

## ASCLEPIADACEAE

萝藦科 luo mo ke

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Herbs, shrubs, or rarely treelike, with milky or, less often, clear latex. Leaves simple, opposite or occasionally whorled, very rarely alternate, usually without obvious stipules, margin nearly always entire. Inflorescences terminal, axillary, or extra-axillary, cymose, often condensed and umbel-like, occasionally a racemelike bostrychium. Flowers bisexual, 5-merous, actinomorphic. Sepals joined at base only, often with 5 or more basal glands in the sinuses. Corolla sympetalous, reflexed to urceolate or salverform; lobes valvate or overlapping in bud to right or left. Corona usually present, inserted on corolla, stamens, or both. Stamens 5, usually inserted at base of corolla tube and adhering to stigma head to form gynostegium; filaments usually connate to form a tube enclosing ovaries; anthers 4-celled (Periplocoideae and Secamonoideae) or 2-celled (Asclepiadoideae), often with a membranous apical appendage; pollen tetrads contained loosely on a spatulate translator with a basal corpusculum (Periplocoideae), or pollen united into waxy pollinia, each attached through a caudicle (stalk) to the retinaculum (gland) between adjacent anthers to form a pollinarium, pollinia 2 (Asclepiadoideae) or 4 (Secamonoideae) per pollinarium. Ovaries 2, free, superior; ovules numerous. Styles connate; stigma head fleshy. Fruit of 1 or 2 follicles. Seeds numerous, strongly compressed, with a coma (a prominent basal tuft of silky hairs). Chromosome number  $x = (8-11)$  (or 12).

Some 250 genera and over 2000 species: widespread in tropical and subtropical regions, especially in Africa and southern South America, with a moderate representation in northern and southeastern Asia; 44 genera (four endemic) and 270 species (153 endemic) in China.

Some authorities include this family in the Apocynaceae. Genera 1–6 are sometimes placed in a separate family, the Periplocaceae, here regarded as a subfamily, Periplocoideae. Genera 7–10 belong to the Secamonoideae and the remaining genera to the Asclepiadoideae. Many Chinese taxa are known only from dried material, sometimes not well preserved, and it is likely that the study of living or spirit-preserved material could lead to a reassessment of the taxonomy of some of these endemic taxa.

All plant parts, especially the seeds and latex, are often poisonous. They contain various alkaloids and glycosides, many of which are used in medicine and as insecticides. A few succulent species (e.g., *Stapelia gigantea* N. E. Brown, *Orbea pulchella* (Masson) L. C. Leach, and *O. variegata* (Linnaeus) Haworth) are grown by specialist collectors in China.

Tsiang Ying & Li Ping-tao. 1977. Asclepiadaceae. Fl. Reipubl. Popularis Sin. 63: 249–575.

- 1a. Pollen tetrads contained loosely on a spatulate translator with basal corpusculum; filaments free.
  - 2a. Corolla tube well developed; corona lobes free from stamens.
    - 3a. Flower buds conical-ovoid, apex obtuse; corona inserted at throat of corolla tube, lobes obovate, apex apiculate; pollen in 2 masses in each anther locule ..... 1. *Gymnanthera*
    - 3b. Flower buds cylindrical-lanceolate, apex caudate-lanceolate; corona inserted at middle of corolla tube, lobes ovate or linear, apex obtuse; pollen in a single mass in each anther locule ..... 2. *Cryptolepis*
  - 2b. Corolla tube very short so that stamens are inserted very close to corona.
    - 4a. Corona lobes ovate, shorter than anthers ..... 6. *Stelmocrypton*
    - 4b. Corona lobes subulate or threadlike, longer than anthers.
      - 5a. Corona lobes 3-fid, central segment threadlike, lateral segments broad, flaplike; anthers abaxially pilose ..... 5. *Periploca*
      - 5b. Corona lobes entire; anthers glabrous.
        - 6a. Follicles not winged, densely tomentose; interpetiolar line inconspicuous; inflorescences solitary at nodes, obconical, top rounded to flat; cymules racemelike ..... 3. *Streptocaulon*
        - 6b. Follicles with ca. 20 prominent papery wings, glabrous; interpetiolar line conspicuous, lobed; inflorescences normally paired at nodes, conical with well-defined main rachis, lax, top pointed; cymules forked ..... 4. *Myriopteron*
- 1b. Pollen granular, united into pollinia attached to a retinaculum through a caudicle; filaments connate into a gynostegium.
  - 7a. Pollinaria each with 4 pollinia, fixed on a very small, sessile, pale retinaculum.
    - 8a. Anthers without a membranous apical appendage.
      - 9a. Corona deeply 5-lobed, lobes erect, acuminate or acute at apex, usually longer than stamens; inflorescences, and often rest of plant, with dark brown pilose hairs ..... 7. *Toxocarpus*
      - 9b. Corona shallowly 5-lobed, lobes revolute, rounded at apex, as long as stamens; plant glabrous to pale puberulent ..... 8. *Goniostemma*
    - 8b. Anthers with a membranous apical appendage.
      - 10a. Corolla lobes villous inside; corona lobes triangular ..... 9. *Genianthus*

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- 10b. Corolla lobes glabrous inside; corona lobes falcate ..... 10. *Secamone*
- 7b. Pollinaria each with 2 pollinia, fixed on a stipitate, dark reddish retinaculum.
- 11a. Plants always growing on trees or rock surfaces, often by means of adventitious roots; inflorescences flowering over long period and eventually developing a cylindric rachis covered with close-set pedicel scars; leaves mostly fleshy, rarely leathery to membranous.
- 12a. Leaves cuneate, apex truncate to shallowly retuse; corolla lobes overlapping to left; stigma head long beaked, longer than anther appendages ..... 24. *Micholitzia*
- 12b. Leaves linear to orbicular or obovate, apex rounded to long acuminate, very rarely truncate to retuse; corolla lobes valvate; stigma head discoid, 5-angled, shorter than anther appendages.
- 13a. Corolla rotate or reflexed, conspicuous; corona lobes fleshy, stellately spreading, glossy when dried ..... 25. *Hoya*
- 13b. Corolla ovoid-urceolate, minute and inconspicuous; corona lobes not very fleshy, erect, not glossy when dried ..... 26. *Dischidia*
- 11b. Plants usually rooted in the ground; inflorescences various, rarely developing cylindric rachis covered with close-set pedicel scars; leaves membranous to leathery.
- 14a. Anthers without apical appendages or, if appendages present, inconspicuous and lacking membranous margin; pollinia with prominent translucent margin.
- 15a. Corolla tubular with a swollen base and funnellform limb, lobes erect, usually coherent at apex ..... 44. *Ceropegia*
- 15b. Corolla shortly campanulate to subrotate, lobes stellately spreading or incurved.
- 16a. Corona apparently represented by 5 denticulate scales inserted on corolla tube alternating with corolla lobes, no corona associated with gynostegium; plant always growing in close association with flowing water ..... 41. *Pentasachme*
- 16b. Corolla tube without scales or appendages, corona inserted at base of gynostegium or on anthers; plants growing in relatively dry situations.
- 17a. Erect herbs with tuberous rootstock; latex clear or translucent; corona apparently double: outer lobes erect, usually 2-toothed or lobed, inner lobes incumbent over anthers ..... 43. *Brachystelma*
- 17b. Twining, often robust, herbs; latex white; corona simple, with lobes flat on corolla, apex acute or rounded, inner lobes very short and inconspicuous ..... 42. *Heterostemma*
- 14b. Anthers with apical appendages, these with conspicuous membranous margin; pollinia without prominent translucent margin.
- 18a. Corona double: an outer whorl inserted at base of corolla and an inner whorl inserted on gynostegium or back of anthers.
- 19a. Stems slender and herbaceous when young; leaves well developed, persistent; corolla bowl-shaped, 2–3 cm in diam. .... 11. *Oxystelma*
- 19b. Stems succulent; leaves reduced to scales, short lived so plant is often leafless; corolla rotate or nearly so, deeply lobed, less than 1 cm in diam. .... 12. *Sarcostemma*
- 18b. Corona single, inserted on corolla tube, gynostegium, or back of anthers, sometimes very reduced to virtually absent.
- 20a. Erect herbs, shrubs, or small trees, always with self-supporting stems.
- 21a. Corona lobes inserted on backs of anthers; pollinia erect or horizontal ..... 39. *Tylophora*
- 21b. Corona lobes inserted at base of gynostegium; pollinia pendulous.
- 22a. Plants slender herbs, sometimes tending to twine at tip; corona membranous and cupular to cylindric, or if deeply 5-lobed, lobes always joined laterally at base, fleshy, simple except sometimes for adaxial appendage ..... 18. *Cynanchum*
- 22b. Plants robust herbs to small trees; corona of 5 free, fleshy, often elaborate lobes.
- 23a. Leaves ovate to obovate, often oblong, 7–30 × 3–15 cm, with cordate to amplexicaul base; corona lobes each with an upcurved dorsal spur at base ..... 13. *Calotropis*
- 23b. Leaves lanceolate, 5–15 × 0.5–4 cm, with cuneate to tapering base; corona lobes without spur at base.
- 24a. Flowers erect; corolla red or purple; corona bright red or yellow; follicles smooth, 1–1.5 cm thick ..... 14. *Asclepias*
- 24b. Flowers pendent; corolla whitish; corona purplish; follicles with soft spines or bristles, 2.5–5 cm thick ..... 15. *Gomphocarpus*
- 20b. Climbing or prostrate herbs.

- 25a. Corona lobes absent or reduced to separate scales at base of gynostegium, corolla tube sometimes with apparent corona.
- 26a. Sepals leaflike, ca. 26 × 8 mm; corolla tube ca. 5 cm ..... 32. *Jasminanthes*
- 26b. Sepals up to 7 mm; corolla tube up to 1 cm.
- 27a. Corolla tube with 5 longitudinal ridges sometimes produced into fleshy lobes and/or with lines of stiff hairs along each side ..... 29. *Gymnema*
- 27b. Corolla tube without fleshy lobes or lines of hairs.
- 28a. Corolla lobes shorter than tube; stigma head club-shaped, exerted beyond anther appendages ..... 17. *Adelostemma*
- 28b. Corolla lobes as long as or longer than tube; stigma head rounded or conical, not exerted beyond anther appendages.
- 29a. Corolla campanulate; corona lobes opposite anthers; pollinia erect ..... 30. *Gongronema*
- 29b. Corolla very shallowly bowl-shaped, almost rotate; corona lobes alternate with anthers; pollinia pendulous ..... 22. *Sichuania*
- 25b. Corona lobes well developed or corona forming a continuous ring around base of gynostegium.
- 30a. Apex of corolla lobes abruptly narrowed into a long tail; anthers thread-like at apex; stems with very conspicuous long reddish brown hairs; inflorescences racemelike with fleshy rachis obviously thicker than peduncle ..... 27. *Dolichopetalum*
- 30b. Apex of corolla lobes obtuse or acuminate; anthers rounded at apex; stems without conspicuous reddish brown hairs; inflorescences various but never with fleshy rachis.
- 31a. Corona inserted around base of gynostegium; pollinia nearly always pendulous (horizontal in *Tylophora*).
- 32a. Stigma head elongated or beaked, exerted well beyond anther appendages ..... 16. *Metaplexis*
- 32b. Stigma head disclike, lower than membranous anther appendages.
- 33a. Flowers 2–4 cm in diam.; fruit thick walled.
- 34a. Leaf blade pinnately veined, base rounded to cuneate, axils often with reduced stipulelike leaves ..... 23. *Graphistemma*
- 34b. Leaf blade palmately to pedately 3–5-veined, base cordate, reduced stipulelike leaves absent.
- 35a. Corolla tube campanulate; corona lobes linear-subulate, erect, longer than gynostegium; calyx glandular inside ..... 20. *Raphistemma*
- 35b. Corolla subrotate; corona forming a low, entire or undulate, fleshy ring around base of gynostegium; calyx not glandular inside ..... 21. *Holostemma*
- 33b. Flowers 0.4–1.2(–2) cm in diam.; fruit thin walled.
- 36a. Corona much shorter than anthers, ringlike or shallowly cupular, entire, undulate, or deeply 5-notched, without adaxial appendages; corolla often urceolate or campanulate; leaves linear to narrowly elliptic, adaxially often with minute, raised pale dots ..... 19. *Biondia*
- 36b. Corona well developed, deeply lobed and fleshy and/or with adaxial appendages, sometimes cupular to tubular and membranous, tube apex and throat often with 5–10 teeth, sometimes threadlike, rarely shorter than anthers and then membranous; corolla usually deeply divided, tube usually very shallow, rarely campanulate and then stems erect; leaves very variable in form, adaxially never with raised pale dots.
- 37a. Corona lobes circular to almost square, laterally contiguous to form a cup, with narrow inflexed tips; pollinia horizontal ..... 39. *Tylophora*
- 37b. Corona not as above; pollinia pendulous ..... 18. *Cynanchum*
- 31b. Corona lobes inserted on backs of anthers or gynostegium; pollinia

erect or horizontal.

- 38a. Corolla lobes strongly inflexed in bud, oblong, obviously curved to right at anthesis ..... 40. *Lygisma*
- 38b. Corolla lobes not inflexed in bud, ovate, straight.
  - 39a. Corolla salverform, urceolate, or campanulate.
    - 40a. Corona inconspicuous to virtually absent; corolla 1.4–8.5 cm, salverform, inside of tube with 5 longitudinal lines of hairs ..... 32. *Jasminanthes*
    - 40b. Corona conspicuous; corolla usually less than 1.4 cm, if more and salverform then inside of tube uniformly hairy or glabrous.
      - 41a. Corona lobes with inner appendages often longer than lobe proper and/or lobed or toothed, smooth toward base; corolla always salverform ..... 31. *Telosma*
      - 41b. Corona lobes simple at tips, often ridged or grooved toward base; corolla campanulate to urceolate, rarely almost salverform (*Marsdenia stenantha*).
        - 42a. Corona lobes with back produced into a conspicuous longitudinal wing; corolla lobes with thickenings at base ..... 34. *Dischidanthus*
        - 42b. Corona lobes with backs convex or shallowly ridged; corolla lobes without any thickening at base ..... 33. *Marsdenia*
  - 39b. Corolla rotate to shallowly bowl-shaped.
    - 43a. Corona lobes flattened on back, membranous ..... 28. *Cosmostigma*
    - 43b. Corona lobes fleshy, hooked, spurred, horned, falcate, or turgid, or processes stellately spreading or erect.
      - 44a. Outer angle of corona lobes produced into curved, stellately spreading, acute, relatively slender horn ..... 36. *Belostemma*
      - 44b. Outer angle of corona lobes rounded or 2-ribbed, if spreading then swollen and rounded.
        - 45a. Corona lobes as high as anthers and with interior angle forming an acute tooth incumbent on top of the anthers; inflorescences long pedunculate umbel-like clusters of cymules; follicles often with longitudinal or transverse ridges or wings ..... 35. *Dregea*
        - 45b. Corona lobes shorter than anthers, tip incumbent on lower part of anther or on filament; inflorescences with a conspicuously elongated, often branched rachis, rarely condensed and umbel-like and then short pedunculate; follicles always smooth.
          - 46a. Corona lobes each with a pair of longitudinal wings on back ..... 38. *Pentastelma*
          - 46b. Corona lobes ovoid, rounded on back.
            - 47a. Inflorescence rachis fleshy, bracts ovate, ca. 1 mm; corolla lobes ca. 4 mm wide; follicles with a thick, fibrous mesocarp ..... 37. *Merrillanthus*
            - 47b. Inflorescence rachis slender, bracts linear-lanceolate, 1.5–2 mm; corolla lobes 1–3 mm wide; follicles with a thin mesocarp ..... 39. *Tylophora*

**1. GYMNANTHERA R. Brown, Prodr. 464. 1810.**

海岛藤属 hai dao teng shu

Shrubs or lianas. Cymes apparently axillary, extra-axillary, or terminal, often shorter than leaves. Flowers subsessile. Calyx with 5 to many basal glands. Corolla salverform, tube long cylindrical; lobes overlapping to right. Corona lobes inserted at throat of corolla tube, adnate to filaments, ovate. Stamens inserted in throat; filaments short, bases broad, connate, upper part narrow, free; anthers adnate to stigma head, apex acuminate, exerted; pollen tetrads in loose masses, 2 in each anther cell and fixed on 1 common retinaculum. Stigma head short conical. Follicles paired, divaricate, linear-lanceolate in outline. Seeds elliptic.

Two species: S and SE Asia, Australia; one species in China.

**1. *Gymnanthera oblonga*** (N. L. Burman) P. S. Green, Kew Bull. 47: 333. 1992.

海岛藤 hai dao teng

*Jasminum oblongum* N. L. Burman, Fl. Indica 6, t. 3, fig. 2. 1768; *Dicerolepis paludosa* Blume; *Gymnanthera nitida* R. Brown; *G. paludosa* (Blume) K. Schumann; *Parechites bowringii* Hance; *Trachelospermum bowringii* (Hance) Hemsley.

Lianas to 2 m. Branchlets tawny-brown, lenticellate, slightly pubescent. Petiole 5–10 mm; leaf blade oblong or elliptic, 3–5.5 × 1.5–2.5 cm, papery, glabrous, base rounded or broadly cuneate, apex rounded, apiculate. Cymes apparently axillary, subsessile, congested, ca. 2 cm wide, to 7-flowered, glabrous. Pedicel 5–10 mm. Sepals ovate, ca. 2 × 1 mm, basal glands 5–10. Corolla yellow-green; tube 6–9 mm; lobes ovate, ca. 7 × 5 mm, obtuse. Corona lobes ovate, apex apiculate. Pollen carriers short cylindrical, erect. Ovaries glabrous. Follicles dark brown, 8–12 cm × 5–6 mm. Seeds tawny-brown, oblong, ca. 7 × 2 mm; coma ca. 2 cm. Fl. Jun-Sep, fr. Sep-Jan.

Mangroves. S Guangdong, Hainan [Cambodia, Indonesia, Malaysia, New Guinea, Philippines, Thailand, Vietnam; Australia].

**2. CRYPTOLEPIS** R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 69. 1810.

白叶藤属 bai ye teng shu

Shrubs or woody lianas. Leaves abaxially glaucous. Cymes terminal, apparently axillary or extra-axillary, pedunculate. Calyx with 5 to 10 basal glands. Flower buds cylindrical, apex caudate-acuminate. Corolla salverform; tube short cylindrical or campanulate; lobes overlapping to right. Corona lobes inserted near middle of corolla tube, linear or ovate, free from filaments. Filaments broad below, narrow above; anthers connate, adnate to stigma head; pollen tetrads in masses, solitary in each anther cell, pollen carriers spatulate, erect. Stigma head broadly conical. Follicles paired, widely divaricate, narrowly lanceolate in outline.

About 12 species: SE Asia, tropical Africa; two species in China.

- 1a. Leaf blade 1.5–8 × 0.8–2.5 cm, lateral veins 5–9 pairs; cymes terminal or extra-axillary, longer than leaves; follicles to 12.5 × 0.6–0.8 cm ..... 1. *C. sinensis*
- 1b. Leaf blade 10–18 × 4.5–7.5 cm, lateral veins ca. 30 pairs; cymes axillary, shorter than leaves; follicles 6.5–8 × 1–2 cm ..... 2. *C. buchananii*

**1. *Cryptolepis sinensis*** (Loureiro) Merrill, Philipp. J. Sci. 15: 254. 1920.

*caulon chinense* (Sprengel) G. Don; *Vallis sinensis* (Loureiro) G. Don.

白叶藤 bai ye teng

*Pergularia sinensis* Loureiro, Fl. Cochinch. 1: 167. 1790; *Aganosma edithae* Hance; *Cryptolepis edithae* (Hance) Benthams & J. D. Hooker ex Maximowicz; *C. elegans* Wallich ex G. Don; *Emericia sinensis* (Loureiro) Schultes; *Periploca chinensis* Sprengel; *P. sinensis* (Loureiro) Steudel; *Strepto-*

Lianas to 3 m; glabrous throughout. Branchlets red-brown, exfoliating. Petiole 5–7 mm; leaf blade oblong to lanceolate, 1.5–6 × 0.8–2.5 cm, base rounded to shallowly cordate, apex rounded, apiculate; lateral veins 5–9 pairs. Cymes terminal or axillary, lax, longer than leaves. Pedicel 1–3.5 cm. Sepals ovate, ca. 1 mm; basal glands 10. Corolla yellowish; tube ca. 5 mm; lobes oblong lanceolate or linear, 1–1.5 cm. Corona lobes

club-shaped. Anthers glabrous. Follicles cylindric, to 12.5 cm × 6–8 mm. Seeds brown, oblong, ca. 1 cm × 2 mm; coma ca. 2.5 cm. Fl. Apr-Sep, fr. Jun-Dec.

Thickets, forest edges; 100–800 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Malaysia, Vietnam].

The stems and leaves are used externally for the treatment of snake bites, traumatic injury, and scabies. A fine, strong bast fiber, obtained from the inner bark, is used for making ropes.

## 2. *Cryptolepis buchananii* Schultes in Roemer & Schultes, Syst. Veg. 4: 409. 1819.

古钩藤 gu gou teng

*Trachelospermum cavaleriei* H. Léveillé.

Lianas to 6 m, glabrous throughout. Branchlets pale gray, not exfoliating. Petiole ca. 1 cm; leaf blade oblong or elliptic, 10–18 × 4.5–7.5 cm, base broadly cuneate, apex rounded, retuse, or sometimes acute and apiculate; lateral veins ca. 30 pairs. Cymes extra-axillary, paniculate, shorter than leaves. Pedicel 2–5 mm. Sepals broadly ovate, ca. 1.5 × 1 mm; basal glands 10. Corolla greenish yellow or yellow-white; tube ca. 2 mm; lobes linear-lanceolate, ca. 7 × 1.5–2 mm. Corona lobes club-shaped. Anthers hirsute at base. Follicles cylindric, 6.5–9 × 1–2 cm, with 2 longitudinal ridges. Seeds brownish, ovate-oblong, ca. 6 × 3 mm; coma white, ca. 3.5 cm. Fl. Mar-Aug, fr. Jun-Dec.  $2n = 22$ .

Montane forests; 500–1500 m. Guangdong, Guangxi, Guizhou, Yunnan [India, Kashmir, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam].

The roots and fruits are used for the treatment of chills and edema.

## 3. STREPTOCAULON Wight & Arnott in Wight, Contr. Bot. India 64. 1834.

马莲鞍属 ma lian an shu

Shrubs or lianas. Cymes extra-axillary or terminal, lax, irregularly forked. Calyx glands 5, minute. Corolla rotate; tube short, overlapping to right. Corona lobes 5, slender, inflexed, adnate to filaments. Stamens inserted at corolla base; filaments distinct, threadlike, alternate with minute teeth; anthers connivent, adnate to stigma head, appendages membranous; pollen tetrads in solitary masses in each anther cell, pollen carriers erect; retinaculum minute, dilated at base. Stigma head convex, angular. Follicles paired, divaricate, cylindrical, ovoid, or beaked.

About five species: SE Asia, one in China.

### 1. *Streptocaulon juvenas* (Loureiro) Merrill, Trans. Amer. Philos. Soc. n.s., 24: 315. 1935.

马莲鞍 ma lian an

*Apocynum juvenas* Loureiro, Fl. Cochinch. 1: 167. 1790; *Streptocaulon griffithii* J. D. Hooker; *S. tomentosum* Wight & Arnott.

Lianas to 8 m, densely tawny pilose except for corolla. Petiole 3–7 mm; leaf blade obovate or broadly elliptic, 7–15 × 3–9.5 cm, leathery or thick papery, base rounded to cordate, apex acute or rounded and apiculate; lateral veins 14–20 pairs, subparallel. Inflorescences 4–20 cm, sometimes thyrsoid; sessile or with peduncle to 8 cm; flowers densely clustered in young inflorescences. Flower buds subglobose to ovoid, ca. 3 × 3 mm. Sepals ovate, ca. 1.3 × 1 mm, acute. Corolla

yellow-green outside, yellow-brown inside, glabrous; tube short; lobes ovate, ca. 3 × 1.5 mm. Corona lobes longer than anthers. Ovaries densely pubescent. Follicles oblong or oblong-lanceolate in outline, 7–13 cm × 5–10 mm, horizontal. Seeds oblong, 6–9 × 2–3 mm; coma 3–3.5 cm. Fl. May-Oct, fr. Aug-Dec.

Montane forests, thickets, often clinging to trees; 300–1000 m. Guangxi, Guizhou, Yunnan [Cambodia, India, ?Indonesia, Laos, Myanmar, Thailand, Vietnam].

The roots are used medicinally for the treatment of dysentery and stomachache, and the leaves are used externally for the treatment of snake poisoning and abscesses.

#### 4. MYRIOPTERON Griffith, Calcutta J. Nat. Hist. 4: 385. 1844.

翅果藤属 chi guo teng shu

Lianas. Nodes with a prominent, lobed, interpetiolar flange. Inflorescences large axillary thyrses with a distinct main axis and regularly forked branches. Calyx glands 5. Flower buds narrowly ovoid. Corolla rotate or nearly so; tube short; lobes overlapping to right. Corona lobes linear, much longer than anthers. Stamens inserted at base of corona; filaments connate at base into a ring and alternate with minute interstaminal teeth; anthers connate at tips, adnate to stigma head, with apical appendages; pollen tetrads in masses. Stigma head convex. Follicles often paired, divergent to  $\pm$  deflexed, ovoid, with  $\pm$  attenuate tip, with many, prominent, papery, longitudinal wings.

One species: China, India, Indonesia, Myanmar, Thailand, Vietnam.

**1. Myriopteron extensum** (Wight & Arnott) K. Schumann in Engler & Prantl, Nat. Pflanzenfam. 4(2): 215. 1895.

翅果藤 chi guo teng

*Streptocaulon extensum* Wight & Arnott in Wight, Contr. Bot. India 65. 1834; *Myriopteron horsfieldii* (Miquel) J. D. Hooker; *M. paniculatum* Griffith; *Streptocaulon extensum* var. *paniculatum* (Griffith) Kurz; *S. horsfieldii* Miquel.

Lianas to 10 m. Branchlets pale gray, lenticellate, glabrous. Petiole 1.5–4 cm; leaf blade ovate-elliptic to broadly ovate, 8–18(–30)  $\times$  4–11(–22) cm, membranous, glabrous to sparsely pilose, base broadly cuneate to rounded, apex acute to subcaudate-acuminate; lateral veins 7–9 pairs. Inflorescences conical, lax, many flowered, 12–26 cm, glabrous or sparsely pubescent. Pedicel threadlike, 5–10 mm. Sepals ca. 1  $\times$  0.7 mm, ovate, obtuse, delicate, glabrous or ciliate, reflexed at anthesis. Corolla ca. 3 mm in diam., glabrous; lobes lanceolate or ovate-oblong. Corona lobes 3–4 mm, glabrous. Follicles 7–7.5  $\times$  3–3.5 cm, with ca. 20 wings. Seeds 8–10  $\times$  3–4 mm; coma 2.5–3 cm. Fl. May-Aug, fr. Aug-Dec.

Thickets, open woods; 600–1600 m. Guangxi, Guizhou, Yunnan [India, Indonesia, Laos, Myanmar, Thailand, Vietnam].

The roots are used as medicine for pulmonary tuberculosis and cough.

#### 5. PERIPLOCA Linnaeus, Sp. Pl. 1: 211. 1753.

杠柳属 gang liu shu

Shrubs scandent, glabrous except for flowers. Leaves with numerous lateral veins and a well-defined intramarginal vein. Cymes terminal and extra-axillary, lax. Calyx glands 5. Corolla rotate; tube short; lobes obtuse, usually hairy inside, overlapping to right. Corona inserted at base of corolla; lobes 3-fid, central segment threadlike, inflexed; lateral segments short, broad, flaplike. Filaments short, distinct; anthers dorsally hairy, connivent, adnate to stigma head; apical appendages incurved; pollen tetrads in masses, attached to a common retinaculum. Style short; stigma head convex. Follicles paired, somewhat divergent, sometimes adhering at tips.

About 10 species: temperate Asia, southern Europe, tropical Africa; five species in China (but see also Browicz's monograph of the genus [Arboretum Kurnickie 11: 1–104. 1966], which recognized in China only two species, one with three subspecies).

- 1a. Leaves membranous; corolla lobes reflexed, purple with a prominent, elongated, raised, pale patch along center; corona lobes glabrous ..... 1. *P. sepium*
- 1b. Leaves leathery or nearly so; corolla lobes erect, uniformly purple or yellow green; corona lobes puberulent to pilose.
  - 2a. Corolla lobes 11–13 mm ..... 2. *P. tsangii*
  - 2b. Corolla lobes up to 4 mm.
    - 3a. Leaves narrowly lanceolate, 4–14 mm wide, 5.5–8.5 times as long as wide; corolla yellow-green, lobes sometimes glabrous ..... 3. *P. forrestii*
    - 3b. Leaves oblanceolate to oblong-lanceolate, (7–)9–19(–25) mm wide, 2.5–4.5 times as long as wide;

corolla purple, lobes always pubescent or pilose.

- 4a. Cymes ca. 2 cm, to 10-flowered ..... 4. *P. calophylla*  
4b. Cymes ca. 3.5 cm, to 20- (or more)-flowered ..... 5. *P. floribunda*

**1. *Periploca sepium*** Bunge, Enum. Pl. China Bor. 43. 1833 (1831).

杠柳 gang liu

Shrubs deciduous, to 4 m. Petiole to 5 mm; leaf blade ovate-oblong, 5–9 × 1.5–2.5 cm, membranous, base cuneate, apex attenuate; lateral veins 20–25 pairs. Cymes on lateral branchlets, often paired, few flowered. Pedicel ca. 2 cm. Sepals triangular-ovate, ca. 3 × 2 mm. Corolla mostly purple, ca. 1.5 cm in diam.; tube ca. 3 mm; lobes oblong-lanceolate, ca. 8 × 4 mm, strongly reflexed, abaxially glabrous, adaxially pilose near margin, with prominent, elongated, raised, pale patch along center. Corona lobes glabrous. Follicles cylindric, 7–12 cm × ca. 5 mm, pair often connected at tip. Seeds oblong, ca. 7 × 1 mm; coma ca. 3 cm. Fl. May–Jun, fr. Jun–Jul.  $2n = 22^*$ .

• Plains, forest edges, slopes. Throughout China except Guangdong, Guangxi, Hainan, and Taiwan.

The root and stem bark are used as medicine for the treatment of rheumatoid arthritis and traumatic injury.

**2. *Periploca tsangii*** D. Fang & H. Z. Ling, Guihaia 14: 122. 1994.

大花杠柳 da hua gang liu

Shrubs scandent, to 4 m, glabrous except for flowers. Petiole 1–2 mm; leaf blade narrow lanceolate, rarely linear, 2–6 × 0.3–1.2 mm, base cuneate, apex acuminate; lateral veins numerous, subparallel. Cymes axillary, rarely terminal, shorter than leaves, 1–6-flowered. Flowers ca. 2.7 cm in diam. Pedicel 4–11 mm. Sepals ovate to orbicular, ca. 1 × 0.8 mm. Corolla reddish violet, rotate, glabrous outside; tube ca. 1 mm; lobes linear-lanceolate, 1.1–1.3 cm × 1.5–2 cm, puberulent along midrib on inside. Corona lobes puberulent, 5–6 mm. Stigma head obscurely 2-lobed.

• Guangxi (Banling).

**3. *Periploca forrestii*** Schlechter, Notes Roy. Bot. Gard. Edinburgh 8: 15. 1913.

黑龙骨 hei long gu

*Periploca calophylla* (Wight) Falconer subsp. *forrestii* (Schlechter) Browicz.

Shrubs scandent, to 10 m, much branched. Petiole 1–2 mm; leaf blade lanceolate, 3.5–7.5 cm × 5–10 mm, leathery, base cuneate; lateral veins numerous, subparallel. Cymes axillary, shorter than leaves, few flowered. Flowers ca. 5 mm in diam. Sepals ovate to suborbicular. Corolla yellow-green; tube short; lobes oblong, ca. 2.5 mm, erect, not thickened at center. Corona lobes puberulent, slightly shorter than corolla tube, lateral lobes subacute. Anthers dilated at base, connective puberulent. Stigma head apex subconical. Follicles cylindric, ca. 11 cm × 5 mm. Seeds oblong, flat; coma ca. 3 cm. Fl. Mar–Apr, fr. Jul–Sep.

Thickets, sparse montane woods; below 2000 m. Guangxi, Guizhou, Qinghai, Sichuan, Xizang, Yunnan [India, Kashmir, Myanmar, Nepal].



Used in Guangxi as medicine for traumatic injury and rheumatic arthralgia.

Browicz [Arboretum Kùrnickie 11: 1–104. 1966] treated this and the two following species as subspecies of *Periploca calophylla*.

**4. *Periploca calophylla*** (Wight) Falconer, Proc. Linn. Soc. London 1: 115. 1841.

青蛇藤 qing she teng

Shrubs scandent, to 10 m. Branchlets pale gray, pendent, lenticellate. Petiole 1–2 mm; leaf blade elliptic-lanceolate to oblong-elliptic, 4.5–6 × 1.5–2.2 cm, adaxially lustrous green, abaxially paler, leathery; lateral veins numerous, subparallel. Cymes axillary, to 10-flowered, sessile or short pedunculate, shorter than leaves. Sepals ovate, ca. 1.5 × 1 mm, ciliate. Corolla purple, ca. 8 mm in diam., glabrous outside, pilose inside; tube short; lobes oblong, not thickened at center. Corona lobes pilose. Anthers ovate, dorsally barbed; retinaculum adherent to stigma head. Ovaries glabrous. Follicles cylindrical, ca. 12 cm × 5 mm, free at tip. Seeds oblong, ca. 1.5 × 0.3 cm; coma 3–4 cm.

Thickets, mixed woods along valleys; below 2100 m. Guangxi, Guizhou, Hubei, Hunan, Sichuan, Xizang, Yunnan [Bhutan, India, Kashmir, Nepal, Sikkim, Vietnam].

- 1a. Leaf blade elliptic-lanceolate to oblong-elliptic, apex acuminate ..... 4a. var. *calophylla*  
1b. Leaf blade usually oblanceolate, apex mucronate ..... 4b. var. *mucronata*

**4a. *Periploca calophylla* var. *calophylla***

青蛇藤 (原变种) qing she teng (yuan bian zhong)

*Streptocaulon calophyllum* Wight, Contr. Bot. India 65. 1834.

Leaf blade elliptic-lanceolate to oblong-elliptic, apex acuminate. Fl. Apr–May, fr. Aug–Sep.

Thickets, mixed woods along valleys; below 1000 m. Guangxi, Guizhou, Hubei, Hunan, Sichuan, Xizang, Yunnan [Bhutan, India, Kashmir, Nepal, Sikkim, Vietnam].

The stem is used as medicine for lumbago, traumatic injury, and against snake bites.

**4b. *Periploca calophylla* var. *mucronata*** P. T. Li, Acta Phytotax. Sin. 23: 467. 1985.

凸尖叶青蛇藤 tu jian ye qing she teng

Leaf blade usually oblanceolate, to 4 × 1.8 cm, apex with a prominent mucro 2.5 mm.

- Bushland; 1700–2100 m. Xizang (Medog).

**5. *Periploca floribunda*** Tsiang, Sunyatsenia 2: 180. 1934.

多花青蛇藤 duo hua qing she teng

*Periploca calophylla* (Wight) Falconer subsp. *floribunda* (Tsiang) Browicz.

Shrubs scandent, to 5 m. Young branches tawny, longitudinally striate, terete, glabrous. Petiole ca. 3 mm; leaf blade oblong-lanceolate to oblong-elliptic, 4.7–5.5 × 1–1.6 cm, somewhat leathery; lateral veins subparallel, numerous. Cymes extra-axillary, trichotomous, 3–5 cm, to 20- (or more) -flowered. Sepals ovate, ca. 1.5 × 1 mm. Corolla purple; tube ca. 1.5 mm; lobes oblong, ca. 4 × 2 mm, glabrous outside, tomentose inside. Corona lobes densely pilose, outer teeth scalelike, very small. Filaments free, villous on back of connective; stigma head conical. Fl. Sep.

Montane forests; 1800 m. Yunnan [Vietnam].

## 6. STELMOCRYPTON Baillon, Bull. Mens. Soc. Linn. Paris 2: 812. 1889.

须药藤属 *xu yao teng shu*

Lianas. Cymes extra-axillary, short pedunculate. Sepals stout; basal glands 5. Corolla  $\pm$  campanulate; tube short; lobes overlapping to right. Corona lobes 5, short, ovate, inserted at base of corolla. Stamens inserted at base of corolla; filaments free, broad at base; anthers oblong-ovate, pilose on back, long pilose at apex, exerted; pollen carriers spatulate, pollen tetrads in masses, translator oblong, retinaculum ovoid. Styles short; stigma head slightly projected. Follicles divaricate.

One species: India and China.

**1. *Stelmocrypton khasianum*** (Kurz) Baillon, Hist. Pl. 10: 300. 1890.

须药藤 *xu yao teng*

*Pentanura khasiana* Kurz, Forest Fl. Burma 2: 196. 1877.

Lianas to 10 m. Branchlets lenticellate, pubescent when young. Petiole ca. 5 mm; leaf blade reddish, oblong-elliptic to elliptic-ovate, 7–17  $\times$  2.5–8 cm, somewhat leathery, glabrous, base cuneate, apex acute or short acuminate; lateral veins ca. 7 pairs, tertiary veins finely reticulate. Inflorescences shorter than leaves, 4- or 5-flowered; peduncle ca. 5 mm. Pedicel ca. 2 mm. Sepals broadly ovate, glabrous. Corolla yellow-green, ca. 6 mm wide, pubescent; lobes ovate. Corona lobes ovate. Follicles oblong-elliptic, 5–9  $\times$  ca. 2 cm, glabrous. Seeds ovate; coma ca. 3 cm. Fl. May-Sep, fr. Oct-Dec.

Bushland, forests. Guangxi, Guizhou, Yunnan [India, Myan-mar].

All parts are used medicinally for bronchitis, cough, and epidemic influenza. The roots yield an aromatic oil.

The basionym is sometimes given as *Periploca khasiana* Ben-tham, but this name was never validated.

## 7. TOXOCARPUS Wight & Arnott in Wight, Contr. Bot. India 61. 1834.

弓果藤属 *gong guo teng shu*

*Schistocodon* Schauer.

Shrubs or woody lianas, villous or rusty tomentose, rarely glabrous. Cymes axillary, umbel-like. Sepals small, sometimes with minute basal glands. Corolla usually yellow or yellowish, rotate or rarely campanulate; tube very short; lobes patent-reflexed, overlapping to left, rarely to right. Corona lobes 5, inserted at back of gynostegium, dorsally compressed, slightly exceeding stamens. Anthers small, retuse, sometimes with minute apical appendages appressed to stigma head; pollinia 4 on each pollinarium, erect or horizontal. Styles short; stigma head exerted beyond anthers, beaked or swollen. Follicles divaricate, terete, usually villous. Seeds flat, beaked; coma white.

About 40 species: tropical Asia, Africa, and Pacific Islands; ten species in China.

The separation of *Toxocarpus* from *Secamone* seems to be somewhat arbitrary, and some authorities favor combining them. *Goniostemma* and *Gonianthus* are also closely related and also sometimes included (see Forster & Harold, *Austrobaileya* 3: 69–78. 1989).

- 1a. Corolla lobes ovate, ca. 2.5 mm; stigma head capitate ..... 10. *T. aurantiacus*
- 1b. Corolla lobes oblong or oblong-lanceolate, 5–10 mm; stigma head long beaked or fusiform.
  - 2a. Leaves reddish brown villous to tomentose, at least abaxially when young.
    - 3a. Leaf blade broadly ovate to ovate-elliptic; corolla glabrous ..... 7. *T. fuscus*
    - 3b. Leaf blade elliptic or elliptic-oblong; corolla tube villous inside.
      - 4a. Leaf blade elliptic, glabrescent, lateral veins 3–5 pairs ..... 8. *T. himalensis*
      - 4b. Leaf blade elliptic-oblong, densely rusty villous abaxially, lateral veins 6–8 pairs ..... 9. *T. villosus*

- 2b. Leaves glabrous or puberulent.
- 5a. Stigma head long beaked.
- 6a. Inflorescences 7–10 cm; petiole 1.5–2 cm ..... 6. *T. patens*
- 6b. Inflorescences 2–3 cm; petiole 0.8–1.2 cm.
- 7a. Leaf blade 4–5.5 × 1–2.2 cm, lateral veins 3 or 4 pairs ..... 4. *T. paucinervius*
- 7b. Leaf blade 11–15 × 5–7 cm, lateral veins 5–8 pairs ..... 5. *T. wangianus*
- 5b. Stigma head fusiform or top-shaped.
- 8a. Leaves drying brownish; stigma head hirsute; inflorescences longer than leaves, 8–10 cm ..... 3. *T. laevigatus*
- 8b. Leaves drying green; stigma head glabrous; inflorescences shorter than leaves, less than 6 cm.
- 9a. Leaf blade 6.5–8.5 × 3.5–5.2 cm; inflorescences 2–4 cm; flowers brown or deep yellow ... 2. *T. hainanensis*
- 9b. Leaf blade 3.5–6 × 1.5–4.5 cm; inflorescences up to 2 cm; flowers pale yellow ..... 1. *T. wightianus*

**1. *Toxocarpus wightianus*** Hooker & Arnott, Bot. Beechey Voy. 200. 1837.

弓果藤 gong guo teng

*Schistocodon meyenii* Schauer; *Secamone wightiana* (Hooker & Arnott) K. Schumann; *Toxocarpus ovalifolius* Tsiang.

Lianas slender, to 8 m. Branchlets tawny brown puberulent, lenticellate. Petiole 1–1.5 cm, rusty tomentose; leaf blade elliptic or elliptic-oblong to ovate-orbicular, 2.5–6 × 1.5–4.5 cm, subleathery, glabrous, base rounded to subcordate, apex acute to rounded or subemarginate, apiculate to cuspidate; lateral veins 5–8 pairs. Cymes umbel-like, to 10-flowered, much shorter than leaves; peduncle to ca. 6 mm, rusty pubescent. Pedicel ca. 3 mm, minutely villous. Sepals ovate-oblong, membranous, rusty tomentose. Corolla yellow-ish, rotate, glabrous; tube ca. 2 × 3 mm; lobes narrowly lanceolate, ca. 8 × 1–2 mm. Corona lobes triangular, ca. 2 mm, obtuse. Pollinia minute. Stigma head fusiform. Follicles narrowly lanceolate in outline, 8–9 × ca. 1 cm, divaricate at 180–200°, densely rusty tomentose, pericarp thick. Seeds ovate-oblong, ca. 10 × 3–5 mm, not beaked; coma ca. 3 cm. Fl. Jun-Aug, fr. Oct-Dec.

Open forests, bushland; 100–600 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [India, Vietnam].

All parts are used externally for the treatment of traumatic injury and boils.

**2. *Toxocarpus hainanensis*** Tsiang, Sunyatsenia 4: 69. 1939.

海南弓果藤 hai nan gong guo teng

Lianas to 6 m. Branchlets tawny brown, lenticellate. Petiole 1–3 cm, rusty pubescent; leaf blade elliptic, 6.5–8.5 × 3.4–5.2 cm, subleathery, adaxially glabrous, abaxially rusty puberulent, soon glabrescent, base cuneate, apex acuminate; lateral veins 5–7 pairs. Cymes shorter than leaves, 3–9-flowered, fragrant, rusty tomentose; peduncle 2–4 cm. Pedicel 3–5 mm. Calyx glands 5. Corolla yellow or brown; tube ca. 4 × 3 mm; lobes lanceolate, ca. 6 × 2 mm. Corona lobes 5, reddish, apex 2-cleft, with a short adaxial appendage. Anther appendages orbicular, pollinia elliptic. Stigma head fusiform, tapering to a slender point, twice as long as anthers. Fl. Apr-Jul.

- Humid open woods along valleys; 100–600 m. Hainan.

**3. *Toxocarpus laevigatus*** Tsiang, Sunyatsenia 4: 70. 1939.

平滑弓果藤 ping hua gong guo teng

Lianas to 5 m. Branchlets glabrous, lenticellate. Petiole 1–1.5 cm, puberulent; leaf blade elliptic or oblong, 8–12.5 × 1.5–5.2 cm, base obliquely auriculate, apex short acuminate, glabrous, drying brownish; lateral veins 5–8 pairs. Cymes 8–10 × 5–15 cm, many flowered; peduncle yellow pubescent. Pedicel ca. 2 mm. Sepals puberulent, glands absent. Corolla

yellowish white, ca. 5 mm, tube ca. 1/4 as long; lobes oblong. Corona lobes ovate-elliptic, apex retuse, with a short adaxial appendage. Anther appendages apiculate. Stigma head top-shaped, hirsute, twice as long as anthers. Fl. May.

- Dense woods. Hainan.

**4. *Toxocarpus paucinervius*** Tsiang, Sunyatsenia 6: 129. 1941.

凌云弓果藤 ling yun gong guo teng

Lianas to 5 m. Branchlets tawny brown, densely pubescent at nodes. Petiole 0.8–1.2 cm; leaf blade obovate to oblanceolate, 4–5.5 × 1–2.2 cm, glabrescent or abaxially puberulent, base cuneate-auriculate, apex apiculate; lateral veins 3 (or 4) pairs, at ± 90° to midvein. Cymes shorter than leaves, rusty tomentose. Flower buds acuminate. Pedicel 2–3 mm. Sepals lanceolate, 2.5–3 × ca. 1 mm. Corolla puberulent outside; tube ca. 3 mm; lobes oblong, ca. 6 × 3 mm. Corona lobes ovate, apex acute. Anther appendages acute. Stigma head long beaked. Follicles linear-lanceolate in outline, ca. 9 cm × 5 mm, rusty tomentose to glabrous. Seeds ovate-oblong, ca. 10 × 5 mm, apex short beaked; coma ca. 2 cm. Fl. Apr–Jun, fr. Aug–Nov.

- Forests; 800 m. Guangxi, Yunnan.

**5. *Toxocarpus wangianus*** Tsiang, Sunyatsenia 4: 100. 1939.

澜沧弓果藤 lan cang gong guo teng

Lianas to 6 m. Branchlets glabrescent. Petiole ca. 1 cm; leaf blade ovate-oblong to subelliptic, 11–15 × 5–7 cm, papery, adaxially glabrous, abaxially rusty puberulent, base rounded and obscurely auriculate, apex acuminate; lateral veins 7 or 8 pairs. Cymes 2–3 cm, rusty tomentose. Sepals ovate-lanceolate, ca. 2 mm. Corolla ca. 1 cm, glabrous; lobes oblong, ca. 5 mm. Corona lobes flat. Anthers longer than corona, appendages ligulate. Stigma head long beaked. Follicles linear-lanceolate, ca. 12 cm × 5 mm, rusty pubescent. Fl. May, fr. Aug.

- Forests along valleys; 1500 m. Guizhou, Yunnan.

**6. *Toxocarpus patens*** Tsiang, Sunyatsenia 6: 128. 1941.

广花弓果藤 guang hua gong guo teng

Lianas to 5 m, glabrescent except for flowers. Branchlets slightly lenticellate. Petiole 1.5–2 cm; leaf blade elliptic, 9–10 × 4–4.5 cm, papery, drying brownish, both ends acute; lateral veins 5 or 6 pairs, arcuate ascending. Cymes dichotomous, lax, slightly shorter than leaves, rusty tomentose to glabrous. Sepals ovate, ca. 2 × 1 mm. Corolla membranous, glabrous outside; tube ca. 4 × 3 mm, villous inside; lobes ligulate-falcate, ca. 5 × 1 mm. Corona lobes ovate, shorter than anthers, apex acuminate. Pollinia obovate. Stigma head long beaked. Fl. May.

- Mixed woods. Hainan.

Klackenberg (in litt.) suggests that *Toxocarpus patens* may not be separable from *T. hainanensis*.

**7. *Toxocarpus fuscus*** Tsiang, Sunyatsenia 4: 81. 1939.

锈毛弓果藤 xiu mao gong guo teng

Lianas to 5 m. Young branchlets rusty pubescent, glabrescent and lenticellate with age. Petiole ca. 2.5 cm, rusty tomentose; leaf blade broadly ovate-oblong, 9–15 × 5–5.8 cm, papery, adaxially glabrous except for rusty hairs along midvein, abaxially rusty pubescent, base rounded, apex acute or short acuminate; lateral veins 5–7 pairs. Cymes to 8.5 cm, shorter than leaves, few branched, 12–20-flowered, rusty pubescent; peduncle less than 1 cm. Flower buds long acuminate. Pedicel ca. 5 mm. Sepals lanceolate, ca. 3 mm. Corolla yellow, ca. 9 mm, glabrous; lobes oblong-lanceolate. Corona lobes ovate, longer than anthers, apex acute. Stigma head long beaked. Fl. May.

- Open montane woods. Guangdong, Guangxi, Yunnan.

**8. *Toxocarpus himalensis*** Falconer ex J. D. Hooker, Fl. Brit. India 4: 13. 1883.

西藏弓果藤 xi zang gong guo teng

Lianas to 6 m. Branchlets tawny brown, lenticellate, puberulent. Petiole ca. 1 cm; leaf blade elliptic-oblong, 5.5–9(–14) × 3–5(–8.5) cm, ± leathery, adaxially glabrous, abaxially glabrescent, base acute, apex acute or apiculate; lateral veins ca. 8 pairs. Cymes rusty pubescent. Corolla ca. 8 mm in diam.; lobes membranous, oblong, adaxially villous at base. Corona lobes slightly shorter than anther tips. Stigma head slender. Follicles oblong-lanceolate, 10–15 × 1.2–1.8 cm, rusty pubescent when young. Seeds ovate, ca. 1.8 mm, beaked; coma ca. 2 cm. Fl. May–Jun, fr. Aug–Dec.

Montane forests, bushland along valleys; 500–1000 m. Guangxi, Guizhou, Yunnan [India].

**9. *Toxocarpus villosus*** (Blume) Decaisne in A. de Candolle, Prodr. 8: 506. 1844.

毛弓果藤 mao gong guo teng

Lianas to 10 m, rusty villous especially on young parts. Petiole 1–1.5 cm; leaf blade orbicular to elliptic-oblong, 4.5–12 × 2–7 cm, leathery, adaxially deeply lustrous green and glabrous except for midvein groove, abaxially densely rusty villous, apex acute or apiculate; lateral veins 6–8 pairs. Cymes irregularly dichotomous, rusty villous; peduncle 3–10 cm. Pedicel ca. 2 mm. Sepals oblong-lanceolate, ca. 3 mm. Corolla yellowish, subrotate; tube short; lobes oblong-lanceolate, 8–10 × ca. 2 mm, villous at base. Corona lobes with subulate tips overtopping anthers. Stigma head beaked, longer than anthers. Follicles subcylindric, often solitary, divergent when paired, 8–18 cm × 5–10 mm. Seeds ca. 10 × 2 mm; coma to 2 cm. Fl. Apr–May, fr. Jun–Dec.

Dense montane forests, open woods; 500–1500 m. Fujian, Guangxi, Guizhou, Hubei, Sichuan, Yunnan [Cambodia, Indonesia, Laos, Vietnam].

1a. Stigma head included in corolla tube

- ..... 9c. var. *brevistylis*  
 1b. Stigma head exerted from corolla tube.  
 2a. Stigma head puberulent ..... 9a. var. *villosus*  
 2b. Stigma head glabrous ..... 9b. var. *thorelii*

**9a. *Toxocarpus villosus* var. *villosus***

毛弓果藤(原变种) mao gong guo teng (yuan bian zhong)

*Secamone villosa* Blume, Bijdr. 1050. 1826.

Stigma head exerted from corona tube, puberulent. Fl. Apr, fr. Jun-Aug.

Open woods. Fujian, Guangxi, Hubei, Sichuan, Yunnan [Indo-nesia, Vietnam].

**9b. *Toxocarpus villosus* var. *thorelii*** Costantin in Lecomte, Fl. Indo-Chine 4: 52. 1912.

小叶弓果藤 xiao ye gong guo teng

Leaf blade ovate, 4.5–5.5 × 2.8–3.2 cm, apex apiculate. Stigma head exerted from corolla tube, glabrous. Fl. May, fr. Jul-Dec.

Dense montane forests. Guangxi, Yunnan [Cambodia, Laos, Vietnam].

**9c. *Toxocarpus villosus* var. *brevistylis*** Costantin in Lecomte, Fl. Indo-Chine 4: 52. 1912.

短柱弓果藤 duan zhu gong guo teng

Leaf blade ovate, 4.5–7 × 3.2–5.6 cm. Stigma head very short, included in corolla tube. Fl. May.

Montane forests. Fujian [Cambodia, Laos, Vietnam].

**10. *Toxocarpus aurantiacus*** C. Y. Wu ex Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 81. 1974.

云南弓果藤 yun nan gong guo teng

Lianas to 5 m. Young branchlets rusty tomentose, glabrescent. Petiole 1–1.5 cm, rusty tomentose; leaf blade ovate to subelliptic, 4.5–8 × 2.5–4 cm, base ± rounded, apex short acuminate, glabrous or puberulent when young; lateral veins 8–10 pairs, obliquely ascending. Cymes lax, many flowered, divaricate branched, 4–7 × 4–8 cm, rusty tomentose except for corolla. Sepals ovate, ca. 1.5 × 1 mm, basal glands 5. Corolla orange; lobes ovate, ca. 2.5 × 2 mm, glabrous outside, minutely pubescent inside. Corona lobes flat at back, apex short acuminate. Anthers without apical appendages; pollinia obovate, translator arms absent. Ovaries glabrous. Styles swollen; stigma head capitate. Fl. Mar.

- Dense woods; 1500 m. S Yunnan.

The small flowers and capitate stigma head are not typical for *Toxocarpus*.

**8. GONIOSTEMMA** Wight & Arnott in Wight, Contr. Bot. India 62. 1834.

勐腊藤属 meng la teng shu

Lianas. Inflorescences thyrses, axillary or extra-axillary, longer than leaves, many flowered. Calyx glands 5, 2-toothed. Corolla rotate; tube short, sometimes with 5 scales alternate with corolla lobes; lobes overlapping to left. Corona campanulate, inserted on back of gynostegium, apex 5-cleft; lobes revolute, as long as stamens. Filaments connate into a short tube; anthers without apical appendages; pollinia 4 per pollinarium, oblong, erect, retinaculum minute, translator very short or absent. Stigma head fusiform.

Two species: one each in India and China.

**1. *Goniostemma punctatum*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 81. 1974.

勐腊藤 meng la teng

Plants to 4 m. Stems warty; branches and branchlets puberulent to glabrous. Petiole ca. 2 cm; leaf blade elliptic or elliptic-oblong, 6–9 × 2.5–4 cm, thin papery, glabrous, trans-lucent dotted, base nearly rounded, apex acuminate; lateral veins 12–15 pairs. Inflorescences extra-axillary, longer than leaves, lax, many flowered; peduncle to 10 cm, rusty pubescent. Sepals broadly ovate, ca. 1.5 × 1.5 mm. Corolla yellow; tube without scales; lobes oblong, ca. 5 × 2 mm, glabrous outside, densely hirsute inside. Corona fleshy; lobes rounded, revolute, as long as stamens. Ovaries glabrous. Stigma head fusiform. Fl. Oct.

- Montane forests; 200 m. S Yunnan.

## **9. GENIANTHUS** J. D. Hooker, Fl. Brit. India 4: 15. 1883.

须花藤属 xu hua teng shu

Lianas. Cymes extra-axillary, paniculate; branches racemelike or spicate, brown or rusty hairy, many flowered. Calyx with or without basal glands. Corolla rotate, lobed ca. halfway down to nearly to base; lobes ± valvate. Corona lobes 5, inserted at base of gynostegium, sometimes with ligulate adaxial appendages, longer than stamens, shorter than stigma head. Anther appendages minute; pollinia 4 per pollinarium, erect, retinaculum minute, translator arms absent. Stigma head usually club-shaped, fusiform, or long subulate. Follicles cylindric or narrowly ovoid. Seeds oblong.

Fifteen species: tropical and subtropical Asia, with a center of diversity in Malaysia; one species in China.

**1. *Genianthus bicoronatus*** Klackenberg, Phytologia 75: 200. 1993.

须花藤 xu hua teng

Lianas to 10 m, glabrous except for inflorescences. Stems lenticellate. Petiole 1–3(–4) cm; leaf blade broadly elliptic, 6–10(–13) × 3–6(–8) cm, base rounded, apex acute; lateral veins 8–10 pairs, widely patent. Cymes paniculate, dichotomous, shorter than leaves, rusty pubescent. Sepals ovate, 1.1–1.6 × 0.8–1.2 mm, rusty puberulent outside. Corolla yellowish orange with a violet center; tube 0.5–1 mm; lobes oblong, 1.8–2.3 × 1–1.5 mm, glabrous outside, villous inside. Corona lobes triangular-oblong, with a distinct slender adaxial tooth near apex. Pollinia subglobose, erect. Stigma head capitate to peltate. Follicles lanceolate, 9–12 cm × 5–10 mm, cylindric. Seeds oblong, brown, ca. 1.5 cm; coma to 5 cm. Fl. Jan–May, fr. Aug–Dec.

Mixed woods, 500–1000 m. S Yunnan [Myanmar, Thailand].

## **10. SECAMONE** R. Brown, Prodr. 464. 1810.

鲫鱼藤属 *ji yu teng shu*

Lianas or scandent shrubs. Leaves opposite, often with translucent dots. Cymes terminal or axillary, forked, sessile or short pedunculate. Flowers small. Sepals ciliate at margin; basal glands usually absent. Corolla subtrotate; tube short; lobes erect patent, overlapping to right. Corona usually double, outer lobes 5, reduced to longitudinal ridges below corolla lobe sinus; inner lobes 5, inserted on gynostegium, usually laterally compressed, straight or incurved. Filaments free or connate at base; anthers with short, incurved apical appendages; pollinia minute, 4 per pollinarium, erect, globose to ellipsoid, retinaculum minute, translator arm absent. Ovaries glabrous. Stigma head capitate or short conical. Follicles terete, smooth. Seeds ovate.

About 80 species: mostly in Africa, especially Madagascar (62 species), 2–7 species in tropical and subtropical Asia and Australia; six species in China.

Klackenberg (Kew Bull. 47: 595–612. 1992) included all six Chinese species in two subspecies of *Secamone elliptica* R. Brown: *S. elliptica* subsp. *minutiflora* (Woodson) Klackenberg for *S. minutiflora* and *S. elliptica* subsp. *elliptica* for the other five species.

