate, sometimes unequal, ca. 1.5 mm. Corolla pink, urceolate, 2.5–3 mm; lobes 4 or sometimes 5, persistent, often reflexed, triangular-ovate. Stamens inserted below sinus; filaments longer than anthers; anthers ovate-circular; scales very thin, obovate, 2-cleft or sometimes entire, sparingly fimbriate. Ovary subglobose. Styles 2; stigmas divergent or curved, filiform, ca. as long as or shorter than styles. Capsule capped by withered corolla, subglobose, ca. 3 mm in diam., circumscissile. Seeds often 4, pale brown, elliptic, ca. 1 mm, scabrous. $2n = 14$.

Open grassy localities, streamsides, hilly areas on Asteraceae, Fabaceae, Chenopodiaceae, and other herbaceous plants; 800–3100 m.

Gansu, Heilongjiang, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Japan, Kashmir; N Africa, W Asia, Europe, occasionally in North and South America].

11. *Cuscuta approximata* Babington, Ann. Mag. Nat. Hist. 13: 253. 1844.

杯花菟丝子 bei hua tu si zi

Cuscuta approximata var. *urceolata* (Kuntze) Yuncker; *C. planiflora* Tenore var. *approximata* (Babington) Engelman; *C. urceolata* Kuntze.

Stems filiform, less than 1 mm in diam. Inflorescences lateral, compact glomerules, few to many flowered. Flowers sessile. Calyx cupular, 2–2.5 mm; sepals overlapping, broadly rhomboid, thickened abaxially. Corolla white to pink, cam-

panulate, 2–2.5 mm; lobes triangular-ovate, shorter than tube. Stamens inserted at throat, shorter than corolla lobes; anthers ovate-circular, ca. as long as or shorter than filaments; scales oblong, not reaching base of filaments or ca. as long as corolla tube, apex obtuse or 2-cleft, fimbriate. Ovary subglobose. Style ca. as long as or shorter than filiform stigmas. Capsule enclosed by withered corolla, subglobose, circumscissile. Seeds ovoid, ca. 1 mm. $2n = 14, 28$.

Wasteland, mountain slopes, on *Medicago*, and other plants including *Artemisia*. Xinjiang [N Africa, SW Asia, S Europe].

According to Kamelin (in litt.), the specimens identified as *Cuscuta approximata* require further study. Possibly two or three species are combined in this description, one of them probably *C. cupulata* Engelman. *Cuscuta approximata* is known to be strictly parasitic on *Medicago*.