- 1a. Leaf epidermis seemingly powdery abaxially (epidermis finely and densely tuberculate-papillate under × 25 magnification), glabrous or with a hairy petiole and few hairs along midrib; stigma head clearly exerted beyond anthers ..... 6. *S. minutiflora*
- 1b. Leaf epidermis smooth abaxially, hairy to glabrous; stigma head not or only slightly exerted beyond anthers.
  - 2a. Leaves abaxially pubescent.
    - 3a. Leaves abaxially gland dotted ..... 1. *S. sinica*
    - 3b. Leaves abaxially not gland dotted ..... 2. *S. ferruginea*
  - 2b. Leaves glabrous.
    - 4a. Leaves ca. 3 mm wide, usually linear to oblong-lanceolate, not gland dotted ..... 3. *S. likiangensis*
    - 4b. Leaves 10–25 mm wide, elliptic or ovate-elliptic, gland dotted.
      - 5a. Leaf apex caudate-acuminate; peduncle flexuous ..... 4. *S. elliptica*
      - 5b. Leaf apex acute or obtuse; peduncle not flexuous ..... 5. *S. bonii*

1. **Secamone sinica** Handel-Mazzetti, Symb. Sin. 7: 997. 1936.

吊山桃 *diao shan tao*

Plants to 8 m. Young branchlets rusty puberulent, branches of previous years pale gray, densely lenticellate. Petiole pubescent, 2–5 mm; leaf blade ovate-lanceolate, 2–7 × 2–2.5 cm, papery, glabrous adaxially, pubescent and glandular dotted abaxially, base subrounded or broadly cuneate, apex acuminate; lateral veins 6–10 pairs. Cymes extra-axillary or subterminal; peduncle short, densely rusty pubescent. Pedicel ca. 5 mm. Sepals broadly ovate, ca. 1 mm, ciliate. Corolla yellow; tube short; lobes oblong, ca. 2 mm, papillose inside. Corona lobes shorter than gynostegium. Stigma head short conical. Follicles lanceolate in outline, 4–6 cm × ca. 7 mm. Seeds oblong, 1–3 cm × ca. 5 mm; coma ca. 3.5 cm. Fl. May–Jun, fr. Sep–Oct.

• Open montane woods, dense forests; 400–800 m. Guangdong, Guangxi, Guizhou, Yunnan.

2. **Secamone ferruginea** Pierre ex Costantin in Lecomte, Fl. Indo-Chine 4: 44. 1912.

锈毛鲫鱼藤 *xiu mao ji yu teng*

Plants to 6 m. Branchlets glabrescent. Petiole 3–5 mm; leaf blade ovate-lanceolate, 4.5–6 × 1.2–2.5 cm, thin papery, adaxially deep green and short gray hairy, abaxially rusty villous, base obtuse, margin recurved, apex acuminate; lateral veins numerous, arching toward margin. Cymes extra-axillary, 1.8–2.5 × 2.5–3 cm, with reddish hairs; peduncle 3–10 mm. Pedicel 1–3 mm. Sepals pubescent. Corolla greenish yellow,

1.5–2 mm, glabrous; lobes rounded, apex obtuse. Corona lobes falcate. Stigma head slightly exerted from anthers, apex umbonate. Follicles oblong-lanceolate in outline, ca. 6 cm × 6 mm, glabrous. Seeds oblong ca. 6 × 3 mm; coma to 3 cm. Fl. Jun–Aug, fr. Aug–Dec.

Thickets, montane forests; 200–800 m. Guangdong, Guangxi, Hainan [Thailand, Vietnam].

3. **Secamone likiangensis** Tsiang, Sunyatsenia 4: 57. 1939.

丽江鲫鱼藤 *li jiang ji yu teng*

Plants to 4 m, glabrous except for inflorescences. Branchlets pale gray. Petiole 1–2 mm; leaf blade linear or oblong-lanceolate, 1.5–3 cm × ca. 3 mm, thin papery; lateral veins flat, inconspicuous. Cymes extra-axillary, shorter than

leaves, tawny puberulent except for corolla. Corolla yellow; tube short; lobes oblong, 1–2 mm, glabrous. Corona lobes falcate. Anthers oblong, appendages retuse; pollinia erect, retinaculum nearly 4-angled, 2-cleft at base. Styles apically dilated; stigma head terete, slightly exserted beyond anther appendages. Follicles linear-lanceolate in outline, ca. 4 cm × 5 mm, glabrous. Seeds with white silky coma. Fl. May-Jul, fr. Jul-Dec.

- Montane bushland. C & S Yunnan.

#### 4. *Secamone elliptica* R. Brown, Prodr. 464. 1810.

鲫鱼藤 ji yu teng

*Secamone lanceolata* Blume; *S. micrantha* (Decaisne) Decaisne; *Tylophora micrantha* Decaisne.

Plants to 5 m, glabrous except for inflorescences. Branches pale gray. Petiole 2–5 mm; leaf blade elliptic, elliptic-oblong, or rarely ovate, 4–7 × 1.5–2.5 cm, papery, with translucent gland dots, base cuneate, apex caudate-acuminate; lateral veins inconspicuous. Cymes extra-axillary, to 6 cm, many flowered; peduncle flexuous, dichotomous, pubescent. Pedicel 2–4 mm, pubescent. Sepals ovate, pubescent. Corolla yellow or greenish yellow; lobes oblong, ca. 3 mm. Corona lobes falcate, shorter than stamens. Stigma head exserted from anthers. Follicles lanceolate in outline, 5–7 × ca. 1 cm, terete, glabrous. Seeds ovate-oblong, ca. 5 × 3 mm; coma ca. 3 cm. Fl. Jul-Aug, fr. Sep-Dec.

Bushland, open woods; 100–600 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Cambodia, Indonesia, Malaysia, Vietnam].

The roots are used as medicine for rheumatism and traumatic injury.

#### 5. *Secamone bonii* Costantin in Lecomte, Fl. Indo-Chine 4: 43. 1912.

斑皮鲫鱼藤 ban pi ji yu teng

Plants to 3 m, glabrous except for young branchlets and inflorescences. Branches tawny brown, with pale lenticels. Petiole 2–3 mm; leaf blade elliptic or ovate-lanceolate, 3–4.5 × 1.5–2.8 cm, base broadly cuneate, apex acute or rarely acuminate; lateral veins inconspicuous. Cymes extra-axillary, 1.5–2 cm; peduncles, pedicels, and bracteoles puberulent. Sepals ovate, pubescent. Corolla yellowish; tube short; lobes ovate, obtuse. Stigma head conical. Follicles oblong-lanceolate in outline, 5–6.5 × ca. 1 cm, glabrous. Seeds oblong, ca. 8 × 3 mm; coma white, ca. 3.5 cm. Fl. May-Jul, fr. Aug-Oct.

Mixed forests; 100 m. Hainan [Vietnam].

#### 6. *Secamone minutiflora* (Woodson) Tsiang, Sunyatsenia 4: 56. 1939.

催吐鲫鱼藤 cui tu ji yu teng

*Tylophora minutiflora* Woodson, Ann. Missouri Bot. Gard. 21: 609. 1934; *Secamone elliptica* subsp. *minutiflora* (Woodson) Klackenberg; *S. szechuanensis* Tsiang & P. T. Li.

Plants to 5 m, glabrous except for petioles and inflorescences. Petiole 2–3 mm, puberulent; leaf blade elliptic-ovate, 3–6.5 × 1.2–2.5 cm, thin papery, base cuneate, apex acute, abaxially gland dotted; lateral veins inconspicuous. Cymes extra-axillary, ± umbel-like, shorter than leaves. Sepals ovate, ca. 1 mm, densely pubescent. Corolla ± rotate, ca. 4 mm in diam.; lobes oblong, ca. 1.5 mm. Corona lobes falcate. Stigma head clearly exserted from anthers. Follicles linear-lanceolate in outline, 5–6 cm × 6–9 mm, divaricate at 180–200°, glabrous. Seeds brownish, oblong, ca. 10 × 4 mm; coma white sericeous, to 2.5 cm. Fl. May-Jul, fr. Aug-Oct.

- Open woods, below 800 m. Guangxi, Guizhou, Sichuan, Yunnan.

Previous authors have assumed that Woodson's original name was a later homonym of *Tylophora minutiflora* A. Chevalier (1920). However, Chevalier's name is invalid and thus Woodson's is legitimate.



## 11. OXYSTELMA R. Brown, Prodr. 462. 1810.

尖槐藤属 jian huai teng shu

Lianas, woody at base. Cymes extra-axillary, lax, racemelike or umbel-like, rarely a solitary flower, pedunculate. Flower buds globose. Calyx glands 5 or many. Corolla bowl-shaped; lobes basally valvate and apically overlapping to right. Corona in 2 series: outer corona at base of corolla tube, annular, truncate, margin membranous; inner series of 5 ovate-lanceolate lobes attached to gynostegium and exceeding anthers. Filaments short, connate into a tube; anthers with appendages; pollinia 2 per pollinarium, pendulous, on long translator arms. Stigma head convex. Follicles solitary or paired, oblong or ovate-lanceolate in outline, smooth.

Two species: tropical and subtropical Asia, tropical Africa; one species in China.

**1. Oxystelma esculentum** (Linnaeus f.) Smith in Rees, Cycl. 25: (not numbered). 1813.

尖槐藤 jian huai teng

*Periploca esculenta* Linnaeus f., Suppl. Pl. 168. 1781; *Asclepias rosea* Roxburgh; *Oxystelma wallichii* Wight; *Sarcostemma esculentum* (Linnaeus f.) R. W. Holm.

Lianas to at least 4 m, glabrous except for flowers. Petiole 1–1.5 cm; leaf blade linear or linear-lanceolate, 6–11 × 0.7–2 cm, membranous, base rounded; lateral veins 9–12 pairs, marginal vein present. Inflorescences longer than leaves, (1- or) 2–4-flowered. Flower buds 8–9 mm. Sepals ovate-lanceolate, ca. 3.5 × 1 mm. Corolla white with purple veins or blotches, 2–3 cm in diam., limb 1.5–2 cm; lobes triangular, 1–1.5 cm, densely ciliate. Outer corona densely pubescent. Pollinia ca. 1.5 mm. Ovaries glabrous. Follicles lanceolate in outline, ca. 5 × 1.5 cm, apex subacute. Seeds ovate, ca. 2 × 1.5 mm; coma 1.5–2 cm. Fl. Jul-Sep, fr. Oct-Dec.

Moist bushland, stream banks. Guangdong, Guangxi, Yunnan [Bangladesh, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam; NE Africa, SW Asia].

Decoctions of all parts are used against cancer, menoxenia, and traumatic injury.

Some authorities have suggested that the correct name for this species is *Oxystelma secamone* (Linnaeus) Karsten, 1883, based on *Periploca secamone* Linnaeus, 1771, but Goyder & Singh (Taxon 40: 629–630, 1991) showed that *P. secamone* is a synonym of *Secamone alpinii* Schultes from Africa.

## 12. SARCOSTEMMA R. Brown, Prodr. 463. 1810.

肉珊瑚属 rou shan hu shu

Lianas, trailing or twining, rarely ± erect, succulent, base woody. Leaves reduced to minute scales, soon lost. Cymes umbel-like, sessile, terminal or extra-axillary. Calyx with or without 5 basal glands. Corolla rotate or nearly so, deeply lobed; lobes overlapping to right. Corona double: outer corona inserted at junction of corolla tube and gynostegium, ringlike or cupular, membranous, 5-angled, truncate or shallowly lobed; inner corona lobes 5, inserted at base of gynostegium, fleshy, basally dilated, 2-keeled inside. Anther appendages membranous; pollinia 2 per pollinarium, waxy, pendulous, caudicle slender. Stigma head short conical or oblong-fusiform. Follicles thick, smooth.

At least ten species: Africa, tropical Asia, Australia; one species in China.

**1. Sarcostemma acidum** (Roxburgh) Voigt, Hort. Suburb. Calcutt. 542. 1845.

肉珊瑚 rou shan hu

*Asclepias acida* Roxburgh, Fl. Ind. ed. 1832, 2: 31. 1832; *Sarcostemma brevistigma* Wight & Arnott.

Stems to 2 m, twining, green or gray, glabrous. Cymes terminal or extra-axillary, 6–15-flowered, ca. 1 × 2 cm. Pedicel 3–5 mm, puberulent. Sepals ovate, ca. 1 mm, puberulent, margin translucent. Corolla white or yellowish; lobes ovate-oblong or oblong-lanceolate, ca. 3 × 1 mm, glabrous. Outer corona shallowly cupular, inner lobes obtuse, slightly shorter than or as long as anthers. Pollinia caudicles ± horizontal,

retinaculum subelliptic. Stigma head shorter than anther appendages. Follicles lanceolate in outline, terete, ca. 15 × 1 cm. Seeds broadly ovate, ca. 3 × 2 mm; coma ca. 2 cm. Fl. Mar-Nov.  $2n = 22$ .

Seashore thickets. S Guangdong, Hainan [India, Myanmar, Nepal, Thailand, Vietnam].

All parts are used as medicine to induce lactation.

### 13. CALOTROPIS R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 39. 1810 (preprint).

牛角瓜属 niu jiao gua shu

Shrubs erect, canescent. Leaves opposite, broad, subsessile. Cymes extra-axillary or terminal, umbel-like, long pedunculate. Calyx with basal glands. Corolla bowl-shaped to subrotate, divided to middle; lobes valvate or overlapping to right. Corona lobes 5, adnate to gynostegium, fleshy, laterally compressed, apex with a tubercle on each side, with abaxial, basal, revolute spur. Filaments connate; anther appendages incurved; pollinia 2 per pollinarium, oblong, pendulous. Styles long; stigma head slightly convex. Follicles ovoid, subglobose, or oblong-lanceolate, mesocarp inflated.

Three species: northern Africa, Arabia, and tropical Asia; two species in China.

- 1a. Flower buds cylindrical; corolla 2.5–3.5 cm in diam., lobes long ovate or oblong, 1–1.5 cm, usually reflexed; corona shorter than gynostegium ..... 1. *C. gigantea*  
1b. Flower buds subglobose; corolla 1.5–2 cm in diam., lobes broadly ovate or ovate-triangular, 0.7–1 cm, not reflexed; corona as long as gynostegium ..... 2. *C. procera*

**1. *Calotropis gigantea*** (Linnaeus) W. T. Aiton, Hortus Kew. ed. 2, 2: 78. 1811.

牛角瓜 niu jiao gua

*Asclepias gigantea* Linnaeus, Sp. Pl. 1: 214. 1753; *Periploca cochinchinensis* Loureiro; *Streptocaulon cochinchinense* (Loureiro) G. Don.

Shrubs 1–5 m tall. Petiole 1–4 mm; leaf blade obovate-oblong or oblong, 7–30 × 3–15 cm, base cordate, apex obtuse, cottony tomentose when young, frequently glabrescent and glaucous green; lateral veins 4–8 pairs. Cymes umbel-like, with fine woolly hairs; peduncle robust, 5–12 cm. Pedicel thick, 2–5 cm. Calyx almost flat, 1.2–1.5 cm in diam. Flower buds cylindrical. Corolla usually purplish or lilac with paler greenish base, 2.5–3.5 cm in diam., fleshy, glabrous; lobes ovate, 1–1.5 × 0.6–1 cm, spreading or reflexed, margin revolute. Corona shorter than gynostegium. Follicles obliquely elliptic to oblong-lanceolate in outline, 5–10 × 2.5–4 cm, both ends incurved. Seeds broadly ovate, 5–7 × 3–4 mm; coma 2.5–4 cm. Fl. almost throughout the year.  $2n = 22$ .

Woods of dry areas, stream banks; 0–1400 m. Guangdong, Guangxi, Hainan, Sichuan, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam; tropical Africa].

The bark is used as a medicine for the treatment of neurodermatitis and syphilis, and the leaves are used as a poultice. The juice is used in making a yellow dye and in tanning. A fine fiber is obtained from the stems.

**2. *Calotropis procera*** (Aiton) W. T. Aiton, Hortus Kew. ed. 2, 2: 78. 1811.

白花牛角瓜 bai hua niu jiao gua

*Asclepias procera* Aiton, Hort. Kew. 1: 305. 1789; *A. gigantea* Jacquin, not Linnaeus.

Shrubs or small trees to 6 m tall. Petiole very short; leaf blade grayish green or hoary white, ovate to obovate, 10–30 × 5–15 cm, base cordate, apex abruptly pointed. Cymes umbel-like, 3–10-flowered, finely woolly; peduncle 2–5.5 cm. Pedicel 1.5–2.5 cm. Sepals elliptic or ovate, ca. 5 × 3 mm. Flower buds subglobose. Corolla white outside, pinkish inside, 1.5–2 cm in diam.; lobes with purple-brown apices, broadly ovate or ovate-triangular, 7–10 × 6–10 mm, spreading. Corona as long as gynostegium. Follicles subglobose to obliquely ovoid, inflated, 6–10 × 3–7 cm, pericarp thick, spongy. Seeds ca. 6 × 4 mm; coma 3.5–5 cm. Fl. May–Dec.  $2n = 22$ .

Cultivated for medicine in S Guangdong, Guangxi, S Yunnan [Afghanistan, India, Myanmar, Nepal, Pakistan, Thailand, Vietnam; Africa, SW Asia, introduced to Australia and Central and South America].

The bark and leaves are used for the treatment of leprosy and asthma, respectively.

## 14. ASCLEPIAS Linnaeus, Sp. Pl. 1: 214. 1753.

马利筋属 ma li jin shu

Herbs, base frequently woody. Leaves opposite or whorled, short petiolate. Cymes terminal and extra-axillary, erect, umbel-like, many flowered. Calyx glands 5–10. Corolla rotate, deeply parted; lobes reflexed, valvate or rarely overlapping to right. Corona lobes 5, inserted on gynostegium, erect, apex hooded, with an incurved, ligular-hornlike adaxial appendage. Stamens inserted at base of corolla tube; filaments connate into a tube; anther appendages incurved; pollinia 2 per pollinarium, pendulous. Stigma head conical. Follicles fusiform, apex acuminate. Seeds flat, with a long coma.

About 120 species: America, some naturalized in Old World; one species in China.

### 1. *Asclepias curassavica* Linnaeus, Sp. Pl. 1: 215. 1753.

马利筋 ma li jin

Plants to 1 m tall. Stems pale gray, puberulent to glabrous. Leaves opposite; petiole to 1 cm; leaf blade lanceolate or oblong-lanceolate, 6–15 × 1–4 cm, glabrous or abaxially puberulent along veins, base decurrent into petiole, apex acuminate or acute. Cymes up to as long as leaves, 10–20-flowered; peduncle 3.5–6 cm, pubescent. Pedicel 1.2–2.5 cm, pubescent. Sepals lanceolate, ca. 3 × 1 mm, pubescent. Corolla purple or red, 7–9 mm; lobes oblong, 5–8 × ca. 3 mm, reflexed. Corona lobes yellow or orange, 3.5–4 mm; gynostegium 2.5–3 mm. Follicles fusiform, 5–10 × 1–1.5 cm. Seeds ovate, 6–7 × ca. 3 mm; coma 2–4 cm. Fl. almost all year.  $2n = 22$ .

Cultivated and naturalized in Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [native of tropical America, widely introduced elsewhere].

Root extracts are used as an emetic and laxative. Leaf juice is used to kill intestinal parasitic worms and to hasten sweating during fevers. Flower juice has been used to stop bleeding. Chinese villagers brush dogs with twigs to repel fleas.

## 15. GOMPHOCARPUS R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 37. 1810 (preprint).

钉头果属 ding tou guo shu

Shrubs or subshrubs, erect. Leaves opposite or whorled, short petiolate. Cymes extra-axillary, umbel-like, pendent, many flowered. Calyx glands 5 or more. Corolla rotate, deeply lobed; lobes patent or reflexed, valvate. Corona lobes 5, inserted on gynostegium, erect, hood-shaped, apex with 2 recurved or straight adaxial cusps, hood not appendaged. Filaments connate into a tube; anther appendages incurved; pollinia 2 per pollinarium, oblong, pendulous. Stigma head depressed. Follicles broadly ovoid, inflated, pericarp usually with long, soft spines or bristles. Seeds oblong.

About 50 species: tropical Africa, two in China.

- 1a. Leaves glabrous; corona lobes dark; follicles acuminate, long beaked ..... 1. *G. fruticosus*  
1b. Leaves sparsely pubescent adaxially, hairy along midvein abaxially; corona lobes white; follicles blunt,  
beakless ..... 2. *G. physocarpus*

**1. *Gomphocarpus fruticosus*** (Linnaeus) W. T. Aiton, Hortus Kew. ed. 2, 2: 80. 1811.

钉头果 ding tou guo

*Asclepias fruticosa* Linnaeus, Sp. Pl. 1: 216. 1753.

Shrubs to 2 m tall. Stems puberulent. Leaves opposite, short petiolate; leaf blade linear or linear-lanceolate, 6–10 cm × 5–8 mm, glabrous, apex acuminate, margin revolute; lateral veins inconspicuous. Cymes 4–6 cm. Flower buds globose.

Sepals lanceolate, puberulent. Corolla white; lobes broadly ovate or elliptic, reflexed, ciliate. Corona lobes dark, hood-like. Follicles inflated, 5–6 × ca. 3 cm, apex acuminate, long beaked, spines of pericarp soft, ca. 1 cm. Seeds ovate; coma ca. 3 cm. Fl. summer.  $2n = 22$ .

Cultivated for medicine in N China, Guangxi, and Yunnan [Africa; widely introduced].

Decoction of all parts is used as a medicine for stomach trouble. The leaves are used against pulmonary tuberculosis. Floss from seeds

is used for stuffing pillows.

**2. Gomphocarpus physocarpus** E. Meyer, Comm. Pl. Afr. Austr. 202. 1838.

钝钉头果    dun ding tou guo

Shrubs 1–2 m tall, few stemmed. Young stems and inflorescences pubescent. Petiole ca. 1 cm; leaf blade narrowly lanceolate, 5–10 × 0.6–1.5 cm, adaxially sparsely pubescent, abaxially hairy along midvein, both ends tapering or acute. Peduncle 2–4.5 cm, short hairy. Pedicel 1.5–2.5 cm. Sepals lanceolate. Corolla white, 1.4–2 cm in diam.; lobes ovate, 8–10 mm, reflexed, margin densely bearded. Corona lobes white, inner margin of hoodlike apex with 2, short, recurved or straight cusps, with a large adaxial nectary. Follicles obliquely ovoid to subglobose, 6–8 × 2.5–5 cm, base oblique, apex rounded, beakless; pericarp with soft bristles or spines, minutely tomentose when young, glabrescent when ripe. Seeds ovate, ca. 5 mm; coma shining white, ca. 5 mm.  $2n = 22$ .

Cultivated for medicine in S Guangdong and Hainan [Africa; widely introduced].

## 16. METAPLEXIS R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 48. 1810.

萝沸属    luo mo shu

*Aphanostelma* Schlechter.

Lianas or scandent subshrubs. Leaves opposite, long petiolate. Inflorescences long pedunculate, racemelike with cymules laxly arranged along well-developed rachis. Calyx with 5 basal glands. Corolla subrotate; lobes longer than tube, twisted to left. Corona ringlike, inserted at base of gynostegium, rim 5-lobed; lobes hoodlike. Filaments connate into a short tube; anther appendages incurved; pollinia 2 per pollinarium, oblong or ovate-oblong, pendulous. Stigma head long beaked, 2-cleft or entire, exserted beyond anther appendages. Follicles fusiform or oblong, pericarp muricate, rugose, or smooth. Seeds ovate.

About six species: E Asia, two in China.

- 1a. Leaf base with a narrow deep sinus, basal lobes often overlapping; flower buds conical; corolla hairy inside; stigma head long and slender, exserted out of corolla tube; follicles glabrous, smooth ..... 1. *M. japonica*
- 1b. Leaf base with a broad sinus; flower buds broadly ovate; corolla glabrous; stigma head conical, not exserted from corolla tube; follicles puberulent, muricate, or rugose ..... 2. *M. hemsleyana*

**1. Metaplexis japonica** (Thunberg) Makino, Bot. Mag. (Tokyo) 17: 87. 1903.

萝沸    luo mo

*Pergularia japonica* Thunberg, Fl. Jap. 1: 11. 1784; *Metaplexis chinensis* Decaisne; *M. stauntonii* Schultes; *Urostelma chinensis* Bunge.

Lianas to 8 m. Young stems densely pubescent, glabrescent. Petiole 3–6 cm; leaf blade deep green adaxially, glaucous abaxially, ovate-cordate, basal lobes rounded, re-curved and sometimes overlapping, sinus 1–2 cm deep and often very narrow, glabrous or puberulent when young; lateral veins 10–12 pairs. Inflorescences usually 13–20-flowered; peduncle 6–12 cm; bracteoles membranous, lanceolate, ca. 3 mm. Pedicel ca. 8 mm, puberulent. Flower buds conical, apex acute. Sepals lanceolate, 5–7 × ca. 2 mm, puberulent. Corolla white, sometimes with purplish stripes; tube short; lobes lanceolate, slightly longer than sepals, spreading, reflexed at apex, conspicuously pilose inside. Stigma head conspicuously exserted, long and slender with 2-fid apex. Follicles fusiform, 8–9 × ca. 2 cm, smooth, glabrous. Seeds ca. 5 × 3 mm, flat, margin membranous; coma silky white, ca. 1.5 cm. Fl. Jul-Aug,

Thickets, forest edges, stream banks. Throughout China except for Hainan and Xinjiang [Japan, Korea, adjacent Russia].

The stems and roots are used as medicine for traumatic injury, snake bites, impotence, and infantile malnutrition due to intestinal parasites.

**2. Metaplexis hemsleyana** Oliver, Hooker's Icon. Pl. 20: Pl. 1970. 1891.

华萝沸    hua luo mo

*Holostenma sinense* Hemsley, J. Linn. Soc., Bot. 26: 103. 1889; *Aphanostelma chinensis* Schlechter ex H. Léveillé; *Metaplexis japonica* (Thunberg) Makino var. *platyloba* Handel-Mazzetti; *M. rostellata* Turczaninow; *M. sinensis* (Hemsley) Hu.

Lianas to 5 m. Stems slender pubescent along 1 line, densely pubescent at nodes. Petiole to 5 cm; leaf blade deep green adaxially, glaucous abaxially, ovate-cordate, 5–13 × 2.5–10 cm, membranous, base cordate, basal lobes rounded, recurved, sinus 1–3 cm deep and always wide and rounded; lateral veins ca. 5 pairs. Cymes extra-axillary, racemelike,

rachis usually simple, 6–16-flowered; peduncle 4–6 cm. Pedicel 5–10 mm, puberulent. Flower buds broadly ovate, apex obtuse or rounded. Sepals ovate-lanceolate, half as long as corolla. Corolla 0.9–1.2 cm in diam.; lobes broadly oblong, ca. 5 mm, glabrous. Stigma head narrowly conical, usually just exerted from anther appendages. Follicles oblong, 7–8 × ca. 2 cm, pubescent and muricate or rugose. Seeds ovate, ca. 6 × 4 mm, marginate, denticulate at base; coma white sericeous, ca. 3 cm. Fl. Jul-Sep, fr. Sep-Dec.

• Moist bushland, valleys. Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan.

## 17. ADELOSTEMMA J. D. Hooker, Fl. Brit. India 4: 20. 1883.

乳突果属 ru tu guo shu

Lianas. Leaves opposite, petiolate. Cymes extra-axillary, racemelike, pedunculate. Flowers small. Calyx glands 5. Corolla campanulate; lobes short, overlapping to right. Corona with up to 5 minute, membranous, triangular lobes; lobes inserted opposite anthers at base of stalked gynostegium, sometimes absent. Anther appendages oblong; pollinia 2 per pollinarium, ovoid, waxy, pendulous, translator arms threadlike, corpusculum ovoid. Stigma head club-shaped, apex exerted. Follicles usually solitary, pericarp papillose. Seeds flat, margin membranous, with white silky coma.

One species: China, Myanmar.

1. *Adelostemma gracillimum* (Wallich ex Wight) J. D. Hooker, Fl. Brit. India 4: 21. 1883.

乳突果 ru tu guo

*Cynanchum gracillimum* Wallich ex Wight, Contr. Bot. India 57. 1834.

Lianas to 4 m. Petiole 1.5–4 cm; leaf blade ovate or oblong-ovate, 3.5–6 × 2.5–4.5 cm, membranous, glabrous, base cordate, apex acuminate; lateral veins faint, 5–7 pairs. Cymes shorter than leaves; pubescent except for corolla. Corolla white, glabrous, ca. 4 mm; tube (2–)3 mm; lobes oblong, 1(–)2 mm, spreading. Follicles elliptic-oblong or oblong-lanceolate, ca. 4.5 × 1.5 cm. Seeds suborbicular; coma ca. 2 cm. Fl. autumn.

Thickets, forests along valleys; 500–1000 m. Guangxi, Guizhou, Yunnan [Myanmar].

## 18. CYNANCHUM Linnaeus, Sp. Pl. 1: 212. 1753.

鹅绒藤属 e rong teng shu

*Alexitoxicon* Saint-Lager; *Antitoxicon* Pobedimova; *Cyathella* Decaisne; *Cynoctonum* E. H. F. Meyer; *Pycnostelma* Bunge ex Decaisne; *Rhodostegiella* C. Y. Wu & D. Z. Li; *Seutera* H. G. L. Reichenbach; *Symphyoglossum* Turczaninow; *Vincetoxicum* N. M. Wolf.

Subshrubs or perennial herbs, erect or twining, often rhizomatous. Roots fibrous, woody or fleshy. Leaves opposite, rarely whorled, often petiolate, axils sometimes with small stipulelike leaves. Inflorescences extra-axillary or occasionally terminal, rarely axillary, umbel-like, corymbose, or racemelike. Sepals erect, often with basal glands. Corolla rotate or subrotate; tube short; lobes patent or reflexed, overlapping to right or left, rarely subvalvate. Corona inserted at base of gynostegium, membranous or fleshy, cupular, cylindric, or deeply 5-divided, sometimes with adaxial appendages. Filaments connate into tube, anthers with membranous apical appendages; pollinia 2 per pollinarium, pendulous. Stigma head convex or short conical. Follicles fusiform or lanceolate, usually smooth, rarely narrowly winged or setose.

About 200 species: Africa, North and South America, Asia, Europe; 57 species in China.

1a. Erect herbs, sometimes uppermost parts tending to twine.

2a. Corona tube cupular to tubular, at least as long as gynostegium, membranous, longitudinally pleated,

- white or near white.
- 3a. Flowers produced after leaves are fully developed; corolla green-white; corona tube as high as gynostegium, marginal lobes linear-triangular; inner appendages well developed, as long as corona lobes; base of leaf blade cordate to truncate ..... 2. *C. anthonyanum*
- 3b. Flowers produced before leaves are fully developed; corolla purple; corona tube much higher than gynostegium, marginal lobes very short; inner appendages absent; base of leaf blade rounded to narrowly cuneate ..... 3. *C. purpureum*
- 2b. Corona usually deeply lobed, lobes fleshy, tube (when present) usually much shorter than gynostegium (well developed in *C. bicampanulatum*), not longitudinally pleated nor grooved, variously colored.
- 4a. Leaf blade ovate, broadly ovate, ovate-oblong, or broadly elliptic.
- 5a. Leaves (at least lower on stem) amplexicaul; stems and leaves glabrous or nearly so; inflorescences pedunculate ..... 31. *C. amplexicaule*
- 5b. Leaves not amplexicaul; stems and leaves often hairy and/or inflorescences sessile.
- 6a. Inner surface of corolla lobes and/or tube hairy.
- 7a. Corolla lobes erect, slender but with a blunt apex; corolla glabrous except for conspicuously woolly tube ..... 37. *C. rockii*
- 7b. Corolla lobes rotate, ovate; corolla indumentum variable but never with a conspicuously woolly tube.
- 8a. Stems flexuous; leaves glaucous, leathery; corona lobes broadly ovate, broader than long ..... 33. *C. canescens*
- 8b. Stems erect; leaves green, thin papery; corona lobes triangular-ovate, longer than broad ..... 35. *C. forrestii*
- 6b. Inner surface of corolla glabrous, rarely a few hairs inside tube.
- 9a. Corolla campanulate, tube as long as lobes, lobes apparently erect; corona tube as long as anthers, adnate to anthers and corolla ..... 36. *C. bicampanulatum*
- 9b. Corolla reflexed to shallowly bowl-shaped with spreading lobes; corona tube much shorter than anthers, not adnate to corolla.
- 10a. Corona lobes lanceolate, subacute, clearly higher than gynostegium, each lobe with a well-developed inner appendage incumbent on anther; leaf margin shallowly undulate ..... 26. *C. lysimachioides*
- 10b. Corona lobes rounded, not higher than gynostegium, inner appendages not incumbent on anther or absent; leaf margin not undulate.
- 11a. Leaves uniformly densely pubescent on both surfaces; corolla deep purple; inflorescences mostly sessile ..... 32. *C. atratum*
- 11b. Leaves pubescent to puberulent on veins only at least on adaxial surface; corolla dull yellow or white; inflorescences pedunculate.
- 12a. Corolla up to 1 cm in diam.; peduncles not longer than leaves ..... 34. *C. inamoenum*
- 12b. Corolla 1.2–1.8 cm in diam.; peduncles longer than upper leaves; stems sometimes tending to twine at tip, leaves sometimes whorled.
- 13a. Corolla lobes ca. 3 mm wide; leaves abaxially puberulent on veins only ..... 47. *C. acuminatifolium*
- 13b. Corolla lobes 1.2–1.5 mm wide; leaves abaxially densely uniformly puberulent ..... 48. *C. pingshanicum*
- 4b. Leaf blade linear to narrowly elliptic or lanceolate.
- 14a. Most parts of plant densely puberulent, rarely leaves glabrous; corona with short but distinct tube and inflexed linear-oblong lobes ..... 1. *C. thesioides*
- 14b. At least some parts of plant sparsely pubescent to glabrous; corona divided to near base, with ill-defined tube and triangular-ovate, fleshy lobes.
- 15a. Inflorescences strictly lateral, longer than leaves; leaves 1–2 mm wide; corolla lobes oblong-lanceolate; corona deeply 5-lobed ..... 39. *C. wangii*
- 15b. Inflorescences terminal and from upper nodes or, if strictly lateral, shorter than leaves; leaves 5–15 mm wide; corolla lobes ovate or ovate-oblong.
- 16a. Peduncles 2.5–4 cm, often subterminal, longer than uppermost leaves; leaf blade with lateral veins ca. 8 pairs; corona lobes laterally compressed ..... 38. *C. paniculatum*
- 16b. Peduncles less than 2 cm, much shorter than leaves; leaf blade with lateral veins obscure or up to 6 pairs; corona lobes dorsiventrally compressed.
- 17a. Leaves leathery, glabrous, glaucous.
- 18a. Stems glabrous; corolla dark red ..... 40. *C. mongolicum*
- 18b. Stems pubescent; corolla yellow ..... 41. *C. glaucescens*
- 17b. Leaves membranous to thin papery, often hairy.
- 19a. Corolla hairy inside; lateral leaf veins ca. 6 pairs.

- 20a. Leaves always paired, veins glabrous; inflorescences racemelike, slender ..... 46. *C. stauntonii*
- 20b. Leaves often whorled, veins puberulent; inflorescences umbel-like ..... 43. *C. hydrophilum*
- 19b. Corolla glabrous; lateral leaf veins obscure or up to 4 pairs.
  - 21a. Corona lobes adnate dorsally to corolla; inflorescences raceme-like ..... 42. *C. stenophyllum*
  - 21b. Corona lobes free from corolla; leaves often whorled; inflorescences umbel-like.
    - 22a. Stems glabrous; leaves 2–9 mm wide ..... 45. *C. riparium*
    - 22b. Stems pubescent; leaves 7–15 mm wide ..... 44. *C. verticillatum*
- 1b. Twining climbers.
  - 23a. Fruit winged or setose.
    - 24a. Fruit densely and conspicuously setose, not winged ..... 15. *C. corymbosum*
    - 24b. Fruit smooth, longitudinally winged ..... 19. *C. callialatum*
  - 23b. Fruit not ornamented (not known for several species).
    - 25a. Corona without inner free-tipped appendages, interior sometimes with longitudinal folds or wings.
      - 26a. Stems uniformly pubescent, sometimes densely so, basal part often not twining, erect.
        - 27a. Leaves linear to lanceolate, up to 2.3 cm wide, usually much less, adaxially with tiny pale dots ..... 1. *C. thesioides*
        - 27b. Leaves narrowly elliptic to ovate, 2.5–10 cm wide, adaxially without dots.
          - 28a. Lower part of stem erect, only upper part twining.
            - 29a. Base of leaf blade rounded or subcordate; pedicel up to 5 mm ..... 50. *C. versicolor*
            - 29b. Base of leaf blade cuneate; pedicel 1–2 cm ..... 52. *C. taihangense*
          - 28b. Stems twining throughout.
            - 30a. Pedicel 15–22 mm; corolla lobes ovate; 5–5.5 × ca. 3 mm; sepals glabrous ..... 53. *C. linearisepalum*
            - 30b. Pedicel 5–13 mm; corolla lobes oblong, ca. 10 × 2.5 mm; sepals pubescent ..... 54. *C. mooreanum*
        - 26b. Stems glabrescent or pubescent along 1 or 2 lines only.
          - 31a. Corona fleshy, often deeply lobed; leaves concolorous, abaxial surface at most only slightly paler.
            - 32a. Leaf blade linear, 0.5–1 cm wide; corona shallowly lobed, shorter than anthers ..... 49. *C. biondioides*
            - 32b. Leaf blade ovate, 1.5–15 cm wide; corona deeply lobed, longer than anthers.
              - 33a. Stems with basal part erect; leaf blade broadly elliptic to ovate, 4–15 cm wide, base cuneate ..... 51. *C. chekiangense*
              - 33b. Stems always twining from base; leaf blade lanceolate or narrowly oblong, 1.5–5 cm wide, base shallowly cordate to rounded.
                - 34a. Corolla purple or purple-red ..... 55. *C. sublanceolatum*
                - 34b. Corolla white or yellow-white.
                  - 35a. Lateral leaf veins 4–6 pairs; corolla ca. 7 mm in diam., oblong, glabrous ..... 56. *C. fordii*
                  - 35b. Lateral leaf veins 7–10 pairs; corolla 12–15 mm in diam., lobes lanceolate, pubescent inside ..... 57. *C. volubile*
            - 31b. Corona membranous, cupular, often with marginal lobes shorter than tube; leaves often discolored with abaxial surface much paler.
              - 36a. Corolla lobes hairy; corona tube shorter than prominent lobes.
                - 37a. Corolla lobes ca. 10 mm; corona cupular, ca. 1 mm high, with 5 triangular marginal lobes to 3 mm high ..... 16. *C. megalanthum*
                - 37b. Corolla lobes 2–5 mm; corona tube absent, lobes well developed, narrower at base.
                  - 38a. Leaf blade ovate or ovate-cordate, apex cuspidate, basal lobes incurved and sometimes overlapping; peduncle ca. 1.5 cm; corona lobes shorter than gynostegium, truncate ..... 22. *C. wilfordii*
                  - 38b. Leaf blade ovate-lanceolate, apex acuminate, basal lobes not incurved; peduncle to 3.5 cm; inflorescences dense, with flowers overlapping when pressed; corona slightly longer than gynostegium, rounded ..... 23. *C. otophyllum*
              - 36b. Corolla lobes glabrous; corona tube longer than lobes, lobes sometimes rounded teeth.
                - 39a. Corona ca. ½ as high as anthers; sepals reflexed at anthesis ..... 10. *C. brevicoronatum*
                - 39b. Corona at least as high as anthers or only slightly shorter; sepals

- not reflexed.
- 40a. Leaves linear-lanceolate, to 11 × 1.2 cm, base cuneate; corona ca. 2.5 mm high; inflorescences umbel-like ..... 17. *C. kingdonwardii*
- 40b. Leaves ovate-oblong, 2–8(–10) cm wide, base cordate; corona ca. 4 mm high; inflorescences racemelike, cymules arranged in regular spiral along rachis.
- 41a. Stems pubescent along 1 line, hairs sometimes very sparse, or in 2 obscure lines immediately above node.
- 42a. Corolla ca. 3 mm; corona tube lower than anthers, marginal teeth prominent, almost acute ..... 12. *C. duclouxii*
- 42b. Corolla 3.5–5 mm; corona tube higher than anthers, marginal teeth low and rounded ..... 14. *C. kintungense*
- 41b. Stems pubescent along 2 lines.
- 43a. Corolla lobes erect ..... 13. *C. sinoracemosum*
- 43b. Corolla lobes rotate to strongly reflexed.
- 44a. Inflorescences to 3.5 cm, subsessile ..... 11. *C. wallichii*
- 44b. Inflorescences 2.5–7 cm, peduncle 1–5 cm ..... 15. *C. corymbosum*
- 25b. Corona with appendages inside, these free at apex.
- 45a. Corona deeply 5-divided, lobes fleshy, tube much shorter than gynostegium to absent, lobes erect or ascending.
- 46a. Peduncle much longer than pedicel.
- 47a. Corolla strongly reflexed ..... 30. *C. boudieri*
- 47b. Corolla rotate.
- 48a. Corolla lobes 4.5–5 mm, minutely pubescent ..... 28. *C. officinale*
- 48b. Corolla lobes (4.5–)5.5–8(–10) mm, densely pilose or villous ..... 29. *C. auriculatum*
- 46b. Peduncle up to 3(–4) cm, up to 2 × as long as pedicel.
- 49a. Corolla glabrous; leaf blade hastate, hastate-oblong, or narrowly ovate-deltate.
- 50a. Corona shorter than gynostegium, inner appendages ca. as long as lobes; leaf blade 7–14 × 3–8 cm ..... 24. *C. giraldii*
- 50b. Corona longer than gynostegium, inner appendages shorter than lobes; leaf blade 3–8 × 1–5 cm ..... 27. *C. bungei*
- 49b. Corolla adaxially puberulent; leaf blade broadly ovate to ovate-oblong.
- 51a. Peduncle 1–2 mm, much shorter than pedicel; base of leaf blade auriculate; corolla purple ..... 25. *C. batangense*
- 51b. Peduncle 20–30 mm; about as long as pedicel, base of leaf blade shallowly cordate; corolla white ..... 26. *C. lysimachioides*
- 45b. Corona distinctly cupular or cylindric, usually obviously membranous, sometimes plicate, tube as long as or longer than gynostegium and/or much longer than marginal lobes.
- 52a. Leaves pinnately veined, slightly fleshy.
- 53a. Inflorescences simple, umbel-like; peduncle 1–7 mm; leaf base cordate ..... 19. *C. callialatum*
- 53b. Inflorescences racemelike, sometimes branched; peduncle 5–30 mm; leaf base rounded to cuneate.
- 54a. Leaf blade 2.5–7 cm, apex acute or rounded, rarely subacuminate, blade often leathery ..... 20. *C. formosanum*
- 54b. Leaf blade 6–10 cm, apex long acuminate or caudate, blade membranous ..... 21. *C. kwangsiense*
- 52b. Leaves palmately to pedately 5–7-veined at base, often with enlarged basal lobes.
- 55a. Corona lobes or teeth rounded to triangular, often shorter than corona tube, sometimes obsolete.
- 56a. Corolla lobes ca. 10 mm ..... 16. *C. megalanthum*
- 56b. Corolla lobes up to 5 mm.
- 57a. Corolla glabrous; corona appendages reduced to small teeth or ridges; leaf blade ovate-deltate, oblong-hastate, lanceolate, or linear-lanceolate, less than 1.5 cm wide ..... 18. *C. insulanum*
- 57b. Corolla hairy; corona appendages well developed, fleshy; leaf blade ovate or ovate-lanceolate, 2–4 cm wide.
- 58a. Corona shorter than stigma head, lobes very short, rounded; corolla reflexed ..... 9. *C. decipiens*
- 58b. Corona longer than stigma head, lobes triangular, acute; corolla erect to rotate ..... 8. *C. longipedunculatum*
- 55b. Corona lobes threadlike to acute triangular, as long as or longer than corona tube.



- 59a. Corona lobes longer than corolla; leaves lanceolate or oblong-lanceolate, basal sinus very deep, lobes mostly incurved to overlapping ..... 4. *C. heydei*
- 59b. Corona lobes shorter than corolla; leaves ovate, deltate-ovate, hastate, or hastate-cordate, basal sinus shallow or, if deep, lobes parallel or divergent.
- 60a. Corolla pubescent inside, lobes lanceolate, 1.5–2 mm wide ..... 5. *C. szechuanense*
- 60b. Corolla glabrous inside, lobes oblong or oblong-lanceolate, 1–1.3 mm wide.
- 61a. Corolla erect, purple inside; inner corona appendages included in corona tube; leaf blade hastate or hastate-cordate with enlarged basal lobes, apex long acuminate ..... 6. *C. acutum*
- 61b. Corolla rigidly rotate to slightly reflexed, white; inner corona appendages nearly as long as main corona lobes; leaf blade broadly triangular-cordate; apex acute to short acuminate ..... 7. *C. chinense*

**1. *Cynanchum thesioides*** (Freyn) K. Schumann in Engler & Prantl, Nat. Pflanzenfam. 4(2): 252. 1895.

地梢瓜 di shao gua

*Vincetoxicum thesioides* Freyn, Oestr. Bot. Z. 40: 124. 1890; *Alexitoxicon sibiricum* (Linnaeus) Pobedimova; *Antitoxicum sibiricum* (Linnaeus) Pobedimova; *Asclepias sibirica* Linnaeus; *Cynanchum sibiricum* (Linnaeus) R. Brown (1810), not Willdenow (1799); *C. sibiricum* var. *australe* (Maximowicz) Maximowicz ex Komarov; *C. sibiricum* var. *gracilentum* Nakai & Kitagawa; *C. sibiricum* var. *latifolium* Kitagawa; *Rhodostegiella sibirica* (Linnaeus) C. Y. Wu & D. Z. Li; *R. sibirica* var. *australis* (Maximowicz) C. Y. Wu & D. Z. Li; *Vincetoxicum sibiricum* (Linnaeus) Decaisne; *V. sibiricum* var. *australe* Maximowicz; *V. sibiricum* var. *boreale* Maximowicz.

Herbs suffrutescent, sometimes lianescent, rhizomatous; usually densely puberulent throughout. Stems erect or upper part twining, mainly branched at base. Leaves opposite or subopposite, rarely whorled, sessile or subsessile; leaf blade linear to linear-lanceolate, or occasionally broadly lanceolate, 3–10 × 0.2–1.5(–2.3) cm; midvein elevated abaxially, lateral veins obscure. Inflorescences umbel-like to short racemelike, sometimes terminal; cymes 2-flowered, solitary or clustered; peduncle 1–5(–20) mm. Pedicel 2–10 mm. Sepals lanceolate, 1–2.5 × 0.4–0.8 mm, puberulent, ciliate. Corolla green-white, mostly glabrous but sometimes with some hairs especially inside tube; tube 1–1.5 mm; lobes 2–3 × 1–1.5 mm, rounded. Corona cupular; tube shorter than anthers, margin 5-lobed; lobes triangular-lanceolate to linear, up to middle of anthers to higher than anther appendages, incurved at base, apex acuminate or rounded. Anther appendages erect, ovate-triangular to lanceolate; pollinia oblong. Stigma head depressed. Follicles ovoid-fusiform, 5–6(–7.5) × 1–2 cm. Seeds ovate, 5–9 × 3–5 mm; coma ca. 2 cm. Fl. Mar–Aug, fr. Aug–Oct.

Open disturbed sites in thickets, dry valleys, sand dunes, grasslands, roadsides; 0–3000 m. Gansu, Hebei, Heilongjiang, Henan, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Xinjiang [Kazakhstan, Korea, Mongolia, Russia].

**2. *Cynanchum anthonyanum*** Handel-Mazzetti, Symb. Sin. 7: 997. 1936.

小叶鹅绒藤 xiao ye e rong teng

*Cynanchum yunnanense* Anthony, Notes Roy. Bot. Gard. Edinburgh 15: 240. 1927, not H. Léveillé, 1915.

Stems erect, to 15(–30) cm tall, tomentulose. Leaves opposite; petiole 1–3 mm, hirsute; leaf blade triangular or cordate-oblong, 0.5–1.5 cm × 1–8 mm, glabrous except for midvein, base cordate or rarely truncate, apex subacuminate; lateral veins obscure. Inflorescences umbel-like; peduncle 1.5–2.5 cm. Pedicel 3–4 mm. Sepals lanceolate, ca. 1.5 × 0.5 mm; basal glands 5. Corolla subrotate, glabrous; tube short; lobes oblong-lanceolate, ca. 4 × 1 mm. Corona cupular, margin with 5 3-toothed lobes, inner appendages linear-triangular, as long as corolla lobes, apex unequally forked. Anthers broadly rhomboid, appendages oblong. Stigma head

subumbonate, included. Follicles ovate-lanceolate, ca. 4.5 cm, glabrescent. Seeds broadly ovate, ca. 7 × 5 mm; coma ca. 5 mm. Fl. May-Jul, fr. Aug-Sep.

- Thicket edges; 1500–2500 m. Sichuan, Yunnan.

**3. *Cynanchum purpureum*** (Pallas) K. Schumann in Engler & Prantl, Nat. Pflanzenfam. 4(2): 253. 1895.

紫花鹅绒藤 zi hua e rong teng

*Asclepias purpurea* Pallas, Reise Russ. Reich. 3: 260. 1776; *A. davurica* Willdenow; *Cyathella purpurea* (Pallas) C. Y. Wu & D. Z. Li; *Cynanchum roseum* R. Brown; *Cynotonum roseum* (R. Brown) Decaisne; *Vincetoxicum purpureum* (Pallas) Kuntze.

Herbs erect, to 60 cm tall. Rootstock a fleshy taproot to at least 2 cm thick. Stems few branched, hispid, densely so toward base of young stems, hollow when dry. Leaves opposite, usually grouped at branch apex; leaf blade linear or linear-lanceolate, 1–3 cm × 2–7 mm, sparsely villous, densely ciliate. Inflorescences terminal, umbel-like, often compound, hemispherical, 4–7 cm; peduncle to 5 cm, sparsely villous. Pedicel 5–10 mm, sparsely villous. Sepals lanceolate, 2–4 × 0.7–0.8 mm, pubescent; small basal glands present. Corolla purple, rotate, glabrous; tube ca. 1 mm; lobes linear-lanceolate, 5–10 × 1.5–2 mm. Corona pale, tubular, ca. 2 × gynostegium, 5–6 mm, membranous, marginal teeth 1–1.5 mm. Pollinia oblong. Stigma head cylindrical. Follicles compressed fusiform, ca. 7.5 × 1 cm, both ends acute. Seeds oblong, ca. 7 × 3 mm, apex irregularly toothed; coma ca. 1.5 cm, tawny. Fl. May-Jun, fr. Jun-Oct.

Montane forests, steppes, sandy ravines. Hebei, Nei Mongol [Korea, Mongolia, Russia].

**4. *Cynanchum heydei*** J. D. Hooker, Fl. Brit. India 4: 25. 1883.

西藏鹅绒藤 xi zang e rong teng

*Vincetoxicum heydei* (J. D. Hooker) Kuntze.

Stems slender, twining, to 1.5 m, sparsely puberulent when young. Petiole 2–3 cm; leaf blade lanceolate to oblong-lanceolate, ca. 5.5 × 2–2.6 cm, slightly fleshy, sparsely puberulent when young, base very deeply cordate, basal lobes incurved and overlapping, apex acute; basal veins 3–5, lateral veins 5–6 pairs. Inflorescences short racemelike, to 3.5 cm, to 9-flowered; peduncle to 1.6 cm. Pedicel 5–8 mm. Sepals ca. 2 × 0.8 mm, slightly puberulent. Corolla lobes oblong-lanceolate, ± erect, ca. 4.5 × 1.8 mm, glabrous, apex rounded. Corona cylindrical, ca. 1.5 mm, margin produced into 5 linear lobes longer than corolla, interior with 5 short, ligulate appendages, sinus smooth. Stigma head apiculate at apex.

Forests. W Xizang [Kashmir, Pakistan].

**5. *Cynanchum szechuanense*** Tsiang & Zhang in Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 86. 1974.

四川鹅绒藤 si chuan e rong teng

*Cynanchum szechuanense* var. *albescens* Tsiang & Zhang.

Plants pubescent or pilose except for corolla. Stems twining, to 6 m, pubescent along 1 side. Petiole 1.5–5.5 cm; leaf blade ovate or triangular-ovate, 3.2–13(–23) × 1.5–8.5(–13.5) cm, papery, adaxially minutely appressed puberulent, abaxially pubescent on veins, base deeply cordate with basal lobes sometimes incurved and rarely slightly enlarged, apex acuminate; basal veins 5–7, pedate, lateral veins 2 or 3 pairs. Inflorescences long, simple or with short lateral branches; cymules distinct, many flowered, umbel-like or ± contiguous, few flowered, and racemelike; peduncle 4–8(–12.5) cm, rachis 0–7 cm. Sepals lanceolate, ca. 3.5 × 1 mm; basal glands present. Corolla green or white with purple apex, rotate to reflexed, tube short; lobes lanceolate, 3.5–5.5(–6.7) × 1.4–2 mm, glabrous outside, pubescent inside. Corona white, tube cupular, 1.3–2.5 mm high, membranous, margin with 5 main lobes, these triangular to threadlike, 1.2–3 mm, sinuses between these each usually with ca. 3 small rounded teeth, sometimes ± truncate; inner appendages lanceolate to threadlike, as long as or exserted from tube. Anther appendages rounded; pollinia oblong. Stigma head conical. Follicles lanceolate in outline, 7.5–9 × ca. 1.5 cm. Fl. May-Jul.

- Open woodland, climbing over shrubs; 2300–3200 m. W Sichuan, Xizang.

*Cynanchum szechuanense* is quite variable in the length of corona lobes. Forms with the longest lobes are restricted to W Sichuan but those with short triangular lobes are found throughout the species range. Further studies are needed to show if infraspecific taxa can be recognized.

**6. *Cynanchum acutum*** Linnaeus subsp. ***sibiricum*** (Willdenow) K. H. Rechinger, Fl. Iranica 73: 9. 1970.

戟叶鹅绒藤 ji ye e rong teng

*Cynanchum sibiricum* Willdenow, Ges. Naturf. Freunde Berlin Neue Schriften 124. 1799; *Cyathella cathayensis* (Tsiang & Zhang) C. Y. Wu & D. Z. Li; *Cynanchum acutum* var. *longifolium* (Martens) Ledebour; *C. cathayense* Tsiang & Zhang; *C. longifolium* Martens.

Roots ca. 2 cm in diam. Stems many branched and woody at base, twining to 3 m, villous to puberulent, sometimes glabrous. Petiole 0.5–4 cm; leaf blade hastate, hastate-cordate, or oblong-hastate, 1.3–6(–15) × 1.1–4.5(–8) cm, papery, base auriculate, apex acute to long acuminate, basal lobes recurved, parallel or divergent, ciliate, glabrous or densely pubescent along veins; basal veins 5–7, lateral veins ca. 3 pairs. Inflorescences racemelike; peduncle 0.5–5 cm, rachis to 7 cm. Pedicel 4–8 mm. Sepals ovate, 1.5–2 × 0.5–0.9 mm, puberulent outside, glandular inside. Corolla white outside, white to purple inside; tube ca. 1 mm; lobes narrowly ovate or oblong, ca. 4 × 1.3–2 mm, obtuse, glabrous. Corona cylindrical, margin 5-lobed; lobes 3-fid with middle segment long threadlike, interior with 5 short appendages included within tube. Anthers nearly square, appendages ovate; pollinia oblong. Stigma head subapiculate. Follicles lanceolate

to linear, 6.5–13 cm × 8–10 mm, puberulent. Seeds oblong-ovate, 5–7.5 × 2–2.5 mm; coma 2–3 cm. Fl. May–Aug, fr. Jun–Oct.

Dry areas, waste places; 900–1400 m. Gansu, Hebei, Nei Mongol, Ningxia, Xinjiang, Xizang [Afghanistan, Kashmir, Kazakhstan, Mongolia, Pakistan, Russia, Turkmenistan; SW Asia].

The plant is used medicinally to treat swellings.

*Cynanchum acutum* subsp. *acutum* is widespread in the Mediterranean region from Spain east to Iraq, where there is a small area of overlap with subsp. *sibiricum*. It differs by having ovate leaves with convex sides.

### 7. *Cynanchum chinense* R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 44. 1810.

鹅绒藤 e rong teng

*Cynanchum deltoideum* Hance; *C. pubescens* Bunge; *Vincetoxicum pubescens* (Bunge) Kuntze.

Plants twining to 4 m, pubescent throughout. Leaves opposite; petiole 1–4 cm; leaf blade broadly triangular-cordate, 2.5–9 × 2–7 cm, thin papery, glaucous abaxially, base cordate, apex acute; basal veins up to 9, lateral veins up to 6 pairs, slightly elevated abaxially. Inflorescences normally forked at first flower, sometimes rebranching, to ca. 20-flowered; peduncle to 6 cm; rachis to 10 cm, often branched, zigzag in fruit. Pedicel ca. 1 cm. Sepals oblong-triangular, 1–2 × 0.5–1 mm, ciliate, pubescent. Corolla white, rotate to reflexed, glabrous; tube 0.5–1 mm; lobes oblong-lanceolate, 3–6 × 1–1.2 mm. Corona tube cupular, ca. 1 mm, as long as gynostegium, margin with 5 threadlike lobes as long as corolla lobes alternating with 5 short rounded lobes, interior with 5 shorter, threadlike appendages. Anthers subrhomboid, appendages rounded; pollinia oblong. Stigma head convex. Follicles cylindrical-fusiform, 8–13 cm × 5–8 mm, apex acuminate. Seeds oblong, 5–6 × ca. 2 mm; coma 2.5–3 cm. Fl. Jun–Aug, fr. Aug–Oct.

Thickets, roadsides, river banks; below 500(–900) m. Gansu, Hebei, Henan, Jiangsu, Jilin, Liaoning, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi [Korea, Mongolia].

A decoction of all parts is used for the treatment of colds and chills.

### 8. *Cynanchum longipedunculatum* M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 7. 1995.

短柱豹药藤 duan zhu bao yao teng

Stems twining, internodes puberulent along 1 side. Petiole ca. 2.5 cm, slender; leaf blade lanceolate, ca. 5.6 × 2.3 cm, adaxially puberulent, abaxially hairy along veins, base deeply cordate, lobes often overlapping, apex long acuminate; basal veins usually 7, lateral veins 3 or 4 pairs. Inflorescences umbel-like, dense, to 2 cm wide; peduncle 6–9 cm, densely hairy on 1 side, sometimes an isolated flower below main inflorescence. Pedicel 3.5–6 mm, puberulent on 1 side. Sepals oblong lanceolate, ca. 2 × 0.9 mm, puberulent. Corolla white, glabrous outside, densely pilose inside, tube ca. 0.5 mm; lobes ca. 5.5 × 1.7 mm, ± erect. Corona cupular, longer than stigma head, slightly fleshy, tube longer than triangular marginal lobes, interior with 5 internal appendages nearly as long as marginal

lobes. Anther appendages ovate. Stigma head rounded.

- 3600 m. Western China (Sichuan or Hubei).

Known only from the type, which lacks detailed locality data.

### 9. *Cynanchum decipiens* C. K. Schneider in Sargent, Pl. Wilson. 3: 345. 1916.

豹药藤 bao yao teng

Plants twining to 3 m. Branchlets gray-brown, terete, pubescent along 1 line, sometimes subglabrous. Leaves opposite; petiole 1–3 cm, sparsely puberulent, with a group of adaxial glands; leaf blade ovate or ovate-lanceolate, 5–8 × 2–4 cm, membranous, sparsely puberulent, base cordate, apex acuminate. Inflorescences umbel-like, 3–15 cm, to 25-flowered, puberulent; peduncle 4–10 cm; basal bracts linear-lanceolate, to 1.8 cm. Pedicel 1–2 cm. Sepals lanceolate, ca. 2 mm, sparsely pilose, ciliate. Corolla white or reddish, rotate; lobes oblong, ca. 4 mm, glabrous outside, whitish puberulent inside. Corona cupular, shorter than gynostegium, somewhat fleshy, margin very shallowly 5-lobed, interior with 5 ovate, fleshy appendages. Anther appendages rounded, incurved; pollinia oblong. Follicles lanceolate, ca. 11 × 1.2 cm. Seeds oblong-spatulate; coma ca. 2 cm. Fl. May–Jul, fr. Jul–Oct.

- Open woodland, thickets along valleys and roadsides; 2000–3500 m. Guizhou, Hunan, Sichuan, Yunnan.

### 10. *Cynanchum brevicoronatum* M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 5. 1995.

短冠豹药藤 duan guan bao yao teng

Stems twining, puberulent along 2 lines. Petiole to ca. 3 cm, adaxially puberulent; leaf blade ovate or ovate-triangular, 6–7.5 × 3–4.2 cm, adaxially sparsely minute hairy, abaxially pale gray-green and puberulent along veins, base cordate with wide sinus, basal lobes incurved, apex acute to subacuminate; basal veins 3(–5), lateral veins 2 or 3 pairs. Inflorescences simple, densely racemelike, to 1.5 cm; cymules 2-flowered; peduncle 1–5 mm, puberulent. Pedicel to 5.5 mm, pubescent. Sepals lanceolate, ca. 1.5 × 0.7 mm, ciliate, minutely puberulent, strongly reflexed at anthesis. Corolla erect; lobes oblong-ovate, ca. 3.5 × 1.7 mm, slightly fleshy, glabrous. Corona a shallow membranous cup ca. as high as gynostegium, internal appendages absent. Gynostegium ca. 2.5 mm high; anther appendages ovate, acute. Follicles often solitary, lanceolate in outline, ca. 6 × 1.5 cm.

- Hubei.

### 11. *Cynanchum wallichii* Wight, Contr. Bot. India 56. 1834.

昆明杯冠藤 kun ming bei guan teng

*Cyathella wallichii* (Wight) C. Y. Wu & D. Z. Li; *Cynotonum wallichii* (Wight) Decaisne; *Vincetoxicum wallichii* (Wight) Kuntze.

Stems twining to 2 m, terete, internodes with 2 lines of hairs. Petiole 2.5–4 cm; leaf blade ovate-oblong, 4–9 × 2–4 cm, thin papery, adaxially pubescent, densely so along veins, abaxially glabrescent and glaucous, ciliate, base deeply cordate with rounded and incurved lobes, apex short acuminate; basal veins 5, lateral veins 3 or 4 pairs; stipulelike axillary leaves present. Inflorescences subsessile, racemelike, to 3.5 cm, 10–20-flowered; cymules 2-flowered, in regular spiral; peduncle to 2 cm, often shorter than pedicels. Pedicel to 1.5 cm. Sepals ovate, ca. 1.5 mm, pubescent; basal glands up to 20. Corolla white or yellow-white, usually reflexed to rotate, glabrous; lobes oblong-lanceolate, ca. 5 × 1.7 mm. Corona white, cupular, membranous, 3.3–4 mm high, margin with 5 rounded teeth, plicate inside between teeth, these often well developed and appendagelike. Pollinia oblong. Fl. Sep.

Yunnan (Kiukiang Valley) [Bangladesh, Myanmar].

Most Chinese material formerly included in *Cynanchum wallichii* belongs to *C. kintungense* Tsiang.

**12. *Cynanchum duclouxii*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 6. 1995.

小花杯冠藤 xiao hua bei guan teng

Stems twining, puberulent along 1 line. Petiole 2.5–3.2 cm; leaf blade abaxially slightly paler but apparently not glaucous, triangular-ovate, 4.5–8 × 1.7–5.1 cm, abaxially glabrous except for puberulent veins, adaxially uniformly minute puberulent, base deeply cordate, basal lobes slightly enlarged, sometimes overlapping, apex acute to subacuminate; basal veins 3–5, pedate, lateral veins 2 or 3 pairs. Inflorescences racemelike, sometimes terminal on short axillary branches; peduncle 0.7–5.5 cm; rachis to 1.5 cm; cymules 2-flowered, in lax spiral. Pedicel to 6 mm, puberulent. Sepals ovate, ca. 1 × 0.8 mm, sparsely puberulent, apex acute. Corolla white, erect, deeply divided; lobes 2.5–3 × 1–1.4 mm, glabrous. Corona membranous, prominently 5-lobed; tube ca. as high as middle of anthers; lobes longer than anther appendages, often inflexed, each with 2 prominent adaxial ridges at base, rarely with a small adaxial appendage. Anther appendages ovate, acute, prominent. Follicles solitary, lanceolate in outline, ca. 6.5 cm × 9 mm, base tapered, apex subacuminate.

• Bushland in valleys. Yunnan.

**13. *Cynanchum sinoracemosum*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 8. 1995.

尖叶杯冠藤 jian ye bei guan teng

Stems twining, terete, internodes puberulent along 1 or 2 sides. Petiole 1.4–3.5 cm, slender, puberulent along adaxial groove; leaf blade lanceolate, 4.3–6(–8) × 1.5–2.5(–4.5) cm, adaxially sparsely pubescent, abaxially paler and more sparsely hairy, sometimes glabrous except for veins, base deeply cordate, basal lobes incurved and sometimes overlapping, apex long acute to subacuminate; basal veins 5–7, lateral veins 3 or 4 pairs; minute stipulelike axillary leaves present. Inflorescences racemelike, 2–4 cm; cymules 2-flowered, in regular spiral; peduncle 0.4–2.5 cm, puberulent. Pedicel 3–7 mm. Sepals ca. 1.3 × 0.7 mm, puberulent. Corolla white, erect, glabrous; lobes oblong-lanceolate, 3.3–4.5 ×

1.3–1.5 mm. Corona white, deeply cupular, ca. 2–3 mm high, concealing gynostegium, plicate, marginal lobes 5, bluntly triangular, up to 0.4 mm, alternating with well-defined, appendagelike plicae. Young fruit relatively broad, solitary. Fl. Jun-Aug.

• Hedges. Sichuan, Yunnan.

**14. *Cynanchum kintungense*** Tsiang, *Sunyatsenia* 4: 110. 1939.

景东杯冠藤 jing dong bei guan teng

Stems twining to 2 m, terete, pubescent along 1 side. Leaves opposite; petiole 2.5–4 cm; leaf blade ovate-oblong, 4–9 × 2–4 cm, thin papery, adaxially pubescent, densely so along veins, abaxially glabrescent and glaucous, ciliate, base auriculate-cordate, basal lobes rounded, incurved, apex short acuminate; basal veins 5, lateral veins 3 or 4 pairs; stipulelike axillary leaves present. Inflorescences corymbose, 10–20-flowered. Sepals ovate, ca. 1.5 mm, pubescent; basal glands up to 20. Corolla white or yellow-white, glabrous; lobes oblong-lanceolate, ca. 3.5 × 1.5 mm, rotate. Corona white, cupular, membranous, ca. 2 mm high, margin with 5 rounded teeth, plicate inside between teeth. Pollinia oblong. Follicles subfusiform, ca. 6.5 × 1 cm, glabrous, apex beaked, acuminate. Seeds broadly ovate, ca. 8 × 5 mm; coma 1–2 cm. Fl. Jul-Oct, fr. Sep-Dec.

• Thickets, roadsides, along valleys. Guangxi, Guizhou, Sichuan, Xizang, Yunnan.

Nearly all the Chinese material formerly included in *Cynanchum wallichii* belongs here. The species differs from *C. wallichii* by the shorter corona tube and rotate corolla. The illustration in the protologue shows the corolla as reflexed but no material with clearly reflexed corollas has been seen, and the illustration may be based on a faulty reconstruction of the rather shrivelled type collection.

**15. *Cynanchum corymbosum*** Wight, *Contr. Bot. India* 56. 1834.

刺瓜 ci gua

*Cyathella corymbosa* (Wight) C. Y. Wu & D. Z. Li;  
*Cynoctonum corymbosum* (Wight) Decaisne.

Root tubers strong. Stems twining, to 2 m, pale gray, pubescent along 2 lines. Petiole 2.5–4.5 cm; leaf blade abaxially glaucous, adaxially darkening on drying, ovate or ovate-oblong, 4.5–12(–20) × 3.5–8(–10) cm, thin papery, base cordate, basal lobes rounded, apex apiculate or acuminate, glabrous except for veins, basal veins 5, lateral veins ca. 3 pairs. Inflorescences racemelike, 2.5–7 cm, less often laxly branched and to 13 cm; cymules 2-flowered; peduncle 1–5 cm, puberulent. Pedicel 0.2–1.8 cm, pubescent. Sepals ovate, 1.5–2 × ca. 1 mm, glabrous or pubescent; basal glands 5, minute. Corolla greenish white drying dark, subrotate; lobes oblong-lanceolate, ca. 5 × 1.5 mm, glabrous. Corona ± tubular, pure white, 3–4 mm high, plicate and with ± free

adaxial appendages between acute teeth, marginal teeth 10, alternately rounded and acute, ca. 0.5–0.7 mm. Anther appendages oval; pollinia oblong. Stigma head bifid, included within anthers. Follicles fusiform, 9–12 × 2–3 cm, conspicuously echinate, spines curved at tip. Seeds brown, 7–10 × ca. 5 mm, conspicuously dentate at end opposite coma; coma 3–4 cm. Fl. May–Oct, fr. Aug–Dec.

Thickets, open woods, riversides, valleys. Fujian, Guangdong, Guangxi, Hunan, Sichuan, Yunnan [Cambodia, India, Laos, ?Malaysia, Myanmar, Vietnam].

All parts are used as medicine to induce lactation and to treat nephritis, neurasthenia, and pulmonary tuberculosis.

**16. *Cynanchum megalanthum*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 7. 1995.

大花刺瓜 da hua ci gua

Twiners robust. Stems puberulent along 1 (or 2) lines. Leaves opposite; petiole ca. 2.5 cm; leaf blade abaxially gray-green, triangular-ovate, to 8.5 × 4.8 cm, thin papery, minutely puberulent, base deeply cordate, basal lobes rounded, not incurved, apex acute to acuminate; basal veins 5, lateral veins ca. 3 pairs. Inflorescences umbel-like or sometimes raceme-like with many-flowered cymes; peduncle robust, ca. 5 cm, thin puberulent. Pedicel 1–1.4 cm, puberulent along 1 side. Sepals lanceolate, ca. 5 × 1.4 mm, very sparsely and minutely puberulent. Corolla cream or pale greenish pink, deeply divided, rotate; lobes linear-lanceolate, ca. 10 × 2.2 mm, very sparsely hairy. Corona cupular, ca. 1 mm high, with 5 triangular marginal lobes to 3 mm high and small internal appendages. Anther appendages oval, incurved over stigma head. Fruit and seeds not seen.

Probably along thicket margins; 3300 m. Yunnan [Myanmar].

**17. *Cynanchum kingdonwardii*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 6. 1995.

宁蒗杯冠藤 ning lang bei guan teng

Stems twining, internodes with 2 poorly defined lines of hairs. Leaves opposite; petiole to 1.1 cm; leaf blade linear-lanceolate, to more than 11 × 1.2 cm, adaxially thin puberulent, abaxially glabrous, base cuneate, apex acute; lateral veins ca. 10 pairs. Inflorescences umbel-like; peduncle to 3 mm, pubescent along 1 side. Pedicel to 7 mm, puberulent. Sepals lanceolate, ca. 2 × 0.8 mm, sparsely hairy. Corolla very pale green, deeply divided, glabrous; lobes oblong-lanceolate, ca. 5 × 2.4 mm, blunt. Corona white, cupular, ca. 2.5 mm high, membranous, adnate to anthers, margin with 5 low, acute teeth, smooth inside. Gynostegium slightly higher than corona; anther appendages narrowly ovate. Fl. Jun–Jul.

• Yunnan (Yung-ning).

**18. *Cynanchum insulanum*** (Hance) Hemsley, *J. Linn. Soc.*, *Bot.* 26: 107. 1889.

海南杯冠藤 hai nan bei guan teng

Herbs, glabrous except for pubescent nodes, petioles, and

leaf margin. Rhizome nodes sometimes forming globose tubers. Stems twining, to 60 cm. Leaves opposite; petiole 1–15 mm; leaf blade oblong-hastate, ovate-triangular, to linear-lanceolate, 1–4 × 0.1–1.5 cm, base rounded to subcordate-hastate, apex acute or short apiculate; lateral veins 5 or 6 pairs. Inflorescences umbel-like, much shorter than leaves, 4- or 5-flowered. Sepals oblong, ca. 1 × 0.5 mm, acute; basal glands 5. Corolla greenish white, subrotate; tube ca. 0.5 mm; lobes ovate-oblong, ca. 2 × 1 mm, acute. Corona tube cupular, thin membranous, ca. 2 mm, longer than gynostegium, longitudinally plicate; anthers nearly square, appendages ovate; pollinia oblong. Stigma head capitate, included within anthers. Follicles lanceolate, 4.5–5 cm × 7–8 mm, with 2 inconspicuous longitudinal ridges, glabrous. Seeds oblong, ca. 3 mm; coma ca. 2 cm.

• Two varieties: 0–100 m. Guangdong, Guangxi, Hainan.

- 1a. Leaf blade 5–15 mm wide, base truncate or subcordate-hastate; corona shallowly 10-lobed ..... 18a. var. *insulanum*
- 1b. Leaf blade 1–3 mm wide, base rounded; corona deeply 10-lobed ..... 18b. var. *lineare*

#### **18a. *Cynanchum insulanum* var. *insulanum***

海南杯冠藤(原变种) hai nan bei guan teng (yuan bian zhong)

*Cynoctonum insulanum* Hance, *J. Bot.* 6: 330. 1868; *Cyathella insulana* (Hance) Tsiang & Zhang; *Vincetoxicum insulanum* (Hance) Kuntze.

Leaves ovate-triangular, oblong-hastate, or lanceolate, 2–3.5 × 0.5–1.5 cm, base truncate or subcordate-hastate. Corona shallowly 10-lobed, lobes obtuse. Fl. May–Oct, fr. Oct–Dec.

• Open woodland, sandy seashores; 0–100 m. Guangdong, Guangxi, Hainan.

#### **18b. *Cynanchum insulanum* var. *lineare*** (Tsiang & Zhang) Tsiang & Zhang, *Acta Phytotax. Sin.* 12: 109. 1974.

线叶杯冠藤 xian ye bei guan teng

*Cyathella insulana* (Hance) Hemsley var. *lineare* Tsiang & Zhang, *Acta Phytotax. Sin.* 10: 39. 1965.

Leaves linear or linear-lanceolate, 1–4 cm × 1–3 mm, base rounded. Corona deeply 10-lobed, lobes acuminate. Fl. Jun–Sep.

• Seaside grasslands. S Guangdong, Hainan.

#### **19. *Cynanchum callialatum*** Buchanan-Hamilton ex Wight, *Contr. Bot. India* 56. 1834.

美翼杯冠藤 mei yi bei guan teng

*Cyathella callialata* (Buchanan-Hamilton ex Wight) C. Y. Wu & D. Z. Li; *Cynoctonum callialatum* (Buchanan-

Hamilton ex Wight) Decaisne; *Vincetoxicum callialatum* (Buchanan-Hamilton ex Wight) Kuntze.

Herbs twining, to 3 m. Stems pubescent along 1 side. Leaves opposite; petiole 1–4 cm; leaf blade abaxially glaucous, oblong or ovate-oblong, 4.5–8 × 2–4 cm, slightly fleshy, base cordate, apex acuminate, basal lobes incurved, sometimes overlapping; lateral veins 6–12 pairs. Inflorescences simple, umbel-like, dense, 6–12-flowered; peduncle 1–7 mm. Pedicel 3–6 mm. Sepals lanceolate, 2–2.5 × 1 mm; basal glands ca. 10. Corolla whitish, drying darker than corona, rotate; tube ca. 1 mm; lobes oblong, ca. 4 × 1.5–2 mm. Corona white, cupular, ca. 3.5 mm, or reduced to membranous ring, apex 2-cleft, with a longitudinal ridge below each sinus. Gynostegium distinctly stipitate. Anthers ± rhomboid, ca. 1 mm, appendages oval; pollinia oblong. Stigma head ovoid, slightly exerted. Follicles oblong-lanceolate, 5–8 × 1–1.5 cm, with 2 wings especially prominent at tip. Seeds oval-oblong, ca. 5 × 3 mm; coma ca. 2 cm. Fl. Aug-Oct, fr. Oct-Dec.

Open woodland, thickets along mountain roadsides; 1000–1500 m. W Guangxi, Yunnan [India, Myanmar, Pakistan].

Records of *Cynanchum alatum* Wight & Arnott in China are based on a misidentification of *C. callialatum*. *Cynanchum alatum* appears to be restricted to India and Sri Lanka.

**20. *Cynanchum formosanum*** (Maximowicz) Hemsley, J. Linn. Soc., Bot. 26: 106. 1889.

台湾杯冠藤 tai wan bei guan teng

*Cynoctonum formosanum* Maximowicz, Bull. Acad. Sci. Saint-Pétersbourg 23: 370. 1877; *Cyathella formosana* (Maximowicz) C. Y. Wu & D. Z. Li; *C. formosana* var. *ovalifolia* (Tsiang & P. T. Li) C. Y. Wu & D. Z. Li; *Cynanchum crassifolium* Hatusima (1963), not R. Brown (1810); *C. formosanum* var. *ovalifolium* Tsiang & P. T. Li; *C. hatusimai* P. T. Li; *Vincetoxicum formosanum* (Maximowicz) Kuntze.

Stems twining, to 3 m, glabrous or sparsely pubescent. Petiole 1–4 cm; leaf blade oblong to elliptic, 2.5–7 × 1.5–5 cm, leathery or thick papery, glabrous, base rounded or cordate, apex acute or rounded-cuspidate, sometimes subacuminate; lateral veins 4–6 pairs. Inflorescences racemelike, often branched, 10–35-flowered, 2.5–3.5 cm; cymules 2-flowered; peduncle 0.5–3 cm, pubescent or glabrous. Pedicel to 5 mm. Sepals ovate-oblong, ca. 5 × 2 mm, ciliate; basal glands 5. Corolla ca. 1 cm in diam., rotate to reflexed, fleshy, glabrous; lobes oblong, 4–5 mm, apex acute. Corona cupular, longer than gynostegium, plicate, margin with 5 long teeth alternating with 5 short-truncate, denticulate lobes. Anther appendages rounded to reniform, mucronate; pollinia broadly ovoid. Stigma head slightly elevated. Follicles lanceolate, 7–9 × 1–1.5 cm, glabrous. Seeds flattened, ovate, ca. 1.5 cm; coma to 4 cm. Fl. May-Oct.

• Forests, thickets; low to medium altitudes. Taiwan (Taibei and Taizhong, Lanyu and Lutao Islands).

**21. *Cynanchum kwangsiense*** Tsiang & Zhang in Tsiang &

P. T. Li, Acta Phytotax. Sin. 12: 109. 1974.

广西杯冠藤 guang xi bei guan teng

*Cyathella kwangsiensis* (Tsiang & Zhang) C. Y. Wu & D. Z. Li.

Stems twining to 3 m, pilose, glabrescent. Leaves opposite; petiole ca. 1.5 cm; leaf blade elliptic, 6–10 × 2.5–4 cm, leathery, glabrous, base cuneate or rounded, apex acuminate or caudate; lateral veins 5–9 pairs. Inflorescences racemelike, 2–3 cm, 5–10-flowered; peduncle 1–2 cm, puberulent. Pedicel ca. 5 mm, puberulent. Sepals ovate, ca. 1.5 × 0.8 mm, ciliate, puberulent. Corolla white, glabrous; lobes oblong-ovate, ca. 3.2 × 1.7 mm, apex acute or obtuse. Corona cupular, longer than gynostegium, plicate, margin with 10 teeth alternating with pairs of minute, rounded teeth. Anther appendages ovate, apiculate; pollinia elliptic. Stigma head raised. Fl. May-Oct.

• Open woodland; 550–600 m. Guangxi (Tianlin and Luocheng).

*Cynanchum kwangsiensis* is very closely related to *C. formosanum*, differing only in quantitative leaf characters.

**22. *Cynanchum wilfordii*** (Maximowicz) J. D. Hooker, Fl. Brit. India 4: 25. 1883.

隔山消 ge shan xiao

*Cynoctonum wilfordii* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 9: 799. 1876; *Seutera wilfordii* (Maximowicz) Pobedimova; *Vincetoxicum wilfordii* (Maximowicz) Franchet & Savatier.

Roots fleshy, irregularly fusiform, up to 10 × 2 cm. Stems twining, to 2 m, pubescent along 1 line. Leaves opposite; petiole 2 cm, with adaxial glands; leaf blade ovate or ovate-cordate, 5–6 × 2–4 cm, thin papery, appressed puberulent, adaxially dark when dry, base auriculate-cordate, basal lobes rounded, recurved or incurved, apex short cuspidate to acuminate; basal veins 3–5, lateral veins ca. 4 pairs. Inflorescences umbel-like to very short racemelike, hemispherical, densely 15–20-flowered; peduncle ca. 1.5 cm, rarely dichotomous, puberulent along 1 side. Pedicel 5–7 mm, puberulent. Sepals oblong-lanceolate, ca. 1.5 × 0.6 mm, glabrous or sparsely pubescent; basal glands 10. Corolla yellowish, rotate; lobes lanceolate, 4.5–5 × ca. 2 mm, glabrous outside, densely short pilose inside. Corona deeply 5-lobed; lobes rounded to nearly square, membranous, shorter than gynostegium, base attenuate, apex truncate, with transverse adaxial ridge. Gynostegium stipitate. Anther appendages ovate, almost as long as corona; pollinia oblong. Stigma head umbonate. Follicles lanceolate, 11–12 × 1–1.4 cm. Seeds ovate, ca. 7 mm; coma ca. 2 cm. Fl. May-Sep, fr. Jul-Nov.

Thickets, valleys, mountain slopes, roadsides, grasslands; 800–1500 m. Anhui, Gansu, Henan, Hubei, Hunan, Jiangsu, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Yunnan [Japan, Korea, Russia].

The root is used as medicine for impotency, neurasthenia, and lumbago.

**23. *Cynanchum otophyllum*** C. K. Schneider in Sargent, Pl. Wilson. 3: 347. 1916.

青羊参 qing yang shen

*Cyathella otophylla* (C. K. Schneider) C. Y. Wu & D. Z. Li.

Stems twining, to 2 m, pubescent along 1 line. Leaves opposite; petiole 1.5–5 cm, adaxially puberulent; leaf blade ovate-lanceolate, 4–11 × 2.5–8 cm, abaxially distinctly paler, membranous, minutely pilose, sometimes glabrescent, base strongly auriculate, basal lobes rounded, apex gradually acuminate. Inflorescences umbel-like or racemelike; peduncle 2–4 cm, puberulent to subglabrous; cymules up to 8-flowered. Pedicel 3–5 mm, puberulent on 1 side. Sepals ovate-lanceolate, ca. 1 × 0.7 mm, puberulent; basal glands 5. Corolla white, rotate; lobes oblong, 2–3 × ca. 1 mm, minutely puberulent inside. Corona slightly shorter than corolla, deeply 5-lobed; lobes oblong-lanceolate, narrower toward base, apex rounded to subacute, sometimes slightly 3-toothed, slightly fleshy, adaxially grooved with lateral longitudinal ridges, adaxial appendages minute or absent. Gynostegium short stipitate. Anther appendages ovate, erect; pollinia oblong. Stigma head slightly convex. Follicles lanceolate, 8–9 × ca. 1 cm, with 2 ridges or angles. Seeds ovate, ca. 6 × 3 mm; coma ca. 3 cm. Fl. Jun-Oct, fr. Aug-Dec.

• Thickets, open woods; 1000–3000 m. Guangxi, Guizhou, Hubei, Hunan, Sichuan, Xizang, Yunnan.

The roots are used as medicine for rheumatism, epilepsy, hydrophobia, and detoxification of viper bites.

*Cynanchum otophyllum* previously included *C. triangulare* M. G. Gilbert & W. D. Stevens (*C. deltoideum* J. D. Hooker, not Hance) from northwestern India but that species, though very similar vegetatively, has a distinctly tubular corona, leaving *C. otophyllum* as a Chinese endemic.

**24. *Cynanchum giraldii*** Schlechter, Bot. Jahrb. Syst. 36: Beibl. 82: 92. 1905.

峨眉牛皮消 e mei niu pi xiao

Herbs; most parts puberulent. Stems twining to 4 m, slender. Leaves opposite, usually with small, axillary, stipulelike leaves; petiole 2–3 cm, slender; leaf blade hastate-oblong, 7–14 × 3–6 cm, thin papery, base auriculate-cordate, apex acuminate; lateral veins ca. 10 pairs. Inflorescences umbel-like, 5–10-flowered; peduncle and pedicel 1–2 cm, glabrescent. Sepals ovate-triangular, usually glabrescent, sparsely ciliate. Corolla red or reddish, subtrotate; lobes oblong, 3–4 mm, apex obtuse, glabrous. Corona deeply 5-lobed, pubescent; lobes ovate or broadly ovate, apex obtuse, shorter than gynostegium, with a ligulate, adaxial appendage. Anthers subrhomboid, base dilated, appendages ovate, obtuse, incurved over stigma head; pollinia oblong; stigma head slender. Follicles fusiform, acuminate at both ends, 8–10 × ca. 1 cm, glabrous. Seeds ovate, ca. 7 × 3 mm, apex truncate; coma ca. 3 cm. Fl. Jul-Aug, fr. Aug-Oct.

• Thickets, open woods, grasslands. Gansu, Henan, Shaanxi, Sichuan.

**25. *Cynanchum batangense*** P. T. Li, Acta Bot. Yunnan. 12: 19. 1990.

巴塘白前 ba tang bai qian

Herbs perennial climbers to 3 m. Stems, leaves, petioles, and pedicels puberulent. Petiole 1.5–3 cm, with adaxial glands; leaf blade ovate, ovate-triangular, or oblong-lanceolate, 5–8.5 × 3–5 cm, papery, base cordate with rounded enlarged lobes, apex short acuminate; lateral veins 6 or 7 pairs. Inflorescences 1.3–2.1 cm; peduncle 1–2(–6) mm. Pedicel 0.8–1.5 cm. Sepals ovate-oblong, 4–4.5 × 1–1.5 mm, glabrous, ciliate; basal glands 10. Corolla purple, rotate, membranous, ca. 1.7 cm in diam.; tube ca. 1 mm; lobes oblong, 5–8.5 × 2.5–3.5 mm, glabrous outside, puberulent inside, apex obtuse. Corona deeply 5-lobed; lobes oblong, 5–5.5 × 1.5–2 mm, longer than gynostegium, base ± fleshy, apical part membranous, retuse, with a fleshy adaxial, ligulate appendage. Anther appendages broadly ovate; pollinia oblong. Stigma head discoid, apex conical. Fl. Aug.

• Thickets. Sichuan.

**26. *Cynanchum lysimachioides*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 89. 1974.

白牛皮消 bai niu pi xiao

*Cynanchum likiangense* W. T. Wang ex Tsiang & P. T. Li.

Herbs, erect or twining to 4 m, pilose throughout. Root-stock fleshy. Leaves opposite; petiole 2–4 cm; leaf blade triangular to circular, 4–10 × 2.5–8.5 cm, base shallowly cordate, margin subundulate, apex rounded-cuspidate to acute; basal veins 3–5, lateral veins (2 or) 3–6 pairs. Inflorescences umbel-like, 5–8-flowered; peduncle 2–3 cm. Pedicel 2–3 cm. Sepals lanceolate or narrowly triangular, (2–)3.5–5 × 1–1.5 mm, minutely hirsute; basal glands 5. Corolla white, rotate to reflexed; lobes oblong, 5–10 × 2.5–4 mm, puberulent. Corona deeply 5-lobed; lobes ovate-oblong, ca. 5 mm, apex subobtuse and longer than gynostegium, with rounded, adaxial appendages incumbent on anther. Pollinia oblong. Fl. Aug.

• Forest edges and thickets. Yunnan (Lijiang).

**27. *Cynanchum bungei*** Decaisne in A. de Candolle, Prodr. 8: 549. 1844.

白首乌 bai shou wu

*Asclepias hastata* Bunge, Enum. Pl. China Bor. 43, n. 146. 1833 (1831), not *Cynanchum hastatum* Lamarck (1786); *Symphyoglossum hastatum* (Bunge) Turczaninow; *Vincetoxi-cum hastatum* (Bunge) Kuntze.

Root tubers 3–7 × 1.5–4 cm. Stems twining, to 4 m, slender, puberulent. Leaves opposite; petiole 1–1.5 cm; leaf blade hastate or narrowly ovate-triangular, 3–8 × 1–5 cm, membranous, hispid, base cordate, basal lobes rounded, recurved, apex acuminate; lateral veins 4–6 pairs. Inflorescences umbel-like, to 4 × 2.5 cm; peduncle 1.5–2.5 cm. Pedicel ca. 1 cm. Sepals lanceolate, ca. 1.5 × 0.7 mm,

glabrous; basal glands present, few. Corolla white or yellowish green, rotate; tube ca. 1 mm; lobes oblong, ca. 4 × 2.5 mm, acute, strongly reflexed, minutely puberulent adaxially near center, otherwise glabrous. Corona deeply 5-lobed; lobes lanceolate, ca. 3.5 mm, longer than gynostegium, with slender, ligulate, adaxial appendage incumbent on anther. Anther appendages ovate; pollinia oblong. Follicles lanceolate in outline, 9–10 × ca. 1 cm, with 2 inconspicuous longitudinal ridges, glabrous. Seeds ovate, ca. 1 × 0.5 cm; coma ca. 4 cm. Fl. Jun-Jul, fr. Jul-Nov.

Thickets, roadsides, valleys; 1500 m. Gansu, Hebei, Liaoning, Nei Mongol, Shandong, Shanxi, Zhejiang [Korea].

The root tuber is used as medicine for lumbago, neurasthenia, and insomnia. The plant is the basis of an important Chinese tonic medicine.

**28. *Cynanchum officinale*** (Hemsley) Tsiang & Zhang in Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 90. 1974.

朱砂藤 zhu sha teng

*Pentatropis officinalis* Hemsley, J. Linn. Soc., Bot. 26: 110. 1889; *Cynanchum bodinieri* Schlechter ex H. Léveillé.

Taproots rather fleshy. Stems twining to 4 m, pubescent along 1 line when young. Leaves opposite; petiole 2–6 cm, pubescent; leaf blade ovate or ovate-oblong, 5–12 × 3–7.5 cm, thin papery, glabrous or puberulent, ciliate, base cordate with rounded sinus, apex acuminate; basal veins 3–5 or more. Inflorescences sometimes axillary, umbel-like, 1–8 cm, 10- to many flowered; peduncle 1–2 cm, pubescent. Pedicel 7–10 mm, pubescent. Sepals ovate-oblong, ca. 2 × 0.8 mm, puberulent; basal glands 5. Corolla reflexed; tube ca. 1 mm; lobes oblong, 4.5–5 × ca. 1.8 mm, glabrous outside, minutely villous inside. Corona deeply 5-lobed; lobes ovate, drying darker than corolla, fleshy, as long as or slightly longer than gynostegium, with a rounded, ligulate, adaxial appendage. Pollinia oblong. Follicles divaricate, lanceolate in outline, to 7.5–11 cm × 8–10 mm, with 2 narrow ridges running the whole length, glabrous. Seeds oblong-ovate, apex truncate; coma ca. 2 cm. Fl. May-Aug, fr. Jul-Nov. 2n = 22.

• Thickets, open woods; 1000–2800 m. Anhui, Gansu, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan.

The roots are used medicinally for epilepsy, hydrophobia, and detoxifying viper bites.

**29. *Cynanchum auriculatum*** Royle ex Wight, Contr. Bot. India 58. 1834.

牛皮消 niu pi xiao

*Cynanchum saccatum* W. T. Wang ex Tsiang & P. T. Li; *Diploglossum auriculatum* (Royle ex Wight) Meisner; *Endotropis auriculata* (Royle ex Wight) Decaisne; *Vincetoxicum auriculatum* (Royle ex Wight) Kuntze.

Stems twining, puberulent along 1 side to uniformly puberulent, sometimes glabrescent. Leaves opposite; petiole 2.4–3.5(–8.5) cm, axillary stipulelike leaves sometimes present; leaf blade ovate, 4.5–11(–16) × 2.6–7(–11.5) cm, papery, puberulent, densely so on veins abaxially, base cordate with rounded sinus, apex acuminate; basal veins 5, lateral veins 2 or 3 pairs. Inflorescences racemelike, many flowered, to 23 cm;

peduncle 4.5–15 cm. Pedicel 0.9–2.8 cm, puberulent. Sepals lanceolate, 2.2–5.2 × 0.8–2 mm, puberulent; basal glands 5. Corolla white, pale yellow, pink, or purple, rotate; tube short; lobes lanceolate to lanceolate-oblong, 5.5–8(–10) × 2–3 mm, coarsely pubescent to pilose inside. Corona very deeply 5-lobed, white; lobes much longer than gynostegium, elliptic, to ca. 4.5 mm, fleshy, obtuse, with narrowly triangular adaxial appendages. Stigma head conical. Follicles oblong-lanceolate, ca. 8 × 1 cm. Seeds ovate, truncate, ca. 6 × 3 mm; coma ca. 2.5 cm. Fl. Jun-Aug, fr. Aug-Dec. 2n = 22.

Bushland on mountain slopes; 2800–3600 m. Sichuan, Xizang, Yunnan [Bhutan, India, Kashmir, Nepal, Pakistan].

**30. *Cynanchum boudieri*** H. Léveillé & Vaniot, Bull. Soc. Bot. France 51: CXLIV. 1904.

折冠牛皮消 zhe guan niu pi xiao

*Cynanchum auriculatum* Royle ex Wight var. *amamianum* (Hatusima) T. Yamazaki; *C. ampibolum* C. K. Schneider; *C. taiwanianum* T. Yamazaki; *C. wilfordii* var. *amamianum* Hatusima.

Roots tuberous, 10–50 × 1–4 cm. Stems twining to 5 m, puberulent. Leaves opposite; petiole ca. 5 cm, with adaxial glands; leaf blade broadly ovate to ovate-oblong, 4–>18 × 4–11.5(–17) cm, membranous, adaxially puberulent, base cordate, basal lobes mostly recurved, sometimes incurved, rarely overlapping, apex short acuminate; lateral veins 5 or 6 pairs. Inflorescences racemelike, to 30-flowered; peduncle 6–10 cm. Pedicel ca. 1.5 cm, puberulent. Sepals ovate-oblong, ciliate, pubescent. Corolla white, to 1 cm; tube short; lobes oblong, (3–)3.5–6 × 1.5–1.7 mm, strongly reflexed after anthesis, pilose inside. Corona very deeply 5-lobed; lobes elliptic, fleshy, obtuse, up to 2 × as high as gynostegium, with narrowly triangular adaxial appendages; pollinia oblong. Stigma head conical, apex 2-cleft. Follicles lanceolate in outline, 8–11 cm × 8–10 mm, with 2 longitudinal ridges. Seeds ovate-elliptic. Fl. Jun-Sep, fr. Jul-Dec.

Forest edges, thickets, riversides; 300–3500 m. Anhui, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan (Ryukyu Islands)].

Root tubers are used medicinally for the treatment of infantile malnutrition caused by intestinal parasites, gastric and duodenal ulcer, nephritis, and neurasthenia.

**31. *Cynanchum amplexicaule*** (Siebold & Zuccarini) Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 104. 1889.

合掌消 he zhang xiao

*Vincetoxicum amplexicaule* Siebold & Zuccarini, Abh. Akad. Muench 4(3): 162. 1846; *Alexitoxicon amplexicaule* (Siebold & Zuccarini) Pobedimova; *Antitoxicum amplexicaule* (Siebold & Zuccarini) Pobedimova; *Cynanchum am-*



*plexicaule* var. *castaneum* Makino; *Vincetoxicum amplexicaule* var. *castaneum* (Makino) Kitagawa.

Herbs glabrous except for calyx and corolla. Stems erect, to 1 m tall, often branched from upper axils. Leaves opposite, sessile; leaf blade obovate-elliptic, ovate, or ovate-oblong, up to 4–6(–10) × 2–4(–5) cm, uppermost leaves often conspicuously smaller than lower, papery, abaxially glaucous, base cordate, basal lobes sometimes clasping stem, apex acute; lateral veins 8–10 pairs. Inflorescences extra-axillary and terminal, umbel-like or lax; peduncle 0.5–6 cm. Pedicel ca. 4 mm. Sepals ovate, 1–1.5 × ca. 0.5 mm; basal glands minute. Corolla yellow-green or yellow-brown to purple, rotate; tube ca. 0.5 mm; lobes oblong, 2.5–3.5 × ca. 1 mm, obtuse, puberulent in center. Corona deeply 5-lobed; lobes flattened, ovate, base stipitate, apex rounded to obscurely 3-toothed, as long as corolla tube and gynostegium. Anthers rhomboid, appendages rounded, membranous, as long as anther; pollinia oblong. Stigma head slightly convex. Follicles lanceolate in outline, 5–7(–8) cm × 5–8(–11) mm, glabrous. Seeds oblong-ovate, ca. 5 × 2 mm, dark brown; coma ca. 2 cm, brownish. Fl. May-Sep, fr. Sep-Dec.  $2n = 22$ .

Mountain slopes, grasslands, maritime dunes; 0–1000 m. Guangxi, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong [Japan, Korea].

All parts are used medicinally for traumatic injury, rheumatic arthralgia, and swelling.

**32. *Cynanchum atratum* Bunge**, Enum. Pl. China Bor. 45. 1833 (1831).

白薇 bai wei

*Alexitoxicon atratum* (Bunge) Pobedimova; *Antitoxicum atratum* (Bunge) Pobedimova; *Cynanchum multinerve* (Franchet & Savatier) Matusma; *Vincetoxicum atratum* (Bunge) Morren & Decaisne; *V. multinerve* Franchet & Savatier.

Herbs, most parts densely pubescent to tomentose. Roots fibrous, fragrant. Stems erect, to 50 cm, sometimes ± inflated. Leaves opposite; petiole ca. 5 mm; leaf blade ovate or ovate-oblong, 5–8(–12) × 3–4(–7) cm, papery, base rounded or sometimes obscurely cordate, apex acute or acuminate; lateral veins 6 or 7 pairs. Inflorescences umbel-like, sessile, 8–10-flowered. Pedicel ca. 1.5 cm. Sepals lanceolate, ca. 3 mm, ciliate, pubescent; basal glands 5. Corolla deep purple, rotate, 1–1.2(–2.2) cm in diam., pubescent outside, glabrous inside; lobes ovate-triangular, 4–7 × 3–3.7 mm, ciliate. Corona deeply 5-lobed; lobes as long as gynostegium, apex rounded, adnate to anthers. Anther appendages rounded; pollinia oblong-ellipsoid. Stigma head depressed. Follicles fusiform to lanceolate in outline, 5.5–11 × 0.5–1.5 cm, base obtuse, apex attenuate, not ridged. Seeds light brown, 4–6 × 3–4 mm; coma 3–4.5 cm. Fl. Apr-Aug, fr. Jun-Oct.  $2n = 22^*$ .

Grasslands, riversides, drylands; 100–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan [Japan, Korea, E Russia].

The roots are used medicinally for urinary tract infection, gonorrhoea, nephritis, edema, bronchitis, and rheumatic arthralgia.

**33. *Cynanchum canescens* (Willdenow) K. Schumann** in Engler & Prantl, Nat. Pflanzenfam. 4(2): 252. 1895.

粉绿白前 fen lu bai qian

*Asclepias canescens* Willdenow, Ges. Naturf. Freunde Berlin Neue Schriften 3: 418. 1801; *Cynanchum glaucum* Wallich ex Wight; *Vincetoxicum canescens* (Willdenow) Decaisne; *V. glaucum* (Wallich ex Wight) K. H. Rechinger; *V. hirundinaria* Medicus subsp. *glaucum* (Wallich ex Wight) H. Hara.

Herbs, most parts canescent or puberulent. Rhizomes with dense fascicles of roots. Stems erect, to 50 cm, flexuous, pale or glaucous. Petiole 2–15 mm; leaf blade ovate to oblong, or lanceolate, 2.5–8 × 1.5–5 cm, leathery, base rounded to cordate, apex acuminate or apiculate. Inflorescences usually sessile, umbel-like, pubescent. Pedicel 2–7 mm. Sepals ca. 0.7 × 0.4 mm, puberulent. Corolla yellow or green fading to greenish orange; tube ca. 1 mm; lobes ovate, 2–3 × ca. 1.5 mm, glabrous outside, sparsely hirsute inside, apex subacute. Corona lobes broadly ovate, fleshy, apex rounded, broader than long. Follicles slender, 5–10 cm. Seeds broadly ovate, 5–7 mm, comose. Fl. May-Aug, fr. Aug-Dec.  $2n = 22$ .

Open woodland, thickets; 2500 m. Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Kashmir, Nepal, Pakistan, Russia; SW Asia].

Extensive field work is needed to establish the extent of variation in the characters used to separate members of the *Cynanchum vincetoxicum* complex, including species 34–37. Two species groups, separated arbitrarily by the presence or absence of corolla hairs, are recognized. The group with hairy corollas includes *C. forrestii*, *C. bicampanulatum*, and *C. rockii*. Although most material with glabrous corollas belongs to *C. inamoenum*, some collections from widely scattered localities between the Himalayas and Taiwan have been named as *C. vincetoxicum*. It is not clear that these are discontinuous with *C. inamoenum* and that they represent true *C. vincetoxicum*. For the present, all material with glabrous flowers is included in *C. inamoenum*.

**34. *Cynanchum inamoenum* (Maximowicz) Loesener**, Bot. Jahrb. Syst. 34 (Beibl. 75): 60. 1904.

竹灵消 zhu ling xiao

*Vincetoxicum inamoenum* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 9: 787. 1876; *Alexitoxicon inamoenum* (Maximowicz) Pobedimova; *Antitoxicum inamoenum* (Maximowicz) Pobedimova; *Vincetoxicum macrophyllum* Siebold & Zuccarini var. *nikoense* Maximowicz.

Stems simple, erect, to 70 cm, hollow, pubescent along 1 line, apical part densely pubescent. Leaves opposite; petiole 0–6 mm; leaf blade broadly ovate, 3–7 × 1.5–5 cm, puberulent along veins, glabrescent, base rounded to subcordate, apex acute to acuminate; lateral veins ca. 5 pairs. Inflorescences umbel-like, (3–)8–10-flowered; peduncle 0.4–2.5 cm, pubescent. Pedicel 3–8 mm, pubescent. Sepals lanceolate, 2–

2.5 × 0.7–0.9 mm, sparsely pubescent to glabrescent. Corolla yellow, glabrous except sometimes for a few hairs inside tube; tube 1–1.3 mm; lobes rotate, ovate-oblong, 2.5–4 × 1–2 mm. Corona lobes thick, ± triangular, acute, longer than gynostegium, basally attached to anthers, tip sometimes inflexed. Anther appendages rounded; pollinia oblong. Stigma head convex. Follicles linear-lanceolate in outline, 4–6 cm × 5–10 mm, glabrous, mostly solitary, divergent when paired. Fl. May–Jul. *2n* = 44.

Open woodland, thickets, grassy mountain slopes; 100–3500 m. Anhui, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Zhejiang [Japan, Korea, Russia].

The roots are used for the treatment of scrofula, rupture, scabies, and internal fever.

**35. *Cynanchum forrestii*** Schlechter, Notes Roy. Bot. Gard. Edinburgh 8: 15. 1913.

大理白前 da li bai qian

*Cynanchum balfourianum* (Schlechter) Tsiang & Zhang; *C. forrestii* var. *balfourianum* Schlechter; *C. forrestii* var. *stenolobum* Tsiang & Zhang; *C. limprichtii* Schlechter; *C. muliense* Tsiang; *C. steppicola* Handel-Mazzetti; *Vincetoxicum balfourianum* (Schlechter) C. Y. Wu & D. Z. Li; *V. forrestii* (Schlechter) C. Y. Wu & D. Z. Li; *V. forrestii* var. *stenolobum* (Tsiang & Zhang) C. Y. Wu & D. Z. Li; *V. limprichtii* (Schlechter) C. Y. Wu & D. Z. Li; *V. muliense* (Tsiang) C. Y. Wu & D. Z. Li; *V. steppicola* (Handel-Mazzetti) C. Y. Wu & D. Z. Li.

Plants perennial. Rootstocks dense clusters of little-branched roots. Stems erect, often clustered, tips sometimes tending to twine, to 60 cm tall, usually unbranched, pubescent along 1 side, apical parts densely pubescent. Petiole 5–10 mm, puberulent; leaf blade broadly ovate to rarely elliptic-oblong, 2.5–8 × 1.5–4 cm, thin papery, glabrescent, base cuneate or obtuse to subcordate especially near base of plant, apex obtuse or acute; lateral veins 5–7 pairs, puberulent. Inflorescences extra-axillary or subterminal, umbel-like, shorter than leaves; peduncle 0–5 cm. Pedicel 5–8 mm. Sepals lanceolate or narrowly triangular, 1.5–2.5 × 0.5–0.8 mm, sometimes ciliate; basal glands 5, minute. Corolla yellow to brownish or purple; tube 1–2 mm; lobes rotate, ovate-oblong or oblong, to 3–7.5 × 1.5–2 mm, inside pubescent or puberulent except sometimes for lobes, outside glabrous or puberulent, margin sometimes ciliate. Corona deeply lobed; lobes triangular-ovate, fleshy, at least as long as gynostegium, apex blunt, sometimes extended and sharply incurved. Pollinia oblong; stigma head elevated, retuse. Follicles often pendent, lanceolate in outline, 5–9.6 × 0.7–1.2 cm, sometimes paired and diverging at ca. 90°. Seeds oblong, ca. 8 × 3–4 mm; coma 1–2 cm. Fl. Apr–Jul, fr. Jun–Nov.

• Alpine waste places, grass savanna, humid grasslands; 1000–5000 m. Gansu, Guizhou, Sichuan, Xizang, Yunnan.

The roots are diuretic and are used to relieve pain.

**36. *Cynanchum bicampanulatum*** M. G. Gilbert & P. T. Li

in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 5. 1995.

钟冠白前 zhong guan bai qian

Roots not seen. Stems ascending, to 30 cm, minutely puberulent mainly along 2 sides. Petiole 4–9 mm; leaf blade oblong-ovate, 5.5–7 × 4–4.5 cm, base shallowly cordate, truncate or rounded, margin puberulent, apex acute to subacuminate; basal veins 5–7, lateral veins 4 or 5 pairs. Inflorescences umbel-like; cymules several flowered, separated by very short rachis; peduncle 0.8–1.8 cm, puberulent. Pedicel 5–8 mm, to 12 mm in fruit, puberulent. Sepals oblong, ca. 1.5 × 0.5 mm, apex rounded, almost glabrous. Corolla campanulate, ca. 4 mm; glabrous except for a few stiff hairs inside tube, color not recorded, probably yellow or white; tube ca. 2 × 3 mm; lobes oblong-ovate, ca. 1.7 × 1.5 mm, apex rounded, usually revolute. Corona tube as high as anthers, membranous; lobes inflexed, rounded, fleshy, adnate to corolla tube and to anthers opposite lobes. Anthers square, subgibbous; anther appendages ovate, inflexed over stigma head; pollinia ovoid, ca. 0.2 mm. Stigma head dark, rounded. Young fruit paired, glabrous, beaked fusiform. Fl. Jul.

• Open fields; 2400–2700 m. Gansu, Sichuan (Tachienlu).

**37. *Cynanchum rockii*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 8. 1995.

高冠白前 gao guan bai qian

Stems erect, to 30 cm, branched, pubescent. Leaves opposite; petiole 5–11 mm; leaf blade ovate, ca. 5 × 3 cm, abaxially densely puberulent on veins, adaxially sparsely pubescent, base rounded to broadly cuneate, apex acuminate; lateral veins 3 or 4 pairs. Inflorescences up to 7-flowered, slender, often forked with umbel-like clusters of flowers, to 3.6 cm; peduncle ca. 1.8 cm. Pedicel ca. 6 mm. Sepals lanceolate, ca. 2.2 × 0.5 mm. Corolla dark red; tube ca. 2 mm; lobes erect, ca. 4 × 1.5 mm, triangular-acuminate, glabrous outside, throat with woolly hairs, tube and lobes glabrous, apex blunt. Corona lobes almost free, ovate, higher than gynostegium, apex rounded, adnate to anther, without internal appendages. Fruit not seen.

• Alpine meadows; 3300 m. Sichuan.

**38. *Cynanchum paniculatum*** (Bunge) Kitagawa, J. Jap. Bot. 16: 20. 1940.

徐长卿 xu chang qing

*Asclepias paniculata* Bunge, Enum. Pl. China Bor. 43. 1833 (1831); *Cynanchum dubium* Kitagawa; *Pycnostelma chinense* Bunge ex Decaisne; *P. leucanthum* Kitagawa; *P. paniculatum* (Bunge) K. Schumann; *Vincetoxicum paniculatum* (Bunge) C. Y. Wu & D. Z. Li; *V. pycnostachys* Kitagawa.

Roots densely fibrous, fragrant. Stems slender, erect, to 1 m, glabrous or hispid below, rigid, unbranched or with few branches from upper parts. Leaves opposite; petiole ca. 3 mm; leaf blade lanceolate to linear, 5–13 × 0.5–1.5 cm, stiffly papery, glabrous or adaxially puberulent, ciliate, base

and apex acute; lateral veins obscure. Inflorescences terminal and from upper nodes, laxly branched, to 7 cm; peduncle 2.5–4 cm. Pedicel 5–10 mm. Sepals lanceolate, 1–1.5 × ca. 0.5 mm; glands present or absent. Corolla yellow-green, subrotate, glabrous; tube short; lobes ovate, 4–5.5 × 1.5–3 mm. Corona deeply 5-lobed; lobes ovate-oblong, fleshy, slightly laterally compressed, apex obtuse, as long as anthers, adaxially keeled up to middle and adnate to anthers. Anther appendages semiobicular, slightly shorter than stigma head; pollinia oblong. Stigma head subumbonate. Follicles lanceolate in outline, 4–8 cm × 3–8 mm. Seeds oblong, ca. 5 × 3 mm; coma 1.5–3 cm. Fl. May–Jul, fr. Aug–Dec.  $2n = 22^*$ .

Sunny mountain slopes. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Mongolia].

All parts are used as medicine for the treatment of stomachache, enteritis, infantile malnutrition due to intestinal parasites, toothache, traumatic injury, and snake bites.

**39. *Cynanchum wangii*** P. T. Li & W. Kittredge, *Novon* 2: 220. 1992.

启无白前 qi wu bai qian

Stems erect, 10–20 cm, many branched, ca. 1 mm in diam., puberulent along 1 side. Leaves opposite, linear-spatulate, 5–20 × 1–2 mm, glabrous, base cuneate, apex rounded; lateral veins obscure. Inflorescences extra-axillary or terminal, umbel-like, 3–7-flowered; peduncle slender, 3–8 cm, puberulent. Pedicel 4–7 mm. Sepals ovate-triangular, ca. 1 × 0.5 mm, glabrous; basal glands 5. Corolla greenish yellow, rotate; tube ca. 1 mm, glabrous; lobes oblong-lanceolate, ca. 4 × 1 mm, glabrous outside, densely pubescent inside. Corona deeply 5-lobed; lobes semiobicular, ca. 0.5 × 0.5 mm, erect, somewhat fleshy, apex rounded, nearly half as long as anther appendages. Anthers oblong, appendage rounded, as long as stigma head; pollinia oblong-ovoid. Stigma head disclike, apex slightly elevated. Fl. May–summer.

- Among bare rocks along river banks; 700–900 m. Yunnan.

**40. *Cynanchum mongolicum*** (Maximowicz) Hemsley in F. B. Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 107. 1889.

华北白前 hua bei bai qian

*Vincetoxicum mongolicum* Maximowicz, *Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg* 9: 780. 1876; *Cynanchum hancockianum* (Maximowicz) Iljinski; *C. komarovii* Iljinski; *C. lateriflorum* (Hemsley) Kitagawa; *Pycnostelma lateriflorum* Hemsley; *Vincetoxicum hancockianum* (Maximowicz) C. Y. Wu & D. Z. Li; *V. lateriflorum* (Hemsley) Kitagawa; *V. mongolicum* var. *hancockianum* Maximowicz.

Herbs usually glabrous, rarely sparsely puberulent, glaucous. Stems erect, to 50 cm tall, occasionally puberulent along 1 side, glabrescent. Leaves opposite or whorled; petiole 0–5 mm; leaf blade narrowly oblong-elliptic to lanceolate or rhomboid, 3–10 × 0.5–3 cm, leathery or thick papery, base cuneate, margin sometimes ciliate, apex acuminate or acute; lateral veins ca. 4 pairs, often obscure. Inflorescences

umbel-like, shorter than leaves; peduncle ca. 1.2 cm. Pedicel ca. 5 mm. Sepals ovate-lanceolate, 1–1.7 × 0.5–1 mm; basal glands 5. Corolla purple; tube ca. 1 mm; lobes ovate, 2–3 × 1.5–2 mm, glabrous. Corona deeply 5-lobed; lobes fleshy, keeled, obtuse, ca. as long as anthers. Pollinia ovoid. Stigma head depressed to slightly elevated. Follicles oblong-lanceolate, 6.5–7 cm × 5–10 mm, with 2–4 narrow ridges along beak, usually solitary, hanging when ripe. Seeds oblong, ca. 5 × 3 mm; coma ca. 2 cm. Fl. May–Aug, fr. Jun–Nov.

- Mountains, sand barrens; to 3000 m. Gansu, Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan.

All parts are used internally for relieving pain and externally for treating rheumatoid arthritis, traumatic injury, and abscesses.

The correct position of *Cynanchum mongolicum* var. *hupehense* Pampanini (*Nuovo Giorn. Bot. Ital.* 17: 695. 1910) is not known.

**41. *Cynanchum glaucescens*** (Decaisne) Handel-Mazzetti, *Symb. Sin.* 7: 994. 1936.

白前 bai qian

*Pentasachme glaucescens* Decaisne in A. de Candolle, *Prodr.* 8: 627. 1844; *Cynanchum lightii* Dunn; *Vincetoxicum glaucescens* (Decaisne) C. Y. Wu & D. Z. Li.

Herbs rhizomatous, roots fibrous, fascicled at nodes. Stems erect, to 60 cm, pubescent along 2 lines. Leaves opposite, subsessile; leaf blade glabrous, elliptic, oblong-lanceolate, or oblong, 1–7 cm × 7–12 mm, base cuneate or rounded, apex rounded to ± acute; lateral veins 3–5 pairs, obscure. Inflorescences umbel-like, sometimes with 2 cymules separated by a short rachis, shorter than leaves, glabrous or puberulent. Sepals oblong-lanceolate, ca. 2.3 × 1 mm, glabrous, basal glands 5. Corolla yellow, rotate, ca. 8 mm in diam.; lobes ovate-oblong, ca. 3.5 × 2.3 mm, obtuse. Corona shallowly cupular, 5-lobed; lobes ovate, fleshy, incurved, slightly shorter than anthers and adnate to them. Pollinia ovoid. Stigma head convex. Follicles fusiform, 4.5–6 cm × 6–1 mm. Seeds oblong, ca. 5 mm; coma ca. 2 cm. Fl. May–Nov, fr. Jul–Dec.

- Mountains, riversides; 100–800. Fujian, Guangdong, Guangxi, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang.

The roots are used as medicine for reducing phlegm and against coughs.

**42. *Cynanchum stenophyllum*** Hemsley in F. B. Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 108. 1889.

狭叶白前 xia ye bai qian

*Vincetoxicum stenophyllum* (Hemsley) Kuntze.

Roots fascicled. Stems erect, to 40 cm, pubescent along 1 side. Petiole ca. 2 mm; leaf blade linear-lanceolate, ca. 6 cm × 5 mm. Inflorescences umbel-like, 2–2.5 cm, sometimes

2 separated by a short rachis; peduncle 0.5–1(–1.7) cm. Sepals ovate, ca. 1.3 × 0.7 mm. Buds ca. 3 mm. Corolla deep purple, white, or pale yellow, rotate; tube short; lobes ovate, obtuse, villous inside. Corona shallowly cupular; lobes fleshy, ovate, thick, pouched, apex rounded, each lobe adnate ventrally to anther and dorsally to corolla. Pollinia oblong; stigma head slightly convex. Follicles linear-lanceolate in outline, ca. 4 cm × 5 mm. Seeds oblong-ovate, ca. 7 × 3 mm; coma ca. 2 cm. Fl. May.

- Moist lowlands. Guizhou, Hubei, Sichuan.

**43. *Cynanchum hydrophilum*** Tsiang & Zhang in Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 94. 1974.

水白前 shui bai qian

*Vincetoxicum hydrophilum* (Tsiang & Zhang) C. Y. Wu & D. Z. Li.

Stems erect, to 50 cm, minutely puberulent, hollow when dry. Leaves opposite or occasionally in whorls of 3; petiole 5–7 mm; leaf blade narrowly elliptic, 6–9 × 0.6–1.5 cm, base and apex acuminate; lateral veins ca. 6 pairs, puberulent. Inflorescences axillary, corymbose, or umbel-like; peduncle 0.2–2.2 cm, puberulent. Pedicel 6–10 mm. Sepals triangular, 1.5–2 × 0.5–0.6 mm, puberulent outside, glabrous inside; basal glands 5. Corolla white, rotate; lobes ovate, ca. 4 × 2 mm, obtuse, glabrous outside, puberulent inside. Corona deeply 5-lobed; lobes ovate, slightly shorter than gynostegium. Pollinia elliptic. Stigma head rounded, apex depressed. Fl. Jun.

- In shallow water or water-logged sites; 1100–1200 m. Sichuan.

**44. *Cynanchum verticillatum*** Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 109. 1889.

轮叶白前 lun ye bai qian

*Cynanchum leveilleianum* Schlechter ex H. Léveillé; *C. verticillatum* var. *arenicola* Tsiang & Zhang; *Vincetoxicum verticillatum* (Hemsley) Kuntze; *V. verticillatum* var. *areni-cola* (Tsiang & Zhang) C. Y. Wu & D. Z. Li.

Herbs perennial, erect, to 60 cm tall, glabrescent except for stems and inflorescences. Stems simple or branched, puberulent on 1 side. Leaves opposite or in whorls of 3–6; petiole ca. 1 cm; leaf blade membranous, linear-lanceolate, 5–10(–17) × 0.7–1.5 cm, acuminate at both ends; lateral veins ca. 7 pairs, slightly elevated abaxially. Inflorescences subterminal, umbel-like or racemelike, 6–10-flowered; peduncle 0.2–1.5(–2.5) cm, pubescent along 1 side. Pedicel slender, ca. 1 cm. Sepals lanceolate, ca. 2 × 0.6 mm, acute, puberulent abaxially or glabrous, margin sometimes ciliate; basal glands few. Corolla pale yellow, white, or dark red, rotate, glabrous; tube ca. 1 mm; lobes ovate-oblong, 3–5.5 × 2–2.5 mm, acute. Corona lobes triangular, fleshy, adnate to anthers, joined laterally to form a thin tube ca. as high. Anthers square to oblong, appendages acute; pollinia oblong. Stigma head discoid, 5-angled, depressed, entire. Follicles lanceolate in outline, ca. 5 × 1 cm, smooth. Fl. Apr-Jul, fr. Jul-Aug.

- Valleys, moist sandy tracts, along ditches; 500–1000 m. Guangxi, Guizhou, Hubei, Sichuan, Yunnan.

**45. *Cynanchum riparium*** Tsiang & Zhang in Tsiang & P. T.

Li, Acta Phytotax. Sin. 12: 96. 1974.

荷花柳 he hua liu

*Vincetoxicum riparium* (Tsiang & Zhang) C. Y. Wu & D. Z. Li.

Herbs glabrous throughout. Stems erect, to 60 cm. Lower leaves in whorls of 4, upper leaves opposite, ± sessile; leaf blade linear, 3.5–12 cm × 2–9 mm, papery, base attenuate, decurrent; lateral veins obscure. Inflorescences axillary, shorter than leaves; peduncle 0.7–1.5 cm. Pedicel 4–5 mm. Sepals ovate, ca. 1.5 × 0.7 mm, apex acuminate; basal glands present. Corolla purple, rotate; tube short; lobes oblong, ca. 2 × 1.7 mm, apex acute. Corona deeply 5-lobed, up to as long as gynostegium; lobes ovate, obtuse, with a basal adaxial scar. Anthers square, appendages rounded; pollinia ovoid. Stigma head elevated. Fl. May.

- Grassy areas in upper beds of Yellow River. Henan.

**46. *Cynanchum stauntonii*** (Decaisne) Schlechter ex H. Léveillé, Mem. Real. Acad. Ci. Barcelona 12: 4. 1916.

柳叶白前 liu ye bai qian

*Pentasachme stauntonii* Decaisne in A. de Candolle, Prodr. 8: 627. 1844; *Cynanchum linearifolium* Hemsley; *Pentasachme brachyantha* Handel-Mazzetti; *Vincetoxicum linearifolium* (Hemsley) Kuntze; *V. stauntonii* (Decaisne) C. Y. Wu & D. Z. Li.

Herbs glabrous except for corolla and sometimes interpetiolar lines. Roots fascicled, slender. Stems erect, to 1 m. Leaves opposite; petiole ca. 5 mm; leaf blade narrowly lanceolate, 6–13 cm × 3–9(–17) mm, papery, acuminate at both ends; lateral veins ca. 6 pairs. Inflorescences slender, racemelike; peduncle up to 1.7 cm. Pedicel 3–9 mm. Sepals ovate-oblong, 1–1.5 × 0.4–0.5 mm; basal glands few. Corolla purple, less often greenish yellow, rotate; tube ca. 1.5 mm; lobes linear-oblong, 3–5(–8) × 0.6–1 mm, obtuse, interior minutely and conspicuously villous at base, sometimes throughout. Corona lobes 5, ovate, pouched, blunt, adaxially keeled, shorter than anthers and adnate to them at base. Anther appendages rounded, covering stigma head; pollinia oblong. Stigma head convex, included. Follicles linear-lanceolate in outline, 9–12 cm × 3–6 mm, smooth, glabrous. Seeds oblong; coma ca. 2.5 cm. Fl. May-Aug, fr. Sep-Dec.

- Sunny places in moist woodland, water-logged lands; low to medium elevations. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Jiangxi, Yunnan, Zhejiang.

Decoctions of all parts are used as a febrifuge and for treating internal fever. The roots are used medicinally for pulmonary tuberculosis, infantile malnutrition due to intestinal parasites, influenza, cough, and chronic bronchitis.

*Cynanchum stauntonii* is sometimes confused with *Pentasachme caudatum*, which is similar in habit and grows in similar habitats, but

the latter can easily be distinguished by the longer, white, glabrous corollas.

**47. *Cynanchum acuminatifolium*** Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 104. 1889.

潮风草 chao feng cao

*Vincetoxicum acuminatum* Decaisne in A. de Candolle, Prodr. 8: 524. 1844, not Humboldt & Bonpland ex Schultes (1820); *Alexitoxicon acuminatum* (Decaisne) Pobedimova; *Antitoxicum acuminatum* (Decaisne) Pobedimova; *Cynanchum acuminatum* (Decaisne) Matsumura (1912), not Humboldt & Bonpland ex Schultes (1820).

Herbs pubescent or puberulent. Rootstock a short rhizome, roots clustered. Stems erect, to 60 cm. Leaves opposite or in whorls of 4; petiole ca. 1 cm; leaf blade elliptic or broadly ovate, 7–13 × 4–5 cm, membranous, base broadly cuneate or rounded, apex acuminate; lateral veins 6 or 7 pairs. Inflorescences terminal and subterminal, umbel-like, 10–12-flowered, 3–5 cm. Sepals ovate; basal glands 5. Corolla white, rotate, 1–1.5 cm in diam.; lobes oblong, to 7.5 × 3 mm, glabrous. Corona cupular, 5-lobed to middle; lobes triangular, fleshy, as long as gynostegium, adnate to anther. Pollinia ovoid. Follicles solitary, erect, lanceolate in outline, 6–7 cm × 5 mm. Seeds oblong; coma ca. 2 cm. Fl. Jun-Aug, fr. Aug-Nov.

Sunny open woods, grasslands on mountain slopes. Anhui, Hebei, Jilin, Liaoning, Shandong [Japan, Korea, E Russia].

The roots are diuretic.

**48. *Cynanchum pingshanicum*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 8. 1995.

平山白前 ping shan bai qian

Stems 30–60 cm high, tending to twine at tip in larger plants; internodes at first pubescent, soon glabrescent. Lower leaves reduced; upper leaves large, petiole 1–2 cm; leaf blade ovate to elliptic, 7.5–15 × 3.7–8.5 cm, abaxially puberulent on veins, adaxially uniformly puberulent, base cuneate to truncate and decurrent along petiole; lateral veins 5–8 pairs. Uppermost leaves much reduced. Inflorescences at upper nodes, uppermost usually longer than subtending leaves, irregularly forked to umbel-like, many flowered; peduncle 1–6.5 cm, glabrescent. Pedicel 6–9 mm, glabrous or sparsely puberulent. Sepals triangular-lanceolate, ca. 2 × 0.6–0.8 mm, glabrous except for ciliate margin. Corolla probably white, ca. 1.2 cm in diam., glabrous; lobes oblong-triangular, ca. 6 × 2 mm, apex obtuse. Corona fleshy, 5-lobed to near base, slightly shorter than anthers; lobes bluntly triangular, free from gynostegium, without internal appendages. Fl. Jun.

• No data on ecology. Sichuan (Mei-huei-t'ouo; P'ing Shan, SW of Nan Yéli).

**49. *Cynanchum biondioides*** W. T. Wang ex Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 106. 1974.

秦岭藤白前 qin ling teng bai qian

*Vincetoxicum biondioides* (W. T. Wang) C. Y. Wu & D. Z. Li.

Rhizomes ca. 3 mm in diam. Stems twining, to 2 m, pubescent along 1 line. Petiole 5–10 mm; leaf blade narrow elliptic, 3.5–13 × 0.5–1.8 cm, papery, glabrous or adaxially scabrous, base cuneate to shallowly cordate, apex acute to rounded-apiculate; lateral veins obscure. Inflorescences umbel-like, 5–10-flowered; peduncle 0–8 mm, puberulent. Pedicel 5–10 mm, slender, puberulent. Sepals ovate, 1.2–2 × 0.8–1.3 mm, glabrescent; basal glands many. Corolla yellow-green; tube ca. 2 mm; lobes erect, ovate, 4–5 × 2.5–3 mm, glabrous. Corona 1.5–1.7 mm, ca. 1/2 as high as gynostegium; lobes triangular-ovate, apex rounded, adnate ventrally to anthers. Anther appendages ovate; pollinia ovoid. Stigma head elevated. Fl. Mar-Jul.

• Thickets; 2100 m. Yunnan (Luquan, Lancang).

**50. *Cynanchum versicolor*** Bunge, Enum. Pl. China Bor. 44. 1833 (1831).

变色白前 bian se bai qian

*Cynanchum mandshuricum* (Hance) Hemsley; *Vincetoxicum mandshuricum* Hance; *V. versicolor* (Bunge) Decaisne.

Plants tomentose or pubescent throughout. Stems to 2 m, lower part erect with larger and broader leaves, upper fertile part twining with smaller and narrower leaves. Petiole 3–15 mm; lower leaf blades broadly ovate or elliptic, 7–10 × 3–6 cm, papery, base rounded or subcordate, ciliate; lateral veins 6–8 pairs. Inflorescences umbel-like, up to 12-flowered; peduncle 0–10 mm, tomentose. Pedicel 3–5 mm. Sepals linear-lanceolate, 2–3 × ca. 0.5 mm; basal glands 5. Corolla yellow-white to dark purple, rotate to campanulate; tube ca. 0.5 mm; lobes ovate-triangular, ca. 2.5 × 2 mm, pubescent. Corona shorter than gynostegium; lobes triangular, fleshy, somewhat laterally compressed, adnate to anthers. Anthers rhomboid, appendages rounded; pollinia ellipsoid. Stigma head slightly convex. Follicles broadly lanceolate in outline, 4–5 cm × 8–10 mm. Seeds ovate, ca. 5 × 3 mm; coma ca. 2 cm. Fl. May-Aug, fr. Jul-Nov.  $2n = 22^*$ .

• Thickets, riversides; 0–800 m. Hebei, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Shandong, Sichuan, Zhejiang.

The roots and rhizomes are used as diuretic and for the treatment of pulmonary tuberculosis, edema, and gonorrhea.

**51. *Cynanchum chekiangense*** M. Cheng in Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 101. 1974.

蔓剪草 man jian cao

*Vincetoxicum chekiangense* (M. Cheng) C. Y. Wu & D. Z. Li.

Roots fibrous, fascicled. Stems simple, to 1 m, basal part erect, apical part twining, very sparsely puberulent. Petiole 2–2.5 cm; leaf blade elliptic, 10–28 × 4–15 cm, upper leaves much smaller, thin papery, puberulent or pilose to glabrous, apex acute or acuminate, base acute; lateral veins 5–8 pairs.

Inflorescences very slender, umbel-like, sometimes branched, 2–2.5 cm; peduncle to 5 mm, puberulent. Pedicel ca. 7 mm. Sepals ovate-lanceolate, ciliate. Corolla purple or purple-red, rotate, ca. 5 × 11 mm; tube short; lobes ovate-oblong, obtuse, glabrous. Corona lobes triangular-ovate, shorter than or as long as gynostegium, apex obtuse, with an oblong adaxial appendage. Anthers nearly square, appendages rounded; pollinia ellipsoid. Stigma head broadly discoid, somewhat depressed. Follicles lanceolate in outline, ca. 5.5 × 1.5 cm, often solitary. Seeds broadly ovate, ca. 5 × 3 mm; coma 3–5 mm. Fl. May, fr. Jun-Sep.

• Moist thickets, valleys. Guangdong, Henan, Hubei, Hunan, Zhejiang.

The roots are used for the treatment of traumatic injury and scabies.

**52. *Cynanchum taihangense*** Tsiang & Zhang in Tsiang & P. T. Li, *Acta Phytotax. Sin.* 12: 102. 1974.

太行白前 tai hang bai qian

*Cynanchum gracilipes* Tsiang & Zhang; *Vincetoxicum gracilipes* (Tsiang & Zhang) C. Y. Wu & D. Z. Li; *V. taihangense* (Tsiang & Zhang) C. Y. Wu & D. Z. Li.

Stems simple, to 1.5 m, hollow when dry, puberulent, basal part erect, apical part twining. Leaves opposite; petiole 1–3.5 cm; leaf blade narrowly elliptic to elliptic, 8–23 × 2.5–10 cm, membranous or thin papery, pubescent to puberulent, base cuneate, apex acuminate or caudate-acuminate; lateral veins 6–8 pairs. Inflorescences umbel-like, usually dichotomous, shorter than leaves; peduncle 2–5 cm, puberulent. Pedicel 1–2 cm. Sepals lanceolate, 1.5–2.5 × 0.5–0.7 mm, puberulent to glabrous outside, ciliate; basal glands present or absent. Corolla yellow-green, rotate; tube short; lobes oblong, 5–7.5 × 2–2.5 mm. Corona slightly shorter than gynostegium; lobes broadly ovate-triangular, obtuse to subacute, adnate to anthers. Anthers nearly square, apical membrane ovate-triangular; pollinia oblong. Stigma head elevated. Fl. Jun-Aug.

• Thickets along valleys. Anhui, Shanxi.

**53. *Cynanchum linearisepalum*** P. T. Li, *Acta Bot. Yunnan.* 12(1): 20. 1990.

线萼白前 xian e bai qian

Herbs, most parts pubescent. Stems twining to 4 m. Petiole 1–2 cm; leaf blade ovate or oblong-ovate, 5–9 × 2.2–6.7 cm, base subcordate to truncate, apex short acuminate; lateral veins 5 or 6 pairs. Inflorescences 4–7 cm; peduncle to 6 cm, puberulent. Pedicel 1.5–2.2 cm. Sepals linear to linear-lanceolate, 3–3.5 × 0.5–0.7 mm, glabrous; basal glands 5. Corolla glabrous; lobes ovate, 5–5.5 × ca. 3 mm, apex obtuse. Corona ca. 1/2 as long as gynostegium; lobes ovate-triangular, fleshy, with ovate, adaxial scale. Pollinia oblong-ovate. Stigma head discoid. Fl. Sep.

• Among shrubs along rivers; 2300 m. Sichuan (Muli).

*Cynanchum linearisepalum* may prove to be just a robust form of *C. mooreanum*.

**54. *Cynanchum mooreanum*** Hemsley in F. B. Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 108. 1889.

毛白前 mao bai qian

*Vincetoxicum chinense* S. Moore, *J. Bot.* 13: 228. 1875, (not *Cynanchum chinense* R. Brown 1810); *Cynanchum affine* Hemsley; *Vincetoxicum affine* (Hemsley) Kuntze.

Plants slender climbers. Stems twining, to 2 m, densely pubescent. Leaves opposite; petiole 1–2 cm, pubescent; leaf-blade ovate-cordate to ovate-oblong, 2–8 × 1.5–3 cm, smaller in the inflorescence, pubescent, base cordate or truncate, apex acute; lateral veins 4 or 5 pairs. Inflorescences umbel-like, to 9-flowered; peduncle 0–1.5(–4) cm, pubescent. Pedicel 5–13 mm. Sepals ovate, ca. 2.5 mm, pubescent; basal glands minute. Corolla purple, rotate, glabrous, deeply divided; lobes oblong-lanceolate, 6.5–8(–10) × 2–2.5 mm. Corona cupular, 5-lobed; lobes ovate to ± square, obtuse to truncate, shorter than gynostegium, adnate at base to corresponding anther. Anther appendages broadly ovate; pollinia ovate-oblong. Stigma head depressed. Follicles lanceolate in outline, 7–9 × ca. 1 cm. Seeds brown, oblong, comose. Fl. Jun-Jul, fr. Aug-Dec.

• Thickets, open woods; 200–800 m. Anhui, Fujian, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangxi, Zhejiang.

**55. *Cynanchum sublanceolatum*** (Miquel) Matsumura, *Index Pl. Jap.* 2(2): 511. 1912.

镇江白前 zhen jiang bai qian

*Tylophora sublanceolata* Miquel, *Ann. Mus. Bot. Lugduno-Batavum* 2: 128. 1866; *Vincetoxicum sublanceolatum* (Miquel) Maximowicz.

Stems twining, to 1.5 m, pubescent along 2 lines, glabrescent. Leaves opposite; petiole ca. 5 mm; leaf blade lanceolate or narrowly oblong, 3–5 × 2–2.8 cm, base rounded, apex short acuminate, glabrescent or puberulent along veins. Inflorescences umbel-like, ca. 1.5 cm. Sepals lanceolate, ca. 2.5 × 1 mm, glabrescent. Corolla purple, rotate; lobes lanceolate, ca. 3.5 × 1 mm, glabrous. Corona shorter than anthers; lobes ovate, fleshy. Pollinia oblong. Follicles lanceolate in outline, ca. 7 cm × 7 mm, glabrous. Seeds ovate, ca. 3 × 2 mm; coma ca. 2 cm. Fl. Mar-Aug, fr. Sep-Dec.

Thickets, open woodland. Jiangsu (Zhenjiang) [Japan].

**56. *Cynanchum fordii*** Hemsley in F. B. Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 106. 1889.

山白前 shan bai qian

*Vincetoxicum fordii* (Hemsley) Kuntze.

Stems twining to 2 m, pubescent along 2 lines. Leaves opposite; petiole 0.5–2 cm; leaf blade oblong or ovate-oblong, 3.5–10 × 1.5–5 cm, sparsely pubescent, base truncate, rarely subcordate or rounded, apex short acuminate; lateral veins 4–6 pairs. Inflorescences extra axillary, corymbose or umbel-like, ca. 4 cm, to 15-flowered. Sepals ovate-triangular,

puberulent; basal glands 5. Corolla yellow-white, ca. 7 mm in diam., glabrous; lobes oblong, ca.  $9 \times 3$  mm. Corona lobes 5, thin, rounded, shorter than gynostegium, each attached adaxially to anther. Pollinia ovate-oblong. Stigma head slightly elevated. Follicles lanceolate in outline,  $5-6 \times$  ca. 1 cm. Seeds ovate, flattened; coma ca. 2.5 cm. Fl. May-Aug, fr. Aug-Dec.

- Open woodland, thickets; 200–800 m. Fujian, Guangdong, Hubei, Hunan, Yunnan.

**57. *Cynanchum volubile*** (Maximowicz) Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 109. 1889.

蔓白前 man bai qian

*Vincetoxicum volubile* Maximowicz, Mém. Acad. Imp. Sci. Saint-Pétersbourg Divers Savan 9: 195. 1858; *Alexitoxicon volubile* (Maximowicz) Pobedimova; *Antitoxicum volubile* (Maximowicz) Pobedimova.

Stems twining to 3 m, pubescent along 2 lines at base of internode, 1 line disappearing along the upper part of node. Leaves opposite; petiole ca. 1 cm; leaf blade oblong or oblong-lanceolate,  $4-10(-15) \times 1.2-3(-4.5)$  cm, papery, glabrescent or pubescent along veins, base truncate to shallowly cordate, margin ciliate, apex acuminate; lateral veins 7–10 pairs. Inflorescences umbel-like to short, lax, racemelike, to 6 cm; peduncle 0–3.5 cm, glabrous. Pedicel 1–1.7 cm, glabrous. Sepals lanceolate,  $2-2.3 \times 0.5-0.7$  mm, ciliate. Corolla white, rotate; tube ca. 2 mm; lobes linear-lanceolate,  $4-6 \times 1.3-1.7$  mm, glabrous outside, densely pubescent inside. Corona lobes ovate-triangular, apex acute. Pollinia ovoid. Stigma head depressed. Follicles lanceolate in outline, ca.  $5 \times 1$  cm, glabrous. Fl. Jul-Sep, fr. Aug-Dec.

Moist grasslands. Heilongjiang (Mishan and Yiehun) [Korea, E Russia].

## 19. BIONDIA Schlechter, Bot. Jahrb. Syst. 36 (Beibl. 82): 91. 1905.

秦岭藤属 qin ling teng shu

Lianas or twining herbs. Leaves linear to lanceolate, usually with minute, pale, adaxial dots. Inflorescences extra-axillary, with 1 to few, umbel-like, rarely elongated cymules. Sepals valvate, often with 5 basal glands. Corolla urceolate or campanulate, lobes valvate. Corona inserted at base of gynostegium, ringlike, shallowly 5-cleft or toothed. Filaments connate into a short tube; anther appendages incurved; pollinia 2 per pollinarium, oblong, pendulous. Stigma head discoid. Follicles usually 1, narrowly lanceolate in outline.

About 13 species: all endemic to China.

*Biondia* is closely related to *Cynanchum*. It is distinguished by the better-developed corolla tube and reduced, ringlike corona, which in dried material gives the gynostegium an appearance of being stalked. Most collections have narrow leaves adaxially with distinctive minute pale dots. *Biondia* is not well represented in herbaria, and species delimitation is uncertain.

1a. Corolla interior glabrous.

2a. Leaf blade 1–1.5 mm wide; corolla ca. 2 mm ..... 8. *B. longipes*

2b. Leaf blade 7–15 mm wide; corolla 3–4.5 mm.

3a. Corolla lobes  $1/3-1/2$  as long as tube; leaves  $3-6 \times 0.7-1$  cm ..... 1. *B. chinensis*

3b. Corolla lobes less than  $1/4$  as long as tube; leaves  $5-9 \times 1-1.5$  cm.

4a. Inflorescences including flowers 1.5–2.5 cm; corolla broadly cylindric, ca. 2 mm wide ..... 2. *B. hemsleyana*

4b. Inflorescences including flowers less than 1 cm; corolla urceolate, ca. 1 mm wide at throat, broader below ..... 3. *B. parviurnula*

1b. Corolla interior hairy.

5a. Corolla tube clearly shorter than lobes.

6a. Pedicel 2–5 mm; internodes uniformly minutely puberulent when young, later glabrescent; leaf veins mostly obscure, never pale and reticulate ..... 11. *B. henryi*

- 6b. Pedicel 10–15 mm; internodes with distinct lines of hairs; veins of older leaves becoming prominently pale and reticulate.
- 7a. Abaxial leaf surface with 2 or 3 main lateral vein pairs at acute angles to midrib plus up to 6 minor lateral veins at ca. 90° to midrib ..... 12. *B. insignis*
- 7b. Abaxial leaf surface with lateral veins 5–7 pairs at ca. 45° to midrib, all similar ..... 13. *B. laxa*
- 5b. Corolla tube as long as or longer than lobes.
- 8a. Corolla tube urceolate, clearly widest below throat.
- 9a. Internodes puberulent along 1 side only; petiole 5–10 mm ..... 4. *B. microcentra*
- 9b. Internodes uniformly puberulent; petiole 1–2 mm ..... 5. *B. yunnanensis*
- 8b. Corolla tube cylindrical or campanulate, widest at throat or with parallel sides.
- 10a. Leaves to 13 mm wide; inflorescences with an umbel-like cyme; sepals glabrous ..... 6. *B. tsiukowensis*
- 10b. Leaves to 5 mm wide; inflorescences often with 2 cymules separated by a distinct rachis; sepals sparsely puberulent.
- 11a. Corolla tube longer than lobes; cymules racemelike with short but distinct rachis ..... 7. *B. crassipes*
- 11b. Corolla tube as long as lobes; cymules umbel-like with rachis completely suppressed.
- 12a. Stems hairy along 1 side only; pedicel 4–6 mm ..... 9. *B. pilosa*
- 12b. Stems minutely hairy along 2 sides; pedicel 7–9 mm ..... 10. *B. revoluta*

**1. *Biondia chinensis*** Schlechter, Bot. Jahrb. Syst. 36 (Beibl. 82): 91. 1905.

秦岭藤 qin ling teng

Lianas to 2 m. Branches terete, slender, minutely pubescent along 2 lines. Leaves remote; petiole 3–5 mm; leaf blade lanceolate to linear-lanceolate, 3–6 cm × 7–10 mm, glabrescent; lateral veins flat, obscure. Cymules umbel-like, few flowered, sometimes 2 close together; peduncle 5–8 mm. Pedicel threadlike, 5–8 mm, minutely puberulent. Sepals ovate-elliptic. Corolla lobes 1/3–1/2 as long as tube, acute, erect, glabrous. Corona ringlike, rim shallowly 5-cleft. Anthers oblong-rhomboid, apex broadly triangular, subacute, inflexed; pollinia oblong, caudicles as long as pollinia, retinaculum half as long as pollinia. Follicles narrowly lanceolate, 5–7 cm × ca. 4 mm. Seeds linear, ca. 7 × 2 mm; coma ca. 1 cm. Fl. May, fr. Oct.

• Mountain forests, roadsides, bottom of cliffs; 1600 m. Gansu, Shaanxi (In kia p'u (Lao y shan)).

More material is needed to determine if *Biondia chinensis* is distinct from *B. hemsleyana*.

**2. *Biondia hemsleyana*** (Warburg) Tsiang, Sunyatsenia 6: 124. 1941.

宽叶秦岭藤 kuan ye qin ling teng

*Gongronema hemsleyana* Warburg in Schlechter & Warburg, Repert. Spec. Nov. Regni Veg. 3: 341. 1907.

Lianas to 2 m. Internodes glabrous. Petiole 5–7 mm, adaxially pubescent; leaf blade narrowly lanceolate, 5–9 × 1–1.5 cm, short acuminate or acute at both ends, margin sub-revolute; midvein pubescent and elevated abaxially, lateral veins obscure. Inflorescences sometimes branched at base to form small groups; cymes umbel-like, up to 7-flowered; peduncle to 1 cm, sparsely puberulent. Pedicel to 9 mm, sparsely puberulent. Sepals ovate, ca. 1.5 mm, without basal glands. Corolla white, broadly cylindrical, to 4.5 mm; lobes broadly triangular, ca. 0.5 mm. Corona ringlike, rim 5-toothed. Anther apex rounded; pollinia globose. Follicles linear-lanceolate, 5–6 cm × 3–5 mm. Seeds ovate-oblong, ca. 5 × 2 mm; coma ca. 2 cm. Fl. Apr-Sep, fr. Oct-Dec.

• Mixed woods; 1400–2000 m. Sichuan.

**3. *Biondia parviurnula*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 2. 1995.

小花秦岭藤 xiao hua qin ling teng

Herbs twining. Stems densely minutely puberulent along 2 sides. Petiole to 7 mm, adaxially puberulent; leaf blade lanceolate, to 6.5 × 2.2 cm, glabrous except for adaxially densely puberulent midrib, base rounded, apex acute-apiculate; lateral veins 3 or 4 pairs, slightly raised on both sides; upper leaves relatively narrower, ± elliptic to elliptic-oblong. Cymules solitary, umbel-like, ca. 4-flowered; peduncle ca. 2 mm, puberulent. Pedicel 1.5–2 mm, glabrous. Sepals lanceolate, ca. 1.5 × 0.7 mm, apex acute, pubescent, somewhat glabrescent. Corolla urceolate, 3–3.5 mm, pale purple inside, glabrous outside; tube ca. 2.5 × 2 mm, throat ca. 1.2 mm wide, sparsely hairy inside; lobes ovate, ca. 1.2 mm, apparently not revolute. Corona a collar covering bases of anthers, thin when dried. Stigma head conical.

• 800 m. Anhui (Bai Ma Zhai).

**4. *Biondia microcentra*** (Tsiang) P. T. Li, J. S. China Agric. Univ. 12(3): 39. 1991.

祛风藤 qu feng teng

*Adelostemma microcentrum* Tsiang, Sunyatsenia 2: 184. 1934; *Biondia elliptica* P. T. Li & Z. Y. Zhu.

Lianas, twining to 2 m. Stems, branches, petioles, and peduncles mostly pubescent along 1 side. Petiole 5–10 mm; leaf blade elliptic to oblong-lanceolate, 1–7 × 0.5–1.4(–2.3) cm, papery or nearly so, glabrous except for minutely puberulent midrib adaxially, base minutely rounded to cuneate, apex acuminate; lateral veins 4–7 pairs, usually obscure. Inflorescences shorter than leaves; cymules usually solitary, 4–9-flowered; peduncle (1.5–)4–13(–23) mm. Pedicel (1.7–)3–4(–12) mm. Sepals lanceolate, 1.6–3 × 0.8–1 mm, apex acute, pubescent; basal glands 5. Corolla yellowish white with “purplish” interior, cylindrical-urceolate; tube (2.5–)3.5–4 mm, pubescent inside; lobes oblong-lanceolate or oblong-elliptic, 1.2–2 × ca. 1 mm. Corona minute, ringlike. Anther appendages rounded, incurved; pollinia ± cylindrical, slightly curved, ca. 0.4 mm, as long as corpusculum, caudicles short and rigid. Stigma head round/conical, obscurely 2-lobed; ovaries glabrous. Follicles oblong-lanceolate, 8–12 cm × 5–7 mm. Seeds oblong,



ca. 6 × 2 mm, flat; coma to 3 cm. Fl. Apr-Jul.

• Open woods, thickets. 800 m. Anhui, Sichuan, ?Yunnan, Zhejiang.

A decoction of all parts is used as a febrifuge and for the treatment of rheumatism and internal fever.

**5. *Biondia yunnanensis*** (H. Léveillé) Tsiang, Sunyatsenia 6: 126. 1941.

短叶秦岭藤 duan ye qin ling teng

*Dischidia yunnanensis* H. Léveillé, Cat. Pl. Yun-Nan 14. 1915; *Adelostemma mairei* Handel-Mazzetti.

Lianas to 1 m. Stems gray; branches green, uniformly puberulent. Petiole 1–2 mm; leaf blade narrowly oblong to linear-lanceolate, 2–3.5 cm × 3–7 mm, fleshy, glabrous, base rounded, margin revolute, apex rounded-apiculate to acute; lateral veins invisible abaxially, raised adaxially. Inflorescences shorter than leaves; cymules solitary, 4–6-flowered; peduncle 4–10 mm, glabrescent. Pedicel 3–5 mm, glabrous. Sepals ovate-oblong, puberulent, basal glands 5. Corolla yellow or white, urceolate, 3–3.5 mm, densely pubescent inside, otherwise glabrous; lobes oblong, ca. half as long as tube. Corona 5-toothed. Anther appendages orbicular; pollinia oblong. Stigma head conical. Follicles lanceolate in outline, ca. 9 cm × 5–6 mm. Seeds ovate; coma ca. 1.3 cm. Fl. Jun-Sep, fr. Oct.

• Montane forests; 2000–2500 m. Henan, Sichuan, Yunnan.

**6. *Biondia tsukowensis*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 3. 1995.

茨菇秦岭藤 ci gu qin ling teng

Internodes densely pubescent along 2 sides. Petiole ca. 6 mm, adaxially puberulent; leaf blade lanceolate, to 6 × 1.2 cm, adaxially with minute pale dots, glabrous except for minutely puberulent veins adaxially, base rounded, apex ± acute, subapiculate; lateral veins 5–7, adaxially slightly raised, at an acute angle to midrib. Inflorescences shorter than leaves; cymules apparently solitary, umbel-like; peduncle 0.2–1.8 cm, subglabrous. Pedicel to 1.1 cm. Sepals ovate, ca. 1.4 × 0.7 mm, glabrous. Corolla tube campanulate, ca. 2.3 mm, longer than lobes; lobes triangular-acuminate, ca. 2 × 1.4 mm, minutely puberulent inside. Corona lobes ± square, reaching base of anthers. Gynostegium ca. 1.4 mm high; pollinia cylindrical, as long as corpusculum.

• 2400 m. Yunnan (Tsiu kow).

**7. *Biondia crassipes*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 2. 1995.

厚叶秦岭藤 hou ye qin ling teng

Internodes puberulent along 2 sides and at nodes. Petiole 2–4 mm, adaxially densely puberulent; leaf blade linear-oblong, to 5 cm × 3 mm, base cuneate, apex acute; midvein raised adaxially, lateral veins obscure, glabrous. Inflorescences 2–3.5 cm; cymules mostly 2, separated by rachis ca. as long as pedicels; rachis of cymules slightly elongated, ± fleshy, very sparsely puberulent. Pedicel 6–10 mm. Sepals elliptic, ca. 1.5 × 0.6 mm, sparsely puberulent. Corolla apparently green, campanulate, ca. 2.5 mm, glabrous

outside, minutely hairy inside, hairs short, stiff, white; tube ca. 1.5 mm; lobes triangular, revolute, twisted. Corona reduced to inconspicuous collar concealing bases of anthers. Pollinia oblong-reniform. Follicles solitary, narrowly fusiform, ca. 5.5 cm × 4 mm.

• 2700 m. Xizang

**8. *Biondia longipes*** P. T. Li, Bull. Bot. Res., Harbin 3(1): 106. 1983.

长序梗秦岭藤 chang xu geng qin ling teng

Lianas to 1.5 m. Stems, branches, and petioles pubescent along 1 line. Petiole 1–1.5 mm; leaf blade linear, 3–7 cm × 1–2 mm, thin papery, glabrous, base subcordate, apex acute; midvein puberulent, elevated; lateral veins obscure. Cymes extra-axillary, shorter than leaves, 3–12-flowered, up to 3 together; peduncle 1.5–3 cm, glabrous. Pedicel slender, 6–10 mm. Sepals puberulent, basal glands 5. Corolla subcampanulate, glabrous; tube ca. 1 mm; lobes oblong, as long as tube, acute. Corona short 5-toothed. Pollinia reniform. Ovaries oblong, glabrous. Fl. May.

• Thickets; 2500 m. Sichuan (Kangding).

**9. *Biondia pilosa*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 112. 1974.

宝兴藤 bao xing teng

Lianas to 1.5 m. Stems, branches, petioles, and peduncles pubescent along 1 side. Petiole 2–4 mm; leaf blade linear to linear-lanceolate, 2.5–7 cm × ca. 5 mm, thin papery, glabrous except for puberulent midvein, acuminate at both ends; lateral veins 5–7 pairs, slightly elevated abaxially. Inflorescences

shorter than leaves; cymules umbel-like, 4–6-flowered, solitary or 2 separated by rachis almost as long as peduncle; peduncle to 3 cm. Pedicel slender, 4–6 mm. Sepals lanceolate, ca. 1 × 0.5 mm, pubescent, basal glands 5. Corolla subcampanulate, glabrous outside, pubescent inside; tube ca. 2 mm; lobes oblong, up to as long as tube. Corona ringlike, rim truncate or subundulate. Anther appendages orbicular; pollinia oblong. Fl. Jun.

• Mixed woods along stream banks; 2700 m. Sichuan (Baohsien), Yunnan (Likiang).

**10. *Biondia revoluta*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 3. 1995.

卷冠秦岭藤 juan guan qin ling teng

Stems hairy along 2 sides. Petiole to 3.5 mm, puberulent; leaf blade linear-oblong, to 2.8–6 cm × 4–6 mm, probably rather fleshy when fresh, glabrous except for midrib adaxially, base ± rounded, margin strongly revolute, apex subacute, apiculate; lateral veins not raised, underside distinctly paler, wrinkled when dried. Cymules umbel-like, 2–4-flowered, solitary or 2 separated by rachis to 5 mm, puberulent; peduncle to 1–1.5 cm, hairy along 1 side. Pedicel to 7–9 mm, glabrous. Sepals ovate, 0.7–1 × 0.5–0.7 mm, sparsely puberulent, apex acute. Corolla campanulate, inside minutely puberulent, 2.5–3.5 mm; lobes ovate, ca. 1.5 × 1.5 mm, apex rounded, subrevolute. Corona annular, obscurely 5-toothed.

• “Arid region”; 3000 m. ?Gansu, E Xizang/NW Yunnan (Tung-chu-ling).

**11. *Biondia henryi*** (Warburg ex Schlechter & Diels) Tsiang & P. T. Li, *Acta Phytotax. Sin.* 12: 114. 1974.

青龙藤 qing long teng

*Cynanchum henryi* Warburg ex Schlechter & Diels in Diels, *Bot. Jahrb. Syst.* 29: 542. 1900.

Lianas to 2 m. Stems slender, glabrous or sparsely puberulent when young. Petiole ca. 3 mm; leaf blade lanceolate, 3–5.2 × 0.5–1.2(–2) cm, thin papery, glabrescent; lateral veins obscure, 2 lower veins visible in younger leaves, at acute angle to midrib. Cymules usually solitary, umbel-like; peduncle slender, 0.5–1.5(–3) cm, glabrescent. Pedicel 2–5 mm. Sepals lanceolate, ca. 1.2 × 0.6 mm, pubescent, basal glands 5. Corolla glabrous outside, puberulent inside; tube bowl-shaped, ca. 1.2 mm; lobes ovate-triangular, ca. 1.7 × 2 mm, patent. Corona ringlike, 5-toothed; teeth triangular, acute. Anther appendages orbicular; pollinia oblong, caudicles inflexed ascending. Ovaries glabrous. Follicles narrowly lanceolate, 5–6 cm × 3–4 mm. Seeds oblong; coma to 2 cm. Fl. Apr–Jul, fr. Jul–Oct.

• Open woods, thickets; 1200 m. Anhui, Fujian, Jiangxi, Sichuan, Zhejiang.

Cheng & Feng (*Bull. Bot. Lab. North-East. For. Inst.* 8(8): 2. 1980) described material from Anhui and Zhejiang as var. *longipedunculata*, but the name is invalid because the authors failed to designate a type.

**12. *Biondia insignis*** Tsiang, *Sunyatsenia* 4: 106. 1939.

黑水藤 hei shui teng

Lianas to 1 m. Branches and petioles pubescent along 1 line. Petiole ca. 1 cm; leaf blade linear-lanceolate to lanceolate, 3–7 cm × 3–15 mm, glabrous except for minute hairs along margin and midrib adaxially, base cuneate to obtuse,

apex acuminate to acute; major lateral veins 2 or 3 pairs at an acute angle to midrib and up to 6 pairs of minor veins at a wider angle; older leaves with reticulate abaxial veins thickened and ± white. Cymule solitary, umbel-like, 4–6-flowered; peduncle 0.6–4 cm, slender, glabrous. Pedicel 8–10 mm, glabrous. Sepals ovate; glands absent. Corolla green, 5–6 mm in diam.; tube bowl-shaped, 1.2–2 mm; lobes ovate-oblong, ca. 1.7 × 1 mm, rotate, short pilose or glabrous inside. Corona ringlike, rim shallowly 5-cleft. Anthers orbicular; pollinia ob-long, ovaries glabrous. Follicles narrowly lanceolate, ca. 8 cm × 4 mm. Seeds oblong-elliptic, ca. 8 × 2 mm; coma ca. 2.5 cm. Fl. Jun-Aug, fr. Aug-Oct.

• Mixed forests; 200–2900 m. Guizhou, Hunan, Sichuan, Xizang, Yunnan.

**13. *Biondia laxa*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 2. 1995.

杯冠秦岭藤 bei guan qin ling teng

Lianas with densely pubescent internodes along 1 side. Petiole to 7 mm; leaf blade lanceolate, ca. 5 × 1.8 cm, glabrous, base rounded, apex acute; lateral veins 5–7 pairs, adaxially slightly raised and minutely puberulent. Inflorescences lax; cymules umbel-like, glabrous, up to 3 along zigzag rachis to 1.7 cm; peduncle to 2.5 cm, glabrous. Pedicel ca. 1 cm, very slender. Sepals ovate, ca. 1 × 0.5 mm, glabrous. Corolla tube bowl-shaped, ca. 1 mm, much shorter than lobes; lobes triangular-acuminate, ca. 2.5 mm, very minutely puberulent, apex twisted. Corona lobes rounded, to base of anthers.

• Yunnan (Ouei cha).

## 20. **RAPHISTEMMA** Wallich, *Pl. Asiat. Rar.* 2: 50. 1831.

大花藤属 da hua teng shu

Lianas woody. Leaves opposite, long petiolate, 3–5-veined from base. Inflorescences extra-axillary, umbel-like to short racemelike, large, long pedunculate. Calyx with many basal glands. Corolla campanulate, large; lobes overlapping to right. Corona lobes separate, inserted at base of gynostegium, linear-subulate, longer than gynostegium and exerted from corolla tube. Filaments connate; anther appendages short, sharply bent; pollinia 2 per pollinarium, ellipsoid, pendulous. Stigma head broadly rounded, depressed. Follicles fusiform or cylindrical, thick, with a fibrous pericarp. Seeds ovate.

Two species: SE Asia, both in China.

- 1a. Buds 0.8–1.4 cm; corolla tube 0.8–1.6 cm, lobes as long as or slightly longer, spreading-rotate; corona lobes exerted and easily seen in herbarium material ..... 1. *R. hooperianum*  
 1b. Buds (1.7–)2.2–3.1 cm; corolla tube up to 2.5 cm, lobes shorter, straight, subrevolute; corona lobes usually concealed in herbarium material ..... 2. *R. pulchellum*

**1. *Raphistemma hooperianum*** (Blume) Decaisne in A. de Candolle, *Prodr.* 8: 516. 1844.

广西大花藤 guang xi da hua teng

*Oxystelma hooperianum* Blume, *Bijdr.* 1053. 1826; *Raphistemma brevipedunculatum* Y. Wan.

Stems to 5 m, terete, glabrous. Petiole 3–8.5 cm; leaf blade oblong-ovate to broadly triangular, 4–16 × 2–12 cm, glabrous except for finely puberulent veins, base cordate to subtruncate, apex acute-acuminate; lateral veins 5–7 pairs.

Peduncle 2–10.5 cm. Pedicel 1–3.5 cm. Buds 0.8–1.4 cm. Sepals ovate-oblong, 3–6 × ca. 2.4 mm, ciliate. Corolla white, glabrous; tube 0.8–1.6 cm, limb 2.5–3 cm in diam.; lobes oblong-ovate, as long as or slightly longer than tube. Corona lobes white, 1–1.3 cm. Stigma head truncate. Follicles 13–18 × 4–6 cm, glabrous. Seeds flat, ca. 7 × 6 mm; coma to 5 cm. Fl. Jun-Jul.

Bushland, open woods; 400–800 m. SW Guangxi [Indonesia, Thailand, Vietnam].

**2. *Raphistemma pulchellum*** (Roxburgh) Wallich, *Pl. Asiat. Rar.* 2: 50, tab. 163. 1831.

大花藤 da hua teng

*Asclepias pulchella* Roxburgh, Fl. Ind. 2: 54. 1824.

Stems to 8 m, terete, glabrous. Petiole 4–12 cm, with apical adaxial gland cluster; leaf blade ovate, 6–20 × 4–15 cm, sparsely appressed pubescent to glabrous, base deeply cordate, apex acute-acuminate; lateral veins 6 or 7 pairs. Peduncle 3.7–13 cm. Pedicel 1.2–4 cm. Sepals ovate-oblong, 3–4 mm, ciliate. Corolla yellowish white; tube 1.2–1.8 cm, limb 3–4 cm in diam.; lobes shorter than tube, oblong, glabrous. Corona lobes white, 1–1.2 cm. Ovaries glabrous. Follicles ca. 16 × 4 cm. Seeds ovate; coma to 4 cm. Fl. Jun-Aug, fr. Sep-Dec.

Open woods, forests, bushland; 400–1200 m. SW Guangxi, S Yunnan [India, Laos, Malaysia, Myanmar, Nepal, Sikkim, Thailand].

## 21. HOLOSTEMMA R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 42. 1810 (preprint).

铰剪藤属 jiao jian teng shu

Lianas large, herbaceous or woody. Inflorescences extra-axillary, umbel-like or short racemelike, occasionally branched, shorter than leaves, usually few flowered. Flowers large. Calyx without glands. Corolla subrotate; lobes overlapping to right. Corona shallowly cupular, inserted at base of gynostegium, fleshy, apex entire or shallowly undulate. Filaments connate; anthers very large, decurrent to base of column, apex acuminate; pollinia 2 per pollinarium, slender, falcate, pendulous. Stigma head scarcely umbonate. Follicles stout, cylindrical-fusiform, slightly tapering to a blunt apex.

Two species: China, India, Myanmar, Sri Lanka, Thailand; one species in China.

1. *Holostemma ada-kodien* Schultes in Roemer & Schultes, Syst. Veg. 6: 95. 1820.

铰剪藤 jiao jian teng

*Asclepias annularis* Roxburgh; *Holostemma annulare* (Roxburgh) K. Schumann, *H. rheedianum* Sprengel.

Stems to 8 m, much branched, puberulent to glabrous. Petiole 2–6 cm; leaf blade ovate-cordate, 5–12 × 2–8 cm, glabrous except for puberulent abaxial veins. Peduncle 2.5–5 cm. Pedicel longer than peduncle. Sepals ovate, 3 mm. Corolla white to yellowish white, purplish crimson inside, 2–3.5 cm in diam., divided ca. 2/3 way to base; lobes ovate-oblong, 0.8–1.6 cm. Corona ca. 3 mm. Follicles 8–14 × 1–4 cm, glabrous. Seeds ovate, ca. 5 mm, margin membranous; coma 2–3 cm. Fl. Apr-Sep, fr. Aug-Dec.

Bushland. Guangdong, Guangxi, Guizhou, Yunnan [India, Kashmir, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand].

Decoction of all parts is used to induce lactation.

## 22. SICHUANIA M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 12. 1995.

四川藤属 si chuan teng shu

Lianas. Nodes with narrow but distinct interpetiolar line. Leaves opposite. Inflorescences extra-axillary, pedunculate, racemelike, not branched, with few-flowered cymules arranged in lax spiral along rachis. Flowers medium sized. Corolla shallowly bowl-shaped, glabrous. Corona of 5 separate lobes inserted at base of gynostegium and alternating with anthers, ovate to semicircular, short and inconspicuous. Anthers confluent to corolla, uniformly pale and glossy with long margin and dorsal groove, apex retuse, appendages sharply delimited, ovate, scarious except for narrow midrib, covering stigma head; pollinia 2 per pollinarium, oblong, pendulous. Fruit not seen.

One species: endemic to China (Sichuan).

The corona lobes are alternate with the anthers whereas in all other genera they are opposite.

**1. *Sichuania alterniloba*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 12. 1995.

四川藤 si chuan teng

Stems minutely puberulent along 1 side (sometimes along 2 at base of internode). Petiole 2–3 cm; leaf blade ovate-triangular, 5–8 × 3.3–7 cm, thick textured, glabrous throughout, abaxially conspicuously pale, adaxially much darker and apparently glossy, base cordate; lateral veins 4–6 pairs. Peduncle 1.5–5.5 cm, sometimes sharply reflexed; rachis up to 2 cm. Pedicel up to 1 cm, puberulent along 1 side, subtending bracteoles ca. 1 mm. Sepals lanceolate, ca. 2.7 × 1.3 mm, subglabrous, apex acute. Corolla white; lobes ovate, ca. 5.5 × 3.5 mm. Gynostegium ca. 2.5 mm high; anthers ca. 2 mm; retinaculum ca. 0.5 mm; translator arms short and rigid; pollinia cylindrical-ovoid, slightly compressed, ca. 0.6 mm. Stigma head apiculate, concealed by anther appendages.

- Sichuan.

## 23. **GRAPHISTEMMA** Champion ex Bentham in Bentham & J. D. Hooker, *Gen. Pl.* 2: 760. 1876.

天星藤属 tian xing teng shu

Lianas. Leaves opposite, stipulate. Cymes extra-axillary, short pedunculate, racemelike, usually simple. Flowers large. Calyx glands present. Corolla subrotate, thick; lobes longer than tube, overlapping to right. Corona ringlike, inserted at base of gynostegium, deeply 5-lobed; lobes erect, membranous, revolute, separated by truncate sinus, shorter than anthers. Filaments connate into a tube; anthers somewhat concave at middle, appendages rounded, covering stigma head; pollinia 2 per pollinarium, oblong, pendulous. Stigma head elevated. Follicles ovoid-cylindric, woody. Seeds ovate.

One species: China, Vietnam.

**1. *Graphistemma pictum*** (Champion ex Bentham) Bentham & J. D. Hooker ex Maximowicz, *Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg* 9: 776. 1876.

天星藤 tian xing teng

*Holostemma pictum* Champion ex Bentham, Hooker's *J. Bot. Kew Gard. Misc.* 5: 53. 1853.

Lianas to 8 m, glabrous. Stipules present, leafy, rounded to ovate, 1–3.5 × 0.8–1.5 cm, amplexicaul; petiole 1–4.5 cm, flat, with a group of adaxial glands; leaf blade oblong-lanceolate, 6–20 × 2.5–7 cm, base rounded, sometimes minutely cordate, apex acuminate or acute; lateral veins ca. 10 pairs, pale. Inflorescences 3–12-flowered; peduncle 0.5–5 cm. Pedicel 0.5–1.5 cm. Corolla green outside, purplish with yellow margin inside; lobes oblong, 8–10 × 3–4 mm, minutely ciliate. Follicles 9–11 × 3–4 cm. Seeds brownish, ovate, ca. 1.3 cm; coma to 4 cm. Fl. Apr-Sep, fr. Jul-Dec.

Open woods, bushland; 100–700 m. Guangdong, Guangxi, Hainan [Vietnam].

Decoction of all parts is used for the treatment of traumatic injury and sore throat.

## 24. **MICHOLITZIA** N. E. Brown, *Bull. Misc. Inform. Kew* 1909: 358. 1909.

扇叶藤属 shan ye teng shu

*Hoya* sect. *Antiostelma* Tsiang & P. T. Li; *Antiostelma* (Tsiang & P. T. Li) P. T. Li.

Subshrubs epiphytic or epilithic. Stems rooting from lowermost nodes only. Leaves opposite, fleshy. Inflorescences extra-axillary, rachis usually branched, branches racemelike with close-spaced pedicel scars and producing successive umbel-like clusters of flowers. Calyx not glandular. Corolla tubular; lobes erect, twisted to left. Corona lobes 5, fleshy, erect, square, adnate lengthwise to gynostegium, margin strongly recurved at back. Anther with membranous apical appendages; pollinia 2 per pollinarium, erect, basal margin translucent. Stigma head beaked, exceeding anther appendages. Follicles linear-lanceolate.

One species: China, India, Myanmar, Thailand.

**1. *Micholitzia obcordata*** N. E. Brown, Bull. Misc. Inform. Kew 1909: 358. 1909.

扇叶藤 shan ye teng

*Antiostelma lantsangense* (Tsiang & P. T. Li) P. T. Li; *A. manipurensis* (Deb) P. T. Li; *Dischidia obcordata* (N. E. Brown) Maxwell & Donckelaar; *Hoya lantsangensis* Tsiang & P. T. Li; *H. manipurensis* Deb.

Subshrubs to 1 m, glabrous except for young parts and inflorescences. Stems and branches straw colored, striate. Petiole ca. 2 mm, with 2 or 3 glands grouped adaxially; leaf blade obtriangular or obovate, 2–3 × 1.5–2.5 cm, fleshy, sub-leathery when dry, base cuneate, apex retuse, rarely truncate; lateral veins obscure. Inflorescences sessile or subsessile. Pedicel 0.3–5.5 cm, pubescent. Sepals ovate-oblong, ca. 1.5 × 1 mm, hirsute. Corolla hirsute; tube ca. 6 × 3 mm; lobes triangular, ca. 1.5 × 1 mm, erect. Margins of corona lobes meet at middle. Anthers oblong, apical membrane acuminate, longer than corona lobes; pollinia nearly square; gynostegium shorter than corolla tube. Stigma head long, beaked at apex, exceeding anthers. Follicles linear-lanceolate, ca. 6.5 cm × 4 mm. Seeds oblong, ca. 3 × 1 mm; coma ca. 2 cm. Fl. Jul.

Montane forests, often attached to rocks or trees; 1000–1600 m. SW Yunnan [NE India, Myanmar, N Thailand].

*Micholitzia* was overlooked when *Antiostelma* was elevated by Li (Novon 2: 218. 1992) to the generic rank. The material from Thailand combines the characters used to separate the two species of *Antiostelma*, and it is not practical to recognize more than one species. Maxwell (Nat. Hist. Bull. Siam Soc. 39: 78–79. 1991) included *Micholitzia* in *Dischidia*, but this has not been followed as taxa of both genera differ markedly in habit and flower structure.

## 25. HOYA R. Brown, Prodr. 459. 1810.

球兰属 qiu lan shu

*Centrostemma* Decaisne; *Otostemma* Blume.

Subshrubs or lianas, epiphytic or epilithic, often twining or climbing by adventitious roots. Leaves opposite, fleshy, papery, or membranous. Inflorescences extra-axillary or sometimes terminal, umbel-like, producing a succession of globose or flat-top-ped clusters; old rachis thick, with contiguous pedicel scars. Calyx small, with basal glands. Corolla fleshy, rotate, reflexed, [or campanulate]; lobes valvate, often densely hairy or scurfy inside. Corona lobes 5, depressed patent or adnate vertically to gynostegium, fleshy, glossy when dried, inner angle a tooth incumbent on anthers, outer angle rounded or acute; margin revolute, longitudinally grooved basally. Stamens short connate, apical membrane of anthers appressed against stigma head; pollinia 2 per pollinarium, oblong, erect, with raised, translucent margin. Stigma head discoid, rounded or subapiculate. Follicles often solitary, cylindrical-fusiform.

At least 100 species: SE Asia to Oceania; 32 species in China.

1a. Leaves 3-veined from base ..... 2. *H. pottsii*

- 1b. Leaves pinnately veined, or veins obscure.
- 2a. Inflorescences 4- or 5-flowered, terminal; leaves 1–1.5 cm ..... 32. *H. chinghungensis*
- 2b. Inflorescences many flowered, usually extra-axillary, rarely terminal (*H. lii*); leaves more than 2 cm.
- 3a. Outer angle of corona lobes rounded.
- 4a. Leaves villous or pubescent.
- 5a. Leaf blade broadly oblong or long quadrate, villous, apex mucronate; corolla lobes as long as tube ..... 23. *H. villosa*
- 5b. Leaf blade elliptic, oblong, elliptic-lanceolate, or rarely suborbicular, pubescent, apex short acuminate to obtuse; corolla lobes longer than tube ..... 24. *H. lyi*
- 4b. Leaves glabrous.
- 6a. Leaf blade orbicular to widest above middle, 3–6 cm wide.
- 7a. Leaf blade spatulate to oblanceolate, 10–21 cm, lateral veins 10 or more pairs; flower clusters flat topped; corolla white with purple spots ..... 21. *H. radicalis*
- 7b. Leaf blade obovate to orbicular, 4–8 cm, lateral veins ca. 4 pairs or obscure; flower clusters globose; corolla uniformly white.
- 8a. Apex of leaf blade retuse or concave, lateral veins obscure ..... 20. *H. kerrii*
- 8b. Apex of leaf blade entire, lateral veins conspicuous, ca. 4 pairs ..... 22. *H. liangii*
- 6b. Leaf blade of other shapes, if more than 3 cm wide then widest below middle.
- 9a. Leaf blades often pandurate, sometimes oblong; peduncle 0.3 cm; corolla yellow or reddish ..... 27. *H. pandurata*
- 9b. Leaf blade lanceolate or oblong-lanceolate to oblong-oblanceolate; peduncle 1–8 cm; corolla white.
- 10a. Branchlets and petiole hairy; peduncle 1–4 cm; corolla reflexed; corona lobes erect.
- 11a. Branchlets and petiole setose; lateral veins of leaf blade conspicuous adaxially; inflorescences terminal ..... 25. *H. lii*
- 11b. Branchlets and petiole minutely puberulent at least when young; lateral veins of leaf blade ill defined adaxially; inflorescences extra-axillary ..... 26. *H. mekongensis*
- 10b. Branchlets and petiole glabrous; peduncle 5–8 cm; corolla rotate; corona lobes spreading-stellate.
- 12a. Leaf blade 1.5–2 cm wide; flower clusters flat topped; corolla 1–1.5 cm in diam., villous inside ..... 28. *H. mengtzeensis*
- 12b. Leaf blade 2.5–4.5 cm wide; flower clusters globose; corolla ca. 3 cm in diam., obscurely puberulent inside ..... 29. *H. griffithii*
- 3b. Outer angle of corona lobes acute.
- 13a. Corolla purple; inflorescences on hanging leafless branches (leaves not known) ..... 11. *H. commutata*
- 13b. Corolla white, pink, yellow, or yellowish; inflorescences always on normal leafy branches.
- 14a. Leaf blade linear, 0.4–0.7 cm wide.
- 15a. Leaf blade 2.5–5 cm, hirsute abaxially; inflorescences terminal; corolla lobes glabrous ..... 31. *H. linearis*
- 15b. Leaf blade 10–20 cm, glabrous; inflorescences extra-axillary; corolla lobes pubescent ..... 30. *H. longifolia*
- 14b. Leaf blade not linear, 1–6.5 cm wide.
- 16a. Corolla strongly reflexed; corona distinctly stalked, lobes spurred at base ..... 1. *H. multiflora*
- 16b. Corolla not reflexed; corona sessile, lobes not spurred.
- 17a. Leaf apex caudate; flowers yellow or yellowish.
- 18a. Leaf blade 4.5–7 cm, base rounded, lateral veins 4 or 5 pairs, obscure; peduncle ca. 0.4 cm; pedicel 1–1.2 cm; corolla lobes glabrous ..... 5. *H. lasiognostegia*
- 18b. Leaf blade 9–13 cm, base cuneate, lateral veins 10–12 pairs, conspicuous; peduncle 1.5–2.5 cm; pedicel 2–2.5 cm; corolla lobes puberulent inside.
- 19a. Leaf blade symmetrical at base, lateral veins at right angle to midvein, uniformly colored ..... 3. *H. fusca*
- 19b. Leaf blade oblique at base, lateral veins obliquely ascending, midrib with pale zone on both sides ..... 4. *H. lipoensis*
- 17b. Leaf apex obtuse to acuminate; flowers white or reddish.
- 20a. Lateral veins of leaf blade obscure or obsolete.
- 21a. Leaf blade oblong or widest above middle.
- 22a. Petiole and abaxial surface of leaf blade pubescent; corolla ca. 1.2 cm in diam. .... 6. *H. thomsonii*
- 22b. Petiole and leaf blade glabrous; corolla 2–4 cm in diam. .... 30. *H. longifolia*

- 21b. Leaf blade widest below middle.
  - 23a. Pedicel longer than peduncle.
    - 24a. Leaf blade lanceolate to ovate-lanceolate, apex acuminate; peduncle 1–5 cm; sepals puberulent outside ..... 7. *H. siamica*
    - 24b. Leaf blade elliptic or elliptic-oblong, apex obtuse; peduncle ca. 0.3 cm; sepals glabrous outside ..... 8. *H. revolubilis*
  - 23b. Pedicel shorter than or as long as peduncle.
    - 25a. Corolla 0.6–0.7 cm wide, violet dotted, base conspicuously white villous inside, lobes much longer than tube ..... 9. *H. lacunosa*
    - 25b. Corolla 1.5–2 cm wide, not violet dotted, densely papillate inside, lobes as long as tube ..... 10. *H. carnosa*
- 20b. Lateral veins of leaf blade conspicuous.
  - 26a. Flower clusters flat topped.
    - 27a. Leaf blade cordate at base; petiole and abaxial side of midvein puberulent; peduncle shorter than pedicel; calyx outside and corolla puberulent ..... 12. *H. cordata*
    - 27b. Leaf blade rounded at base; petiole and midvein glabrous; peduncle much longer than pedicel; calyx and corolla glabrous ..... 13. *H. nervosa*
  - 26b. Flower clusters globose.
    - 28a. Petiole up to 0.4 cm.
      - 29a. Lateral leaf veins numerous, parallel; peduncle shorter than pedicel; corolla lobes papillate inside ..... 14. *H. polyneura*
      - 29b. Lateral leaf veins 4 or 5 pairs, not parallel; peduncle longer than pedicel; corolla mealy inside ..... 15. *H. dasyantha*
    - 28b. Petiole 1–3 cm.
      - 30a. Leaves pubescent abaxially, especially along veins.
        - 31a. Leaf blade short acuminate at apex, cuneate at base; calyx glabrous; corolla ca. 1 cm in diam. .... 16. *H. silvatica*
        - 31b. Leaf blade obtuse or rounded at apex, rounded or broadly cuneate at base; calyx puberulent outside; corolla ca. 1.5 cm in diam. .... 17. *H. salweenica*
      - 30b. Leaves glabrous.
        - 32a. Lateral leaf veins ca. 7 pairs; peduncle to 5 cm; calyx pubescent outside; corolla densely pale scurfy inside ..... 18. *H. fungii*
        - 32b. Lateral leaf veins ca. 4 pairs; peduncle ca. 2 cm; calyx glabrous; corolla sparsely pubescent inside ..... 19. *H. ovalifolia*

**1. *Hoya multiflora*** Blume, Catalogus 49. 1823.

蜂出巢 feng chu chao

*Centrostemma multiflora* (Blume) Decaisne; *C. platypetalum* Merrill.

Plants glabrous throughout except for corolla throat. Stems erect or decumbent, to 2.5 m tall, pale gray, yellowish when dry, with persistent leaf scars. Petiole 1–2 cm; leaf blade oblong-lanceolate, 8–18 × 2–6 cm, thick papery when dried, base cuneate, apex obtusely acuminate; lateral veins obscure. Inflorescences extra-axillary, subterminal, or terminal, hemispherical, many flowered; peduncle stout, 1.5–3 cm. Pedicel 3.5–7 cm. Sepals ovate, ca. 2.5 × 1.7 mm; glands many, linear. Corolla yellowish white with orange lobe apices, 1.6–1.8 cm, strongly reflexed from base; limb ca. 6 mm, throat white villous; lobes oblong-triangular, ca. 1.2 × 0.8 cm. Corona on distinct stalk; lobes yellow, narrowly lanceolate, 8–9 mm, outer angles extended into acuminate spurs, inner angles acuminate, higher than stigma head. Follicles linear-lanceolate in outline, 12–18 cm. Seeds ovate, ca. 4 × 2 mm; coma to 5 cm. Fl. May–Jul, fr. Sep–Dec.

Open forests, bushland, 500–1200 m. Guangdong (cultivated),

Guangxi, Yunnan [Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

**2. *Hoya pottsii*** Traill, Trans. Hort. Soc. London 7: 25. 1830.

三脉球兰 san mai qiu lan

*Hoya angustifolia* Traill; *H. obscurinervia* Merrill; *H. pottsii* var. *angustifolia* (Traill) Tsiang & P. T. Li.

Plants glabrous except for corolla. Stems mostly climbing, to 4 m or more. Petiole 0.5–2 cm; leaf blade ovate-oblong to oblong-lanceolate, 6–12 × 3–6 cm, thin leathery when dry, base rounded, subcordate, acute, or cuneate, apex



acute; basal veins 3, extending more than halfway along blade. Inflorescences extra-axillary, globose; peduncle (2–)5–10 cm. Pedicel 1–1.5 cm. Sepals ovate, ca. 1.5 × 0.8 mm. Corolla white with reddish center, up to 1 cm in diam., reflexed; lobes broadly ovate, glabrous outside, slightly villous inside. Corona lobes stellate spreading, outer angle acute, margin strongly reflexed to enclose a hollow space, inner angle acute, incumbent over stigma head. Follicles linear-oblong, ca. 11 cm × 8 mm. Seeds linear-oblong ca. 4 × 1 mm; coma ca. 3.5 cm. Fl. Apr–May, fr. Aug–Oct.

• Dense forests, on tree trunks or rocks; below 500 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan.

The leaves are used for the treatment of fractures and swellings and for draining off pus and promoting new growth.

**3. *Hoya fusca*** Wallich, Pl. Asiat. Rar. 1: 68, tab. 75. 1830.

黄花球兰 huang hua qiu lan

Plants glabrous except for corolla. Stems stout, to 3 m. Petiole 1–2 cm; leaf blade oblong to ± elliptic or lanceolate, 10–13 × 2.5–4.5 cm, leathery or thick papery when dry, base cuneate or broadly so, apex caudate; lateral veins ca. 10 pairs, nearly at right angles to midvein. Pseudumbels terminal and extra-axillary, globose, many flowered, shorter than leaves; peduncle 1.5–2.5 cm. Pedicel 2–2.5 cm. Sepals elliptic, 1.5–2 × 1.2–1.4 mm, obtuse. Corolla yellow, ca. 1 cm in diam., often reflexed; lobes triangular-ovate, puberulent inside. Corona lobes short, very thick, outer angle obtuse or acute, inner angle ending in an erect or recurved spur up to as long as anther tips. Follicles linear-lanceolate in outline, 13–15 cm × 6–10 mm. Seeds oblong or oblong-elliptic, ca. 5 mm; coma ca. 3 cm. Fl. May–Sep, fr. Oct–Dec.

Moist forests; 500–2600 m. Guangxi, Guizhou, Hainan, Xizang, Yunnan [Bhutan, Cambodia, India, Laos, Myanmar, Nepal, Thailand, Vietnam].

**4. *Hoya lipoensis*** P. T. Li & Z. R. Xu, Bull. Bot. Res., Harbin 5(2): 130. 1985.

荔坡球兰 li po qiu lan

Shrubs epiphytic, glabrous throughout. Stems to 1.5 m. Petiole ca. 1 cm; leaf blade oblong-elliptic, 9–15 × 3–5 cm, base cuneate, oblique, apex caudate with a tail ca. 1.5 cm; lateral veins 10–12 pairs, obliquely ascending, conspicuous adaxially, obscure abaxially. Pseudumbels extra-axillary; peduncle ca. 2.5 cm. Flowers not seen. Fruiting pedicel ca. 2 cm. Follicles linear-lanceolate, ca. 15.5 cm × 4 mm. Seeds ca. 5 × 2.5 mm; coma ca. 4 cm.

• Limestone forests; 900 m. Guizhou (Lipo).

**5. *Hoya lasiognostegia*** P. T. Li, Bull. Bot. Res., Harbin 4(1): 118. 1984.

橙花球兰 cheng hua qiu lan

Epiphytes glabrous except for branchlets and young petiole. Stems to 2 m, pale gray. Petiole 2–4 mm; leaf blade ovate-lanceolate, 4.5–7 × 1–2.7 cm, base rounded, apex cau-

date; midvein flattened; lateral veins 4 or 5 pairs, obscure. Pseudumbels flat topped, many flowered; peduncle ca. 4 mm. Pedicel 1–1.2 cm. Sepals ca. 2 mm. Corolla yellowish, rotate, ca. 1 cm in diam.; lobes broadly ovate, 3–4 × 3–4 mm, apex mucronate. Corona lobes brownish, oblong-ovate, stellate, margin revolute, outer angle acute, inner angle subulate, erect and incurved at apex. Anthers acuminate, gynostegium pubescent. Ovaries glabrous. Fl. Apr.

• Forests; 900 m. Hainan (Diaoluoshan).

**6. *Hoya thomsonii*** J. D. Hooker, Fl. Brit. India 4: 61. 1883.

西藏球兰 xi zang qiu lan

Subshrubs epiphytic. Stems climbing to 2 m, slender. Petiole 1–1.5 cm, sparsely pilose; leaf blade oblong or obovate-oblong, 5–8 × 2–4 cm, thick papery when dry, sparsely pilose abaxially, base rounded, apex acuminate; lateral veins obscure. Pseudumbels extra-axillary; peduncle 1.5–2.5 cm, pubescent or glabrescent. Pedicel sparsely puberulent to glabrous. Corolla ca. 1.2 cm in diam.; lobes fringed at margin, glabrous or pubescent inside. Corona lobes obovate, outer angle broad and rounded, inner angle forming a short erect tooth as long as anther tip. Fl. May.

Lower pine forests; 900 m. Xizang (Medong) [India].

**7. *Hoya siamica*** Craib, Bull. Misc. Inform. Kew 1911: 419. 1911.

菖蒲球兰 chang pu qiu lan

Shrubs epiphytic, glabrous except for calyx and corolla; stems to 1.5 m. Petiole 0.5–1.5 cm; leaf blade lanceolate, oblong-lanceolate, or ovate-lanceolate, 4–10 × 2–3 cm, leathery when dry, base obtuse, margin subrevolute, apex acuminate; lateral veins obscure. Pseudumbels flat topped, 10–14 (–20)-flowered; peduncle 1–5 cm. Pedicel ca. 2 cm. Sepals acute, puberulent. Corolla 1–5 cm in diam.; lobes ovate-triangular, puberulent, margin ciliate. Corona lobes broadly ovate, distally flat and with a central boss, outer angle acute, margin convex, suberect, apex concave, umbonate at middle, 3–3.5 mm. Fl. Sep.

Mountain forests; 1500–2500 m. NW Yunnan [Thailand].

**8. *Hoya revolubilis*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 124. 1974.

卷边球兰 juan bian qiu lan

Shrubs epiphytic, glabrous except for flowers. Stems climbing, hollow when dry. Petiole 1–1.5 cm, adaxially with a group of few glands; leaf blade elliptic or elliptic-oblong, 6–9 × 2–3 cm, thick leathery, base broadly cuneate or rounded, margin revolute, apex acute; lateral veins obscure. Pseudumbels shorter than leaves, ca. 7 cm in diam.; peduncle ca. 3 mm. Pedicel ca. 3 cm. Sepals triangular-ovate, ca. 2 × 1.4 mm, acute, sparsely hairy on midrib. Corolla white, reflexed, ca. 1.2 cm in diam., glabrous outside, densely puberulent inside; lobes ca. 4 × 3 mm. Corona stellate

spreading, outer angle acute, inner tooth erect, slightly shorter than anther appendages. Ovaries glabrous. Fl. Dec.

- Dense forests. W Guangxi, W Yunnan.

Thaithong (in litt.) suggests that *Hoya revolubilis* is probably not separable from *H. oreogena* Kerr of Thailand.

### 9. *Hoya lacunosa* Blume, Bijdr. 1063. 1826.

裂瓣球兰 lie ban qiu lan

*Otostemma lacunosum* (Blume) Blume.

Subshrubs epiphytic. Stems climbing to 1.5 m by adventitious roots, glabrous or sparsely pubescent. Petiole 3–12 mm, subglabrous; leaf blade ovate or ovate-lanceolate, 2–5 × 1.2–3 cm, glabrous or subglabrous, base cuneate or rounded, apex acute; lateral veins 2–4 pairs, obscure. Peduncle 2.5–7 cm, robust. Pedicel 5–13 mm. Sepals obtuse. Corolla white with violet dots, 6–7 mm in diam., tube conspicuously white villous inside; lobes suborbicular, much longer than tube. Corona lobes ovate, constricted at middle, outer angle rounded, inner angle acute, surface with a thin keel. Apical anther membranes triangular, exceeding stigma head; pollinia subobovate. Follicles lanceolate, 5–7 cm.

Cultivated in S Guangdong [introduced from Indonesia].

Decoctions of all parts are used to detoxify insect bites, draw out pus, and reduce swellings.

### 10. *Hoya carnosa* (Linnaeus f.) R. Brown, Prodr. 460. 1810.

球兰 qiu lan

Shrubs epiphytic, climbing, glabrous except for inflorescences. Stems robust, to 6 m, pale gray, smooth. Petiole 1–1.5 cm; leaf blade broadly ovate-cordate to ovate-oblong or elliptic, 3.5–13 × 3–5 cm, base rounded to shallowly cordate, apex obtuse or short acuminate; lateral veins ca. 4 pairs, obscure. Pseudumbels extra-axillary, globose, ca. 30-flowered, pubescent; peduncle ca. 4 cm. Pedicel 2–4 cm. Corolla white, sometimes with a pink center, rotate, 1.5–2 cm in diam.; lobes triangular, densely papillate inside, margin recurved, apex reflexed. Corona lobes stellate spreading, outer angle acute, middle ridge prominent, margin strongly reflexed and enclosing a hollow space at base, inner angle acute, incumbent on anthers. Stigma head obtuse or obscurely apiculate. Follicles linear-lanceolate, 6–10 × 0.5–1.5 cm. Seeds ca. 5 × 1 mm; coma ca. 2.5 cm.  $2n = 22^*$ .

Two varieties (one endemic to China): mountain forests, usually on trees; 200–1200 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [India, ?Japan, Malaysia, Vietnam].

- 1a. Leaves deep green, not striate or spotted; ovaries glabrous ..... 10a. var. *carnosa*  
1b. Leaves densely or sparsely maculate adaxially; ovaries puberulent ..... 10b. var. *gushanica*

### 10a. *Hoya carnosa* var. *carnosa*

球兰(原变种) qiu lan (yuan bian zhong)

*Asclepias carnosa* Linnaeus f., Suppl. Pl. 170. 1781; *Hoya chinensis* (Loureiro) Traill; *Stapelia chinensis* Loureiro.

Leaves deep green, not striate or spotted. Ovaries glabrous. Fl. Apr–Nov, fr. Jul–Dec.

Montane forests; 200–1200 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [India, ?Japan, Malaysia, Vietnam].

Used medicinally for the treatment of encephalitis, pneumonia, and orchitis.

The identity of *Stapelia chinensis* is not certain, and the possible type belongs to a species different from *H. carnosa*.

### 10b. *Hoya carnosa* var. *gushanica* W. Xu, Guihaia 9: 199. 1989.

彩叶球兰 cai ye qiu lan

Leaves densely or sparsely silvery spotted adaxially. Ovaries puberulent. Fl. Jul–Dec.

- Valleys; 300 m. Fujian (Fuzhou).

### 11. *Hoya commutata* M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 10. 1995.

广西球兰 guang xi qiu lan

Habit not known, probably a hanging epiphyte. Stems pubescent. Leaves not known. Pseudumbels globose, pubescent, ca. 30-flowered; peduncle ca. 2 cm. Pedicel to 4 cm, slender, flexuous when dried. Sepals triangular, ca. 2.5 × 0.9–1.3 mm, densely pubescent. Corolla rotate with revolute margin, purple, ca. 1.5 cm in diam., densely papillate-pubescent, limb ca. 0.8 cm wide. Corona lobes acute, stellate spreading, extending beyond sinus between corolla lobes; inner margin acute, ± meeting in center.

Forests. Guangxi [Myanmar].

### 12. *Hoya cordata* P. T. Li & S. Z. Huang, Guihaia 5(2): 80. 1985.

心叶球兰 xin ye qiu lan

Subshrubs. Stems climbing, to 2 m, yellowish gray. Petiole ca. 5 mm, stout, puberulent, with a group of 3–5 adaxial glands; leaf blade ovate or oblong-ovate, 5–9 × 4.5–5 cm, thick leathery when dry, adaxially glabrous, abaxially puberulent along midvein, base minutely cordate, apex acute to obtuse; lateral veins 6–8 pairs. Pseudumbels extra-axillary, hemispherical, 30–50-flowered; peduncle 1–1.5 cm. Pedicel 2.5–3 cm. Sepals ca. 2 mm. Corolla white, rotate, ca. 1 cm in diam., puberulent; lobes triangular, obtuse, ca. 2.5 mm. Corona lobes with outer angle acute. Fl. May.

- Limestone forests. Guangxi.

### 13. *Hoya nervosa* Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 122. 1974.

凸脉球兰 tu mai qiu lan

Shrubs epiphytic, glabrous throughout. Stems stout, climbing to 6 m. Petiole 1–2 cm, stout, with a group of adaxial glands; leaf blade ovate or ovate-oblong, 8–17 × 4–6.5 cm, leathery when dry, base rounded, apex acute or short acuminate; lateral veins 5 or 6 pairs, elevated, arcuate ascending, anastomosing near margin. Pseudumbels flat topped, many flowered; peduncle to 13 cm, thickened. Pedicel ca. 2 cm. Corolla white, ca. 1.2 cm in diam. Corona lobes stellate spreading, outer angle acute. Fl. Aug.

- Forests. Guangxi, S Yunnan.

**14. *Hoya polyneura*** J. D. Hooker, Fl. Brit. India 4: 54. 1883.

多脉球兰 *duo mai qiu lan*

Shrubs epiphytic, glabrous throughout. Stems climbing to 2.5 m, stout, flexuous. Leaves subsessile; leaf blade ± rhomboid, 8–12 × 2.5–6.5 cm, base rounded to broadly cuneate, apex acuminate; midvein slender; lateral veins numerous, straight, parallel, conspicuous. Pseudumbels extra-axillary; peduncle very short, thickened. Pedicel ca. 2.5 cm, slender. Sepals obtuse. Corolla white, ca. 1.5 cm in diam.; lobes papillate inside. Corona lobes red-purple, semicordate, inner angle 2-auriculate at base, apex a stout erect beak equalling or shorter than long-subulate anther appendages. Follicles falcate, ca. 10 cm, slender, smooth. Seeds ovate-lanceolate. Fl. Aug.

Broad-leaved evergreen forests; 1400 m. Xizang, NW Yunnan [India, Myanmar].

**15. *Hoya dasyantha*** Tsiang, Sunyatsenia 3: 174. 1936.

厚花球兰 *hou hua qiu lan*

Subshrubs epiphytic, glabrous except for corolla. Stems grayish, climbing to 1.5 m. Petiole ca. 5 mm, with a group of 4–6 adaxial glands; leaf blade broadly ovate, 4–8 × 3–5 cm, papery, base rounded, apex short acuminate; lateral veins 4 or 5 pairs, slightly elevated. Pseudumbels to 22-flowered; peduncle 2.5–5 cm. Pedicel ca. 1.2 cm. Calyx glabrous. Corolla white; lobes triangular, stellate, patent, mealy inside. Corona lobes stellate spreading, inner and outer angles acute. Fl. Apr–May.

- Mixed woods; 1100 m. Hainan.

**16. *Hoya silvatica*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 125. 1974.

山球兰 *shan qiu lan*

Shrubs epiphytic. Stems ash gray, to 1.5 m, pubescent along 2 lines. Petiole 1–3 cm, with groups of 2 or 3 adaxial glands; leaf blade elliptic to elliptic-oblong, 8–11 × 2.5–4 cm, papery when dry, glabrescent adaxially, pubescent abaxially, denser along veins, base cuneate, apex short acuminate; lateral veins 7–10 pairs, slightly elevated. Pseudumbels extra-axillary. Pedicel 3–3.5 cm, glabrous. Calyx glabrous. Corolla white, ca. 1 cm in diam. Corona lobes with outer angle acute, inner angle slightly lower than apical membrane of anther. Fl. Sep.

- Mixed woods; 2000 m. S Xizang, NW Yunnan.

**17. *Hoya salweenica*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 125. 1974.

怒江球兰 *nu jiang qiu lan*

Shrubs epiphytic. Stems stout, climbing to 2 m; branches puberulent to glabrous. Petiole ca. 1 cm; leaf blade elliptic to suboblong, leathery when dry, 10–16 × 3.5–6 cm, abaxially pubescent, base rounded or broadly cuneate, apex obtuse or rounded; lateral veins 6–8 pairs. Pseudumbels extra-axillary, shorter than to equalling leaves; peduncle ca. 5 cm. Pedicel ca. 4 cm. Sepals ca. 2.5 × 1 mm, puberulent, not glandular. Corolla white, ca. 1.5 cm in diam., glabrous outside, puberulent inside; lobes triangular, ca. 6 × 6 mm, margin revolute. Corona stellate spreading, retuse, outer angle acute, inner angle with an acute tooth incumbent on anthers. Ovaries glabrous. Fl. Sep.

- Valleys, woods along riversides; 1600 m. W Yunnan.

**18. *Hoya fungii*** Merrill, Lingnan Sci. J. 13: 68. 1934.

护耳草 *hu er cao*

Shrubs epiphytic, glabrous except for pedicel and calyx. Stems climbing to 2 m. Petiole 1–3 cm; leaf blade ovate, elliptic, to elliptic-oblong, 8–20 × 4.5–9 cm, leathery when dry, base rounded, apex acute to short acuminate; lateral veins ca. 7 pairs. Pseudumbels extra-axillary; peduncle 3.5–5 cm, thick. Pedicel 2–4 cm, puberulent. Sepals pubescent, margin ciliate. Corolla white, glabrous outside, densely pale scurfy inside; lobes rounded, ca. 5 × 4 mm. Corona yellow-ish, stellate; lobes ca. 3.5 mm, outer angle acute or short acuminate, inner angle ± erect, acute, slightly shorter than and clearly narrower than scarious anther appendages. Follicles linear-lanceolate, ca. 12 cm × 8 mm, smooth. Fl. Apr–Sep, fr. Sep–Dec.

- Open woods; 300–1000 m. Guangdong, Guangxi, Hainan, Yunnan.

All parts are used as for the treatment of fractures and traumatic injury.

**19. *Hoya ovalifolia*** Wight & Arnott in Wight, Contr. Bot. India 37. 1834.

卵叶球兰 *luan ye qiu lan*

*Hoya hainanensis* Merrill.

Shrubs epiphytic, glabrous except for corolla. Stems climbing to 2 m. Petiole 1–1.2 cm; leaf blade ovate-elliptic, 6–8 × 2.5–4 cm, papery, base acute, apex acuminate; lateral veins ca. 4 pairs, slender, obliquely ascending, arcuate, anastomosing. Pseudumbels extra-axillary, many flowered; peduncle ca. 2 cm. Pedicel slender, ca. 2 cm. Sepals acute. Corolla cream or pale yellow, 8–10 mm in diam.; lobes ovate-oblong. Corona lobes stellate spreading, outer angle subacute, inner angle produced into a sharp tooth incumbent on anther. Anthers lower than outer lobes, membranous tip rounded. Stigma head short apiculate. Fl. May.  $2n = 22$ .

Mixed woods along riversides. Hainan [India, Sri Lanka].

20. *Hoya kerrii* Craib, Bull. Misc. Inform. Kew 1911: 418. 1911.

凹叶球兰 ao ye qiu lan

*Hoya obovata* Decaisne var. *kerrii* (Craib) Costantin.

Stems stout, to 1 m, glabrous. Petiole 0.5–2 cm, robust; leaf blade obovate to orbicular, 4–6 × 5–6 cm, base rounded to broadly cuneate, margin revolute, apex retuse, sinus to 1 cm wide, glabrous; lateral veins obscure. Pseudumbels 4–5 cm in diam.; peduncle 2–3 cm. Pedicel 1.3–1.8 cm, slender, puberulent. Sepals ca. 2.5 mm, puberulent. Corolla papillate-puberulent, reflexed; lobes ovate-triangular, 4–5 × ca. 4 mm. Corona lobes reddish, furrowed on back, outer angle rounded, apical part concave, ca. 2.5 mm.  $2n = 22$ .

Cultivated in S Guangdong [Laos, Malaysia, Thailand, Vietnam].

The leaves are used for the treatment of swellings and pyoderma.

21. *Hoya radicalis* Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 120. 1974.

匙叶球兰 chi ye qiu lan

Shrubs epiphytic, glabrous except for young parts. Stems to 1.5 m, pale brown. Petiole 3–6 cm, nearly flattened; leaf blade spatulate or oblanceolate, 10–21 × 3–4 cm, base cuneate, apex acute or short acuminate; lateral veins 10 or more pairs, conspicuous. Pseudumbels extra-axillary, flat topped, many flowered; peduncle ca. 4 cm. Pedicel 2–2.5 cm. Corolla white and purple-spotted. Corona lobes with outer angle rounded, inner angle narrow. Fl. Mar-Sep.

- Mixed woods. Guangdong, Guangxi.

22. *Hoya liangii* Tsiang, Sunyatsenia 3: 177. 1936.

崖县球兰 ya xian qiu lan

Shrubs epiphytic, glabrous except for corolla. Stems climbing to 4 m. Petiole ca. 1.5 cm, robust, with a group of 2–5 adaxial glands; leaf blade deep green adaxially, pale green abaxially, obovate or obovate-oblong, 4.5–8 × 3–5 cm, thick leathery and pale yellow when dry, base rounded or subcordate, margin recurved, apex obtuse or rounded; lateral veins ca. 4 pairs. Pseudumbels extra-axillary, globose, ca. 5 cm in diam., many flowered, up to as long as leaves; peduncle stout, 1.5–3 cm; rachis elongated. Pedicel ca. 2 cm. Sepals keeled, ca. 3.5 × 1.5–3 mm, ciliate. Corolla creamy white, glabrous outside, puberulent inside; lobes triangular, ca. 4 × 5 mm. Corona lobes stellate spreading, ca. 2 mm, ca. 1 mm thick, concave, margin strongly recurved, outer angle rounded, inner acute, producing an acute tooth incumbent on anther. Follicles lanceolate, ca. 8 cm × 8 mm. Seeds oblong, ca. 5 mm; coma ca. 2 cm. Fl. Jun-Nov.

- Open woods. Hainan.

23. *Hoya villosa* Costantin in Lecomte, Fl. Indo-Chine 4: 137. 1912.

毛球兰 mao qiu lan

Lianas epiphytic, villous throughout. Stems stout, to 3 m, ca. 8 mm in diam. Petiole 1.5–2 cm; leaf blade oblong, 7–11 × 3.5–5 cm, leathery or thick papery, base rounded or truncate, apex mucronate; lateral veins 4–7 pairs, obliquely ascending, anastomosing before margin. Pseudumbels extra-axillary, globose, to 30-flowered; peduncle robust, 3–7 cm. Pedicel 1–2 cm. Sepals rounded. Corolla stellate patent; tube ca. as long as lobes, glabrous outside, pubescent inside; lobes triangular, ca. 4 × 4 mm. Corona lobes thick, outer angle rounded, inner angle acute or short acuminate, with an ovoid projection on back, center hollow. Follicles linear, 9–11 cm × ca. 4 mm. Seeds linear-lanceolate, ca. 5 mm; coma ca. 2 cm. Fl. Apr-Jun, fr. Sep-Dec.

Valleys, open woods; 400–1000 m. Guangxi, Guizhou, Hainan, Yunnan [Vietnam].

The leaves are used for the treatment of traumatic injury.

24. *Hoya lyi* H. Léveillé, Bull. Soc. Bot. France 54: 369. 1907.

香花球兰 xiang hua qiu lan

*Hoya yuennanensis* Handel-Mazzetti.

Plants pubescent except for corolla exterior. Stems to 1.5 m, slender. Petiole 3–15 mm, stout; leaf blade elliptic, oblong, or elliptic-lanceolate, rarely suborbicular, (3–)5.5–19 × 1.5–4 cm, leathery when dry, base cuneate to rounded, apex short acuminate to obtuse; lateral veins 4–7 pairs. Pseudumbels extra-axillary, globose, to 9 cm, many flowered; peduncle drooping, to 10 cm. Pedicel 2–3 cm. Sepals 2–2.5 × 1.2–1.4 mm. Corolla white, ca. 1 cm wide, glabrous outside; tube ca. 3 mm; lobes triangular, 6–8 × 4–7 mm at base, margin recurved but not reflexed. Corona lobes ca. 3 × 3 mm, stellate spreading, outer angle broadly rounded, margin pouched, middle concave, inner end acute, margin strongly recurved at back and both ends meeting at middle. Stigma head at same level as inner corona lobes. Fl. Sep-Dec.

- On rocks in dense forests; below 1000 m. Guangxi, Guizhou, Sichuan, Yunnan.

The leaves are used for the treatment of rheumatoid arthritis and traumatic injury.

25. *Hoya lii* C. M. Burton, Hoya 12: 98. 1991.

贡山球兰 gong shan qiu lan

*Centrostemma yunnanense* P. T. Li (1990), not *Hoya yuennanensis* Handel-Mazzetti (1936); *Hoya gongshanica* P. T. Li.

Shrubs glabrous except for branchlets and petiole. Stems climbing, to 2 m. Petiole 2–3 mm, setose; leaf blade oblong or oblong-elliptic, 6.5–10 × 2–3 cm, papery, base obtuse, apex acuminate to caudate-acuminate; midvein elevated; lateral veins 5–7 pairs, conspicuous adaxially, obscure

abaxially. Pseudumbels terminal, ca. 5 cm; peduncle ca. 1 cm. Pedicel ca. 3 cm. Sepals ca.  $2 \times 3$  mm, hidden by reflexed corolla. Corolla white, 1.5–1.8 cm in diam., strongly reflexed; tube shorter than lobes; lobes lanceolate, ca.  $1.2 \text{ cm} \times 3.5 \text{ mm}$ . Corona lobes ovoid-lanceolate, 4–5 mm, fleshy, erect, base rounded, margin revolute, apex long caudate and exceeding gynostegium, tails 2–2.5 mm. Fl. Aug.

- Broad-leaved evergreen forests; 1400 m. Yunnan (Gongshan).

**26. *Hoya mekongensis*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 10. 1995.

尾叶球兰 wei ye qiu lan

Lianas climbing, with adventitious roots. Stems minutely puberulent, glabrescent. Petiole 1.2–1.6 cm, minutely puberulent; leaf blade oblong-oblong-lanceolate,  $10\text{--}13 \times 4\text{--}5$  cm, minutely hairy, base rounded, apex acuminate to caudate-acuminate; lateral veins ca. 7 pairs, obscure. Pseudumbels extra-axillary, apparently flat topped, at least 8-flowered; flowers sweet scented; peduncle (0.3–)1–2.5 cm, pubescent. Pedicel 2–2.7 cm, sparsely hairy on 1 side. Sepals ovate, ca.  $1.5 \times 1.5$  mm, very sparsely hairy. Corolla white, 1.5–1.7 cm in diam., reflexed; lobes ca.  $6 \times 5$  mm, minutely papillate with short ciliate margin. Corona lobes  $\pm$  ovoid, erect, ca.  $2 \times$  as high as gynostegium, dorsal grooves very narrow, inner teeth short, incumbent on gynostegium, meeting in center. Anther appendages inconspicuous.

- Xizang/Yunnan (Mekong Valley).

**27. *Hoya pandurata*** Tsiang, *Sunyatsenia* 4: 125. 1939.

琴叶球兰 qin ye qiu lan

Subshrubs epiphytic. Stems to 1.5 m, pendent, greenish ash gray. Petiole ca. 4 mm; leaf blade pandurate or oblong,  $4\text{--}11 \times 1\text{--}2\text{--}(3.2)$  cm, thick papery when dry, glabrous, base rounded, apex acuminate; lateral veins obscure. Pseudumbels extra-axillary, globose, many flowered; peduncle ca. 3 mm. Pedicel ca. 1.5 cm. Sepals  $1.5\text{--}2 \times 1\text{--}1.5$  mm, glands 5. Corolla yellow or reddish, 0.8–1 cm in diam., glabrous outside, puberulent inside, hirsute at base of corona; tube ca. 1.5 mm; lobes ovate, ca.  $6 \times 4$  mm, acute, ciliate. Corona stellate patent to slightly raised, outer angle rounded, slightly retuse, inner angle produced into an erect, slender tooth higher than anthers. Pollinia oblanceolate, caudicles horizontal, retina-culum ellipsoid. Follicles to 8.5 cm. Fl. Jun-Jul.

- Open or mixed woods; 1000–1600 m. S Yunnan.

The leaves are used externally for the treatment of cuts and traumatic injury.

**28. *Hoya mengtzeensis*** Tsiang & P. T. Li, *Acta Phytotax. Sin.* 12: 120. 1974.

薄叶球兰 bo ye qiu lan

Subshrubs epilithic or epiphytic, glabrous except for corolla. Stems to 1.5 m, climbing by adventitious roots. Petiole 1–2 cm, adaxial glands 1–3; leaf blade narrowly lanceolate,  $6\text{--}11 \times 1.5\text{--}2$  cm, thin papery, base attenuate and decurrent to petiole, apex acuminate; lateral veins obscure. Pseudumbels extra-axillary, flat topped, many flowered; peduncle 2–8 cm,

stout. Pedicel 1.5–2.5 cm. Sepals ca.  $1.5 \times 0.8$  mm, acuminate. Corolla white, 1–1.5 cm in diam., stellate spreading, glabrous outside, villous inside; tube ca. as long as lobes; lobes triangular, recurved at margin. Corona lobes yellow, ca. as high as gynostegium, outer angle rounded, inner teeth short, incumbent on gynostegium. Follicles linear-lanceolate, ca.  $17 \text{ cm} \times 5 \text{ mm}$ , smooth. Fl. Jul.

- Mixed woods, covering rock on cliff. Guangxi, S Yunnan.

**29. *Hoya griffithii*** J. D. Hooker, *Fl. Brit. India* 4: 59. 1883.

荷秋藤 he qiu teng

*Hoya kwangsiensis* Tsiang & P. T. Li; *Hoya lancilimba* Merrill; *H. lancilimba* f. *tsoi* (Merrill) Tsiang; *H. tsoi* Merrill.

Shrubs epiphytic, glabrous throughout. Stems to 1.5 m. Petiole 1–3 cm, robust; leaf blade lanceolate or oblong-lanceolate,  $11\text{--}14 \times 2.5\text{--}4.5$  cm, papery, base cuneate, apex acute to acuminate; lateral veins few, obscure. Pseudumbels extra-axillary, globose; peduncle 5–7 cm. Pedicel 4–4.5 cm. Sepals oblong-ovate,  $7\text{--}8 \times$  ca. 4.5 mm. Corolla white, ca. 3 cm in diam.; lobes broadly ovate, subfalcate, spreading, glabrous outside, obscurely puberulent inside. Corona lobes ca. 5 mm, concave, outer angle rounded, inner angle extending into a tooth as long as anther appendages, to 3 mm. Follicles lanceolate, ca.  $15 \times 1$  cm. Fl. Jun-Aug.

Dense or sparse forests; 800 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [India].

The stems and leaves are used for the treatment of traumatic injury, fractures, swellings, and coughs.

**30. *Hoya longifolia*** Wallich ex Wight, *Contr. Bot. India* 36. 1834.

长叶球兰 chang ye qiu lan

Shrubs epiphytic, glabrous except for pedicels and corolla. Stems stout, climbing to 3 m; branches pendulous. Petiole 1–2.5 cm, stout; leaf blade linear to narrowly oblanceolate or oblong,  $8\text{--}20\text{--}(25) \times (0.4\text{--})2\text{--}3$  cm, base narrowly acute or rounded, apex acuminate or acute; lateral veins obscure. Pseudumbels extra-axillary, globose, many flower-ed; peduncle 1.5–5 cm. Pedicel 1.5–3 cm, pubescent. Sepals 1–1.5 mm, apex acute. Corolla white tinged with pink, 2–4 cm in diam.; lobes ovate-triangular, stellate spreading, pubescent. Corona lobes broadly ovate, flat, with a central boss, convex basally, inner angle acute and shorter than anther apices. Follicles straight,  $10\text{--}30 \text{ cm} \times 5\text{--}8 \text{ mm}$ . Seeds ovoid, 1–1.5 mm; coma 1.2–1.5 cm. Fl. Jul-Aug.  $2n = 22$ .

Dense forests; 1400–2400 m. Yunnan [Bhutan, India, Kashmir, Nepal, Pakistan, Sikkim, Thailand].

**31. *Hoya linearis*** Wallich ex D. Don, *Prodr. Fl. Nepal.* 130. 1825.

线叶球兰 xian ye qiu lan

Stems hanging, to 1.5 m, hirsute, puberulent. Petiole ca. 2 mm; leaf blade linear, 2.5–5 cm × ca. 5 mm, leathery when dry, base cuneate, apex mucronate; lateral veins obscure. Pseudumbels terminal, umbellate, sessile, many flowered. Pedicel ca. 2.5 cm. Corolla white, 0.8–1.2 cm in diam., glabrous or papillate inside. Corona lobes stellate spreading, outer angle acute, inner angle acute, base long spurred. Follicles lanceolate, ca. 6.5 cm × 5 mm. Seeds with white coma ca. 2 cm. Fl. Sep.

Evergreen forests; 1500–2000 m. NW Yunnan [India, Myanmar, Nepal].

**32. *Hoya chinghungensis*** (Tsiang & P. T. Li) M. G. Gilbert, P. T. Li, & W. D. Stevens, *Novon* 5: 9. 1995.

景洪球兰 jing hong qiu lan

*Dischidia chinghungensis* Tsiang & P. T. Li, *Acta Phytotax. Sin.* 12: 130. 1974.

Shrubs epiphytic. Stems to 2 m, branching mainly near base, pendent; branches and petiole pubescent. Leaves longer than internodes; petiole ca. 1.5 mm; leaf blade broadly ovate, 1–1.5 × 0.7–1.1 cm, glabrous, base rounded to truncate, apex acute to obtuse; lateral veins obsolete. Pseudumbels terminal, 4- or 5-flowered; peduncle shorter than pedicels, sometimes obsolete. Pedicel 0.8–1.2 cm, puberulent. Sepals ± ovate, 1.5–2 × ca. 1.2 mm, apex obtuse, densely pubescent. Corolla white, 1–1.2 cm in diam., rotate or nearly so; limb ca. 3.5 mm wide; lobes triangular-ovate, ca. 3.5 × 4.5 mm, glabrous outside, minutely puberulent inside, apex subacute. Corona lobes pink when dried, triangular, outer apex subacute, center flat or only slightly raised, inner tooth recumbent on anther, reaching base of appendages. Anther appendages just overlapping in center. Pollinia 0.4–0.5 × ca. 0.2 mm, oblong-oblancoate, pale yellow. Follicles linear-lanceolate 7–9 cm × 3–4 mm, pendent, glabrous. Seeds linear-oblong, ca. 2.5 × 0.3 mm; coma ca. 2 cm. Fl. Jun, fr. Jul–Oct.

Dense forests; 1500–2000 m. S Yunnan [Myanmar].

## 26. DISCHIDIA R. Brown, Prodr. 461. 1810.

眼树莲属 yan shu lian shu

*Collyris* Vahl.

Herbs epiphytic or epilithic. Stems and branches fleshy, usually climbing by adventitious roots, sometimes also twining, or hanging. Leaves opposite or partly in whorls of 3 or 4, fleshy [sometimes leafless]. Inflorescences extra-axillary, small; rachis thick, often branched, eventually elongated, producing a series of often umbel-like groups of flowers. Flowers mostly very small. Calyx with 5 basal glands. Corolla white, red, or violet, ovoid to urceolate, with a narrow mouth, fleshy; lobes valvate in bud, short, often hairy. Corona lobes 5, slender, inserted on gynostegium, erect or ascending, apex entire, notched, 2-cleft, or with recurved arms. Anthers erect, with apical membrane overlying stigma head; pollinia 2 per pollinarium, margin translucent, caudicles enlarged at apex, erect. Follicles lanceolate or cylindrical.

About 80 species: tropical and subtropical Asia and Oceania, five in China.

- 1a. Leaf blade narrowly elliptic, acuminate at both ends; corolla throat not thickened, retrorsely pubescent ..... 1. *D. australis*
- 1b. Leaf blade elliptic or ovate-elliptic to orbicular, apex acute to rounded or retuse, base cuneate to rounded; corolla throat thickened, antrorsely pubescent.
  - 2a. Corolla lobes with 3-angled tips, corolla usually glabrous, occasionally throat softly hairy ..... 2. *D. tonkinensis*
  - 2b. Corolla lobes flat or only slightly thickened, corolla throat or lobes obviously hairy.
    - 3a. Leaf blade apex retuse; corolla lobes with a distinct tuft of hairs at middle on inside; corona

- lobes longer than gynostegium ..... 5. *D. formosana*  
 3b. Leaf blade apex rounded; corolla lobes glabrous, throat hairy; corona lobes shorter than gynostegium.  
 4a. Leaf blade orbicular or ovate ..... 4. *D. nummularia*  
 4b. Leaf blade elliptic, narrowly elliptic, or ovate-elliptic ..... 3. *D. chinensis*

**1. *Dischidia australis*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 130. 1974.

尖叶眼树莲 jian ye yan shu lian

Herbs glabrous except for flowers. Stems green, to 2 m. Leaf blade narrowly elliptic or oblong-elliptic, 3–4 cm × 7–11 mm, glabrous, acuminate at both ends; lateral veins obsolete. Peduncle 1.5–5 cm, thick. Flower buds reddish yellow, apex acuminate. Sepals broadly ovate, ca. 1 × 1 mm, glabrous. Corolla white, urceolate, throat constricted, with retrorse pubescence; tube ca. 3 mm; lobes ovate-triangular, ca. 1 × 0.5 mm, spreading, thickened at middle. Corona lobes anchor-shaped, apex semiorbicular. Apical membrane of anthers acuminate; pollinia oblong. Ovaries glabrous. Stigma head discoid, mucronate. Fl. Mar.

- Open woods; 500–800 m. Guangxi, Yunnan.

*Dischidia australis* might prove to be just a variant of *D. acuminatum* Costantin from N Vietnam.

**2. *Dischidia tonkinensis*** Costantin in Lecomte, Fl. Indo-Chine 4: 146. 1912.

滴锡眼树莲 di xi yan shu lian

*Dischidia alboflava* Costantin; *D. balansae* Costantin; *D. esquirolii* (H. Léveillé) Tsiang; *Hoya esquirolii* H. Léveillé.

Herbs glabrous throughout. Stems to 2 m; internodes terete, longitudinally wrinkled, 6–9 cm. Petiole 1–2 mm; leaf blade ovate-elliptic, 1.8–2 × ca. 1.5 cm, yellow to straw colored when dry, flat, thick, base broadly cuneate or rounded, apex obtuse or rarely submucronate; midvein slightly elevated; lateral veins ca. 4 pairs, inconspicuous. Pseudumbels flat topped; peduncle ca. 1 mm. Pedicel ca. 1.5 mm. Sepals ovate. Corolla white, urceolate, ca. 3.5 × 2 mm; tube ca. 2 mm, throat constricted and thickened; lobes ovate-triangular, ca. 1 × 0.5 mm, apex 3-angled. Corona lobes anchor-shaped, stalked, apex 2-cleft, widely divergent, sinus of divaricate arms without a papilla; lateral arms oblong, recurved at both ends. Follicles linear, 5–6 cm × ca. 2 mm. Seeds oblong; coma ca. 2 cm. Fl. Mar-May, fr. Jul-Dec.

Mixed woods, sometimes on rocks; 300–1500 m. Guangxi, Guizhou, Yunnan [Vietnam].

**3. *Dischidia chinensis*** Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 5: 55. 1853.

眼树莲 yan shu lian

Herbs glabrous throughout; stems green, clinging, twining, or hanging from trees or rocks, to 2 m. Petiole 2–3 mm; leaf blade ovate-elliptic, 1.5–3 × ca. 1 cm, base cuneate or obtuse, apex acute to rounded; lateral veins 4 or 5 pairs. Pseudumbels to 9-flowered; peduncle ca. 2 mm. Pedicel ca. 1 mm. Sepals ovate, ciliate. Corolla yellowish white, throat

thickened, villous; lobes ovate-triangular, ca. 1 × 1 mm. Corona lobes anchor-shaped, stalked, apex linear, 2-cleft, spreading and recurved at both ends, with a small rounded papilla in sinus of divaricate arms. Anther appendage acute; pollinia oblong. Ovaries glabrous. Stigma head subapiculate. Follicles lanceolate or linear-lanceolate, 5–8 cm × ca. 4 mm, smooth. Seeds ovate-oblong; coma ca. 2.5 cm. Fl. Apr-May.

Mixed woods. Guangdong, Guangxi, Hainan [Vietnam].

The plant is used for the treatment of traumatic injury and infantile malnutrition caused by intestinal parasites.

**4. *Dischidia nummularia*** R. Brown, Prodr. 461. 1810.

圆叶眼树莲 yuan ye yan shu lian

*Collyris minor* Vahl; *Dischidia minor* (Vahl) Merrill; *D. orbicularis* Decaisne.

Herbs glabrous except for flowers. Stems slender, twining to 1.5 m; internodes longer than leaves. Petiole 1–2 mm; leaf blade orbicular, 7–10 mm in diam.; lateral veins obsolete. Pseudumbels subsessile. Sepals ovate. Corolla white or yellowish white; lobes ovate-triangular, ca. 1 × 0.5 mm, thickened at middle. Corona lobes anchor-shaped, shorter than gynostegium, stalked, apex 2-cleft, widely divergent, lateral arms oblong, pendulous. Apical membrane of anthers ovate-triangular; pollinia oblong. Stigma head discoid, mucronate at apex. Follicles lanceolate, ca. 4 cm × 5 mm. Fl. Mar-Jun, fr. Jun-Sep.

Forests; 300–1000 m. Fujian, Guangdong, Guangxi, Hainan, S Yunnan [India, Indonesia, Laos, Malaysia, Sri Lanka, Thailand,

Vietnam; Australia, Pacific Islands].

**5. *Dischidia formosana*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 23: 385. 1877.

台湾眼树莲 tai wan yan shu lian

Herbs glabrous except for interior of corolla and sometimes petiole. Stems to 3 m. Petiole 2–4 mm; leaf blade obovate to orbicular, 1–2 × 0.7–1.5 cm, base cuneate or obtuse, apex shallowly emarginate; lateral veins obsolete. Inflorescences 1–5-flowered; peduncle 0.5–3 mm. Flowers white. Pedicel 2–3 mm. Sepals ovate, ca. 1 × 0.5 mm. Corolla 4–6 mm; lobes triangular-acuminate, 2–2.5 × 0.8–1 mm, thickened and villous adaxially at middle. Corona lobes anchor-shaped, apex truncate. Anther appendages oblong-triangular, shorter than corona lobes; pollinia oblong, erect. Stigma head discoid, mucronate at apex. Follicles linear, 4–5 cm × 3 mm. Fl. Apr–May.

- Thickets; low to middle altitudes. Taiwan.

## **27. DOLICHOPETALUM** Tsiang, Acta Bot. Sinica 15: 137. 1973.

金凤藤属 jin feng teng shu

Lianas. Cymes racemelike. Calyx with basal glands. Corolla tube basin-shaped; lobes valvate, abruptly narrowed into long tips. Corona adnate to gynostegium, deeply 5-parted; lobes flat, oblong-quadrangular, apex notched. Filaments connate; anthers nearly square, apex threadlike; pollinia 2 per pollinarium, erect. Stigma head short conical, apex notched. Follicles smooth.

One species: endemic to China.

**1. *Dolichopetalum kwangsiense*** Tsiang, Acta Bot. Sinica 15: 137. 1973.

金凤藤 jin feng teng

Lianas to 4 m. Stems, leaves, and peduncles densely yellow villous. Petiole 2.5–3.5 cm, apex with 10 minute adaxial glands; leaf blade ovate-cordate, 8–12 × 4–7 cm, papery, base cordate, apex acuminate; basal veins 5. Inflorescences to 9 cm; peduncle ca. 4 cm; rachis sparsely hairy, slightly thickened; bracteoles ovate, ca. 4 × 1 mm. Sepals lanceolate, ca. 3 × 0.7 mm, villous, basal glands 25. Corolla purple, villous outside, glabrous inside; tube ca. 2 mm; lobes ca. 1.2 cm, ciliate. Corona lobes ca. 0.5 × 0.3 mm. Anthers ca. 1.5 mm including threadlike apex; pollinia spatulate or oblanceolate, slightly shorter than retinaculum. Follicles oblong-lanceolate, 6.5–11 × ca. 1.5 cm. Seeds elliptic, ca. 1.4 × 0.5 cm, margin membranous; coma ca. 2.5 cm. Fl. Aug–Oct, fr. Sep–Dec.

- Montane bushland. W Guangxi, Guizhou, Yunnan.

A decoction of all parts is used to detoxify viper bites.

## **28. COSMOSTIGMA** Wight, Contr. Bot. India 41. 1834.

荟蔓藤属 hui man teng shu

Lianas. Cymes extra-axillary, racemelike or umbel-like, long pedunculate. Calyx with 5 basal glands. Corolla ± rotate or short campanulate; lobes ± valvate or twisted to right. Corona lobes 5, flattened, inserted at back of stamens, apex 2-cleft or truncate, lower than apical membrane of anthers. Filaments connate into a tube; anthers rectangular, margin softly bony, apical appendages



membranous, incurved; pollinia 2 per pollinarium, erect, obliquely ovoid or oblong, caudicle long, twisted. Styles short; stigma head broad, discoid, as long as anthers. Follicles oblong-lanceolate in outline.

Three species: tropical and subtropical Asia, one in China.

**1. *Cosmostigma hainanense*** Tsiang, Sunyatsenia 6: 156. 1941.

荟蔓藤沸 hui man teng

Lianas to 6 m, yellowish pubescent. Petiole 2.5–3.5 cm; leaf blade ovate, 5–11 × 4–8 cm, pilose, base cordate, apex short acuminate; basal veins 5–7, lateral veins ca. 3 pairs. Cymes umbel-like, to 6 cm, 6–15-flowered. Pedicel to 1.1 cm. Sepals ovate. Corolla yellowish green, short campanulate, ca. 2.5 mm; tube ca. as long as lobes, throat pubescent; lobes ovate, glabrous. Corona lobes flattened, entire, shorter than anthers. Anther appendages rounded; pollinia oblong, retina-culum longer than pollinia. Ovaries glabrous. Fl. May.

- Humid forests along valleys. Hainan.

**29. GYMNEMA** R. Brown, Prodr. 461. 1810.

匙羹藤属 chi geng teng shu

*Bidaria* Endlicher.

Lianas. Cymes often racemelike, sessile or short pedunculate, often 2 at a node. Flowers small. Calyx with basal glands. Corolla campanulate; lobes ca. as long as tube, twisted to right or subvalvate, interior of tube with 5 longitudinal ridges, sometimes produced into fleshy appendages and/or with lines of hairs along each side. Corona lobes otherwise absent. Filaments connate into a tube; anthers erect, apical appendages membranous; pollinia 2 per pollinarium, oblong, erect. Stigma head hemispherical, obtusely conical or clavate and beaked, exceeding anthers. Follicles solitary or paired and widely divergent, ovoid to strongly beaked, often broad at base.

About 25 species: tropical or subtropical Asia, S Africa, and Oceania; seven species in China.

- 1a. Corolla glabrous ..... 1. *G. sylvestre*  
1b. Corolla hairy, usually prominently so.  
2a. Leaf blade 1–2 cm, basal veins 5; retinaculum longer than pollinia; fruit 3–3.5 cm ..... 3. *G. longiretinaculatum*  
2b. Leaf blade over 3.5 cm, basal veins absent; retinaculum half as long as pollinia; fruit 4.5–12.5 cm.  
3a. Base of leaf blade cuneate ..... 6. *G. foetidum*  
3b. Base of leaf blade rounded to cordate.  
4a. Petiole 0.2–0.4 cm ..... 2. *G. hainanense*  
4b. Petiole 1–4 cm.  
5a. Leaf blade abaxially tomentose; corolla tube appendages exerted from corolla tube; follicles apparently mostly paired, strongly beaked, clearly asymmetrically swollen near base ..... 5. *G. yunnanense*  
5b. Leaf blade abaxially pubescent to glabrous; corona lobes and stigma head included within corolla tube; follicles mostly solitary, weakly beaked, only slightly swollen and subsymmetrical at base.  
6a. Corolla lobes densely pubescent inside; fruit 4.5–5.5 cm ..... 4. *G. latifolium*  
6b. Corolla lobes glabrous; fruit 8–12 cm ..... 7. *G. inodorum*

**1. *Gymnema sylvestre*** (Retzius) Schultes in Roemer & Schultes, Syst. Veg. 6: 57. 1820.

匙羹藤 chi geng teng

*Periploca sylvestris* Retzius, Observ. Bot. 2: 15. 1781;  
*Apocynum alterniflorum* Loureiro; *Gymnema affine* Decaisne;  
*G. alterniflorum* (Loureiro) Merrill; *G. formosanum* Warburg; *G. sylvestre* var. *chinensis* Bentham.

Stems to 8 m, sparsely lenticellate; young branchlets pubescent, glabrescent. Petiole 3–12 mm; leaf blade obovate to

ovate, 3–8.5 × 1.5–5.5 cm, thick papery, adaxially pubescent to glabrous except for groove of midvein, abaxially tomentose to glabrous except for veins; lateral veins 4 or 5 pairs, convergent. Cymes much shorter than leaves, pubescent; peduncle 2–5 mm, rachis with close-spaced spiral of pedicel scars. Sepals ovate, ciliate. Corolla greenish white; lobes ovate, glabrous; appendages exerted. Stigma head exerted. Follicles mostly solitary, broadly lanceolate in outline, 5–9 × ca. 2 cm, glabrous, beak acuminate. Seeds ovate, ca. 8 × 4 mm; coma silky white, ca. 3.5 cm. Fl. Apr–Nov, fr. Sep–Dec.  $2n = 22$ .

Open woods, bushland; 100–1000 m. Fujian, Guangxi, Hainan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan (Ryukyu Islands), Malaysia, Sri Lanka, Vietnam; Africa].

All parts are used for the treatment of rheumatism, blood-vessel inflammation, hemorrhoids, and snake bites.

**2. *Gymnema hainanense*** Tsiang, Acta Phytotax. Sin. 10: 37. 1965.

海南匙羹藤 hai nan chi geng teng

*Bidaria hainanensis* (Tsiang) P. T. Li.

Lianas to 3 m, pubescent. Petiole 2–3.5 mm; leaf blade oblong or oblong-elliptic, 3.5–8.5 × 1.5–3.5 cm, membranous or thin papery, adaxially glabrous except for midvein, base rounded to shallowly cordate, apex acute, mucronate; lateral veins 4 or 5 pairs. Cymes ca. 1.5 × 1.5 cm, 20–30-flowered; peduncle 3–7 mm. Pedicel ca. 5 mm. Sepals ovate, ciliate. Corolla campanulate; lobes oblong, ca. 1 × 0.5 mm; tube nearly as long as lobes; appendages absent, hair bands included. Anthers reaching base of stigma head; pollinia oblong, retinaculum half as long as pollinia. Ovaries glabrous. Stigma head capitate. Fl. Aug.

- Dense forests. Hainan.

**3. *Gymnema longiretinaculatum*** Tsiang, Sunyatsenia 6: 136. 1941.

会东藤 hui dong teng

*Bidaria longiretinaculata* (Tsiang) P. T. Li.

Lianas to 1 m, hispid. Petiole 3–5 mm; leaf blade ovate, 1–2 × 0.8–1.8 cm, base cordate, apex acute; basal veins 5, prominent. Cymes 1.5–2.3 cm, (1–)3–5-flowered; peduncle 1–1.3 cm. Pedicel ca. 5 mm. Sepals ovate, hispid. Corolla white; tube ca. 3 mm; lobes oblong, ca. 2 mm, apex rounded or retuse; appendages absent, hair bands included. Gynostegium terete, reaching corolla throat; anthers as high as stigma head; pollinia oblong, retinaculum linear-oblong, longer than pollinia. Stigma head discoid, apex depressed. Follicles fusiform, ca. 3.5 × 1.3 cm, obtuse at both ends, glabrous. Fl. Jul–Sep.

- Bushland; 1000–2400 m. Guizhou, Sichuan, Yunnan.

**4. *Gymnema latifolium*** Wallich ex Wight, Contr. Bot. India 45. 1834.

宽叶匙羹藤 kuan ye chi geng teng

*Bidaria latifolia* (Wallich ex Wight) P. T. Li.

Lianas to 6 m. Branches lenticellate; branchlets pubescent. Petiole 1.5–4 cm, densely pubescent; leaf blade 8–13 × 5–8 cm, pubescent, more densely so abaxially, base rounded, apex acute; lateral veins 6 or 7 pairs. Cymes often paired at nodes, umbel-like, with condensed branched rachis, pubescent, many flowered; peduncle 1–1.5 cm. Pedicel 3–8 mm. Sepals ovate, puberulent. Corolla yellowish, campanulate, glabrous outside; tube with 5 prominent longitudinal ridges with lines of hairs along each side; lobes ovate, ca. 1.2 × 1.2 mm, densely pubescent adaxially, shorter than corolla tube. Gynostegium cylindrical; membranous anther appendages shorter than stigma head; pollinia oblong. Stigma head conical, apex 2-cleft. Follicles lanceolate in outline, beaked, 4.5–5.5 × 1.5–2 cm, densely pubescent. Seeds oblong-ovate, ca. 1.1 cm × 5 mm, margin membranous; coma ca. 3 cm. Fl. Apr–Nov, fr. Aug–Dec.

Mixed woods; 500–1000 m. Guangdong, Guangxi, S Yunnan [India, Myanmar, Thailand, Vietnam].

**5. *Gymnema yunnanense*** Tsiang, Sunyatsenia 6: 131. 1941.

云南匙羹藤 yun nan chi geng teng

*Bidaria yunnanensis* (Tsiang) P. T. Li.

Lianas to 7 m, minutely tomentose throughout. Petiole 1–1.5 cm; leaf blade ovate to ovate-elliptic, rarely obovate, 6–13 × 2.5–6 cm, glabrescent except for veins, base rounded, apex acuminate; lateral veins 5 or 6 pairs. Sepals ovate-oblong, as long as corolla tube, hirsute. Corolla yellowish green to white-green; lobes ovate, ciliate; appendages exerted from corolla tube, hair bands well developed. Anther appendages retuse, shorter than stigma head; pollinia oblong, erect. Stigma head globose, exerted. Follicles ovoid-lanceolate in outline, conspicuously beaked with asymmetrically swollen base, 6–6.5 × 2–3 cm, densely minutely tomentose. Seeds ovate-oblong, 1.3–1.5 cm × 6 mm, margin membranous; coma ca. 2.5 cm. Fl. Mar–Jun, fr. Jun–Dec.

- Mixed woods; 1000–2000 m. SW Guangxi, S Yunnan.

**6. *Gymnema foetidum*** Tsiang, Sunyatsenia 6: 133. 1941.

华宁藤 hua ning teng

*Bidaria foetida* (Tsiang) P. T. Li; *B. foetida* var. *mairei* (Tsiang) P. T. Li; *Gymnema foetidum* var. *mairei* Tsiang.

Lianas to 5 m. Branchlets lenticellate. Petiole 5–10 mm, puberulent; leaf blade elliptic to elliptic-oblong, 4–9.5 × 1.5–4 cm, glabrous or puberulent, base cuneate, apex acute or short acuminate; lateral veins 5 or 6 pairs. Cymes up to as long as petiole, 5–8-flowered. Sepals oblong, ca. 3 × 1.5 mm, puberulent, basal glands 5 or 6 or absent. Corolla yellow-white; tube as long as calyx, interior with longitudinal bands

of stiff hairs with or without appendages at apex, included; lobes oblong, ca. 2 × 1.5 mm. Stigma head dome-shaped, included. Follicles cylindrical, ca. 8 × 1.5 cm. Seeds ovate, ca. 1.4 cm × 6 mm, flat; coma ca. 3 cm. Fl. Mar-Apr, fr. Jun-Oct.

- Open montane woods, dense forests. Yunnan.

**7. *Gymnema inodorum*** (Loureiro) Decaisne in A. de Candolle, Prodr. 8: 551. 1844.

广东匙羹藤 *guang dong chi geng teng*

*Cynanchum inodorum* Loureiro, Fl. Cochinch. 1: 166. 1790; *Bidaria inodora* (Loureiro) Decaisne; *B. tingens* (Roxburgh ex Sprengel) Decaisne; *Gymnema tingens* Roxburgh ex Sprengel.

Lianas to 10 m. Stems glabrous; young branchlets pale gray, lenticellate, puberulent. Petiole 2–6 cm; leaf blade membranous, ovate-oblong to ovate or broadly ovate, 4–13 × 2–9 cm, glabrous or thin puberulent along veins, base rounded to shallowly cordate, apex acuminate to caudate; lateral veins 4–6 pairs. Inflorescences eventually racemelike with sessile umbel-like cymes arranged in spiral, up to 4 cm; peduncle 1–2 cm. Pedicel 1–1.5 cm. Sepals oblong, 2–3 × 1.4 mm, shorter than corolla tube, puberulent, ciliate. Corolla yellow, 6–7 mm, minutely puberulent outside; tube cylindrical, glabrous except for longitudinal bands of stiff hairs alternating with lobes; lobes oblong, 3–4 × 1.6–1.8 mm, apex rounded, glabrous except for ciliate margin. Pollinia oblong. Stigma head dome-shaped, exerted from corolla tube. Follicles lanceolate in outline, up to 16 × 3 cm, wall thick and slightly fibrous, glabrous. Seeds ca. 1.5 × 1 cm; coma ca. 4 cm. Fl. May-Jul, fr. Jun-Dec.

Bushland, open woods; 200–1000 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [India, Nepal, Philippines, Sikkim, Thailand, Vietnam].

All parts are used medicinally for infantile paralysis and pulmonary tuberculosis.

### **30. GONGRONEMA** (Endlicher) Decaisne in A. de Candolle, Prodr. 8: 624. 1844.

纤冠藤属 *qian guan teng shu*

Lianas woody. Cymes extra-axillary, umbel-like or racemelike. Calyx with or without 5 basal glands. Corolla urceolate to campanulate, rarely rotate; lobes 5, twisted to right or subvalvate. Corona lobes 5, scalelike, inserted at base of gynostegium. Filaments connate into a tube; anthers erect, membranous apical appendages as long as or slightly longer than stigma head; pollinia 2 per pollinarium, ovoid-oblong or oblong, erect. Styles short; stigma head vertically conical or convex. Follicles oblong-lanceolate.

About 16 species: Africa, tropical and subtropical Asia, Oceania; two species in China.

- 1a. Stems glabrous; cymes laxly branched, mostly with (2 or) 3 main branches; bracteoles subtending pedicels few, minute, linear, ca. 1 mm ..... 1. *G. napalense*  
 1b. Stems pubescent or puberulent; cymes umbel-like or short racemelike, unbranched; bracteoles subtending pedicels many, 10–13 mm ..... 2. *G. multibracteolatum*

**1. *Gongronema napalense*** (Wallich) Decaisne in A. de Candolle, Prodr. 8: 624. 1844.

*Gymnema napalense* Wallich, Tent. Fl. Nepal. 50, tab. 38. 1826.

纤冠藤 *qian guan teng*

Lianas to 8 m. Stems glabrous, with regularly and longi-

tudinally striated bark when older. Petiole 1–3 cm; leaf blade oblong-lanceolate, oblong-oblong, elliptic, elliptic-oblong, or ovate, 6–14 × 2–8 cm, papery, glabrous, base rounded, truncate or subcordate, apex short acuminate; lateral veins 5–7 pairs, tertiary veins drying dark in young leaves, pale and raised in old leaves. Cymes to 16 cm; peduncle to 8 cm, initially with (2 or) 3 main branches, these usually irregularly forked, with umbel-like to short racemelike cymules, pubescent; bracteoles subtending pedicels few, minute, linear, ca. 1 mm. Pedicel 3–6 mm. Sepals 1.5–2 mm, ovate, sometimes pubescent. Corolla yellowish, ca. 4 mm; tube as long as sepals; lobes ovate-triangular, externally glabrous or margin sparsely pubescent. Corona lobes semicircular. Anther appendages as long as stigma head. Follicles oblong-lanceolate in outline, 4.5–8 cm × 5–7 mm, glabrous. Seeds ovate, ca. 4 × 1.5 mm; coma ca. 2.5 cm. Fl. Jun-Sep.

Moist forests, bushland; 500–1500 m. Guangdong, Guangxi, Guizhou, Hainan, Xizang, Yunnan [India, Laos, Nepal, Sikkim].

Decoction of all parts is used for the treatment of leucorrhoea, blennorrhoea, and traumatic injury. Fine strong fibers, obtained from the inner bark, are used in making ropes, sacks, and paper.

**2. *Gongronema multibracteolatum*** P. T. Li & X. M. Wang, Acta Phytotax. Sin. 25: 476. 1987.

多苞纤冠藤 duo bao qian guan teng

Lianas to 5 m, pubescent except for leaves and corolla. Petiole 5–10 mm; leaf blade papery, obovate or elliptic, 5–7 × 1.5–3 cm, base rounded, apex obtuse or short acuminate; lateral veins 4 or 5 pairs, obliquely ascending. Cymes extra-axillary, umbel-like, 12–16-flowered; peduncle 3–4 cm; rachis simple; bracteoles subtending pedicels many, linear or spatulate, 1–1.3 cm × 1–3 mm. Pedicel ca. 5 mm. Buds ca. 7 mm, long acute. Sepals linear, 4–7 mm. Corolla glabrous; lobes longer than tube, very narrow, open flower not seen. Corona lobes elliptic, adnate to base of gynostegium. Anther appendages oblong, longer than stigma head, pollinia oblong, erect. Ovaries oblong-ovate, glabrous; stigma head conical, apex 2-cleft. Fl. Apr.

- Forests; 600 m. Guizhou (Libo).

**31. *TELOSMA*** Coville, Contr. U.S. Natl. Herb. 9: 384. 1905.

夜来香属 ye lai xiang shu

Lianas. Leaves opposite, long petiolate. Cymes extra-axillary, pendulous, rachis laxly branched. Calyx with 5 glands at base. Corolla tube cylindric, with enlarged base, throat sometimes constricted; lobes patent, twisted to right. Corona lobes 5, adnate to base of staminal tube, margin and apex free, erect, oblong, obtuse, with ligulate inner lobes adnate to near apex, or corona lobes notched. Filaments connate into a tube; membranous anther appendages incurved; pollinia 2 per pollinarium, oblong, erect. Stigma head convex or conical. Follicles thick, acuminate, smooth. Seeds comose.

About ten species: Asia, tropical Africa, Oceania; three species in China.

- 1a. Leaf blade cuneate to shallowly cordate at base ..... 3. *T. procumbens*
- 1b. Leaf blade deeply cordate at base.
  - 2a. Corolla lobes oblong; flowers very fragrant ..... 1. *T. cordata*
  - 2b. Corolla lobes lanceolate; flowers odorless or nearly so ..... 2. *T. pallida*

**1. *Telosma cordata*** (N. L. Burman) Merrill, Philipp. J. Sci. 19: 372. 1921.

夜来香 ye lai xiang

*Asclepias cordata* N. L. Burman, Fl. Indica 72, fig. 2. 1768; *Cynanchum odoratissimum* Loureiro; *Oxystelma ovatum* P. T. Li & S. Z. Huang; *Pergularia minor* Andrews; *P. odoratissima* (Loureiro) Smith; *Telosma minor* (Andrews) Craib; *T. odoratissima* (Loureiro) Coville.

Stems 1–10 m, yellowish green, pubescent when new, those of previous year pale gray, glabrescent, usually sparsely lenticellate. Petiole 1.5–5 cm; leaf blade ovate, 4–12 × 3–10 cm, base deeply cordate with narrow sinus, apex acuminate; basal veins 3, lateral veins to 6 pairs. Cymes umbel-like, 15–30-flowered; peduncle 0.5–1.5 cm, puberulent. Sepals oblong-lanceolate, puberulent. Corolla yellowish green; tube 6–10 × 4–6 mm, puberulent outside, pilose or glabrous with pilose throat inside; lobes oblong, 6–12 × 3–6 mm, ciliate. Corona lobes slightly fleshy, basal part ovate, apex acuminate, often notched to deeply lobed, internal appendage often longer than lobe proper. Pollinia oblong or reniform. Stigma head capitate. Follicles lanceolate in outline, 7–13 × 2–3.5 cm, glabrous, somewhat obtusely 4-angled. Seeds broadly ovate, ca. 1 × 1 cm, flat, apex truncate, margin membranous; coma 3–4 cm. Fl. May–Oct, fr. Oct–Dec.  $2n = 22$ .

Open woods, bushland. Guangdong, Guangxi; cultivated elsewhere in S China [India, Kashmir, Myanmar, Pakistan, Vietnam; America, Europe].

The flowers are very fragrant and yield perfumed oil. They are used in cooking and medicinally to treat conjunctivitis.

Material from outside China varies greatly in corolla size and shape and, to a lesser extent, in leaf shape. It is not clear whether a species complex or a single polymorphic species, possibly including the two following species, is involved.

**2. *Telosma pallida*** (Roxburgh) Craib, Bull. Misc. Inform. Kew 1911: 418. 1911.

台湾夜来香 tai wan ye lai xiang

*Asclepias pallida* Roxburgh, Fl. Ind. 2: 49. 1824; *Pergularia pallida* (Roxburgh) Wight & Arnott.

Stems slender, to 3 m, puberulent. Petiole 2.5–3.5 cm; leaf blade ovate-cordate, 6–8 × 3–5 cm, membranous, glabrous, base deeply cordate, apex acuminate; basal veins 5, lateral veins 4 or 5 pairs. Cymes extra-axillary, umbel-like; peduncle 0.7–1.5 cm. Pedicel 5–12 mm. Flowers odorless or nearly so. Sepals ovate-lanceolate, ciliate. Corolla yellow-white; tube nearly as long as or shorter than lobes, throat villous; lobes lanceolate, glabrous. Corona lobes fleshy, apex acuminate, longer than anther appendages; pollinia oblong, erect. Stigma head conical, apex retuse. Follicles cylindric-lanceolate, 5.5–10 cm. Seeds ovate, 5–8 mm; coma ca. 2.5 cm. Fl. Aug, fr. Oct–Dec.  $2n = 22$ .

Open woods. Taiwan [India, Myanmar, Nepal, Pakistan, Thailand, Vietnam].

*Telosma cordata* is possibly a cultigen of *T. pallida* selected for fragrant flowers.

**3. *Telosma procumbens*** (Blanco) Merrill, Philipp. J. Sci., C. 7: 243. 1912.

卧径夜来香 wo jing ye lai xiang

*Pergularia procumbens* Blanco, Fl. Filip. 201. 1837; *P. filipes* Schlechter; *Telosma cathayensis* Merrill.

Stems to 4 m, glabrous, young branchlets puberulent. Petiole 1.5–3.5 cm; leaf blade ovate, oblong or oblong-elliptic, 6–13 × 3–8 cm, membranous, glabrous to puberulent along veins, base broadly cuneate to subcordate, apex acute to acuminate; lateral veins ca. 6 pairs. Cymes extra-axillary, umbel-like, many flowered; peduncle 1–3 cm. Pedicel 1–1.5

cm. Sepals oblong-elliptic or ovate, ca.  $3.5 \times 2$  mm, puberulent. Corolla greenish or greenish yellow, odorless, ca. 1.5 cm; tube up to as long as lobes, throat villous, interior with 5 narrow lines of hairs; lobes oblong, ca.  $8 \times 2.5$  mm, rounded or subtruncate at apex, glabrous outside, puberulent inside, ciliate. Corona lobes acuminate, as high as or higher than anther appendages, abaxially convex. Pollinia oblong, erect. Stigma head short conical. Follicles lanceolate, ca.  $10 \times 2$  cm. Fl. May, fr. Jul-Sep.

Open woods, bushland, along rivers; 300–800 m. Guangdong, Guangxi, Hainan, Yunnan [Philippines, Vietnam].

### 32. JASMINANTHES Blume, Ann. Mus. Bot. Lugduno-Batavum 1: 148. 1850.

黑鳗藤属 hei man teng shu

*Stephanotis* Du Petit-Thouars sect. *Jasminanthes* (Blume) Hemsley; *Huthamnus* Tsiang.

Lianas. Cymes extra-axillary, umbel-like, simple or dichotomous. Calyx deeply 5-parted, usually eglandular, segments erect and connate at base. Corolla salverform or urceolate; tube elongated, base broad, throat constricted or slightly dilated, interior with 5 pairs of longitudinal lines of hairs; lobes 5, twisted to right, usually longer than tube, acuminate in bud. Corona lobes usually conspicuous, adnate to back of stamens, erect, apex free, dorsally compressed, with board-shaped processes on back, minute or absent. Filaments connate into a short tube; anther appendages erect or inflexed on stigma head; pollinia 2 per pollinarium, erect. Stigma head conical or capitate. Follicles lanceolate or oblong-lanceolate, apex acuminate. Seeds comose.

About five species: China, Thailand; four species in China.

*Jasminanthes* was formerly included in *Stephanotis*, but the latter is endemic to Madagascar.

- 1a. Leaf blade broadly cuneate at base, glabrous ..... 1. *J. saxatilis*  
1b. Leaf blade cordate to truncate at base, tomentose or puberulent when young, glabrescent.  
2a. Corolla lobes shorter than tube; corona absent; leaves tomentose ..... 2. *J. pilosa*  
2b. Corolla lobes longer than or equalling tube; corona present; leaves puberulent to glabrescent.  
3a. Corolla tube 10–20 mm, lobes 17–30 mm ..... 3. *J. mucronata*  
3b. Corolla tube 7–8 mm, lobes ca. 7 mm ..... 4. *J. chunii*

**1. *Jasminanthes saxatilis*** (Tsiang & P. T. Li) W. D. Stevens, & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 11. 1995.

云南黑鳗藤 yun nan hei man teng

*Stephanotis saxatilis* Tsiang & P. T. Li, *Acta Phytotax. Sin.* 12: 118. 1974.

Lianas to 4 m. Branches pale gray, pubescent along 2 lines. Petiole 1–1.5 cm; leaf blade elliptic to oblong-lanceolate,  $5.5\text{--}10 \times 1\text{--}3.5$  cm, thin papery, glabrous, base broadly cuneate, apex long acuminate; lateral veins ca. 7 pairs. Cymes many flowered; peduncle 3–4 cm. Pedicel ca. 1 cm, pubescent. Sepals oblong-ovate, ca.  $3 \times 1$  mm, pubescent. Corolla greenish, salverform; tube ca. 7 mm, dilated at base, glabrous outside; lobes oblong-falcate, ca.  $10 \times 3$  mm. Corona lobes reaching base of anthers, with raised keel on back, apex subobtusate. Anthers subquadrangular, appendages oblong, longer than stigma head; pollinia oblong. Stigma head umbonate. Fl. May.

- Bushland; 800–1200 m. W Guangxi, SE Yunnan.

**2. *Jasminanthes pilosa*** (Kerr) W. D. Stevens & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 11. 1995.

茶药藤 cha yao teng

*Stephanotis pilosa* Kerr, *Bull. Misc. Inform. Kew* 1938: 453. 1938; *Huthamnus sinicus* Tsiang.

Lianas to 10 m, most parts densely yellowish tomentose. Petiole 1–4.5 cm; leaf blade ovate,  $9\text{--}19 \times 4\text{--}12$  cm, sub-leathery, base cordate, apex acute and mucronate; lateral veins 7–10 pairs. Peduncle ca. 2 cm. Pedicel ca. 1 cm. Sepals oblong-lanceolate, ca.  $2.6 \times 0.8$  mm, leaflike. Corolla white, salverform, ca. 4.5 cm in diam.; tube ca. 5 cm, dilated at base, puberulent outside, with 5 longitudinal lines of hairs inside; lobes oblong-falcate, ca.  $3.5 \times 1.3$  cm, puberulent outside, glabrous inside. Corona absent. Anthers subquadrangular, apical appendages oblong, covering stigma head; pollinia oblong. Stigma head conical. Follicles lanceolate, ca.  $21 \times 2.7$  cm, glabrous. Seeds ovate, ca.  $2 \times 1$  cm, margin membranous; coma ca. 4 cm. Fl. summer.

Dense forests, humid thickets; 400–1600 m. Guangxi, Yunnan [Thailand].

**3. *Jasminanthes mucronata*** (Blanco) W. D. Stevens & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 10. 1995.

黑鳗藤 hei man teng

*Apocynum mucronatum* Blanco, Fl. Filip. 852. 1837;  
*Stephanotis chinensis* Champion ex Bentham; *S. mucronata*  
(Blanco) Merrill.

Lianas to 12 m. Stems pubescent along 2 lines, lenticellate. Petiole 2–3 cm; leaf blade ovate-oblong, 7–12 × 4.5–8 cm, papery, pubescent or glabrescent, base cordate, apex acuminate; lateral veins ca. 8 pairs. Cymes usually 2–4(–9)-flowered; peduncle 1.5–2 cm; bracteoles ovate, pubescent. Pedicel 2–3 cm. Sepals oblong, ca. 7 mm. Corolla white with purple juice; tube ca. 2 cm, glabrous outside; lobes falcate, ca. 3 cm × 5 mm, spreading. Gynostegium shorter than corolla tube. Corona lobes 5, shorter than anthers. Anthers apical appendages oblong-ovate, longer than stigma head; pollinia ellipsoid. Stigma head capitate, apex obscurely 2-lobed. Follicles lanceolate, ca. 12 × 1 cm, glabrous. Seeds oblong, ca. 1 cm; coma ca. 2.5 cm. Fl. May–Jun, fr. Sep–Nov.

• Montane forests, often attached to trees; 100–600 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Taiwan, Zhejiang.

**4. *Jasminanthes chunii*** (Tsiang) W. D. Stevens & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 10. 1995.

假木藤 jia mu teng

*Stephanotis chunii* Tsiang, *Sunyatsenia* 3: 165. 1936.

Lianas to 8 m. Branchlets pubescent along 2 lines, glabrescent. Petiole 1–2 cm; leaf blade ovate or broadly ovate-oblong, 7–11 × 4–6.5 cm, papery, glabrescent, base cordate, apex acuminate; lateral veins 6 or 7 pairs. Cymes shorter than leaves, to 12-flowered; peduncle 1–1.5 cm. Pedicel ca. 1.5 cm, densely pubescent. Sepals oblong, ca. 5 × 2 mm, pubescent, ciliate. Corolla white; tube 7–8 mm, glabrous outside, with 5 pairs of longitudinal lines of hairs inside; lobes oblong-falcate, ca. 7 mm, ciliate. Corona lobes minute, flat, shorter than anthers; pollinia ovoid. Stigma head capitate, apex obtuse. Follicles ovoid-lanceolate, ca. 13 × 2 cm, glabrous. Seeds oblong-ovate, margin membranous, ca. 10 × 5–6 mm; coma ca. 5.5 cm. Fl. May–Jun, fr. Aug–Dec.

• Moist forests, often attached to trees; 600–1000 m. Guangdong, Guangxi, Hunan.

### 33. **MARSDENIA** R. Brown, *Prodr.* 460. 1810.

牛奶菜属 niu nai cai shu

Lianas. Inflorescences terminal or extra-axillary, umbel-like, paniculate, or racemelike, pedunculate. Sepals overlapping, basal glands or scales often present. Corolla urceolate or campanulate, throat often hairy; lobes twisted to right. Corona lobes 5, erect, acuminate, fleshy, attached to gynostegium. Filaments connate into a tube; anthers erect, appendages inflexed; pollinia 2 per pollinarium, often oblong, erect. Stigma head flat, convex, or beaked. Follicles mostly thick, acuminate, smooth or longitudinally winged.

About 100 species: Asia, America, tropical Africa; 25 species in China.

- 1a. Inflorescences very congested, bracts and bracteoles leaflike, hiding rachis and flowers; calyx twice as long as corolla; apex of corolla lobes incised ..... 1. *M. incisa*
- 1b. Inflorescences relatively lax, bracts and bracteoles small and not hiding rachis and flowers; calyx much shorter than corolla; apex of corolla lobes entire.
  - 2a. Stigma head produced into long, threadlike to cylindric beak exerted from anther appendages.
  - 3a. Corona lobes as long as anthers; stems short yellowish tomentose.

- 4a. Corolla tube uniformly pilose inside; follicles densely tomentose ..... 10. *M. oreophila*
- 4b. Corolla throat with a dense reflexed pubescence, interior of tube glabrous toward base; follicles glabrous ..... 11. *M. officinalis*
- 3b. Corona lobes shorter than anthers; stems glabrous to minutely puberulent or pubescent along two lines.
- 5a. Corolla tube longer than lobes; peduncle 1.5–3 cm ..... 7. *M. yunnanensis*
- 5b. Corolla tube shorter than lobes; peduncle 2.5–6 cm.
- 6a. Corolla ca. 12 mm; pollinia reniform ..... 8. *M. griffithii*
- 6b. Corolla 5–6 mm; pollinia slender ..... 9. *M. formosana*
- 2b. Stigma head depressed, hemispherical or short conical, not long beaked.
- 7a. Corolla tube not longer than lobes.
- 8a. Corolla lobes 9–12 mm.
- 9a. Leaf blade 5.5–10 cm wide; inflorescences 7–15 cm; corolla interior pubescent; sepals ca. 8 × 6 mm ..... 14. *M. koi*
- 9b. Leaf blade 2–3 cm wide; inflorescences 4–4.5 cm; corolla glabrous; sepals 3–4 × 2–2.5 mm ..... 12. *M. medogensis*
- 8b. Corolla lobes 3–7 mm.
- 10a. Base of leaf blade rounded to truncate; inflorescences unbranched.
- 11a. Plants tomentose; corolla yellowish white, 6–8 mm; back of corona lobes rounded ..... 19. *M. tenii*
- 11b. Plants glabrous; corolla violet or purple, 10–15 mm; back of corona lobes winged or with a hooklike spur at base.
- 12a. Peduncle to 10 cm; corona lobes as long as anthers, dorsiventrally compressed, with a hooklike dorsal spur at base ..... 2. *M. longipes*
- 12b. Peduncle to 3 cm; corona lobes reaching base of anthers, laterally compressed without spur at base ..... 3. *M. brachyloba*
- 10b. Base of leaf blade cordate; inflorescences usually obviously branched.
- 13a. Corolla very densely hairy outside; corona lobes exerted from corolla tube, apex 2(–4)-toothed ..... 5. *M. tenacissima*
- 13b. Corolla glabrous outside; corona lobes included within corolla tube, apex entire.
- 14a. Peduncle to 16 cm; corolla interior pilose; corona lobes shorter than corolla tube ..... 15. *M. hainanensis*
- 14b. Peduncle ca. 1.5 cm; corolla interior glabrous; corona lobes longer than corolla tube ..... 13. *M. yuei*
- 7b. Corolla tube longer than lobes.
- 15a. Leaf blade palmately 3(–5)-veined at base, base deeply cordate; corona lobes with a hooklike spur at base of back.
- 16a. Branches, petiole, abaxial leaf surface, and outside of corolla densely pubescent to tomentose; corolla lobes ca. 2 × 1 mm ..... 4. *M. cavaleriei*
- 16b. Branches, leaves, and corolla glabrous; corolla lobes 3–4 × 1.5–2 mm ..... 6. *M. stanantha*
- 15b. Leaf blade pinnately veined; corona lobes flattened or slightly curved at base of back, without a spur.
- 17a. Corona lobes as long as or longer than anther appendages.
- 18a. Leaf blade elliptic-oblong or oblong-lanceolate; inflorescences ca. 7 mm; peduncle ca. 0.2 cm; corolla ca. 1.5 mm ..... 20. *M. pseudotinctoria*
- 18b. Leaf blade ovate to oblong or ovate-triangular; inflorescences more than 3 cm; peduncle 1–5 cm; corolla 3.5–13 mm.
- 19a. Leaf blade 1–2.5 × ca. 1 cm, papillate abaxially; petiole 0.5–1 cm; corolla tube sparsely retrorse pubescent inside; corona ringlike, as high as anthers and with undulating margin ..... 21. *M. pulchella*
- 19b. Leaf blade 5–13 × ca. 2.7 cm, not papillate; petiole 1–4 cm; corolla tube with a ring of hairs or densely pubescent at throat; corona of separate subulate to ovate lobes.
- 20a. Corolla urceolate, 3.5–4(–6) mm; leaf blade papery, often blue when dry ..... 22. *M. tinctoria*
- 20b. Corolla subcampanulate, ca. 9 mm; leaf blade membranous, not blue when dry ..... 23. *M. glomerata*
- 17b. Corona lobes shorter than anther appendages.
- 21a. Corolla tube interior uniformly hairy; inflorescences branched; corolla throat densely long hairy; leaves without blue pigment.
- 22a. Leaf blade broadly ovate to suborbicular, approximately as long as wide ..... 16. *M. tomentosa*



- 22b. Leaf blade ovate-cordate to oblong, distinctly longer than wide.
- 23a. Stems and undersides of leaves finely yellowish tomentose; corolla lobes hairy on both sides ..... 17. *M. sinensis*
- 23b. Stems and leaves sparsely hairy when young, glabrescent; corolla lobes glabrous, contrasting sharply with prominently hairy throat ..... 18. *M. lachnostoma*
- 21b. Corolla tube interior with hairs restricted to lines or patches; inflorescences unbranched; corolla throat with a thin ring of hairs only; leaves often with blue pigment when dried.
- 24a. Leaf blade abaxially tomentose; inflorescence rachis 3–7 cm, clearly spiral ..... 24. *M. schneideri*
- 24b. Leaf blade abaxially glabrous to puberulent; inflorescence rachis mostly less than 1 cm, if longer then rachis straight.
- 25b. Corolla campanulate ..... 22. *M. tinctoria*
- 25a. Corolla urceolate ..... 25. *M. glabra*

**1. *Marsdenia incisa*** P. T. Li & Y. H. Li, Acta Bot. Yunnan. 4(2): 157. 1982.

裂冠牛奶菜 lie guan niu nai cai

Lianas to 9 m, most parts yellowish tomentose. Stems hollow when dry. Petiole 4–5 cm; leaf blade broadly ovate to ovate-oblong, 20–30 × 11–14 cm, papery, glabrescent, base cordate, apex acute; lateral veins 11 or 12 pairs, anastomosing before margin. Inflorescences very congested, enclosed within bracts at least when young, 6–9 cm; rachis forked; peduncle as long as petiole; bracts and bracteoles leaflike, longer than flowers. Pedicel 1–1.7 cm. Sepals obovate-oblong, 1.5–1.7 cm × 5–10 mm, striate, pubescent; basal glands absent. Corolla yellowish, campanulate, hirsute outside, glabrous inside; tube ca. 5 mm; lobes broadly ovate, ca. 3.5 × 4 mm, apex incised, base auriculate, ciliate. Corona lobes ovate-oblong, obtuse. Pollinia oblong, ca. 6 mm. Follicles cylindrical-ellipsoid, 12(–16) × 3.5(–9) cm. Seeds ovate; coma ca. 2 cm. Fl. Feb–May, fr. Aug–Dec.

- Dense forests; 600 m. ?Guangxi, S Yunnan (Mengla).

**2. *Marsdenia longipes*** W. T. Wang ex Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 117. 1974.

百灵草 bai ling cao

Lianas slender, to 2 m; glabrous except for inflorescences. Petiole 1–1.5 cm; leaf blade oblong or oblong-lanceolate, 5–10 × 2–4 cm, base rounded, apex acuminate; lateral veins 4–6 pairs. Inflorescences congested, 10–15-flowered; peduncle to 10 cm. Corolla violet, ca. 1.2 cm; tube nearly as long as lobes; lobes lanceolate. Corona lobes oblong, base with a hooklike dorsal spur. Anthers oblong, appendages broadly elliptic, longer than corona lobes; pollinia oblong. Ovaries glabrous. Stigma head short conical. Follicles lanceolate in outline. Fl. Feb–Mar.

- Dense forests, humid thickets; below 2000 m. Guangxi, SW Yunnan.

The plant is used for the treatment of fractures and bleeding caused by injury. The roots are used as a medicine for bronchitis and asthma.

**3. *Marsdenia brachyloba*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 11. 1995.

短裂牛奶菜 duan lie niu nai cai

Lianas glabrous except for sepal and corolla margin. Nodes with distinct interpetiolar line. Petiole 2.5–4.5 cm; leaf blade elliptic, 10–14.5 × 5–7.5 cm, probably rather fleshy, abaxially very pale, adaxially dark with paler zone along midrib, base cuneate, apex acuminate; lateral veins 5 or 6 pairs, raised on both surfaces. Inflorescences umbel-like, up to 20-flowered; peduncle to 3 cm. Pedicel 1–1.7 cm. Sepals ± circular, ca. 1.5 × 1.5 mm, margin ciliolate. Corolla campanulate with spreading lobes, purple, buds ca. 6 mm; tube ca. 2 mm, broader than long; lobes ca. 4 × 2 mm, apex rounded. Corona lobes ca. as high as anthers, laterally compressed with almost hooked tip, basal half deeply grooved. Anther appendages oblong, rather fleshy toward base, half as high as stigma head. Stigma head ovoid, with acuminate divided beak, exerted from corolla tube. Follicles solitary, lanceolate in outline, ca. 16 × 4 cm, base narrowed into a stalk ca. 1 cm. Seeds ovate, ca. 1.7 cm × 7 mm; coma off-white, to 3 cm.

- Forests; 2100–2250 m. Yunnan (Feng Chen Lin).

**4. *Marsdenia cavaleriei*** (H. Léveillé) Handel-Mazzetti ex Woodson in Rehder, J. Arnold Arbor. 15: 318. 1934.

灵药牛奶菜 ling yao niu nai cai

*Metaplexis cavaleriesi* H. Léveillé, Fl. Kouy-Tchéou 42. 1914/15.

Lianas to 6 m, densely velvety. Stems stout, yellowish brown. Petiole 5–9(–12) cm; leaf blade ovate-cordate, 7–18 × 5–16 cm, papery, velvety to subglabrous adaxially, tomentose abaxially, base deeply cordate, with rounded lobes, apex acute; basal veins 3–5(–7), lateral veins 3 or 4 pairs. Inflorescences compound, rounded, 3–5(–15) cm, often shorter than subtending petiole, many flowered; peduncle up to 1 cm. Sepals oblong. Corolla purplish, campanulate to urceolate, pilose outside; tube longer than lobes, ca. 3.5 mm, lower part of interior with 5 longitudinal bands of long hairs; lobes oblong, ca. 2 × 0.8 mm, apex rounded. Corona lobes shorter than anthers, base with an erect, hooklike dorsal spur, apex bluntly acute. Anther appendages ovate-oblong; pollinia oblong. Stigma head conical, shorter than anther appendages. Follicles ovoid-oblong, 7–17 × 1–6 cm. Seeds ovate-oblong; coma ca. 4 × as long as seeds. Fl. Jun–Aug, fr. Sep–Dec.

Open woods; 600–2200 m. Guangxi, Guizhou, Yunnan [India].

The bark is used in folk medicine for treating pneumonia and tumors in Yunnan and Guangxi.

**5. *Marsdenia tenacissima*** (Roxburgh) Moon, Cat. Pl. Ceylon 21. 1824.

通光藤 tong guang teng

*Asclepias tenacissima* Roxburgh, Pl. Coromandel 3: 35. 1819; *Gynnema tenacissima* (Roxburgh) Sprengel.

Lianas robust, densely pilose to tomentose throughout except for interior of corolla. Petiole 5–6 cm, slender; leaf blade ovate, 8–10 × 6–6.5 cm, base deeply cordate with rounded sinus, apex acuminate; basal veins 5–7, lateral veins 2 or 3 pairs. Inflorescences much branched, broader than long, to 8 × 12 cm, many flowered; peduncle to 2 cm, shorter than first internode. Pedicel 6–8 mm. Sepals elliptic-lanceolate, ca. 3 × 1–1.3 mm, tip rounded. Corolla “yellow,” campanulate, with spreading lobes, very densely pilose outside; tube ca. 3.5 × 2.5 mm, interior retrorsely pilose toward base; lobes oblong, ca. 4 × 2.2 mm, apex rounded, minutely velvety. Corona lobes exerted from corolla tube, oblong, apex truncate-emarginate with corners produced into short horns, sometimes toothed between these. Anther appendages oblong, slightly longer than corona lobes; pollinia curved cylindrical. Stigma head broadly cylindrical, concealed by anther appendages.

Cliffs; 1500 m. Yunnan (Szemoo) [Cambodia, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

The stems yield very strong fibers, reputedly among the strongest produced by any plant, that are used for making cords and strings.

**6. *Marsdenia stenantha*** Handel-Mazzetti, Symb. Sin. 7: 1003. 1936.

狭花牛奶菜 xia hua niu nai cai

*Stephanotis nana* P. T. Li; *S. yunnanensis* H. Léveillé (1915), not *Marsdenia yunnanensis* (H. Léveillé) Woodson

(1934).

Lianas to 4 m, glabrous except for interior of corolla tube at base. Branchlets pale green. Petiole 1–4 cm; leaf blade ovate to ovate-oblong, 2–9.5 × 1.5–5 cm, papery, base deeply cordate to subauriculate, apex acuminate; lateral veins 4 or 5 pairs, flat on both surfaces or slightly elevated abaxially, conspicuously pale abaxially. Inflorescences umbel-like, to 15-

flowered, probably pendent; peduncle to 2.5 cm. Pedicel 5–10 mm. Sepals lanceolate, ca.  $4.5 \times 2$  mm, with basal glands. Corolla tubular, to 1.2 cm; tube 6–8 mm, 3–4 mm in diam.; lobes ovate,  $3-4 \times 1.5-2$  mm. Corona lobes linear-lanceolate, longer than or equalling anther appendages, ca.  $4 \times 1$  mm,  $\pm$  flat. Stigma head short conical to cylindrical, sometimes exerted beyond anther appendages. Pollinia ellipsoid. Follicles ellipsoid-lanceolate, ca.  $6 \text{ cm} \times 8 \text{ mm}$ . Seeds spatulate, ca.  $8 \times 3$  mm; coma 1–5 cm. Fl. Jun, fr. Aug–Nov.

- Open woods; 1500–2600 m. Sichuan, Yunnan.

**7. *Marsdenia yunnanensis*** (H. Léveillé) Woodson in Rehder, J. Arnold Arbor. 15: 317. 1934.

云南牛奶菜 yun nan niu nai cai

*Gongronema yunnanense* H. Léveillé, Cat. Pl. Yun-Nan 13. 1915; *Marsdenia carnea* Woodson; *M. xuanenensis* Z. E. Zhao & Y. M. Wang.

Lianas. Stems to 5 m, pubescent along 2 lines, glabrescent. Petiole 1.5–2 cm; leaf blade elliptic or elliptic-oblong, 6–12  $\times$  1.5–4(–7) cm, subleathery, adaxially sparsely appressed-puberulent, abaxially pale and sparsely pubescent, base rounded to cuneate, apex caudate or short acuminate; lateral veins 6–8 pairs. Inflorescences umbel-like; peduncle 1.5–3 cm, pubescent. Pedicel 0.4–1 cm, pubescent. Sepals broadly ovate, 2–2.5 mm, pubescent. Corolla pink to white, narrowly campanulate; tube 5–7  $\times$  3–5 mm, glabrous outside, pilose inside, densely so opposite corona lobes; lobes broadly ovate, ca.  $2 \times 3$  mm, glabrous or pilose at base, ciliate. Corona lobes adnate to gynostegium,  $\pm$  acute, basal half deeply grooved, shorter than anthers. Anthers longer than corona, base laterally compressed, apex subulate and membranous; pollinia reniform. Stigma head long beaked, ca. 3 mm. Follicles fusiform-ellipsoid, 9–12  $\times$  ca. 2 cm, glabrous. Seeds ca.  $11 \times 5$  mm; coma ca. 2 cm. Fl. Jul–Sep, fr. Sep–Dec.

- Forests, bushland; 1000–2000 m. Hubei, Sichuan, Yunnan.

**8. *Marsdenia griffithii*** J. D. Hooker, Fl. Brit. India 4: 36. 1883.

白药牛奶菜 bai yao niu nai cai

Lianas stout, woody, to 10 m. Branchlets pale green, glabrous or distal parts minutely puberulent, hollow when dry. Petiole 3–6 cm, pubescent; leaf blade ovate, 7–11  $\times$  5–8 cm, glabrescent or sparsely hairy and denser along veins adaxially, base cuneate to subcordate, apex subacute and mucronate; lateral veins 4 or 5 pairs. Inflorescences glomerate, many flowered; peduncle ca. 2.5 cm, pubescent. Pedicel ca. 1 cm, pubescent. Sepals ovate, pubescent, margin translucent and ciliate; basal glands 5 or more. Corolla white, subcampanulate, ca. 1.2 cm; tube pilose opposite stamens, throat with dense reflexed pubescence; lobes oblong-lanceolate, longer than tube, pilose inside except at margin. Corona lobes subulate or lanceolate, base broadened and fleshy, shorter than anthers. Anther appendages rounded; pollinia subreniform. Stigma head produced into a long beak exerted from anthers. Follicles oblong-lanceolate, ca.  $9 \times 4$  cm, smooth. Seeds ovate, flattened, ca.  $1.7 \times 0.8$  cm, margin membranous; coma ca. 3 cm. Fl. summer to autumn.

Dense forests; 2000 m. Guizhou, Hunan, Yunnan [India].

**9. *Marsdenia formosana*** Masamune, J. Soc. Trop. Agric. 2: 241. 1930.

台湾牛奶菜 tai wan niu nai cai

Lianas to 3 m. Branches stout, pubescent along 2 longitudinal lines when young. Petiole 1.5–3(–7.5) cm; leaf blade ovate to ovate-oblong, 8–12(–22)  $\times$  4.5–7(–16) cm, papery, glabrous or sometimes sparsely puberulent adaxially, base shallowly cordate or rounded, apex acute and mucronate; lateral veins 4 or 5 pairs. Inflorescences umbel-like clusters of cymules, many flowered; peduncle 4–6(–7.5) cm. Pedicel 1–1.3 cm, appressed puberulent. Sepals elliptic to broadly ovate, 2–2.5  $\times$  ca. 2 mm, apex acute, pubescent; glands absent. Corolla pinkish white, ca. 5 mm, bowl-shaped with rotate lobes; lobes 3–3.5  $\times$  1.8–2 mm, glabrous outside, stiffly white pubescent inside except near margin. Corona lobes oblong-lanceolate, fleshy, shorter than anthers. Anthers nearly square, apical appendages orbicular; pollinia oblong. Stigma head produced into a long threadlike beak exerted from corolla tube. Follicles lanceolate, ca. 10 cm. Seeds ovate-oblong, 1–1.5 cm; coma to 4 cm. Fl. Mar–Jul.

Forests; low to middle altitudes; 2600 m. Taiwan, Yunnan [Japan (Ryukyu Islands)].

**10. *Marsdenia oreophila*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 193. 1914.

喙柱牛奶菜 hui zhu niu nai cai

Lianas to 6 m, softly and densely short tomentose. Petiole 2–3 cm; leaf blade elliptic or oblong-elliptic, 6–15  $\times$  4–7 cm, papery, adaxially sparsely pilose, abaxially short tomentose, base rounded, apex abruptly short acuminate; lateral veins 4 or 5 pairs. Inflorescences umbel-like, 7–15-flowered; peduncle 1.5–5 cm. Pedicel 1–2 cm. Sepals ovate; glands 10. Corolla white outside, deep maroon or orange inside, to 1 cm; lobes oblong-lanceolate, much longer than tube, glabrous outside, pilose inside. Corona lobes lanceolate, erect, as long as anthers. Stamens ca. 3 mm; anther appendages orbicular; pollinia oblong, ca. 1 mm. Stigma head produced into a threadlike beak 5–6 mm. Follicles fusiform ca.  $13 \times 3$  cm, densely tomentose. Seeds oblong-ovate, ca.  $1 \times 0.5$  cm; coma ca. 2 cm. Fl. Jul–Sep, fr. Sep–Nov.

- Dense forests; below 3000 m. Sichuan, Xizang, Yunnan.

**11. *Marsdenia officinalis*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 115. 1974.

海枫藤 hai feng teng

Lianas woody, to 5 m, yellowish tomentose. Petiole ca. 2 cm; leaf blade ovate-oblong or ovate, 8–11  $\times$  4–5 cm, adaxially puberulent, base rounded, apex obtuse; lateral veins 6–8 pairs. Inflorescences umbel-like, to 8 cm, ca. 10-flowered; peduncle to 5 cm. Pedicel to 2 cm. Calyx glands

10. Corolla subcampanulate; tube shorter than lobes, throat with dense reflexed pubescence; lobes oblong, minutely tomentose inside. Corona lobes ca. as long as anthers; pollinia oblong. Stigma head long beaked. Follicles fusiform, ca. 10 × 3 cm, glabrous. Seeds ovate; coma to 4 cm. Fl. Jul-Aug, fr. Aug-Nov.

• Forests; 500–1000 m. Hubei, Hunan, Sichuan, Yunnan, Zhejiang.

A decoction of all parts is believed to stimulate blood circulation.

**12. *Marsdenia medogensis*** P. T. Li, Acta Phytotax. Sin. 23: 466. 1985.

墨脱牛奶菜 mo tuo niu nai cai

Lianas woody, to 5 m. Stems pale gray, nodes pilose. Petiole 1–1.6 cm, puberulent to glabrous; leaf blade oblong, 10–11 × 2–3 cm, papery, glabrous, base rounded, apex acute; lateral veins 7 or 8 pairs, flattened on both surfaces. Inflorescences umbel-like, 4–8-flowered, glabrous; peduncle 4–4.5 cm; bracteoles lanceolate or oblong, 3–6 mm. Pedicel 2–2.5 cm. Sepals ovate, ca. 4 × 2 mm, ciliate. Corolla white, campanulate, 1.5–2 cm in diam.; tube ca. 5 mm; lobes broadly ovate, ca. 9 × 9 mm, apex rounded. Corona lobes oblong, fleshy, as long as anther appendages. Pollinia falcate-reniform. Ovaries glabrous. Stigma head discoid, convex, slightly exerted from anther appendages. Fl. Sep.

• Mixed woods; 2200–2600 m. Xizang (Medog).

**13. *Marsdenia yuei*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 12. 1995.

临沧牛奶菜 lin cang nai cai

Lianas glabrous except for flowers. Stems stout. Petiole ca. 4 cm; leaf blade ovate, ca. 9.5 × 5.8 cm, base shallowly cordate, apex bluntly cuspidate to short acuminate; lateral veins 4 or 5 pairs, flattened. Inflorescences umbel-like, up to 9-flowered; peduncle ca. 1.5 cm. Pedicel to 9 mm. Sepals rounded, ca. 3 × 2.5 mm, finely appressed puberulent. Corolla white, ± campanulate, glabrous except for sparsely ciliate margin; tube 4.5–5 × ca. 4 mm; lobes rotate, oblong-obovate, ca. 5.5 × 2.5–3.2 mm, apex rounded. Corona lobes narrowly triangular, as long as anther appendages, apex rounded, exerted from corolla tube. Anther appendages ovate, membranous margin relatively narrow. Stigma head hemispherical, conspicuously exerted from anther appendages and corolla tube.

• Thickets; 2300 m. Yunnan (Mienning).

**14. *Marsdenia koi*** Tsiang, Sunyatsenia 3: 211. 1936.

大叶牛奶菜 da ye niu nai cai

*Marsdenia tsaiana* Tsiang.

Lianas stout, to 15 m, glabrous except for flowers. Stems and branches pale gray, hollow when dry. Petiole 3–10 cm; leaf blade broadly ovate to ovate-oblong, 8–20 × 5.5–10 cm, papery, base cordate, apex acute and mucronate; lateral veins 5–7 pairs, flattened. Inflorescences umbel-like to short branched, shorter than leaves; peduncle 7–9 cm. Pedicel 2–4

cm. Sepals suborbicular, (3–)8 × (2.5–)6 mm, ciliate; glands 10. Corolla subcampanulate, ca. 2.8 cm wide, glabrous outside, pubescent inside; tube ca. 1.1 × 1 cm; lobes broadly ovate, ca. 1.2 × 0.9 cm, margin usually reflexed and ciliate. Corona lobes ovate-lanceolate, base turgid, with a pair of longitudinal grooves defining a blunt dorsal wing, shorter than anthers. Anthers laterally compressed, appendages rounded; pollinia reniform. Stigma head conical, apex obtusely acute and 2-cleft. Follicles ellipsoid, 5–10 × 2.5–4 cm. Seeds ovate-oblong, ca. 1.5 cm × 7 mm; coma ca. 2.5 cm. Fl. Jul-Nov.

Mixed woods; 500–3200(?) m. Guangdong, Guangxi, Guizhou, Xizang, Yunnan [Myanmar, Vietnam].

**15. *Marsdenia hainanensis*** Tsiang, Sunyatsenia 3: 206. 1936.

海南牛奶菜 hai nan niu nai cai

*Marsdenia alata* Tsiang; *M. hainanensis* var. *alata* (Tsiang) Tsiang & P. T. Li

Lianas stout, to 6 m, rusty tomentose except for corolla. Petiole 3–10 cm, rather thick and fleshy; leaf blade broadly ovate to orbicular, 8–18 × 7–12 cm, papery, base shallowly cordate, apex short acuminate; lateral veins 5 or 6 pairs. Inflorescences 10–16 cm, forked at right angles to peduncle, sometimes rebranching; peduncle to 15 cm. Pedicel ca. 1 cm. Sepals ovate, ca. 3 × 2 mm, basal glands sometimes present. Corolla yellowish white, subcampanulate; tube ca. 4 × 2 mm, glabrous outside, pilose inside; lobes ovate, 3–4 × 2–3 mm. Corona lobes ovate or ovate-oblong, fleshy, shorter than anthers and corolla tube. Anther appendages large and rounded; pollinia reniform. Stigma head thick, conical to globose, exerted from anthers. Follicles fusiform, ca. 14 × 3 cm. Seeds ovate; coma ca. 5 cm. Fl. May-Oct, fr. Sep-Dec.

Open woods; thickets on hilltops; 500 m. Hainan, Hunan [Vietnam].

The winged petioles described for *Marsdenia alata* are an artifact of preservation.

**16. *Marsdenia tomentosa*** Morren & Decaisne, Bull. Acad. Roy. Sci. Bruxelles 3: 172. 1836.

假防己 jia fang ji

Lianas 1–3 m. Branchlets and petioles minutely tomentose when young, glabrescent. Petiole ca. 6 cm; leaf blade broadly ovate or orbicular, 6.5–15 × 6–13 cm, thick papery, base shallowly cordate to subtruncate, apex short acuminate, sparsely tomentose to glabrous. Inflorescences umbel-like or condensed paniclelike, 5–7 cm, many flowered; peduncle nearly as long as petiole. Pedicel 1–1.5 cm. Sepals ovate; glands 5. Corolla white, subcampanulate; tube tomentose inside; lobes oblong ca. 3 × 2 mm, ciliate. Corona lobes lanceolate, fleshy, shorter than anthers. Anthers ± square; pollinia oblong. Stigma head discoid, apex conical. Follicles fusiform, ca. 7 × 2 cm; pericarp woody, glabrous. Seeds ovate, ca. 1 cm; coma ca. 1 cm. Fl. Apr.

Thickets. Taiwan [Japan, Korea].

**17. *Marsdenia sinensis*** Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 113. 1889.

牛奶菜 niu nai cai

*Marsdenia yaungpienensis* Tsiang & P. T. Li.

Lianas to 10 m, finely yellowish tomentose. Stems lenticellate, glabrescent, hollow when dry. Petiole 2.5–7.5 cm; leaf blade ovate-cordate to ovate-oblong, 7–17 × 4–10 cm, thick papery, base cordate, apex short acuminate; lateral veins 5 or 6 pairs. Inflorescences dichasial, 3–13 cm, 10–55-flowered; peduncle 2–4.5 cm. Pedicel 3–5 mm. Sepals ovate or elliptic, ca. 3 × 2 mm. Corolla exterior yellow or rose and puberulent on lobes only, otherwise glabrous, interior yellow-ish or yellow-white and densely tomentose, subcampanulate; tube ca. 2.5(–7) mm; lobes ovate, 2–3 × 2–3 mm, spreading and recurved, apex rounded. Corona lobes ovoid-lanceolate, fleshy, shorter than anthers. Pollinia curved cylindrical. Stigma head conical, apex 2-cleft, exserted from corolla tube. Follicles fusiform, 9–13 × 2–3 cm, rusty tomentose. Seeds ovate, 6–13 × 5–8 mm, margin membranous; coma ca. 3.5 cm. Fl. Apr–Jul, fr. Aug–Nov.

• Thickets, open woods, along humid valleys; below 800 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

A decoction of all parts is used to detoxify viper bites and to treat pain, traumatic injury, and swelling.

**18. *Marsdenia lachnostoma*** Bentham, Fl. Hongk. 226. 1861.

毛喉牛奶菜 mao hou niu nai cai

*Marsdenia cambodiensis* Costantin.

Vines suffrutescent, to 2 m, stems, petioles, and inflorescences thin pubescent, glabrescent. Petiole 0.6–1.7 cm; leaf blade ovate to oblong, 2.5–9 × 2–4 cm, base rounded or subcordate, apex acute or obtuse, abaxially pale or glaucous. Inflorescences umbel-like, branched, compact, much shorter than leaves; peduncle 1–1.5 cm. Pedicel 1.5–2 mm, ciliolate. Sepals ovate, ca. 2 mm. Corolla campanulate, 3.5–4 mm; tube longer than lobes, throat with a very dense tuft of woolly hairs, conspicuous in dried material, reflexed hairy in tube; lobes oblong, glabrous except at base. Corona lobes ovate-lanceolate, shorter than anthers. Pollinia oblong or reniform. Stigma head short conical. Follicles ellipsoid, thick walled, 4.5–5.5 × 1.5–2 cm. Seeds ca. 0.9–1.3 cm × 6–8 mm; coma 2–2.5 cm. Fl. May.

Thickets. Hong Kong [Cambodia, Laos, Thailand].

**19. *Marsdenia tenii*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 11. 1995.

绒毛牛奶菜 rong mao niu nai cai

Lianas yellow-brown tomentose except for flowers. Petiole to 4 cm; leaf blade oblong-ovate, to 12.5 × 7.5 cm, more sparsely hairy than petiole, base cordate, apex acute; lateral veins ca. 5 pairs. Inflorescences with several umbel-like cymules along unbranched rachis; peduncle to 3 cm; rachis to at least 2 cm. Pedicel ca. 5 mm. Sepals elliptic, ca. 3 × 2 cm. Corolla white, ca. 6 mm; lobes rotate, ca. 3.5 × 2.5 mm, glabrous outside, glabrous at base inside; throat pilose with retrorse hairs; lobes densely appressed tomentose in center.

Corona lobes to base of anthers, almost flat. Stigma head 2-cleft, conical, equalling anther appendages.

• Yunnan (Siu tchoang).

**20. *Marsdenia pseudotinctoria*** Tsiang, Sunyatsenia 3: 197. 1936.

假蓝叶藤 jia lan ye teng

Lianas to 2 m. Branches glabrescent. Petiole ca. 6 mm; leaf blade oblong to oblong-lanceolate, 3–6 × 1.5–2.5 cm, abaxially glabrous or puberulent when young, base rounded or rarely cuneate, apex obtuse; lateral veins 3 or 4 pairs, nearly flat. Inflorescences umbel-like; peduncle ca. 2 mm, tomentose. Pedicel ca. 2 mm, pubescent. Sepals ovate, ca. 1 × 0.5 mm, ciliate; without glands. Corolla subcampanulate, ca. 1.5 mm, ca. 2 mm in diam., glabrous outside; throat with many rows of short straight hairs; lobes ovate, ca. 0.5 × 0.5 mm. Corona lobes subulate. Anthers slightly shorter than corona lobes; pollinia ellipsoid. Stigma head lower than anthers. Follicles lanceolate, ca. 5 cm × 8 mm, glabrous. Fl. May–Jul, Jul–Oct.

• Thickets; 700–1000 m. Guangxi, Yunnan.

**21. *Marsdenia pulchella*** Handel-Mazzetti, Symb. Sin. 7: 1002. 1936.

美蓝叶藤 mei lan ye teng

Lianas to 1.5 m. Branches dark brown, lenticellate; branchlets slender, glabrous. Petiole 5–10 mm, with an apical adaxial group of subulate glands; leaf blade ovate-triangular, 1–2.5 × 1 cm, adaxially pubescent on veins, abaxially glabrous and densely papillate, base rounded to shallowly cordate, margin translucent, apex acuminate; lateral veins 3 or 4 pairs. Inflorescences umbel-like, 3–6-flowered; peduncle 1–1.5 cm; bracteoles lanceolate, 3–5 mm. Pedicel 5–6 mm. Sepals lanceolate, ca. 3 mm. Corolla urceolate, 5–6 mm; tube interior sparsely pubescent with reflexed hairs; lobes ovate-oblong. Corona ringlike, apex wavy, slightly longer than anthers. Anthers square, appendages triangular; pollinia large. Stigma head short conical, apex 2-cleft. Fl. May.

• Thickets on dry land; 2000–2500 m. Sichuan (Yanyuan).

**22. *Marsdenia tinctoria*** R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 30. 1810.

蓝叶藤 lan ye teng

*Marsdenia globifera* Tsiang; *M. tinctoria* var. *brevis* Costantin; *M. tinctoria* var. *tomentosa* Masumune ex Tsiang & P. T. Li.

Lianas to 5 m, densely to sparsely pubescent when young, glabrescent. Petiole 1–4 cm; leaf blade oblong to broadly ovate, 5–13 × 2–7 cm, thin papery, bluish when dry,

base rounded to cordate, apex acuminate; lateral veins 5–7 (–10) pairs. Inflorescences dense, globose to long racemelike clusters of cymules, (1.5–)3–15 cm; peduncle (0.5–)2.5–5 cm. Pedicel 3–5 mm. Sepals suborbicular, ca. 2 mm. Corolla yellowish white, dark blue when dry, urceolate, 3.5–4(–6) mm long, throat with a ring of hairs, otherwise glabrous; tube ca. 2.5 mm; lobes ovate, 1–1.5 mm, apex rounded. Corona lobes 5, lanceolate, as long as anthers. Pollinia narrowly oblong. Stigma head discoid, slightly convex at apex. Follicles oblong-lanceolate, 5–10 cm × 8–10 mm, pilose to subtomentose. Seeds ovate, ca. 10 × 3 mm; coma 1–2 cm. Fl. Mar–Nov, fr. Jul–Dec.

Humid mixed woods; 400–1000 m. Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

The bark, leaves, and flowers are used in making a blue dye.

As here delimited, *Marsdenia tinctoria* includes a wide range of forms which need more detailed investigation, and several taxa might be involved. There is also considerable variation in the relative length of corona to anthers and in the size, shape, and indumentum of fruits. The Chinese material has distinctly narrower and often paler leaves than Indian material and also lacks the very long spiral rachis of typical *M. tinctoria*. *Marsdenia globifera* was based on material with diseased flowers.

### 23. *Marsdenia glomerata* Tsiang, Sunyatsenia 3: 203. 1936.

团花牛奶菜 tuān huā niú nǎi cài

Lianas slender, to 4 m. Branchlets grayish brown, puberulent, indumentum denser on nodes. Petiole to 2 cm, pubescent, apex with a group of adaxial glands; leaf blade obliquely ovate to ovate-oblong, 5–7 × 2.5–3.5 cm, base rounded, margin ciliate, apex acuminate; lateral veins 3–5 pairs, flattened, adaxially pubescent. Inflorescences glomerate, shorter than leaves, ca. 4 cm in diam.; peduncle ca. 2.5 cm. Pedicel ca. 1 cm. Sepals oblong, ca. 2 × 1 mm, pubescent. Corolla purplish, subcampanulate; tube ca. 9 × 2.5 mm, throat densely pilose; lobes narrowly oblong, ca. 5 × 2 mm. Corona lobes subulate, longer than anthers. Anther appendages rounded, covering stigma head; pollinia ellipsoid. Stigma head globose.

- Montane forests. Zhejiang.

### 24. *Marsdenia schneideri* Tsiang, Sunyatsenia 6: 141. 1941.

四川牛奶菜 sì chuān niú nǎi cài

*Marsdenia balansae* Costantin 1912, non Baillon 1889.

Lianas to 5 m, brownish tomentose. Stems densely lenticellate. Petiole 1–2 cm; leaf blade ovate or broadly elliptic, 5–10 × 3.5–7 cm, base rounded to shallowly cordate, tip abruptly acuminate to attenuate; lateral veins 5 pairs, flattened. Inflorescences racemelike, many flowered; peduncle 1–3 cm, rachis clearly spiral, 3–7 cm. Pedicel 1–2 mm, tomentose. Sepals ovate, 1.5 mm, hispid. Corolla tubular, slightly constricted at throat, glabrous outside; tube 1.8–3 mm, with double hair bands inside, throat with a ring of brushlike hairs; lobes ovate, 1.5–1.8 × ca. 1.5 mm. Corona lobes broadly ovate, connate at base, tips free and long acuminate, as long as anther appendages. Anther appendages long acuminate, concealing stigma head; pollinia oblong, as long as retinaculum.

Gynostegium as long as corolla tube. Stigma head subovoid, apex slightly depressed. Fl. Apr.

Bushland. Sichuan, Yunnan [Laos, Vietnam].

### 25. *Marsdenia glabra* Costantin in Lecomte, Fl. Indo-Chine 4: 96. 1912.

光叶蓝叶藤 guāng yè lán yè teng

Lianas to 6 m, pubescent when young, glabrescent. Petiole 1–3.5 cm; leaf blade green, usually bluish when dry, ovate-oblong or elliptic, 4–13 × 1.5–7 cm, base rounded or cuneate, apex acute to acuminate; lateral veins 3–5 pairs, abaxially prominent. Inflorescences much shorter than leaves, with short thick rachis covered with pedicel scars; peduncle 0.8–1.5 cm. Pedicel 2–5 mm, pubescent. Sepals ovate, pubescent; glands absent. Corolla greenish white, urceolate; tube globose, ca. 5 × 4 mm, interior with a brush of yellowish hairs at throat and 5 narrow double longitudinal hair bands. Corona lobes oblong-ovate, shorter than anther appendages. Pollinia small, oblong, caudicles long. Stigma head short conical, base ringlike, dilated. Follicles lanceolate in outline, 5–7 cm × 6–10 mm, long acute, glabrous to pilose. Seeds ovate, 8–10 × 4–5 mm; coma to 4 cm. Fl. Sep–Oct, fr. Oct–Dec.

In montane forest; 500–800 m. Guangdong, Guangxi, Hainan, Yunnan [Laos, Vietnam].

The bark, leaves, and flowers are used for making a blue dye.

### 34. DISCHIDANTHUS Tsiang, Sunyatsenia 3: 184. 1936.

马兰藤属 ma lan teng shu

Herbs slender, twining. Cymes extra-axillary, short pedunculate, small, dense, irregularly branched. Flowers small. Calyx with 5 basal glands. Corolla urceolate, throat with a ringlike constriction at base of lobes; lobes twisted to right. Corona lobes 5 inserted on anthers, strongly laterally compressed, erect. Filaments connate into a tube; anthers with apical appendages; pollinia 2 per pollinarium, erect. Gynostegium as long as corolla tube; stigma head conical. Follicles linear-lanceolate, normally paired.

One species: southern China, Vietnam.

The ringlike constriction at the base of the corolla lobes has been described as a corolline or outer corona.

**1. *Dischidanthus urceolatus*** (Decaisne) Tsiang, Sunyatsenia 3: 185. 1936.

马兰藤 ma lan teng

*Marsdenia urceolata* Decaisne in A. de Candolle, Prodr. 8: 617. 1844.

Stems slender, to 3 m, grayish, pubescent along 2 lines. Petiole 4–15 mm; leaf blade ovate or ovate-lanceolate, 1.5–5 × 0.6–4 cm, thin leathery, glabrous, base rounded, rarely subcordate, apex mucronate; lateral veins 4 or 5 pairs, flat adaxially, slightly elevated abaxially. Cymes much shorter than leaves, 8–10-flowered; peduncle 2–5(–17) mm, puberulent. Sepals ovate, unequal, ± scarious, up to 0.8 mm, ciliate, apex rounded. Corolla green to yellow, 3–4 mm; lobes erect, ovate-oblong, ca. 1.5 × 1 mm. Corona lobes falcate. Anther appendages acute, inflexed. Ovaries glabrous. Follicles linear-lanceolate, ca. 8 cm × 5 mm, glabrous. Seeds ovate-oblong, ca. 6 × 2 mm, marginate; coma ca. 3.5 cm. Fl. Mar-Sep, fr. May-Dec.

Mixed woods, thickets; 300–800 m. Guangdong, Guangxi, Hainan, Hunan, Sichuan [Vietnam].

The whole plant is used for the treatment of pain caused by rheumatism.

### 35. DREGEA E. Meyer, Comm. Pl. Afr. Austr. 199. 1838, nom. cons.

南山藤属 nan shan teng shu

*Wattakaka* Hasskarl.

Lianas. Inflorescences umbel-like clusters of cymules; peduncle and pedicels long and slender. Sepals overlapping, with 5 basal glands. Corolla rotate to shallowly bowl-shaped, deeply 5-divided; lobes overlapping to right. Corona lobes 5, ± spreading, thick fleshy, adnate to stamens, outer angle obtuse or rectangular, interior angle produced into an acute tooth incumbent to anthers. Anthers with membranous apical appendages; pollinia 2 per pollinarium, oblong, erect. Stigma head umbonate or thick conical. Follicles widely divergent, thick, finely longitudinally ribbed or corrugate, not winged [or winged]. Seeds comose.

About 12 species: southern Asia, Africa; four species in China.

- 1a. Leaf blade oblong-elliptic, base cuneate; stems pubescent along 1 line; peduncle 7–13 cm ..... 4. *D. cuneifolia*
- 1b. Leaf blade broadly ovate, ovate-cordate, or suborbicular, base truncate to cordate; stems glabrous or uniformly pubescent; peduncle less than 6 cm.
  - 2a. Leaf blade abaxially glabrescent, base subcordate or truncate; follicles longitudinally wrinkled-striate or irregularly ribbed ..... 1. *D. volubilis*
  - 2b. Leaf blade abaxially pubescent or tomentose, base cordate; follicles smooth, or longitudinally sinuate-striate or transversely plicate-corrugate.
    - 3a. Leaf blade ovate; corolla interior glabrous except for a ring of ciliate hairs at base of corona; follicles smooth ..... 2. *D. yunnanensis*
    - 3b. Leaf blade ovate-cordate or suborbicular; corolla interior glabrous throughout; follicles

longitudinally sinuate-striate or transversely plicate-corrugate ..... 3. *D. sinensis*

**1. *Dregea volubilis*** (Linnaeus f.) Bentham ex J. D. Hooker, Fl. Brit. India 4: 46. 1883.

南山藤 nan shan teng

*Asclepias volubilis* Linnaeus f., Suppl. Pl. 170. 1781; *Dregea formosana* T. Yamazaki; *Hoya formosana* T. Yamazaki; *Tylophora macrantha* Hance; *Wattakaka volubilis* (Linnaeus f.) Stapf.

Lianas to 12 m. Branches pale gray, lenticellate, branchlets green, smooth. Petiole 2.5–6 cm; leaf blade broadly ovate or suborbicular, 7–18 × 4–17 cm, glabrous or soft pubescent, base shallowly cordate, apex acute or short acuminate; lateral veins ca. 4 pairs. Inflorescences pendent, many flowered; peduncle 2–6 cm, slender, puberulent. Pedicel 2–2.5 cm; flowers green or yellowish green, fragrant. Sepals ovate-oblong, 2.5–3 mm, pubescent, ciliate. Corolla glabrous; lobes broadly ovate, 6–12 × 5–12 mm, obtuse, ciliate. Corona yellowish green, 4–4.5 mm in diam. Anther appendages white; pollinia oblong. Ovaries pilose. Follicles narrowly ovoid, 10–15 × 3–4 cm, longitudinally wrinkled-striate or irregularly ribbed. Seeds ovate, ca. 1.2 cm × 6 mm, flattened, marginate; coma ca. 4.5 cm. Fl. Apr–Sep, fr. Jul–Dec.  $2n = 22$ .

Montane forests. Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [Bangladesh, Cambodia, India, Indonesia, Kashmir, Laos, Malaysia, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

The young leaves are eaten in curries and are used in the treatment of pyoderms and fevers in children. The roots are used as an emetic. A fine fiber is obtained from the stems.

**2. *Dregea yunnanensis*** (Tsiang) Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 129. 1974.

丽子藤 li zi teng

*Wattakaka yunnanensis* Tsiang, Sunyatsenia 4: 126. 1939; *Dregea yunnanensis* var. *major* (Tsiang) Tsiang & P. T. Li; *Wattakaka yunnanensis* Tsiang var. *major* Tsiang.

Lianas to 6 m, tomentose except for corolla and gynostegium; older stems sometimes with corky ridges. Branches lenticellate. Petiole to 2.5 cm; leaf blade ovate, 1.3–8 × 1–5.5 cm, papery, base shallowly cordate, apex acute; lateral veins ca. 4 pairs. Inflorescences to 5 cm, to 15-flowered. Sepals ovate. Corolla white; tube very short, pilose inside, with a prominent ciliate rim; lobes ovate, 5–8.5 × 3.5–4.5 mm, veined, glabrous with ciliate margin. Corona lobes with outer angle rounded; gynostegium ca. 1.5 mm. Anther appendages oblong, as long as corona lobes; pollinia oblong. Ovaries pilose. Stigma head conical, apex 2-cleft. Follicles lanceolate in outline, 3.5–5 cm × 5–7 mm, puberulent to glabrous, smooth. Seeds ovate, ca. 7 × 4 mm; coma ca. 2 cm. Fl. Apr–Aug, fr. Jul–Nov.

- Forests; below 3500 m. Gansu, Sichuan, Xizang, Yunnan.

**3. *Dregea sinensis*** Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 115. 1889.

苦绳 ku sheng

Lianas to 8 m, mostly densely tomentose. Stems lenticellate. Petiole 1.5–5 cm; leaf blade ovate-cordate to suborbicular, 2–13 × 2–9 cm, papery, adaxially pubescent to glabrous, base auriculate with sinus 1–1.5 cm deep, apex acute; lateral veins ca. 5 pairs. Inflorescences umbel-like, to 20-flowered; peduncle 3–6 cm. Pedicel slender, ca. 2.5 cm. Sepals ovate-oblong, pubescent. Corolla white outside, purple inside, ca. 1.6 cm in diam.; lobes ovate-oblong, 6–7 × 4–6 mm, ciliate. Corona lobes ovoid, thick, turgid, apex acute. Pollinia elongated, narrowed at base, sometimes introrsely falcate. Ovaries glabrous or pubescent. Stigma head conical, enclosed by anther appendages. Follicles lanceolate in outline, 5–6 × 1–2 cm, obscurely and longitudinally sinuate-striate or transversely plicate-corrugate, apex curved, almost hooklike.



Seeds ovate-oblong, 0.9–1.2 cm × 4–6 mm, flattened, marginate; coma 2.5–4.5 cm.

- Two varieties: bushland, open woods; 500–3000 m. Gansu, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang.

- 1a. Ovaries glabrous; follicles obscurely longitudinally sinuate-striate ..... 3a. var. *sinensis*  
1b. Ovaries pubescent; follicles transversely plicate-corrugate ..... 3b. var. *corrugata*

### 3a. *Dregea sinensis* var. *sinensis*

苦绳 (原变种) ku sheng (yuan bian zhong)

*Wattakaka sinensis* (Hemsley) Stapf.

Ovaries glabrous. Follicles longitudinally obscurely sinuate-striate. Fl. Apr-Aug, fr. Jul-Dec.

- Open woods, bushland; 500–3000 m. Gansu, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang.

All parts are used to induce lactation and to treat rheumatism and fractures.

**3b. *Dregea sinensis* var. *corrugata*** (C. K. Schneider) Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 129. 1974.

贯筋藤 guan jin teng

*Dregea corrugata* C. K. Schneider in Sargent, Pl. Wilson. 3: 353. 1916; *Wattakaka corrugata* (C. K. Schneider) Stapf; *W. sinensis* var. *corrugata* (C. K. Schneider) Tsiang.

Ovaries pubescent. Follicles transversely plicate-corrugate, sometimes almost transversely winged. Fl. Mar-Aug.

- Bushland. Gansu, Guizhou, Shaanxi, Sichuan, Yunnan.

The stems and leaves are used for the treatment of jaundice, gonorrhoea, edema, and pyodermas.

**4. *Dregea cuneifolia*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 127. 1974.

楔叶南山藤 xie ye nan shan teng

Lianas to 4 m, puberulent. Stems slender, pubescent along 1 line, glabrescent. Petiole 1–1.5 cm, with 8–11 adaxial basal glands; leaf blade oblong-elliptic, 5.5–9.5 × 2–3.5 cm, membranous, puberulent, base cuneate, apex acuminate; lateral veins 5 or 6 pairs. Inflorescences solitary, to 30-flowered; peduncle 7–13 cm. Pedicel 1.2–1.7 cm. Sepals ovate, ca. 1.5 × 1 mm, puberulent. Corolla greenish white, ca. 9 mm in diam.; tube ca. 2 mm, glabrous; lobes ovate-triangular, ca. 4 × 4 mm, margin ciliate. Corona lobes globose. Anthers oblong, appendages covering stigma head; pollinia spatulate. Gynostegium exerted from corolla tube. Ovaries glabrous. Stigma head conical, base pentagonal. Fl. Jul.

- Bushland; 500–800 m. N Guangxi.

**36. BELOSTEMMA** Wallich ex Wight, Contr. Bot. India 52. 1834.

箭药藤属 *jian yao teng shu*

Lianas, slender, woody. Inflorescences extra-axillary; peduncle and pedicels slender. Sepals overlapping; basal glands 5. Corolla rotate; tube short; lobes valvate. Corona lobes 5, inserted at back of stamens, fleshy, horned-falcate, horizontally stellate spreading. Filaments connate into a tube; anther appendages membranous, broadly ovate, covering stigma head; pollinia 2 per pollinarium, subglobose, horizontal or suberect. Gynostegium exceeding corolla tube. Stigma head discoid.

Three species: India, Nepal, China; all three in China.

Often included in *Tylophora*, differing only by the slender spreading corona lobes.

1a. Leaves 8.5–11 × 7–8 cm; calyx and corolla glabrous; corolla yellow or yellowish ..... 3. *B. cordifolium*  
1b. Leaves 2.5–6 × 1.2–3 cm; calyx and corolla hairy; corolla purple or green with reddish margin.

2a. Leaf blade ovate-cordate, base cordate; branches, leaves, and outside of calyx hispid ..... 1. *B. hirsutum*

2b. Leaf blade ovate, base broadly cuneate or rounded; branches pubescent along 2 lines; leaves and outside of calyx glabrous or glabrescent; sepals ciliate ..... 2. *B. yunnanense*

1. ***Belostemma hirsutum*** Wallich ex Wight, Contr. Bot. India 52.1834. *Vincetoxicum hybanthera* Kuntze, not *Vincetoxi-cum cordifolius* (Thwaites) Kuntze.

箭药藤 *jian yao teng*

*Tylophora belostemma* Benth, not *T. hirsuta* Wight.

Lianas to 4 m, hirsute throughout. Petiole 1–2 cm; leaf blade ovate-oblong, 2.5–5 × 1.2–3 cm, membranous, base shallowly cordate, apex acuminate; lateral veins 4 or 5 pairs. Inflorescences shorter than leaves, with 1 or 2, many-flowered, umbel-like cymules; peduncle shorter than pedicels, 0.5–1.5 cm, rachis when present much shorter; bracts linear, to 2 mm. Pedicel threadlike, 1–2 cm. Sepals broadly lanceolate, ca. 0.8 mm. Corolla purple, rotate, glabrous except for lobes; tube ca. 0.7 mm radius; lobes oblong, ca. 2 × 1 mm, apex rounded, sparsely pilose toward margin. Corona dark purple except for conspicuous pale margin of anther appendages; pollinia suberect. Ovaries glabrous. Stigma head flattened. Follicles solitary, apparently slender fusiform (mature fruit not seen). Fl. Jul.

Dense forests, thickets; 700–1500 m. Sichuan, S Yunnan [India, Nepal].

2. ***Belostemma yunnanense*** Tsiang, Sunyatsenia 6: 139. 1941.

镰药藤 *lian yao teng*

Lianas to 5 m. Branches pubescent along 2 lines. Petiole 5–13 mm, pubescent; leaf blade ovate, 3.5–6 × 1.2–2.8 cm, membranous, base broadly cuneate or rounded, margin ciliate, glabrous or glabrescent, apex acuminate; lateral veins 3 or 4 pairs. Inflorescences 10–12-flowered; peduncle and pedicel glabrous. Sepals lanceolate, glabrous, ciliate. Corolla green outside, margin reddish; lobes ovate-oblong, 3–4 × ca. 2.5 mm, pubescent inside. Ovaries glabrous. Fl. May.

• Montane forests; 1400 m. SE Yunnan.

3. ***Belostemma cordifolium*** (Link, Klotzsch, & Otto) P. T. Li, J. S. China Agric. Univ. 15(1): 64. 1994.

心叶箭药藤 *xin ye jian yao teng*

*Hybanthera cordifolia* Link, Klotzsch, & Otto, Icon. Pl. Rar. 109. 1831; *Tylophora cordifolia* (Link, Klotzsch, & Otto) Benth & J. D. Hooker ex Kuntze; *T. cordifolia* Thwaites;

Shrubs scandent, glabrous throughout. Petiole ca. 3 cm; leaf blade ovate-cordate, 8.5–11 × 7–8 cm, base cordate, apex short acute; lateral veins 5 or 6 pairs. Inflorescences shorter than leaves; peduncle robust, to 3 cm. Pedicel 3–4 cm, purple. Sepals ovate-triangular, margin purple. Corolla rotate, ca. 2.5 cm in diam., yellow or yellowish; tube much shorter than lobes; lobes broadly ovate. Corona lobes with a horned oblong spur. Stamens oblong, anther appendages broadly ovate; pollinia subglobose, subhorizontal. Ovaries ovoid. Stigma head pentagonal, apex rounded.

• Forest edges or thickets. S China (locality not given) [described from material cultivated in England].

*Belostemma cordifolium* was described from material cultivated in England in the early nineteenth century. No material has been seen to match the very clear illustration in the original publication, and it is likely that the species is now extinct.

### 37. MERRILLANTHUS Chun & Tsiang, Sunyatsenia 6: 105. 1941.

驼峰藤属 tuo feng teng shu

Lianas. Leaves opposite, long petiolate. Cymes irregularly branched with racemelike cymules, long pedunculate. Calyx glands 5. Corolla shallowly bowl-shaped, divided halfway; lobes overlapping to right. Corona lobes 5, inserted on gynostegium, erect, fleshy, oval, turgid, shorter than anthers. Anther appendages membranous, ovate, overlying stigma head; pollinia 2 per pollinarium, oblong, horizontal, caudicles obliquely ascending. Stigma head discoid. Follicles broadly fusiform, mesocarp fibrous. Seeds ovate.

One species: Cambodia, China.

Most material available has poorly preserved flowers which perhaps explains the original description of the pollinia as pendulous. Reexamination of paratype material with quite well-dried flowers has shown that they are horizontal. There is little, apart from fruit morphology, to distinguish *Merrillanthus* from *Tylophora*, especially *T. augustiniana*, which differs only by the laxer inflorescences and much smaller flowers (its fruits are not known).

#### 1. *Merrillanthus hainanensis* Chun & Tsiang, Sunyatsenia 6: 107. 1941.

驼峰藤 tuo feng teng

Lianas to 3 m, many branched, glabrous except for sparsely pubescent abaxial leaf veins, peduncles, pedicels, and exterior of calyx. Petiole 1.5–5 cm; leaf blade ovate, 5–15 × 2.5–8 cm, membranous, base rounded or cordate, apex acuminate or acute; lateral veins 6 or 7 pairs. Cymes patent, at least as long as leaves, many flowered. Peduncle 2–5 cm; secondary peduncles 3–10 cm; cymule rachis 0.5–1.5 cm. Pedicel 0.5–1.5 cm. Sepals ovate, ca. 2 × 1.5 mm, ciliate. Corolla yellow, veined; tube ca. 3 mm, minutely papillate; lobes ca. 5 × 4 mm, broadly ovate. Follicles 9–12 × 3.5–4 cm. Seeds ovate or suborbicular, ca. 1.3 × 1 cm; coma ca. 3.5 cm.

Forest valleys; low to medium altitudes. Guangdong, Hainan [Cambodia].

### 38. PENTASTELMA Tsiang & P. T. Li, Fl. Hainan. 3: 577. 1974.

白水藤属 bai shui teng shu

Lianas. Leaves opposite, petiolate. Cymes axillary. Flower buds ovoid, apex acute. Calyx with basal glands. Corolla subcampanulate; lobes longer than tube, overlapping to right. Corona lobes 5, adnate to gynostegium, fleshy, with lateral vertical processes. Filaments connate into a tube; anthers appressed against stigma, apical appendages incurved; pollinia 2 per pollinarium. Stigma head discoid, apex slightly convex.

One species: endemic to China.

The protologue describes the pollinia as pendulous, but *Pentastelma* otherwise shows many similarities to *Tylophora*, suggesting that the anther morphology needs reexamination.

#### 1. *Pentastelma auritum* Tsiang & P. T. Li in Chun et al., Fl. Hainan. 3: 577. 1974.

白水藤 bai shui teng

Lianas to 4 m tall, glabrous except for petioles. Petiole 1–2 cm, puberulent; leaf blade oblong-lanceolate, 6–13 × 1.5–3.5 cm, base cordate, apex long acuminate; lateral veins 6–9 pairs. Cymes 3–5-flowered; peduncle and pedicel slender. Sepals triangular, glands 5. Corolla reddish; lobes lanceolate, ca. 7 × 2.5 mm. Corona lobes shorter than anthers. Pollinia long ovate. Stigma head shorter than anther appendages. Fl. Dec.

- Moist valleys; 300–600 m. Hainan (Boating).

### 39. TYLOPHORA R. Brown, Prodr. 460. 1810.

娃儿藤属 wa er teng shu

*Henrya* Hemsley 1889, not Nees 1844; *Henryastrum* Happ; *Hoyopsis* H. Léveillé; *Neohenrya* Hemsley.

Plants usually perennial lianas, less often herbaceous and/or erect. Inflorescences extra-axillary, rarely terminal, mostly with several cymules born along a simple or branched, often zigzag rachis, less often umbel-like; cymules racemelike or sometimes umbel-like. Calyx with basal glands. Corolla rotate or subrotate, deeply 5-lobed; lobes narrowly overlapping to right to subvalvate, often distinctly veined. Corona lobes usually erect, turgid, adnate to and not exceeding gynostegium, rarely  $\pm$  spreading, circular. Anthers short, appendages arching over stigma head; pollinia 2 per pollinarium, horizontal, suberect, rarely erect, caudicles ascending or suberect, retinaculum small. Stigma head depressed, flattened or concave, rarely longer than anthers. Follicles oblong-lanceolate or fusiform. Seeds comose.

About 60 species: tropical and subtropical Asia, Africa, and Australia; 35 species in China.

- 1a. Stems erect, sometimes tip tending to twine.
- 2a. Leaf blade linear-lanceolate to narrowly lanceolate, 1.5–10 mm wide; inflorescences sessile or nearly so, 4–7-flowered ..... 1. *T. nana*
- 2b. Leaf blade ovate-oblong or ovate-elliptic, 8–35 mm wide; inflorescences with peduncle 1–6 cm, mostly longer than leaves.
- 3a. Leaf blade 0.8–1.2 cm wide, with 3 basal and ca. 2 lateral veins; petiole 5–7 mm ..... 2. *T. secamonoides*
- 3b. Leaf blade 1.5–4 cm wide, lateral veins ca. 4 pairs; petiole 20–30 mm.
- 4a. Corolla glabrous; inflorescences strictly lateral ..... 5. *T. tsiangii*
- 4b. Corolla lobes hairy; upper inflorescences often subtended by reduced leaves and aggregated into terminal synflorescence.
- 5a. Corolla lobes to 3 mm, sparsely pilose ..... 3. *T. yunnanensis*
- 5b. Corolla lobes 5(–7) mm, densely puberulent ..... 4. *T. rockii*
- 1b. Stems climbing or prostrate.
- 6a. Petiole articulated just above base; stems papillate ..... 12. *T. cycleoides*
- 6b. Petiole not articulated; stems not papillate.
- 7a. Peduncle usually shorter than pedicels, rachis always short, unbranched.
- 8a. Corona lobes circular to almost square, somewhat spreading, with slender, erect or inflexed tip, as long as gynostegium ..... 34. *T. glabra*
- 8b. Corona lobes ovoid, erect and closely appressed to anthers, distinctly shorter than gynostegium.
- 9a. Leaf blade membranous, tip acute or short acuminate, rarely mucronate; stems twining ..... 23. *T. henryi*
- 9b. Leaf blade papery to almost leathery, tip rounded or apiculate; stems at first prostrate, only occasionally twining at tip.
- 10a. Leaf blade oblong lanceolate to ovate, abaxially glabrous or puberulent on midrib only; petiole and calyx glabrous ..... 20. *T. arenicola*
- 10b. Leaf blade circular, abaxially distinctly pubescent; petiole and calyx hairy.
- 11a. Stems leafy throughout, only occasionally twining; corona lobes erect ..... 19. *T. rotundifolia*
- 11b. Apical part of stems apparently few leaved, twining; corona lobes stellate patent ..... 35. *T. oligophylla*
- 7b. Peduncle usually longer than pedicels, rachis often many branched.
- 12a. Abaxial leaf surface uniformly covered with papilla-based hooked hairs ..... 15. *T. uncinata*
- 12b. Leaves without hooked hairs.
- 13a. Stems hairy all round, at least when young.
- 14a. Leaves lanceolate,  $> 4 \times$  as long as broad ..... 7. *T. insulana*
- 14b. Leaves ovate,  $< 3 \times$  as long as broad.
- 15a. Leaves glabrous ..... 14. *T. brownii*
- 15b. Leaves hairy, usually densely so at least abaxially.
- 16a. Stem hairs pale, appressed; inflorescences about as long as petiole ... 18. *T. astephanoides*
- 16b. Stem hairs softly yellowish or rusty pilose, hairs erect or curved toward base of stem; inflorescences much longer than petiole.
- 17a. Internodes glabrescent; base of leaf blade broadly cuneate to rounded; corolla lobes ca.  $5 \times 1.6$  mm ..... 16. *T. forrestii*
- 17b. Internodes persistently hairy; base of leaf blade cordate to subcordate; corolla lobes ca.  $1.5$ – $2.5 \times 1$ – $1.2$  mm, obtuse ..... 17. *T. ovata*
- 13b. Stems glabrous or with hairs along 1 or 2 sides, often glabrescent.

- 18a. Leaf blade linear or linear-lanceolate, 5 or more times as long as wide.
- 19a. Leaf blade less than 3 mm wide ..... 10. *T. oshimae*
- 19b. Leaf blade 4–35 mm wide.
- 20a. Plant pubescent throughout; inflorescences not branched ..... 7. *T. insulana*
- 20b. Internodes and leaves except for midrib glabrous or very sparsely hairy; inflorescences usually branched.
- 21a. Leaves leathery or thick papery, often less than 5 times as long as wide, abaxially minutely papillate, lateral veins obscure ..... 6. *T. silvestris*
- 21b. Leaves membranous, lateral veins prominent.
- 22a. Petiole 3–7 mm; leaf blade 4–11 mm wide ..... 8. *T. kerrii*
- 22b. Petiole 15–18 mm; leaf blade up to 30–35 mm wide ..... 9. *T. longifolia*
- 18b. Leaf blade ovate, elliptic, ovate-oblong, or oblong-lanceolate, less than 5 times as long as wide.
- 23a. Corona lobes expanded into truncate dorsal lobe; leaves with prominent scattered tubercles; stem hairs in 2 lines, thick, stiffly erect ..... 33. *T. tuberculata*
- 23b. Corona lobes ovoid to almost globose, dorsally rounded; leaves smooth or minutely densely papillate; stem hairs absent or slender, appressed.
- 24a. Lateral veins of leaf blade obscure abaxially.
- 25a. Leaf blade leathery, abaxially minutely papillate ..... 6. *T. silvestris*
- 25b. Leaf blade papery, not papillate.
- 26a. Leaf midvein and petiole pubescent or puberulent; base of leaf blade cuneate to rounded; sepals ovate, with basal glands inside ..... 29. *T. flexuosa*
- 26b. Leaf midvein and petiole glabrous; base of leaf blade rounded to shallowly cordate; sepals oblong, without glands inside ..... 30. *T. leptantha*
- 24b. Lateral veins of leaf blade conspicuous.
- 27a. Lateral leaf veins 12–16 pairs ..... 11. *T. anthopotamica*
- 27b. Lateral leaf veins 3–7 pairs.
- 28a. Leaf blade abaxially distinctly pubescent.
- 29a. Base of leaf blade broadly cuneate to rounded ..... 16. *T. forrestii*
- 29b. Base of leaf blade cordate to truncate.
- 30a. Leaf blade ovate-oblong, 2–3 cm; stems pubescent along 1 side only ..... 28. *T. silvestrii*
- 30b. Leaf blade lanceolate, 3.5–7 cm; stems pubescent all round ..... 7. *T. insulana*
- 28b. Leaf blade abaxially glabrous or sparsely puberulent along midvein only.
- 31a. Inflorescences always shorter than leaves.
- 32a. Corolla exterior hairy.
- 33a. Inflorescences congested, umbel-like clusters of cymules; peduncle purplish red; corolla purplish red, outside yellowish pilose, inside villous ..... 13. *T. picta*
- 33b. Inflorescences lax, little branched; peduncle greenish; corolla yellowish, greenish, or greenish orange, glabrous ..... 21. *T. tengii*
- 32b. Corolla exterior glabrous.
- 34a. Inflorescences unbranched, with 1 or 2 cymules; leaves thin papery ..... 22. *T. chingtungensis*
- 34b. Inflorescences forked, with several cymules; leaves membranous.
- 35a. Corolla purple, lobes ovate, ca. 2 × 1.5 mm .... 23. *T. henryi*
- 35b. Corolla yellowish white, lobes oblong, ca. 4 × 2.5 mm ..... 24. *T. membranacea*
- 31b. Inflorescences longer than leaves.
- 36a. Leaf blade oblong-ovate to hastate, base cordate; corolla purple, 2–3 mm in diam. .... 31. *T. floribunda*
- 36b. Leaf blade ovate or ovate-oblong, base cuneate to truncate, occasionally almost cordate; corolla greenish or greenish orange, 4–6 mm in diam.

- 37a. Cymules lax, racemelike; inflorescences  
divaricately many branched, to 32 cm ..... 27. *T. augustiniana*
- 37b. Cymules umbel-like; inflorescences few  
branched and not conspicuously divaricate.
- 38a. Leaf blade 3–5.5 cm, abaxial surface minutely  
very densely and obscurely papillate (use  
good hand lens) ..... 32. *T. gracilentia*
- 38b. Leaf blade (4–)6.5–14 cm, abaxial surface  
smooth or obscurely and sparsely papillate.
- 39a. Stems and petioles yellowish pubescent;  
leaf blade smooth abaxially ..... 25. *T. hui*
- 39b. All parts glabrous; leaf blade obscurely  
minute papillate abaxially ..... 26. *T. koi*

**1. *Tylophora nana*** C. K. Schneider in Sargent, Pl. Wilson. 3: 351. 1916.

汶川娃儿藤 wen chuan wa er teng

*Tylophora nana* var. *guansuensis* L. C. Wang & X. G. Sun.

Shrublets erect, to 50 cm tall, most parts puberulent, more vigorous stems tending to twine. Petiole 1–2 mm, puberulent; leaf blade linear-lanceolate, 1–3.8 cm × 2–6 mm, base rounded, margin revolute, apex cuspidate; lateral veins obscure. Inflorescences sessile or subsessile, 4–10-flowered. Pedicel slender, 5–12 mm. Flower buds lanceolate in outline, ca. 5 mm. Sepals linear-lanceolate, 1–1.5 × ca. 0.5 mm. Corolla lobes linear-lanceolate, 5–7 × ca. 1 mm, much longer than tube. Corona lobes ovate-triangular, apex acuminate, reaching middle of gynostegium. Anthers nearly square, appendages orbicular; pollinia subhorizontal. Stigma head rounded, minutely depressed in center. Follicles lanceolate in outline, 4.5–6 cm × 3–5 mm, glabrous. Fl. Mar-Jun, fr. Jul-Aug.

• Dryland thickets; 1000–1800 m. Gansu (Minshan), Sichuan (Wenchuan).

**2. *Tylophora secamonoides*** Tsiang, Sunyatsenia 3: 217. 1936.

蛇胆草 she dan cao

Shrublets erect, to 50 cm tall, pubescent or puberulent except for corolla and adaxial leaf surface. Petiole ca. 5 mm, with 4 or 5 glands adaxially; leaf blade ovate-oblong, 2–4 × 0.8–1.2 cm, subleathery, base rounded, apex acute; basal veins 3, lateral veins 1 pair. Inflorescences terminal and extra-axillary, 9–15-flowered, longer than leaves; rachis branched but very contracted so that inflorescences umbel-like; peduncle 1–1.6 cm. Pedicel to 6 mm. Sepals oblong-ovate, ca. 1 × 0.5 mm. Corolla rotate; tube ca. 5 mm; lobes greenish, ovate-oblong, ca. 2.5 × 1 mm. Corona lobes ovoid, apex obtuse. Anthers rhomboid; pollinia subglobose, subhorizontal, caudicles ascending, retinaculum ellipsoid. Stigma head 5-angled, apex apiculate. Fl. Jun-Aug.

• Thickets; low to middle altitudes. Guangxi, Hainan.

The roots are used in Guangxi for the treatment of cough.

**3. *Tylophora yunnanensis*** Schlechter, Notes Roy. Bot. Gard. Edinburgh 8: 17. 1913.

云南娃儿藤 yun nan wa er teng

Herbs erect, to 50 cm, occasionally ± twining at tip, puberulent throughout. Rootstock a dense cluster of fleshy roots. Petiole 2–3 cm; leaf blade ovate to ovate-elliptic 3–8 × 1.5–3.5(–6) cm, papery, glabrescent, base rounded to cuneate, apex obtuse and apiculate, less often acute; lateral veins

ca. 4 pairs. Inflorescences axillary and terminal, longer than leaves, uppermost sometimes subtended by reduced leaves and forming long terminal panicle or thyrses; rachis simple or branched; cymules umbel-like or irregular and poorly defined, many flowered; peduncle to 6 cm. Pedicel to 1.8 cm. Sepals linear-lanceolate, ca. 1.5 mm, ciliate. Corolla rotate; lobes oblong, 3–4 × 1.5–2 mm, ciliate, glabrous outside, sparsely pilose inside. Corona lobes ovoid, pouched, obtuse. Anthers nearly square, appendages rounded; pollinia oblong, horizontal. Stigma head depressed. Follicles lanceolate in outline, 4–6 cm × ca. 7 mm. Seeds ovate, ca. 5 × 3 mm; coma ca. 2.5 cm. Fl. May–Aug, fr. Aug–Nov.

• Thickets, grasslands; below 2000 m. Guizhou, Sichuan, Yunnan.

The roots are used to treat malaria and fever and the seed coma to stop bleeding.

**4. *Tylophora rockii*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 15. 1995.

山娃儿藤 shan wa er teng

Herbs erect, to 70 cm. Stems little branched, tending to twine at apex, uniformly puberulent. Petiole ca. 1.5 cm; leaf blade oblong-obovate, to 9.5 × 4 cm, sparsely puberulent, uppermost and lowermost reduced, base cuneate to rounded, margin undulate, apex rounded-apiculate; lateral veins 4 or 5 pairs. Inflorescences extra-axillary from upper nodes, to 8 cm, mostly sessile with long first internode; cymules short, densely racemelike to umbel-like. Pedicel 1(–2) cm. Sepals linear-triangular, ca. 3 mm. Corolla purplish, stiffly rotate, 8–10 mm in diam.; lobes oblong, 5(–7) × 2.5–3 mm, densely puberulent inside, apex rounded. Corona lobes reaching base of anther appendages, acute. Gynostegium ca. 1.5 mm high; anther appendages broader than long. Stigma head broadly dome-shaped with light colored center. Fruit not seen.

• Forests; 3300 m. Sichuan (Muti Konka).

**5. *Tylophora tsiangii*** (P. T. Li) M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 15. 1995.

曲序娃儿藤 qu xu wa er teng

*Cynanchum tsiangii* P. T. Li, *Bull. Bot. Res.*, Harbin 3(1): 103. 1983; *Vincetoxicum tsiangii* (P. T. Li) P. T. Li.

Herbs, most parts hispid. Stems erect, to 40 cm tall. Leaves opposite; petiole 1–2 mm; leaf blade drying brownish, ovate, 1.5–3.5 × 1–2.5 cm, base rounded, apex acute; lateral veins 4 or 5 pairs. Inflorescences with several racemelike cymules along zigzag rachis; peduncle ca. 7 mm, to 4 cm in fruit. Pedicel 2–5 mm, ca. 1.1 cm in fruit. Sepals lanceolate, ca. 2.5 × 0.5 mm, densely hispid outside, glabrous inside. Corolla whitish, rotate; lobes lanceolate, ca. 2.5 × 1.5 mm, glabrous. Corona lobes elliptic, fleshy, apex acute, reaching middle of stamens, with minute, basal, adaxial scale. Stamens longer than pistil; anthers nearly square; pollinia ellipsoid. Stigma head discoid. Follicles paired, widely divergent, ca. 4.5 cm × 8 mm, puberulent. Seeds brown, ca. 7 × 4 mm; coma ca. 2 cm. Fl. Oct.

Thickets; 1300 m. Guizhou [Vietnam].

**6. *Tylophora silvestris*** Tsiang, *Sunyatsenia* 3: 226. 1936.

贵州娃儿藤 gui zhou wa er teng

Lianas to 2 m. Branches pale gray, glabrous. Petiole ca. 5 mm, puberulent; leaf blade narrowly oblong-lanceolate, 5–9 × 1–1.2 cm, leathery, glabrous except for midvein, base rounded, apex acute; basal veins 3, lateral veins ca. 4 pairs. Inflorescences extra-axillary, lax, up to as long as leaves, rachis usually branched, zigzag; cymules lax, racemelike; peduncle to 6 cm. Pedicel 1–2(–6) mm, pubescent. Sepals oblong, ca. 1.5 × 1 mm, pubescent, ciliate; glands 5. Corolla purple, occasionally pale yellow, rotate; lobes ovate, 2.5–3.5 × 1.4–2 mm, obtuse. Corona lobes ovate, pouched. Anthers nearly square, appendages white, rounded; pollinia globose, horizontal. Ovaries glabrous. Stigma head flat with raised center. Follicles lanceolate in outline, ca. 7 cm × 5 mm, apex acuminate, glabrous. Fl. Mar–May, fr. Jun–Sep.

• Forests, thickets, 300–2400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang.

**7. *Tylophora insulana*** Tsiang & P. T. Li, *Acta Phytotax. Sin.* 12: 134. 1974.

台湾娃儿藤 tai wan wa er teng

Lianas to 2 m, pubescent throughout. Petiole ca. 5 mm; leaf blade lanceolate, 3.5–7 × 0.8–1.5 cm, papery, base truncate to subcordate, apex acuminate; lateral veins 3–5 pairs. Inflorescences shorter than leaves; peduncle slender; rachis simple, longer than peduncle; cymules umbel-like, many flowered. Sepals lanceolate; glands absent. Corolla rotate; tube short; lobes broadly ovate. Corona lobes subglobose, apex rounded and reaching base of anthers. Anthers oblong, appendages rounded; pollinia oblong, horizontal. Ovaries glabrous. Stigma head discoid.

• Montane forests. Taiwan.

**8. *Tylophora kerrii*** Craib, *Bull. Misc. Inform. Kew* 1911: 417. 1911.

人参娃儿藤 ren shen wa er teng

*Tylophora balansae* Costantin; *T. pseudotenerrima* Costantin.

Lianas usually glabrous except for interpetiolar lines, petioles, calyx, and corolla. Petiole 3–7 mm; leaf blade linear-lanceolate, 5.5–9 × ca. 1.5 cm, base rounded to shallowly cordate, apex acute; lateral veins 4–8 pairs. Inflorescences pendent, 2–8 cm; peduncle 1–5 cm; rachis zigzag, laxly branched. Pedicel 3–10 mm. Sepals lanceolate, ca. 1.5 mm, sparsely hairy, apex recurved; glands 5. Corolla green turning yellow, less often purplish to white, ± rotate, ca. 0.4–1.4(–2) cm in diam.; lobes oblong, to 6 × 1.5 mm, partly papillate-pubescent. Corona lobes ovoid, reaching anther base. Anther appendages rounded; pollinia globose, suberect to horizontal. Ovaries glabrous. Stigma head subapiculate. Follicles lanceol-

late in outline, 4.5–11 × ca. 1 cm. Seeds oblong, ca. 8 mm; coma ca. 2.5 cm. Fl. May-Aug, fr. Aug-Dec.

Thickets, valleys. Fujian, Guangdong, Guangxi, Guizhou, Sichuan, Yunnan [Cambodia, Thailand, Vietnam].

The roots are used for the treatment of snake bites and cancerous swellings.

**9. *Tylophora longifolia*** Wight, Contr. Bot. India 50. 1834.

长叶娃儿藤 chang ye wa er teng

Lianas glabrous throughout. Petiole 1.5–1.8 cm; leaf blade narrowly lanceolate, to 17 × 3.5 cm, base truncate to shallowly cordate, apex acute; lateral veins 5–7 pairs, prominent. Inflorescences up to 5 cm, sometimes grouped into a conical panicle on short axillary branches with reduced leaves; peduncle 1–2 cm; rachis almost straight, often forked; cymules umbel-like. Pedicel to 7 mm. Sepals triangular-lanceolate, ca. 1.2 mm. Corolla subrotate, ca. 6 mm in diam.; lobes triangular-ovate, ca. 2.5 × 1.5 mm. Corona lobes ovoid, apex acute, reaching anther base.

Yunnan [Bangladesh].

**10. *Tylophora oshimae*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 197. 1911.

小花娃儿藤 xiao hua wa er teng

Herbs twining. Stems slender, to 1 m, with 2 well-defined lines of hairs. Petiole ca. 5 mm, minutely hirsute to glabrescent; leaf blade linear, ca. 6 cm × 3 mm, minutely hirsute then glabrescent except for densely hairy adaxial side of midrib, base obtuse, apex acute; lateral veins slightly elevated. Inflorescences few flowered. Pedicel ca. 4 mm. Sepals ovate-triangular, ciliate. Corolla subrotate, ca. 8 mm in diam.; lobes oblong-ovate, ca. 3 × 1.5 mm, obtuse, glabrous outside, pubescent inside. Pollinia globose, horizontal. Fl. Jan.

• Thickets. Taiwan.

**11. *Tylophora anthopotamica*** (Handel-Mazzetti) Tsiang & Zhang in Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 133. 1974.

花溪娃儿藤 hua xi wa er teng

*Cynanchum anthopotamicum* Handel-Mazzetti, Symb. Sin. 7: 995. 1936.

Lianas woody, rhizomatous. Stem tips twining, to 1.5 m, densely to sparsely minutely hirsute. Petiole 3–5 mm; leaf blade lanceolate, 4–11 × 1–2 cm, papery, base broadly cuneate; lateral veins 12–16 pairs. Inflorescences axillary, racemelike; peduncle ca. 2.5 cm; bracteoles basal. Pedicel slender, 5–8 mm. Sepals triangular-lanceolate, ca. 1.5 mm, apex acuminate, often recurved. Corolla purple-brown, rotate; lobes triangular-lanceolate, 5–6 mm, recurved, glabrous. Corona short, ringlike; lobes globose-triangular, as long as anthers, back convex, apex acute; appendages ovate. Pollinia ellipsoid, erect. Fl. Jun.

• Montane forests; 900 m. SW Guizhou.

**12. *Tylophora cycleoides*** Tsiang, Sunyatsenia 3: 224. 1936.

轮环娃儿藤 lun huan wa er teng

Lianas woody, to 1.5 m. Stems pale gray, sparsely pubescent along 2 lines, densely papillate. Petiole ca. 1 cm, grooved adaxially, base sharply delineated from rest of petiole by dark line; leaf blade ovate, 2–7 × 2–3.5 cm, thick papery, glabrous, base rounded to very minutely cordate, apex acute; basal veins 3, prominent, ascending; lateral veins 2 or 3 pairs. Inflorescences with single, ca. 10-flowered, umbel-like cymule; peduncle 0.2–2 cm. Pedicel slender, 6–12 mm. Sepals elliptic, ca. 1 × 0.5 mm; glands few. Corolla purple, rotate, glabrous; tube ca. 1 mm; lobes oblong or ovate-oblong, ca. 4 × 2 mm. Corona lobes ovate, fleshy, pouched, apex rounded and reaching base of anthers. Anthers ca. 0.5 mm, appendages rounded; pollinia globose, horizontal. Ovaries glabrous. Follicles (immature) cylindrical, ca. 11 cm × 5 mm, divergent at 180°, apex long acute. Fl. Jul-Sep.

• Montane forests. Guangxi, Hainan.

**13. *Tylophora picta*** Tsiang, Sunyatsenia 3: 218. 1936.

紫叶娃儿藤 zi ye wa er teng

Lianas glabrous except for sparsely yellowish pilose nodes, base of leaf blade, bracts, and exterior of calyx and corolla. Stems to 6 m. Petiole 2–4 cm, slightly flattened; leaf blade ovate-oblong to suborbicular, 6–13 × (3.5–)5–11 cm, leathery to subsucculent, base rounded to subcordate, apex mucronate; lateral veins 4–7 pairs, slightly flattened, abaxially purplish red. Inflorescences pedunculate, congested, umbel-like clusters of cymules, 2–5 × ca. 3 cm, many flowered; peduncle purplish red; bracts blackish, ca. 3 mm. Pedicel up to 5 mm. Sepals ovate-triangular, ca. 1.5 × 1 mm; glands absent. Corolla purplish red, rotate, villous inside; tube ca. 1 mm; lobes ovate-oblong, ca. 3 × 1 mm. Corona lobes ovate, pouched, reaching base of anthers. Pollinia oblong, horizontal. Ovaries glabrous. Stigma head subdepressed, slightly longer than anthers. Follicles lanceolate in outline, ca. 8 × 1 cm, glabrous. Seeds ovate, ca. 10 × 5 mm; coma to 4 cm. Fl. May-Sep, fr. Oct-Dec.

• Moist valleys. Hainan.

**14. *Tylophora brownii*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 195. 1911.

光叶娃儿藤 guang ye wa er teng

*Tylophora ovata* (Lindley) Hooker ex Steudel var. *brownii* (Hayata) Tsiang & P. T. Li.

Lianas. Stems to 3 m, slender, appressed pubescent to glabrous. Petiole 1–2 cm; leaf blade stiffly papery, ovate, rarely oblong-ovate, 4–8 × 2–4 cm, brownish when dried, glabrous on both surfaces, or margin only pubescent, base rounded or cordate, apex apiculate or acute; basal veins 3, lateral veins 3 or 4 pairs, not prominent. Peduncle 1–2 cm, glabrous or glabrescent; rachis up to 8 mm, not zigzag; cymules short racemelike. Pedicel very slender, ca. 1 cm. Sepals ovate-triangular, 1–1.5 mm, glabrous. Corolla rotate, ca. 1 cm



in diam.; lobes ovate-triangular, 3–4.5 × 1–2 mm, glabrous. Corona lobes ovate, covering bases of anthers. Anther appendages rounded; pollinia globose, horizontal. Follicles 4–6 cm × 7–10 mm, glabrous. Seeds ovate, ca. 4.5 mm; coma ca. 1 cm. Fl. Jul-Aug, fr. Sep-Oct.

- Thickets. 200–500 m. Guangdong, Taiwan.

**15. *Tylophora uncinata*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 16. 1995.

钩毛娃儿藤 *gou mao wa er teng*

Lianas. Stems glabrescent. Petiole ca. 1.5 cm; leaf blade ovate, 3.5–9 × 2.3–5.5 cm, stiffly papery, adaxially glabrous, abaxially uniformly pubescent with hairs having papillalike bases and strongly hooked tips, base cordate with narrow sinus, apex acute, apiculate. Cymes shorter than leaves, cymules densely racemelike; peduncle to 2 cm, rachis zigzag, sometimes absent. Pedicel to 6 mm. Sepals ca. 1.7 × 0.7 mm, oblong-lanceolate, subglabrous except for a few hooked hairs, apex acute. Corolla green, 3.5–5 mm; tube ca. 0.5 mm; lobes ovate to ovate-oblong, ca. 3.5 × 1.3 mm. Corona lobes ovate, ca. 0.5 × 0.2 mm, pouched, apex obtuse, covering base of anthers. Anther appendages rounded; pollinia globose, horizontal. Stigma head flat, 5-angled, depressed in center. Follicles linear-lanceolate in outline, ca. 5 cm × 6 mm, apex acuminate. Fl. Aug-Sep.

- 400 m. Hainan (Po-ting).

**16. *Tylophora forrestii*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 13. 1995.

大花娃儿藤 *da hua wa er teng*

Lianas. Stems uniformly pubescent when young, soon glabrescent and pubescent along 1 side. Petiole ca. 2 cm; leaf blade ovate, to 9.4 × 4.2 cm, prominently pilose along veins when young, glabrescent, base broadly cuneate to rounded, apex acuminate; lateral veins 4 or 5 pairs. Cymes to 8 cm; cymules umbel-like, ca. 6-flowered; peduncle to 4.5 cm. Pedicel ca. 1.5 cm. Sepals ca. 3 × 0.4 mm, ciliate. Corolla yellow-green, ca. 6 mm; lobes ca. 1.6 m wide, glabrous. Corona lobes reaching base of anthers, acute. Gynostegium ca. 1.5 mm high; corpuscula longer than ellipsoid pollinia.

- Forest margins; 2100 m. Yunnan.

**17. *Tylophora ovata*** (Lindley) Hooker ex Steudel, *Nomencl. Bot. ed. 2*, 2: 726. 1841.

娃儿藤 *wa er teng*

*Diplolepis ovata* Lindley, *Trans. Hort. Soc. London* 6: 286. 1826; *Gymnema hirsuta* Wallich; *Tylophora atrofoliculata* F. P. Metcalf; *T. hirsuta* (Wallich) Wight; *T. hispida* Decaisne; *T. hispida* var. *brownii* Hayata; *T. lanyuensis* Liu & Lu; *T. mollissima* Wallich ex Wight; *T. panzhutenga* Z. Y. Zhu.

Lianas to 5 m, rusty hispid, villous, or pubescent except for adaxial leaf surface and sometimes follicles. Petiole 0.5–3 cm; leaf blade ovate, 2.5–12.5(–16) × 1.2–9 cm, base cordate to subcordate, apex acute or short acuminate and mucronate; Thickets; 200–1000 m. Guangdong, Guangxi, Hainan [India,

lateral veins 4–6 pairs. Inflorescences 4–13 cm; peduncle 0.5–2 cm; rachis simple, zigzag, occasionally forked; cymules sessile, racemelike, dense, many flowered. Pedicel threadlike, 5–10 mm. Sepals subulate-acuminate to ovate, ciliate; glands 5 or absent. Corolla yellowish or yellow-green, rotate, ca. 5 mm in diam., glabrous or puberulent; tube ca. 1 mm; lobes oblong-ovate or ovate, ca. 1.5–2.5 × 1–1.2 mm, obtuse. Corona lobes ovoid, pouched, apex obtuse, covering base of anthers. Anther appendages rounded; pollinia globose to ovoid, horizontal. Stigma head a 5-angled plate, depressed. Follicles lanceolate to oblong-lanceolate in outline, 4–7 cm × 3–12 mm, puberulent or glabrous, apex sometimes recurved. Seeds oval, 5–7 × 2–4 mm; coma 2–3.5 cm. Fl. Apr-Aug, fr. Aug-Dec.

Forests, mixed woods, thickets; 200–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Sichuan, Taiwan, Yunnan [India, Myanmar, Nepal, Pakistan, Vietnam].

The roots are used for the treatment of leukemia, asthma, snake bites, and traumatic injury.

**18. *Tylophora astephanoides*** Tsiang & P. T. Li, *Acta Phytotax. Sin.* 12: 138. 1974.

阔叶娃儿藤 *kuo ye wa er teng*

Lianas. Stems slender, to 3 m, pubescent. Petiole 1.2–4 cm; leaf blade broadly ovate, 6.5–15 × 3.5–9 cm, thin papery, base rounded, apex obtuse and mucronate; lateral veins 5–7 pairs, flattened. Inflorescences ca. as long as petiole; rachis simple, zigzag; cymules umbel-like, many flowered. Pedicel 4–8 mm, slender. Sepals oblong-ovate, ca. 1.5 × 0.8 mm; glands absent. Corolla greenish white, rotate, ca. 5 mm in diam.; tube shorter than lobes; lobes broadly ovate, ca. 3.5 × 2.5 mm, sparsely pubescent outside. Corona lobes subglobose, apex rounded or truncate and reaching base of anthers. Anther appendages as long as stigma head; pollinia subglobose, pendulous. Ovaries glabrous. Stigma head elevated, apex 2-cleft. Fl. Jun.

- Montane forests; 1100 m. S Yunnan.

**19. *Tylophora rotundifolia*** Buchanan-Hamilton ex Wight, *Contr. Bot. India* 50. 1834.

圆叶娃儿藤 *yuan ye wa er teng*

*Tylophora trichophylla* Tsiang.

Herbs. Stems to 3 m, hollow when dried, at first prostrate, apical part sometimes twining, most parts crisp pilose. Petiole 2–5 mm; leaf blade 4–9 × 3.5–8 cm, lowermost suborbicular and flat on ground, upper smaller, ovate, or obovate, abaxially glabrous or uniformly minutely puberulent, base rounded, apex short mucronate or rounded; lateral veins 4–6 pairs. Inflorescences ca. 2 cm; peduncle 5–8 mm; rachis simple, zigzag; cymules sessile, racemelike, dense. Pedicel 1–2.5(–3) cm. Sepals ovate-triangular; glands 5. Corolla yellow, rotate, twice as long as calyx; tube short; lobes oblong. Corona lobes ovate, pouched, apex reaching to base of anthers. Anthers square, appendages rounded; pollinia globose, horizontal. Stigma head flat. Follicles lanceolate, ca. 6 × 1 cm, slightly puberulent. Seeds ovate; coma ca. 2 cm. Fl. May.

Nepal].

**20. *Tylophora arenicola*** Merrill, Lingnan Sci. J. 13: 69. 1934.

虎须娃儿藤 hu xu wa er teng

Lianas to 1 m, sometimes prostrate. Stems sparsely puberulent. Petiole 3–10 mm; leaf blade oblong to ovate, 2–8.5 × 0.5–4 cm, papery to subleathery, glabrous to abaxially sparsely puberulent, base rounded, apex rounded or apiculate; lateral veins ca. 4 pairs, flattened. Inflorescences shorter than leaves; cymules clustered, dense, racemelike. Pedicel ca. 1 cm. Sepals ovate-triangular, ca. 1.5 × 1 mm; glands 5. Corolla greenish yellow, rotate or subrotate; lobes oblong, ca. 3.5 × 2 mm, veined, glabrous. Corona lobes broadly oblate, pouched, apex obtuse to subtruncate, covering anther base. Anther appendages rounded; pollinia globose, horizontal. Stigma head depressed. Follicles lanceolate, 4–6.3 cm × 7–10 mm, glabrous. Seeds ovate, ca. 4 × 3 mm; coma ca. 2 cm. Fl. May–Aug, fr. Sep–Dec.

Thickets, sandy seashores. Guangdong, Guangxi, Hainan [Vietnam].

**21. *Tylophora tengii*** Tsiang, Sunyatsenia 3: 228. 1936.

普定娃儿藤 pu ding wa er teng

Herbs to 1 m. Stems slender, glabrous or sometimes puberulent. Petiole 5–10 mm, adaxially pubescent; leaf blade oblong or oblong-lanceolate, 2.5–4 × 0.8–1.3 cm, thin papery, glabrous except for adaxially puberulent midvein, base retuse-cordate, apex acute; lateral veins 3 or 4 pairs. Inflorescences ca. 2.5 cm, 10–16-flowered; peduncle 1–1.5 cm, rachis simple, less often forked, zigzag, glabrous; cymules ± umbel-like. Pedicel 2–6 mm, glabrous; sepals oblong, ca. 1 × 0.5 mm, ciliate; glands 5. Corolla greenish, rotate, sparsely and minutely puberulent; tube short; lobes broadly ovate, ca. 3 × 3 mm. Corona lobes ovate, apex reaching anther base. Anthers nearly square; appendages broader than long, rounded; pollinia globose, horizontal. Stigma head discoid, apex elevated. Fl. May.

- Forests. Guangxi, S Guizhou.

**22. *Tylophora chingtungensis*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 141. 1974.

显脉娃儿藤 xian mai wa er teng

Herbs twining, to 5 m. Stems pubescent along 1 side; axillary glands villous. Petiole 1.5–2 cm, slightly flattened, pubescent; leaf blade elliptic, ca. 9 × 5.3 cm, thin papery, pubescent, glabrescent, base rounded or truncate, margin ciliate, apex acute; lateral veins 5 or 6 pairs, flattened adaxially, elevated abaxially. Inflorescences umbel-like; peduncle to 6 cm, puberulent; cymules solitary or 2 close together. Pedicel ca. 8 mm, glabrescent. Sepals linear-lanceolate, ca. 2.5 × 0.7 mm, villous, ciliate. Corolla white, rotate, ca. 7 mm in diam., glabrous; tube ca. 1 mm; lobes elliptic, ca. 3 × 2.5 mm. Corona lobes ovate, apex acute. Anther appendages ovate; pollinia subglobose, horizontal. Stigma head discoid. Fl. May–Aug.

- Montane forests; 2100 m. Sichuan, Yunnan.

**23. *Tylophora henryi*** Warburg in Schlechter & Warburg, Repert. Spec. Nov. Regni Veg. 3: 313. 1907.

紫花娃儿藤 zi hua wa er teng

Herbs. Stems twining, to 3 m, stems and petioles pubescent along 1 side. Petiole 2–6 cm; leaf blade ovate to broadly so, 7.5–16 × 3–13 cm, membranous, glabrous except for puberulent midvein, base rounded to shallow cordate, apex acute to acuminate; lateral veins 5 or 6 pairs. Cymes 2–6 cm, sometimes sessile; rachis forked or several branched, many flowered, puberulent to glabrous; cymules umbel-like. Pedicel 5–10 mm. Sepals lanceolate, ciliate; glands 5. Corolla purple, rotate; lobes broadly ovate, 2–3 × 1.5–2 mm, glabrous outside, puberulent inside. Corona lobes nearly square, apex truncate and reaching anther base. Anther appendages rounded; pollinia globose, horizontal. Stigma head discoid. Follicles lanceolate, ca. 8 cm × 8 mm, glabrous. Fl. Jun–Aug, fr. Aug–Nov.

• Forests, thickets. Fujian, Guizhou, Henan, Hubei, Hunan, Sichuan.

The roots are used for the treatment of rheumatoid arthritis and snake bites.

**24. *Tylophora membranacea*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 141. 1974.

膜叶娃儿藤 mo ye wa er teng

Herbs twining. Stems slender, to 2 m, pubescent along 1 side. Petiole to 2.5 cm, flattened; leaf blade ovate, 6.5–14 × 4–7.5 cm, membranous, glabrous, base truncate or shallow cordate, apex acute; lateral veins 5 or 6 pairs, flattened, anastomosing before margin. Inflorescences shorter than leaves, to 7 cm, branched, primary division unequally 3-fid, later branching lax and irregular; cymules 1- or 2-flowered; peduncle 2–2.5 cm. Pedicel 7–14 mm. Sepals ovate, ca. 1 × 0.5 mm, glabrous, without glands. Corolla yellowish white, rotate, to 1 cm in diam.; lobes oblong ca. 4 × 2.5 mm, glabrous outside, pubescent inside. Corona lobes ovate, pouched, apex acute, reaching base of anthers. Anthers nearly square, appendages rounded; pollinia oblong, subhorizontal. Ovaries glabrous. Stigma head discoid. Fl. Jun.

- Forests. E Guangxi.

**25. *Tylophora hui*** Tsiang, Sunyatsenia 3: 236. 1936.

建水娃儿藤 jian shui wa er teng

Lianas to 3 m. Stems pale gray, yellowish pubescent along 1 side. Petiole 1.5–2.5 cm, adaxially puberulent; leaf blade elliptic-oblong to oblong-lanceolate, 6.5–14 × 1.7–4 cm, base rounded, apex long acuminate; lateral veins 4–6 pairs. Inflorescences 6–18 cm; peduncle to 3 cm, shorter than apical internodes of rachis; rachis almost straight, usually branched; cymules umbel-like. Pedicel slender, 4–10 mm.

Sepals ovate-oblong, ca. 1.5 × 1 mm. Corolla greenish, rotate, glabrous; tube ca. 1.5 mm; lobes ovate, ca. 3 × 2 mm. Corona lobes ovate, pouched, apex obtuse and reaching anther base. Anther appendages rounded; pollinia subglobose, suberect. Stigma head discoid, apex slightly dome-shaped. Fl. May-Sep.

- Open woods, 1000–2000 m. Guizhou, S Yunnan.

**26. *Tylophora koi*** Merrill, Sunyatsenia 2: 17. 1934.

通天连 tong tian lian

*Tylophora sootepensis* Craib; *T. taiwanensis* Hatusima.

Lianas glabrous throughout. Stems to 3 m, slender. Petiole 0.8–2 cm; leaf blade oblong or oblong-lanceolate, 4–8 (–11) × 1–2.5 (–4) cm, thin papery to membranous, abaxially densely papillate, base broadly cuneate to subcordate, apex acuminate, sometimes apiculate; lateral veins 4 or 5 pairs. Inflorescences to 11 cm, shorter or longer than leaves; peduncle to 3.5 cm; rachis usually simple, almost straight, with up to 4 cymules; cymules umbel-like. Pedicel 4–8 mm. Sepals ovate-triangular, ca. 1 × 1 mm, margin translucent; glands 5. Corolla greenish orange, rotate, 4–6 mm in diam.; tube short; lobes oblong or ovate-oblong, apex obtuse, 4–7-veined, glabrous. Corona lobes ovate, pouched, apex obtuse and covering middle of anthers. Anther appendages rounded; pollinia subglobose, horizontal. Stigma head obscurely 2-cleft. Follicles linear-lanceolate, 4–9 cm × ca. 5 mm. Seeds ovate; coma ca. 1.5 cm. Fl. Jun-Sep, fr. Jul-Dec.

Humid forests in valleys, thickets; 100–1000 m. Guangdong, Guangxi, Hainan, Hunan, Taiwan, Yunnan [Thailand, Vietnam].

Used for the treatment of snake bites and traumatic injury.

**27. *Tylophora augustiniana*** (Hemsley) Craib, Bull. Misc. Inform. Kew 1911: 417. 1911.

宜昌娃儿藤 yi chang wa er teng

*Henrya augustiniana* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 111. 1889; *Henryastrum augustinianum* (Hemsley) Happ; *Neohenrya augustiniana* (Hemsley) Hemsley.

Lianas to 2 m, slender, glabrous except sometimes for midvein. Petiole 1.5–2.5 cm; leaf blade ovate-oblong to ovate-lanceolate, 5.5–9 × 2–4.5 cm, adaxially puberulent along midvein, base cordate to rounded or truncate, apex acuminate; lateral veins 5–7 pairs. Inflorescences laxly and divaricately many branched, to 32 cm, many flowered; peduncle 2–3.5 cm, shorter than upper internodes; cymules umbel-like to lax racemelike. Pedicel 0.5–1.5 cm. Sepals ovate-lanceolate, ca. 1.2 × 0.7 mm. Corolla yellowish, rotate, 4–6 (–7) mm in diam.; tube ca. 2 mm in diam.; lobes ovate, ca. 2 × 1.7 mm, middle of inner surface minutely papillate-puberulent. Corona lobes ovoid-globose, pouched, reaching anther base. Anther appendages rounded; pollinia subglobose, horizontal. Stigma head subapiculate. Fl. Jul-Aug.

Open woods. Guangxi, Hubei, Yunnan [Thailand].

**28. *Tylophora silvestrii*** (Pampanini) Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 133. 1974.

湖北娃儿藤 hu bei wa er teng

*Henrya silvestrii* Pampanini, Nuovo Giorn. Bot. Ital. 17: 696. 1910; *Henryastrum silvestrii* (Pampanini) Happ.

Herbs twining. Stems to 1.5 m, slender, pubescent along 1 side. Petiole puberulent, 6–10 mm; leaf blade ovate-oblong, 2–3 × 0.8–1.3 cm, adaxially pubescent, abaxially glabrous and pale gray, base truncate to shallowly cordate, apex acuminate; lateral veins slightly elevated adaxially. Inflorescences dichasial, as long as leaves; peduncle 1.2–2 cm. Pedicel slender, 3–8 mm. Sepals lanceolate, ca. 1 mm. Corolla ca. 5 mm in diam.; lobes lanceolate, ca. 2 × 1 mm. Corona lobes oval, fleshy, shorter than anthers. Anthers reniform, appendages rounded. Fl. Jul.

- Forests, thickets. Hubei.

**29. *Tylophora flexuosa*** R. Brown, Prodr. 460. 1810.

小叶娃儿藤 xiao ye wa er teng

*Asclepias tenuissima* Roxburgh; *A. tetrapetala* Dennstedt; *Hoya flexuosa* (R. Brown) Sprengel; *Hoyopsis dielsii* H. Léveillé; *Tylophora carnosa* Wallich ex Wight; *T. dielsii* (H. Léveillé) Hu; *T. hoyopsis* H. Léveillé; *T. tenuis* Blume; *T. tenuissima* (Roxburgh) Wight & Arnott; *T. tetrapetala* (Dennstedt) Suresh; *Vincetoxicum flexuosum* (R. Brown) Kuntze.

Lianas slender, to 2.5 m. Young stems puberulent along 1 side. Petiole 5–10 mm, puberulent; leaf blade ovate to ovate-oblong or oblong-lanceolate, 1–8 × 0.8–4.5 cm, thin papery, glabrous or sometimes ciliate, glabrous or sometimes puberulent along midvein, base cuneate to rounded, apex acute or obtuse, sometimes apiculate. Inflorescence rachis simple to much branched, 3–10 cm; cymules densely to laxly racemelike. Pedicel ca. 1.5 cm. Sepals ovate, glabrous; glands 5. Corolla white, rotate, ca. 5 mm in diam., glabrous outside, pubescent inside; lobes ovate-oblong or ovate-triangular. Corona lobes ovoid, pouched. Anthers short, appendages extending beyond stigma head; pollinia globose, horizontal to suberect. Stigma head semiglobose. Follicles lanceolate in outline, 4–8 cm × 6–10 mm, glabrous. Seeds ovate, 6–8 mm; coma 1.5–3.5 cm. Fl. Apr-Dec, fr. Jul-Dec.  $2n = 22$ .

Open woods, thickets; 100–1000 m. Guangdong, Guangxi, Guizhou, Hainan, Shaanxi, Taiwan, Yunnan [Cambodia, India, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

**30. *Tylophora leptantha*** Tsiang, Sunyatsenia 3: 234. 1936.

广花娃儿藤 guang hua wa er teng

Lianas to 4 m, glabrous except for corolla. Petiole 1–2.5 cm; leaf blade oblong-lanceolate, 6–16 × 2.5–5 cm, papery, base rounded to shallowly cordate, apex acute or short acuminate; lateral veins ca. 6 pairs. Inflorescences to 12 × 12 cm, many flowered; peduncle purplish; rachis many forked, slightly zigzag, slender; cymules umbel-like or reduced to solitary flowers. Pedicel 2–8 mm; purplish. Sepals oblong,

ca. 1 × 0.5 mm; glands absent. Corolla greenish, rotate, glabrous outside, pilose inside; lobes oblong, ca. 3 × 2 mm. Corona lobes ovate, pouched, apex reaching base of anthers. Anthers square, appendages rounded; pollinia ovoid, horizontal. Ovaries glabrous. Stigma head as long as anthers, nearly flattened. Follicles oblong-lanceolate, ca. 12 cm × 5 mm. Seeds ovate, ca. 7 × 3 mm; coma ca. 3 cm. Fl. Apr-Sep, fr. Aug-Dec.

- Open woods, moist bushland. Guangdong, Guangxi, Hainan.

**31. *Tylophora floribunda*** Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 128. 1866.

多花娃儿藤 duo hua wa er teng

*Tylophora chungii* Merrill ex F. P. Metcalf; *T. shikokiana* Matsumone ex Nakai; *Vincetoxicum floribundum* (Miquel) Franchet & Savatier.

Lianas slender, to 3 m. Stems puberulent along 1 side. Petiole 5–10 mm, puberulent; leaf blade oblong-ovate to ± hastate, 3–5 × 0.6–2.5 cm, membranous to thin papery, abaxially minutely papillate, base cordate to rounded, apex acute or acuminate; lateral veins 3–5 pairs. Inflorescences lax, longer than leaves, to 11 cm; peduncle zigzag; rachis branched, internodes to 1.6 cm; cymules few flowered, racemelike or umbel-like. Sepals oblong-lanceolate; glands 5. Corolla purple, rotate, ca. 2 mm in diam., glabrous; lobes ovate. Corona lobes ovate, obtuse, apex reaching base of anthers. Anthers nearly square, appendages rounded; pollinia subglobose, horizontal. Stigma head subapiculate. Follicles linear-lanceolate, 4–6 cm × 4–5 mm. Seeds ovate, ca. 4 × 2 mm; coma ca. 2 cm. Fl. May-Sep, fr. Aug-Dec.

Thickets, open woods; 100–700 m. Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Jiangxi, Zhejiang [Japan, Korea].

The roots are used for the treatment of infantile convulsions, diphtheria, traumatic injury, toothache, and snake bites.

**32. *Tylophora gracilentia*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 143. 1974.

天峨娃儿藤 tian e wa er teng

Lianas. Stems to 2 m, gray-green, young branches pubescent along 1 side, glabrescent. Petiole 0.8–2 cm, adaxially pubescent; leaf blade ovate or ovate-oblong, 3–5.5 × 1–3.5 cm, glabrous except for adaxially puberulent midvein, abaxially very minutely dense papillate, base rounded, apex acuminate; lateral veins 4 or 5 pairs. Inflorescences longer than leaves, umbel-like; peduncle slender, glabrous; rachis 2- or 3-forked. Pedicel 4–6 mm. Sepals oblong-ovate, ca. 1 × 0.5 mm, glabrous; glands present. Corolla greenish, rotate, ca. 4 mm in diam.; tube short; lobes oblong-ovate, ca. 1.5 × 1 mm, glabrous. Corona lobes ovate, pouched, apex acute and reaching base of anthers; pollinia subglobose, horizontal. Ovaries glabrous. Stigma head discoid, apex convex. Fl. May.

- Bushland, open woods. NW Guangxi, S Yunnan.

**33. *Tylophora tuberculata*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 15. 1995.

个旧娃儿藤 ge jiu wa er teng

Lianas. Stems slender, short pilose along 2 sides. Petiole 5–10 mm, adaxially hairy, glabrescent; leaf blade lanceolate, 2.5–4 × 1.1–1.2 cm, thick papery, glabrous, with prominent scattered tubercles, base rounded-cordate, apex acute. Inflorescences up to 4 cm, much branched, peduncle up to 6 mm, internodes to 1.4 cm. Pedicel 4–6 mm, glabrous. Sepals lanceolate, ca. 0.7 mm, glabrous, tip recurved, acute. Corolla greenish white, rotate to shallowly bowl-shaped, ca. 5 mm in diam., glabrous outside, densely short pilose inside; lobes ovate, ca. 2 × 1.5 mm. Corona lobes reaching base of anther, with prominent, spreading, truncate or submarginate dorsal appendages, joined at base. Anther appendages short, rounded; pollinia ellipsoid, almost vertical. Stigma head rounded. Old follicles linear lanceolate in outline, ca. 6.5 cm × 5 mm. Fl. May.

- 800 m. Yunnan.

**34. *Tylophora glabra*** Costantin in Lecomte, Fl. Indo-Chine 4: 109 1912.

长梗娃儿藤 chang geng wa er teng

*Tylophora longipedicellata* Tsiang & P. T. Li; *T. renchangii* Tsiang.

Lianas to 3 m. Stems pale gray, longitudinally striate, pubescent along 1 side, glabrescent. Petiole 5–13 mm, pubescent; leaf blade elliptic-oblong or oblong-lanceolate, 4.5–8 × 2–3.5 cm, papery, sparsely pubescent along midvein, base cuneate or rounded, apex acute or short acuminate, rarely mucronate. Inflorescences shorter than leaves; peduncle 0.5–1.5 cm, glabrous or sparsely puberulent; cymules umbel-like to short racemelike, 1 or 2 separated by a very short rachis. Pedicel 1–2.8 cm. Sepals lanceolate, ca. 3 × 1 mm, villous; glands 5. Corolla greenish white, rotate; tube ca. 2 mm; lobes ovate-oblong, ca. 4 × 2 mm. Corona lobes inserted at base of anthers, circular to almost square, up to 1.5 mm wide and ± forming a cup as high as anthers, apex abruptly inflexed acuminate. Anther appendages rounded; pollinia cylindrical-ellipsoid, horizontal. Stigma head discoid. Follicles diverging at 180°, linear-lanceolate in outline, 4.5–6.5 cm × 8–10 mm, glabrous. Seeds oblong-ovate, ca. 4 × 2 mm; coma 1.5–2 cm. Fl. Apr-Aug, fr. Sep-Dec.

Open woods, along riversides or roadsides, thickets; to 500 m. Guangdong, Guangxi, Hainan [Vietnam].

The roots are used for the treatment of traumatic injury and fractures, and the leaves for viper bites.

The corona lobes of *Tylophora glabra* are almost as in *Heterostemma* and quite unlike any other *Tylophora* seen from mainland Asia. The inclusion of *T. longipedicellata* is somewhat tentative, and collections from Hainan, which otherwise match *T. glabra* extremely well, do not show the short corona lobes with the erect acuminate tip illustrated in the protologue.

**35. *Tylophora oligophylla*** (Tsiang) M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 14. 1995.

滑藤 hua teng

*Absolmsia oligophylla* Tsiang, *Sunyatsenia* 6: 121. 1941.

Stems at first prostrate and leafy but then twining, to 2 m, pubescent along 2 sides to almost uniformly pubescent, upper parts few leaved. Petiole 5 mm; leaf blade ovate-orbicular, 5–11 × 4.5–10.5 cm, glabrescent adaxially, puberulent abaxially; lateral veins ca. 5 pairs. Cymes subsessile, umbel-like, 4–9-flowered. Sepals oblong, ca. 1 mm, ciliate, valvate; basal glands 5. Corolla purplish green, top-shaped, glabrous outside, puberulent inside; lobes broadly ovate, ca. 2 × 2.5 mm, inflexed, valvate. Corona lobes inserted on back of stamens, ovate, turgid on back, horizontally stellate patent, base rounded, apex acuminate. Gynostegium very short; anthers nearly 4-angled, apical appendages present; pollinia ovoid, pendulous, caudicle subhorizontal, retinaculum ellipsoid. Ovaries glabrous. Stigma head discoid, elevated. Follicles oblong-lanceolate. Fl. Aug.

- Mixed forests; 700 m. S Yunnan (Che-Li Hsien).

**40. *LYGISMA*** J. D. Hooker, *Hooker's Icon. Pl.* 15: 18, t. 1423. 1883.

折冠藤属 zhe guan teng shu

*Costantina* Bullock; *Pilostigma* Costantin 1912, not Van Tieghem 1894.

Herbs perennial, twining. Inflorescences extra-axillary and sometimes terminal, lax cymose. Buds truncate. Calyx glands absent(?). Corolla small, campanulate; tube much shorter than lobes; lobes inflexed in bud, overlapping to right, narrowly oblong-falcate, revolute, apex rounded. Corona lobes inserted on backs of anthers, oblong-ovate, dorsiventrally flattened, as high as gynostegium. Anthers short, appendages appressed to stigma head; pollinia 2 per pollinarium, obliquely oblong-falcate, erect to horizontal. Stigma head depressed or exerted and short 2-lobed. Follicles ellipsoid-ovoid, small.

About 3(–6) species: China, Myanmar, Thailand, Vietnam; one species in China.

**1. *Lygisma inflexum*** (Costantin) Kerr, *Bull. Misc. Inform. Kew* 1939: 457. 1939.

折冠藤 zhe guan teng

*Pilostigma inflexum* Costantin in Lecomte, *Fl. Indo-Chine* 4: 73. 1912; *Costantina inflexa* (Costantin) Bullock; *Tylophora hainanensis* Tsiang.

Lianas to 3 m. Branchlets pubescent along 1 line, glabrescent. Petiole 0.5–2.5 cm, adaxially ciliate; leaf blade ovate or ovate-oblong, 3–6.5 × 1.5–4 cm, membranous, puberulent, sometimes abaxially glabrescent, base rounded to cordate, apex acuminate; lateral veins 3 or 4 pairs. Inflorescences shorter than leaves, to 8-flowered. Pedicel 4–6 mm. Sepals ovate, ca. 1.5 × 1.3 mm, pubescent outside, glabrous inside, ciliate. Corolla white; tube ca. 1 mm; lobes 2.5–3 × 0.8–1 mm, glabrous outside, puberulent inside. Corona lobes ovate, apex obtuse. Stigma head depressed, broader than ovary. Follicles lanceolate, 5–7 × ca. 1 cm, glabrescent. Seeds oblong, ca. 1 cm; coma ca. 3 cm. Fl. Jul–Oct, fr. Sep–Dec.

Thickets, open woods; 100–300 m. Guangdong, Guangxi, Hainan [Vietnam].

**41. *PENTASACHME*** Wallich ex Wight, *Contr. Bot. India* 60. 1834.

石萝拂属 shi luo mo shu

*Pentasacme* G. Don.

Herbs perennial, erect, often growing in or near flowing water. Leaves opposite, narrow. Cymes racemelike or umbel-like. Pedicel threadlike. Calyx with basal glands. Corolla rotate or subcampanulate; tube short; lobes narrow, longer than tube, twisted to right. Corona lobes 5, inserted on corolla tube, apical appendages denticulate or lobed. Filaments connate into a short tube; anthers erect, apex membranous and inflexed on base of stigma head; pollinia 2 per pollinarium, erect, ovoid, apex with a small translucent beak. Stigma head conical or flat, apex 2-cleft. Follicles cylindric-lanceolate, smooth.

Four species: Bangladesh, Bhutan, China, India, Malaysia, Myanmar, Nepal, Singapore, Thailand, Vietnam; one species in China.

**1. *Pentasachme caudatum* Wallich ex Wight, Contr. Bot. India 60. 1834.**

石萝拂 shi luo mo

*Pentasachme championii* Benth.

Herbs to 80 cm tall, branched, glabrous throughout. Petiole 1–2 mm; leaf blade linear-lanceolate, 4–16 × 0.5–2 cm, midvein prominent on both sides, lateral veins obsolete. Cymes subsessile, much shorter than leaves, racemelike, 4–8-flowered. Pedicel 0.3–2 cm. Sepals lanceolate, 1.5–3 × ca. 1 mm. Corolla white; tube short; lobes linear-lanceolate, 0.6–1.5 cm × ca. 2 mm. Corona lobes white, thick, margin denticulate. Anthers laterally flattened; pollinia attached to caudicle at middle, retinaculum ca. 1/3 size of pollinia. Follicles cylindric-lanceolate, 5–7.5 cm × ca. 3 mm. Seeds minute, coma ca. 1.5 cm. fl Apr–Oct, fr. Jul–Dec.

Along rivers and streams in forests, open woodland, bushlands; to 1300 m. Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Yunnan [Bangladesh, Bhutan, India, Malaysia, Myanmar, Nepal, Singapore, Thailand, Vietnam].

All parts are used for the treatment of hepatitis, nephritis, conjunctivitis, sore throat, and bronchitis.

**42. HETEROSTEMMA Wight & Arnott in Wight, Contr. Bot. India 42. 1834.**

醉魂藤属 zui hun teng shu

Lianas, sometimes rooting adventitiously, old stems sometimes developing prominent corky wings. Leaves opposite, long petiolate, usually 3–5-veined at base, sometimes strictly pinnately veined. Inflorescences umbel-like or producing a succession of cymules and eventually racemelike, sessile or pedunculate. Calyx glands 5. Corolla rotate to broadly campanulate [urceolate to globose]; lobes twisted to left or valvate. Corona lobes 5, stellate spreading or suberect, fleshy, adaxially often tuberculate, keeled or appendaged, apex entire, dentate, or lobed. Filaments connate into a tube, anther appendages short and obtuse; pollinia 2 per pollinarium, erect or subhorizontal, margin of inner angle raised and translucent. Stigma head dilated. Follicles linear or cylindrical, usually paired, narrowly divergent to strongly reflexed, smooth. Seeds with coma.

About 30 species: China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia; nine species in China.

The occurrence of *Heterostemma villosum* Costantin in China has not been confirmed. Material so named seems better regarded as a hairy form of *H. esquirolii*.

- 1a. Peduncle up to 3 mm, sometimes obsolete.
  - 2a. Stems pilose all around; leaves conspicuously uniformly pubescent, almost pilose ..... 3. *H. menghaiense*
  - 2b. Stems with 2 lines of hairs, sometimes glabrescent; leaves minutely appressed pubescent.
    - 3a. Internodes glabrescent; inflorescences umbel-like; corolla 6–8 mm in diam. .... 4. *H. wallichii*
    - 3b. Internodes with 2 lines of persistent pilose hairs; inflorescences becoming racemelike; corolla 8–14(–22) mm in diam.
      - 4a. Leaf blade membranous to thin papery, base cuneate; pedicels 1.5–3 cm, very slender and threadlike; follicles narrowly divergent ..... 2. *H. esquirolii*
      - 4b. Leaf blade leathery, base rounded to truncate; pedicels 0.8–1.8(–3) cm, not threadlike; follicles widely divergent ..... 6. *H. oblongifolium*

- 1b. Peduncle 5–55 mm.
- 5a. Inflorescences with 2 or more umbel-like cymules spaced along zigzag rachis; outer corona lobes linear, fleshy, gynostegium narrowed above these; corolla chocolate brown ..... 9. *H. sinicum*
- 5b. Inflorescences with a single cymule, rarely a second in unusually robust material, sometimes elongated and branched; corona lobes lanceolate to circular, flattened, gynostegium rounded to almost flat, not narrowed above outer corona lobes; corolla yellow, orange, or green, sometimes with spots.
- 6a. Corona lobes longer than corolla limb and projecting beyond sinus between corolla lobes ..... 5. *H. siamicum*
- 6b. Corona lobes shorter than corolla limb.
- 7a. Leaves with basal veins all winged abaxially; peduncle 1.5–3 cm; follicles narrowly divergent .... 1. *H. brownii*
- 7b. Leaves with basal veins rounded to flattened abaxially; peduncle 0.5–1.5(–2.5) cm; follicles (where known) widely divergent.
- 8a. Leaf blade (7–)10–19 cm; corolla lobes 8–12 × 4.5–6 mm, yellow with darker (?brown) spots; corona raised in center but without basal tubercles ..... 7. *H. grandiflorum*
- 8b. Leaf blade 3–8 cm; corolla lobes ca. 5 × 3.5 mm, uniformly colored, lobes revolute; corona lobes each with a basal tubercle ..... 8. *H. tsoongii*

**1. *Heterostemma brownii*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 199. 1911.

台湾醉魂藤 tai wan zui hun teng

Lianas. Stems slender, to 5 m, glabrous, pubescent along 2 lines when young. Petiole 2–5 cm, flat, pubescent; leaf blade broadly ovate to oblong-ovate, 7–15 × 5–8 cm, papery, puberulent when young but soon glabrescent, base rounded to broadly cuneate, rarely subcordate, apex acuminate; basal veins 3–5, winged when young, lateral veins 3 or 4 pairs. Inflorescences umbel-like becoming racemelike, 2–6 cm, 10–20-flowered; peduncle 1.5–4.5 cm, puberulent. Pedicel (0.3–) 1–1.5 cm. Sepals ovate, ca. 1.5 mm. Corolla yellow, rotate to shallowly bowl-shaped, ca. 1 cm in diam.; tube 4–5 mm; lobes ovate-triangular, as long as tube. Corona lobes ligulate-oblong, base attenuate, apex obtuse, as long as corona tube. Anther appendages rounded; pollinia oblong, erect. Follicles narrowly divergent, linear-lanceolate, 10–15 cm × 5–10 mm, longitudinally striped. Seeds broadly ovate, ca. 1.5 × 1 cm; coma ca. 3 cm. Fl. Apr-Sep, fr. Jun-Dec.

• Open woods, moist forests; 500–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan.

The roots are used as medicine for malaria.

**2. *Heterostemma esquirolii*** (H. Léveillé) Tsiang, Sunyat-senia 3: 189. 1936.

贵州醉魂藤 gui zhou zui hun teng

*Pentasacme esquirolii* H. Léveillé, Fl. Kouy-Tchéou 14. 1914/15; *Heterostemma gracile* Kerr.

Lianas to 3 m. Branches and branchlets slender, internodes with 2 conspicuous lines of erect pilose hairs. Petiole 1.3–2.3(–5) cm, pubescent; leaf blade ovate or elliptic-ovate, (4–)6.5–10(–12) × 2–6.5 cm, membranous, glabrous or thin villous, base cuneate, sometimes minutely cordate, apex acuminate; lateral veins 3 or 4 pairs; midrib winged abaxially. Inflorescences usually sessile, umbel-like, up to 10–17-flowered. Pedicel 1.5–3(–4) cm, threadlike. Sepals ovate, ca. 1.5 × 1 mm, puberulent, ciliate; glands minutely toothed. Corolla yellow or green, rotate, ca. 1.2 cm in diam.; lobes broadly triangular, 3.5–7 × 2–3.5, glabrous. Corona lobes oblong-ovate, ca. 1 mm, apex rounded to almost acute, flat on corolla. Follicles linear-lanceolate, ca. 6 cm × 5 mm. Fl. Jul-Sep, fr. Sep-Dec.

Open woods. Guangxi, Guizhou, Yunnan [Thailand].

**3. *Heterostemma menghaiense*** (H. Zhu & H. Wang) M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 9. 1995.

勐海醉魂藤 meng hai zui hun teng

*Heterostemma villosum* Costantin var. *menghaiense* H. Zhu & H. Wang.

Lianas. Internodes yellow pilose, hairs retrorse, especially near nodes. Petiole to 2.8 cm, densely pilose; leaf blade ovate, ca. 8 × 6.5 cm, densely yellow pubescent to pilose, base truncate to shallowly cordate, apex acuminate; basal veins 5, lateral veins 3 or 4 pairs. Inflorescences sessile, umbel-like, few flowered; all parts up to sepals densely pubescent, almost tomentose. Pedicel to 2.3 cm. Sepals oblong-triangular, ca. 2.4 × 1.7 mm, apex rounded. Corolla yellow with purple dots, rotate, ca. 2 cm in diam.; densely puberulent outside, glabrous inside, smooth; limb ca. 1 cm in diam.; lobes ovate-triangular, ca. 6.5 × 6 mm, apex subacuminate. Corona raised in center;

lobes oblong-ovate, ca.  $2.5 \times 1.4$  mm, without any dorsal appendages, outer margin rounded, inner tooth rounded, largely concealing gynostegium. Fruit not seen. Fl. Jun.

- In thickets near streams; 1000–2000 m. Yunnan.

**4. *Heterostemma wallichii*** Wight, Contr. Bot. India 42. 1834.

云南醉魂藤 yun nan zui hun teng

Lianas to 3 m. Branches pubescent along 2 lines, longitudinally striate, sometimes glabrescent. Petiole 1–5 cm, flattened, puberulent; leaf blade ovate or elliptic,  $5\text{--}17 \times 3\text{--}10$  cm, glabrous or puberulent when young, base rounded, apex acuminate or obtuse; basal veins 3, lateral veins 3 or 4 pairs. Inflorescences shorter than leaves, few flowered; peduncle 0–7(–10) mm. Pedicel 5–10 mm. Corolla yellow-green, 6–8 mm in diam. Corona lobes obovate to orbicular, exceeding gynostegium. Stigma head centrally depressed. Fl. Jul-Sep.

Open woods, often climbing trees; 800–2100 m. S Yunnan [India, Nepal].

**5. *Heterostemma siamicum*** Craib, Bull. Misc. Inform. Kew 1911: 418. 1911.

心叶醉魂藤 xin ye zui hun teng

Lianas to 4 m. Branches pubescent along 2 lines, glabrescent. Petiole 3–8 cm; leaf blade oblong to ovate,  $4\text{--}15 \times 1.5\text{--}10$  cm, papery, glabrous, base cordate or shallowly so, apex acute; basal veins 5, lateral veins 3 or 4 pairs. Inflorescences extra-axillary; peduncle (0.5–)1.5–2 cm; rachis simple, producing a spiral succession of umbel-like cymules, eventually racemelike. Pedicel 1.5–2 cm. Sepals broadly lanceolate, puberulent, ciliate. Corolla yellowish, rotate; lobes ovate, ca.  $3.5 \times 2.5$  mm, puberulent, minutely tomentose inside. Corona lobes stellate spreading, lanceolate, ca. 2 mm, with a thick appendage on ventral surface. Follicles oblong-lanceolate,  $15\text{--}17$  cm  $\times$   $7\text{--}10$  mm, glabrous. Seeds ovate-oblong, ca.  $1.5$  cm  $\times$   $5$  mm, margin membranous; coma ca. 1.3 cm. Fl. Jun-Aug, fr. Aug-Oct.

Open woods; 1000 m. Guangxi, S Yunnan [Thailand, Vietnam].

**6. *Heterostemma oblongifolium*** Costantin in Lecomte, Fl. Indo-Chine 4: 120. 1912.

催乳藤 cui ru teng

Lianas to 3 m, internodes with 2 lines of hairs. Petiole 1.2–3(–4.5) cm; leaf blade oblong to rarely ovate-oblong,  $7.5\text{--}14\text{--}17.5 \times (2.8\text{--})3.5\text{--}5.4\text{--}(7)$  cm, thin leathery, base rounded, apex acute; lateral veins 5–7 pairs. Inflorescences umbel-like; peduncle 1–2 mm, 4 or 5 flowers open at 1 time. Pedicel (0.8–)1.2–2.2(–3.5) cm. Sepals oblong. Corolla greenish outside, yellowish or orange inside, rotate or shallowly bowl-shaped, 1–1.5 cm in diam., divided ca. halfway; lobes triangular-ovate,  $4\text{--}7\text{--}(9) \times 2.2\text{--}3.2\text{--}(6)$  mm. Corona lobes horizontally stellate spreading, oblong-obovate to circular,  $0.8\text{--}1.5 \times 0.7\text{--}1.4$  mm, apex rounded or acute, basal tubercle  $\pm$  absent. Follicles linear-lanceolate in outline,  $12\text{--}13.5 \times 0.9\text{--}1$  cm, diverging at  $\pm 180^\circ$  or more. Seeds linear-oblong, ca.  $2$  cm  $\times$   $3$  mm; coma ca. 3 cm. Fl. Aug-Oct, fr. Sep-Dec.

Mixed woods, thickets; 100–200 m. Guangdong, Guangxi, Hainan, Yunnan [Laos, Vietnam].

A decoction of the plant is used to induce lactation in women.

**7. *Heterostemma grandiflorum*** Costantin in Lecomte, Fl. Indo-Chine 4: 122. 1912.

大花醉魂藤 da hua zui hun teng

Lianas to 5 m. Stems and branchlets longitudinally striate; internodes usually pubescent along 2 lines, sometimes glabrous. Petiole (2–)2.5–6.5 cm, flattened; leaf blade ovate or ovate-oblong, (7–)10–19  $\times$  (3.5–)5–10.5 cm, papery, glabrous, base rounded, sometimes truncate, apex obtuse or



acute; basal veins 3, lateral veins 3 or 4 pairs, flattened adaxially, elevated abaxially. Inflorescences forked, 6–9 cm; peduncle 0.9–2.5(–3) cm. Pedicel 1–1.5(–4) cm, puberulent. Sepals ovate, margin membranous, ciliate. Corolla rotate, puberulent outside, glabrous inside; lobes ovate, ca. 4 × 3.5 mm. Corona lobes ligulate, ca. 3 mm, spreading horizontally and flat on corolla. Follicles linear-lanceolate, 10–12 cm × 7–10 mm, ± reflexed. Seeds broadly ovate, ca. 2 × 1.2 cm; coma ca. 2.5 cm. Fl. Jul-Sep, fr. Oct-Dec.

Open woodland, thickets. Guangdong, Guangxi, Hainan, Sichuan, Yunnan [Vietnam].

**8. *Heterostemma tsoongii*** Tsiang, Sunyatsenia 3: 192. 1936.

广西醉魂藤 guang xi zui hun teng

*Heterostemma renchangii* Tsiang.

Lianas to 4 m. Young branches pubescent, glabrescent. Petiole 1.5–3 cm, with an adaxial group of glands; leaf blade broadly ovate to ovate-oblong, 3–8 × 1.5–6 cm, papery to subleathery, glabrous, base rounded to cordate, apex acute or acuminate; basal veins 3–5, lateral veins 2 or 3 pairs, often sunken adaxially. Inflorescences umbel-like, shorter than leaves; peduncle 1–9 mm, puberulent. Pedicel 2–8 mm, rusty pubescent. Sepals ovate, ca. 2 × 1.5 mm, pubescent. Corolla yellowish green, puberulent; tube 2.5–3 mm, ca. 4 mm in diam.; lobes ovate-triangular, revolute, ca. 3 × 2.5–3 mm. Corona lobes drying blackish, oblong, thin with distinct basal tubercle, lying flat on corolla. Follicles lanceolate, ca. 11 cm × 4 mm, glabrous. Seeds oblong, ca. 1.3 cm × 4 mm; coma 1.5–2 cm. Fl. Jun-Aug, fr. Sep-Nov.

• Open woodland, thickets; 300–1000 m. Fujian, Guangxi, Hainan.

**9. *Heterostemma sinicum*** Tsiang, Sunyatsenia 3: 190. 1936.

海南醉魂藤 hai nan zui hun teng

Lianas woody, to 5 m, glabrous throughout. Branchlets grayish, thick, hollow, lenticellate. Petiole 2–3 cm; leaf blade ovate-oblong to oblong, 11–19 × 4.5–11 cm, thin papery, base rounded to truncate, apex acute; lateral veins 4 or 5 pairs, flattened. Inflorescences 8–13 cm; peduncle ca. 5.5 cm; rachis zigzag with 2 or more separated cymules; cymules with 2–5 flowers open, eventually racemelike. Pedicel 3–8 mm. Sepals triangular, ca. 1 × 1 mm; glands 10. Corolla brownish purple; tube ca. 1 mm long; lobes rotate, ovate-oblong, ca. 3 × 2 mm, longitudinally veined, mealy inside. Corona stellate spreading, apparently dark brown; lobes oblong-ligulate, ca. 1 mm, posterior angle obtuse. Gynostegium yellow tipped, constricted below apex. Anthers square, appendages rounded; pollinia circular to almost square. Stigma head subdepressed, obtuse. Fl. Jun.

• Mixed woods. ?Guangdong, Hainan.

**43. BRACHYSTELMA** R. Brown, Bot. Mag. tab. 2343. 1822, nom. cons.

润肺草属 run fei cao shu

Herbs erect, perennial. Rootstock usually a subglobose tuber [sometimes a cluster of swollen roots]. Leaves opposite, sessile or subsessile. Inflorescences umbel-like or racemelike. Pedicel slender, short. Calyx with 5 basal glands. Corolla campanulate

to subtotate; lobes erect or spreading, valvate. Corona double, attached to staminal column, outer series of 5 deeply 2-cleft lobes exceeding staminal column, inner series of 5 oblong lobes incumbent over stigma head, not or hardly exceeding staminal column. Filaments connate into a short tube; anthers without membranous apex; pollinia 2 per pollinarium, erect or ascending, with a translucent margin. Stigma head depressed. Follicles often linear, usually paired. Seeds comose.

About 60 species: mostly in Africa, also in Oceania and SE Asia; two species in China.

- 1a. Plants to 15 cm tall; internodes short; leaves 2–4 × 0.2–0.3 cm; inflorescences racemelike, many flowered ..... 1. *B. edule*  
1b. Plants to 50 cm tall; internodes long; leaves 5–6.5 × ca. 1.1 cm; inflorescences umbel-like, few flowered ..... 2. *B. kerrii*

**1. *Brachystelma edule*** Collett & Hemsley, J. Linn. Soc., Bot. 28: 89. 1890.

润肺草 run fei cao

Herbs 5–15 cm tall. Root tuber globose or ovoid, 1.5–2 cm in diam. Stems erect, simple, internodes short, puberulent to glabrous. Leaves opposite, rarely alternate at base of stem, sessile; leaf blade linear-lanceolate, 2–4 cm × 2–3 mm, glabrous; lateral veins 5–7 pairs, obscure. Racemes terminal. Pedicel slender, short. Sepals ovate-lanceolate, pubescent. Corolla subtotate, glabrous outside, pubescent inside; lobes lanceolate. Corona lobes reflexed. Pollinia ovoid, ascending. Follicles ca. 9 cm × 4 mm, glabrous. Fl. Oct.

Forests; 300–1200 m. Guangxi, Yunnan [Myanmar].

The tubers are edible, and the plant is used for the treatment of coughs and reducing of phlegm.

**2. *Brachystelma kerrii*** Craib, Bull. Misc. Inform. Kew 1911: 420. 1911.

长节润肺草 chang jie run fei cao

Herbs to 50 cm tall. Root tuber globose, to 2 cm in diam. Stems erect, simple, internodes long, glabrous. Leaves opposite, sessile; leaf blade linear, 5–6.5 × ca. 1.1 cm, glabrous; midvein concave adaxially, convex abaxially, lateral veins obsolete. Inflorescences terminal, umbellate, few flowered; peduncle ca. 1 cm. Pedicel 7–8 mm, puberulent. Sepals lanceolate, ca. 1.5 mm, puberulent to glabrous. Corolla subtotate; tube short; lobes triangular-ovate, ca. 5 × 1.5 mm, pilose. Corona lobes 3-cleft, reflexed. Pollinia ovoid, erect.

Lower forests. S Guangxi [Thailand, Vietnam].

#### **44. *CEROPEGIA* Linnaeus, Sp. Pl. 1: 211. 1753.**

吊灯花属 diao deng hua shu

Herbs perennial, erect or twining, sap clear or cloudy, rarely milky. Rootstock often a cluster of fusiform roots or a subglobose tuber, sometimes a rhizome [or with fibrous roots only]. Stems herbaceous [to very succulent]. Inflorescences extra-axillary [rarely terminal], mostly umbel-like, less often racemelike and sometimes branched. Flowers usually large. Calyx deeply 5-parted; basal glands many, small. Corolla tubular, base swollen, often asymmetrically, upper part often funnelliform; lobes usually slender and coherent at apex. Corona double, outer lobes 5, joined to form a cup, entire to deeply 2-lobed so that outer corona is 10-toothed; inner lobes 5, subulate to narrowly spatulate, basally incumbent on anthers, apical part usually long, erect. Filaments connate into a very short tube; anthers without apical appendages; pollinia 2 per pollinarium, erect, inner angle with a prominent translucent margin. Stigma head convex or impressed. Follicles linear, fusiform, or cylindrical.

About 170 species: mostly Africa, extending through tropical Asia and Oceania; 17 species in China.

The elaborate flowers of species of *Ceropegia* are particularly difficult to study from dried material, and this account must be regarded as provisional.

- 1a. Rootstock a subglobose tuber up to 3 cm in diam., roots sometimes thickened but not distinctly fusiform;

- leaf blade hastate; corolla exterior minutely hairy, lobes joined for apical third to half to form flat “roof” ... 1. *C. aridicola*
- 1b. Rootstock where known a cluster of fusiform roots and/or an elongated rhizome, subglobose tuber absent; leaf blade linear-lanceolate to ovate; corolla exterior glabrous, lobes joined at tip only to form open “cage.”
- 2a. Apex of flower buds abruptly narrowed at throat into beak with swollen tip; corolla lobes distinctly spatulate.
- 3a. Corolla very slender, up to 3.5 mm wide at throat, lobes 1.8–2 cm ..... 11. *C. trichantha*
- 3b. Corolla broader, 5.5–8 mm wide at throat, lobes 0.9–1.5 cm ..... 12. *C. driophila*
- 2b. Apex of flower buds rounded or if beaked, not swollen at tip; corolla lobes linear-oblong to ovate.
- 4a. Corolla throat narrower than inflated base.
- 5a. Corolla lobes uniformly colored.
- 6a. Inflorescences often more than 2-flowered; stems densely crisped pubescent; leaf blade more than 5 × as long as wide; corolla tube slightly narrower than throat, lobes linear; outer corona lobes 2-toothed ..... 16. *C. muliensis*
- 6b. Inflorescences 1- or 2-flowered; stems sparsely pilose on 1 side; leaf blade less than 4 × as long as wide; corolla narrowing gradually from base to throat, lobes spatulate; outer corona lobes reduced to ill-defined ciliate flanges ..... 17. *C. hookeri*
- 5b. Corolla lobes with pale basal part, sometimes with fine dark veins, and sharply delineated dark apical part, usually purple, possibly dark green, often hairy.
- 7a. Corolla lobes 5–7 mm, broadly lanceolate, corolla widening above base of lobes ..... 2. *C. teniana*
- 7b. Corolla lobes 11–25 mm, linear to narrowly oblong, corolla not widening above base of lobes.
- 8a. Erect herbs to 20 cm high; inflorescences 2–4-flowered ..... 3. *C. sinoerecta*
- 8b. Robust twiners 1 m or more high; inflorescences 5- or more flowered.
- 9a. Corolla lobes 2–2.5 cm, glabrous; outer corona lobes entire ..... 13. *C. pubescens*
- 9b. Corolla lobes 1.1–1.6 cm, hairy; outer corona lobes each with 2 linear teeth ..... 7. *C. longifolia*
- 4b. Corolla throat wider than inflated base.
- 10a. Corolla lobes ovate, uniform in color and indumentum, corolla at anthesis widest part way up lobes; inflorescences (4–)6–10-flowered.
- 11a. Leaf blade ovate, up to 2 × as long as broad ..... 14. *C. monticola*
- 11b. Leaf blade lanceolate, more than 4 × as long as broad ..... 15. *C. salicifolia*
- 10b. Corolla lobes linear to narrowly oblong and sharply differentiated by color and indumentum from triangular base, corolla at anthesis widest at base of lobes; inflorescences 1–4(–7)-flowered (8- or more flowered in *C. longifolia*).
- 12a. Corolla lobes ca. 1/4 as long as corolla, linear, abruptly contracted from triangular base, bud with distinct narrow beak less than 1/3 as wide as corolla at base of lobes ..... 4. *C. exigua*
- 12b. Corolla lobes more than 3/10 as long as corolla, oblong, bud with indistinct beak more than 1/2 as wide as corolla at base of lobes.
- 13a. Leaves glabrous ..... 10. *C. paohsingensis*
- 13b. Leaves hairy, at least on veins.
- 14a. Leaf blade linear-lanceolate, 0.2–1.5(–2) cm wide, (4–)7– > 10 × as long as broad.
- 15a. Leaves (5–)8–15(–2) mm wide; outer corona lobes each with 2 slender teeth ..... 5. *C. dolichophylla*
- 15b. Leaves 2–7 mm wide; outer corona lobes each with 2 short, blunt teeth ..... 6. *C. stenophylla*
- 14b. Leaf blade ovate, 1.2–3 cm wide, 1.5–3(–4) × as long as broad.
- 16a. Peduncle 9–27 mm; inflorescences 4– > 8-flowered; upper parts of plant sparsely hairy ..... 7. *C. longifolia*
- 16b. Peduncle up to 4 mm, often almost absent; inflorescences rarely if ever more than 2-flowered; upper parts of plant densely hairy.
- 17a. Leaf blade base cuneate; corolla (2.3–)4.3–4.9 cm ..... 8. *C. mairei*
- 17b. Leaf blade base rounded; corolla ca. 5 cm ..... 9. *C. christenseniana*

**1. *Ceropegia aridicola* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 197. 1920.**

丽江吊灯花 li jiang diao deng hua

Rootstock a subglobose tuber to 3 cm in diam., with thickened roots. Stems erect, to 50 cm, dichotomous, basal part leafless. Petiole 4–6 mm, crisped-pubescent; leaf blade

ovate-triangular, 5–15 × 3–10 mm, somewhat fleshy, adaxially crisped-pubescent, abaxially sparsely pubescent on veins, base cordate or subhastate, margin revolute, apex acuminate; lateral veins obscure. Inflorescences monochasial, 1–3-flowered. Pedicel 3–10 mm, minutely puberulent. Sepals linear-lanceolate, ca. 2 × 1 mm, puberulent to glabrous. Corolla 1–1.5 cm, sparsely pilose outside, glabrous inside; tube 7–10

mm; lobes ovate to subrhomboid, 3–5 mm, joined for half length to form flat “roof” with short central mucro. Outer corona lobes triangular, joined into cup, glabrous; inner corona lobes ligulate or linear-spatulate, twice as long as outer lobes. Follicles fusiform, ca. 4.5 cm. Seeds ca. 5 mm. Fl. Jul-Aug, fr. Sep-Oct.

- Grasslands; 1500–3000 m. Yunnan (Lijiang to Zhongdian).

**2. *Ceropegia teniana*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 61: 167. 1924.

马鞍山吊灯花 ma an shan diao deng hua

Stems twining to 1 m, slender, minutely hirsute. Petiole ca. 1 cm; leaf blade broadly ovate, 3–4.5 × 1.5–2.5 cm, membranous, glabrous except for midvein abaxially, base subtruncate, apex short acuminate; lateral veins ca. 3 pairs. Inflorescences umbel-like, 1–8-flowered; peduncle up to 1.3 cm. Pedicel 1.2–2 cm. Sepals subulate-lanceolate, 3–4 mm, glabrous. Corolla 1.5–2.3 cm; tube yellow, 3–4 mm in diam. just above dilated base; lobes dark violet, broadly ovate, ca. 5 mm, papillate at base inside. Outer corona lobes triangular-lanceolate, ca. 2.5 mm, sparsely villous; inner lobes linear, ca. 2 mm. Fl. Aug.

- Montane forests. Yunnan (Yanyuan).

**3. *Ceropegia sinoerecta*** M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 4. 1995.

鹤庆吊灯花 he qing diao deng hua

Herbs. Rootstock a cluster of fusiform roots. Stems erect, to 20 cm, uniformly fine puberulent. Petiole 4–6 mm, winged; leaf blade elliptic, 2–5 × 0.6–1.6 cm, abaxially pale, sparsely hairy on veins only, adaxially densely puberulent, base cuneate, acute, lowermost leaves sometimes cuspidate. Peduncle 0.4–1.7 cm. Cymes umbel-like, 2–4-flowered, sometimes producing a second separated by short rachis. Pedicel 0.5–1.7 cm. Sepals linear-lanceolate, ca. 3 × 0.6 mm, glabrous. Corolla 3.6–4.3 cm, glabrous except for lobes; tube dark on basal half, pale on apical half, 1.3–1.6 mm wide, basal swelling ovoid, 4–6 mm wide, increasing gradually to 3.5–5.5 mm at base of lobes; lobes dark colored almost to base, minutely puberulent, 1.4–1.5 cm, linear, slightly curved inward at base, otherwise parallel except for sharply incurved tip. Outer corona lobes each with 2 linear teeth ca. half as long as inner lobes, ciliate; inner corona lobes linear, ca. 2.5 mm, erect.

- On limestone; 2000 m. Yunnan.

**4. *Ceropegia exigua*** (H. Huber) M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 3. 1995.

四川吊灯花 si chuan diao deng hua

*Ceropegia longifolia* Wallich subsp. *exigua* H. Huber, Mem. Soc. Brot. 12: 42. 1957.

Rootstocks not seen. Stems twining, sparsely puberulent. Petiole ca. 3.5 mm, sparsely puberulent; leaf blade linear-lanceolate, ca. 4.5 cm × 6 mm, abaxially with a few hairs on veins only, adaxially puberulent, base cuneate, apex acute. Cymes umbel-like, 1- or 2- (or 3)-flowered; peduncle to 3 mm.

Pedicel to 8 mm, glabrous. Sepals linear-lanceolate, ca. 3 × 0.6 mm, glabrous. Corolla yellow with fine dark lines, 2.5–2.6 cm; tube ca. 2 cm, 2.5–3.5 mm wide, widening to 9.5 mm, base only slightly inflated, 4.5–6.5 mm wide; lobes very abruptly narrowed, ca. 5 mm, forming short narrow beak in bud, margin densely ciliate. Outer corona lobes deeply notched to form 5 pairs of teeth, more than 1/2 as long as inner lobes.

- 1200 m. Sichuan.

**5. *Ceropegia dolichophylla*** Schlechter, Notes Roy. Bot. Gard. Edinburgh 8: 17. 1913.

剑叶吊灯花 jian ye diao deng hua

*Ceropegia dolichophylla* var. *brachyloba* Handel-Mazzetti; *C. dolichophylla* var. *purpureobarbata* W. W. Smith; *C. longifolia* Wallich subsp. *sinensis* H. Huber; *C. profundorum* Handel-Mazzetti.

Stems twining, to 1.5 m, pale gray, glabrous. Petiole to 1 cm; leaf blade linear-lanceolate, 5–12 × 0.5–2 cm, base cuneate, ciliate, adaxially sparsely pubescent, abaxially glabrous, ± glaucous. Inflorescences (1- or) 2–7-flowered; peduncle 0.2–3 cm, sparsely pubescent. Pedicel 1–1.5 cm, glabrous. Sepals linear-lanceolate, 5–6 × ca. 1.5 mm, glabrous. Corolla (2.2–) 3–4.7 cm, glabrous outside; tube streaked and blotched purplish maroon, inflated base 4–6.5(–10) mm wide, narrowing to (1.3–) 2–4.5 mm and then widening to 4–12(–16) mm at base of lobes; lobes (0.8–) 1–2.2(–2.5) cm, base ± triangular, pale, apical part slender, darker, coherent at apex, keeled, pilose inside, sometimes with conspicuous white or purple marginal vibratile hairs. Corona usually glabrous, outer 10-lobed, sometimes ciliate; inner lobes twice as long, linear-lanceolate, obtuse. Follicles linear-lanceolate in outline, ca. 10 cm × 5 mm. Fl. Jul-Aug, fr. Sep-Oct.

- Dense forests; 500–1500 m. Guangxi, Guizhou, Sichuan, Yunnan.

Species 5 to 9 are difficult to define. The extremes are distinctive but there is variation in all the characters (indumentum, leaf size and shape, peduncle length, and inflorescence size) used to define them.

**6. *Ceropegia stenophylla*** C. K. Schneider in Sargent, Pl. Wilson. 3: 350. 1916.

狭叶吊灯花 xia ye diao deng hua

Rootstocks a cluster of fusiform roots. Stems twining to 2 m, glabrous to sparsely pilose. Leaf blade linear or linear-lanceolate, 3.5–9 cm × 2–7 mm, base cuneate, apex ± acute, adaxially short pilose, abaxially subglabrous or glabrous. Inflorescences (1- or) few flowered; peduncle 1–6 mm. Pedicel to 1.4 cm. Sepals linear or linear-lanceolate, 5–7 mm, glabrous or ciliate; glands 16–20. Corolla 3–5 cm; tube 2.6–3 cm, inflated base 5.5–8 mm wide, abruptly narrowed to ca. 3 mm wide and then widening to 8.5–10 mm at base of lobes; lobes oblong-elliptic, 0.9–1.6(–2) cm, sparsely pilose, ciliate. Outer corona lobes 2-toothed, teeth triangular, blunt, ca. as high as gynostegium, ciliate; inner lobes linear, subobtusely, glabrous. Follicles fusiform, 8–9 cm × ca. 3 mm, striate. Seeds oblong, ca. 7 × 3 mm; coma ca. 2 cm. Fl. Jun.

- Montane forests, thickets; 1900–2600 m. Sichuan.

**7. *Ceropegia longifolia*** Wallich, Pl. Asiat. Rar. 1: 56, t. 73. 1830.

长叶吊灯花 chang ye diao deng hua

Stems herbaceous, twining to 3.5 m, sparsely pilose along 1 or 2 sides. Petiole ca. 1.2 cm, narrowly winged, pilose; leaf blade lanceolate, 5–12(–17) × 1.2–3 cm, abaxially glaucous and glabrous except for midvein, adaxially appressed pubescent, base rounded or cuneate, apex acute to acuminate; lateral veins 6 or 7 pairs. Inflorescences umbel-like, 4–8-flowered; peduncle 0.9–2.7(–3.5) cm. Pedicel 1–1.5 cm. Sepals linear, ca. 4 mm, glabrous. Corolla purplish, 2.2–3.6 cm; basal inflation 4.5–6.5 mm wide, tube 1.6–3.2 mm wide, expanding to 4.5–8.5 mm wide at base of lobes; lobes oblong, (0.7–)1–1.3 cm, pale at base, terminal 5–6 mm purple, puberulent. Outer corona lobes divided into pairs of linear teeth; inner corona lobes erect, linear.

2100 m. Xizang, Yunnan [India, Myanmar, Nepal, Sikkim].

The plant illustrated as *Ceropegia trichantha* in Fl. Reipubl. Popularis Sin. (63: 573, t. 218, 1977) is *C. longifolia*. The Chinese material has distinctly broader leaves and relatively longer corolla lobes than typical material from India. However, the variation is continuous, and formal separation does not seem justified.

**8. *Ceropegia mairei*** (H. Léveillé) H. Huber, Mem. Soc. Brot. 12: 43. 1957.

金雀马尾参 jin que ma wei shen

*Aristolochia mairei* H. Léveillé, Bull. Acad. Int. Géogr. Bot. 22: 228. 1912; *A. blinii* H. Léveillé; *A. viridiflora* H. Léveillé; *A. viridiflora* var. *occlusa* H. Léveillé; *Ceropegia balfouriana* Schlechter; *C. mairei* var. *tenella* H. Huber.

Rootstocks a cluster of fusiform roots. Stems erect to 35 cm, or twining, basal part leafless, minutely puberulent. Petiole 3–10 mm, narrowly winged, puberulent; leaf blade elliptic or elliptic-lanceolate, 1–4(–5) × 0.4–1.6(–2.3) cm, abaxially glabrous except for midvein, adaxially densely minute puberulent, base cuneate or attenuate into indistinct petiole, margin somewhat undulate, apex acute or short acuminate; lateral veins obscure. Inflorescences subsessile, 1- or 2(–5)-flowered; peduncle 0–4(–20) mm. Pedicel 0.4–1.7 cm, sparsely puberulent. Sepals linear-triangular, to 7 × 0.9 mm, sparsely puberulent. Corolla yellow or green with purple markings, (2.3–) 4.3–4.9 cm, (4–)5.5–7 mm wide near base; tube uniformly colored, 2–3.4 mm wide, increasing gradually to (6–)9–12 mm wide at throat, glabrous outside; lobes (0.7–) 1.4–2.5 cm, strongly revolute, widest just above base, erect with strongly incurved tip, base pale with fine dark veins, apical part dark, densely pubescent, puberulent inside. Outer corona lobes triangular, pilose; inner lobes linear, slightly dilated toward apex, obtuse, glabrous, twice as long as outer. Fl. May–Jul, fr. Oct.

• Low thickets, limestone slopes; (1000–)1800–3200 m. Guizhou, Sichuan, Yunnan.

**9. *Ceropegia christenseniana*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 61: 167. 1924.

短序吊灯花 duan xu diao deng hua

Stems twining, to 1.5 m, slender, puberulent. Petiole 0.5–2 cm; leaf blade ovate, 4–5 × ca. 3 cm, membranous, densely pubescent, base rounded, margin undulate, apex acute; lateral veins ca. 5 pairs. Inflorescences 1- or few flowered; peduncle very short. Pedicel 8–10 mm, glabrous. Sepals subulate-lanceolate, 5–7 mm, ciliate. Corolla ca. 5 cm, base swollen; tube funnelform, basal half yellow, apical half violet, 4–5 mm in diam. near base; lobes oblong, ca. 2 cm, ciliate, sharply incurved at tip. Outer corona lobes triangular-lanceolate, ca. 3 mm, long ciliate; inner lobes ligulate, ca. 3 mm. Follicles fusiform, ca. 13 cm × 5 mm. Fl. Sep–Oct, fr. Oct–Dec.

• Montane forests. Guizhou, Yunnan.

All parts are used for the treatment of boils and fractures. The distinction from *Ceropegia mairei* seems rather slight.

**10. *Ceropegia paohsingensis*** Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 145. 1974.

宝兴吊灯花 bao xing diao deng hua

Herbs twining, to 2 m, glabrous except for flowers. Petiole 1–1.5 cm; leaf blade ovate or ovate-oblong, membranous, 3–6 × 1.5–2.5 cm, base cordate, apex caudate-acuminate; lateral veins 7–9 pairs, somewhat flattened, glabrous. Inflorescences 1- or 2-flowered, up to as long as leaves; peduncle slender, 0.8–2 cm. Pedicel ca. 1 cm. Sepals lanceolate, ca. 2 × 0.5 mm, ciliate. Corolla with pale green and purplish spots and stripes, glabrous; tube ca. 2 cm, funnelform above swollen base; lobes ligulate, ca. 6 × 2 mm. Outer corona shallowly lobed; lobes 2-cleft at apex, pilose; inner lobes ligulate and longer than gynostegium. Fl. Apr–Aug.

• Valleys; 300–900 m. Hunan, Sichuan.

**11. *Ceropegia trichantha*** Hemsley, J. Bot. 23: 286. 1885.

吊灯花 diao deng hua

*Ceropegia angustilimba* Merrill; *C. jucunda* Kerr.

Rootstock a cluster of fusiform roots. Stems twining to 1.5 m, straw gray, glabrous except for nodes. Petiole to 2.8 cm, winged, appressed pubescent; leaf blade oblong-lanceolate or elliptic-oblong, ca. 4.5 × 2.5 cm, membranous, adaxially appressed pubescent, abaxially glaucous and glabrous except for midvein, base rounded or cuneate, apex acute; lateral veins 6 or 7 pairs. Inflorescences 1- or 2-flowered; peduncle 1.4–3.5 cm. Pedicel 1–1.5 cm. Sepals linear-lanceolate, 3–4(–6) × ca. 1 mm. Corolla glabrous, 3–4.5 cm; tube green and white, 1.5–2 cm, base obliquely inflated ovoid, 3.7–4.5 mm wide, limb narrowly funnelform, 3–3.5 mm wide; lobes dark purple, 1.8–2 cm, very slender, almost threadlike with spatulate tips. Outer corona lobes deeply 2-toothed, teeth ± triangular, ciliate; inner lobes ligulate, to 3 mm, villous. Follicles fusiform, ca. 20 cm × 5 mm. Fl. Aug–Oct, fr. Oct–Dec.

Open woodland, bushland; 100–1000 m. Guangdong, Hainan [Thailand].

The plant figured as *Ceropegia trichantha* in Fl. Reipubl. Popularis Sin. (63: 573, t. 218, 1977) is a form of *C. longifolia* Wallich. Huber (Mem. Soc. Brot. 12: 54. 1957) included *Ceropegia trichantha* in the Indian *C. lucida* Wallich subsp. *lucida*. Material so named is extremely variable and probably represents more than one taxon.

**12. *Ceropegia driophila*** C. K. Schneider in Sargent, Pl. Wilson. 3: 349. 1916.

巴东吊灯花 ba dong diao deng hua

*Ceropegia lucida* Wallich subsp. *driophila* (C. K. Schneider) H. Huber; *C. micrantha* Merrill; *C. siamensis* Kerr.

Herbs twining. Stems to 1.5 m, slender, hollow when dry, glabrous. Petiole 1–2.5 cm, glabrous or sparsely minute pilose; leaf blade oblong or ovate-oblong, (3–)4.5–6.5(–7.5) × 1–2.5(–5.3) cm, membranous, adaxially sparsely short pilose, abaxially glabrous or glabrescent, base subcordate, margin ciliate, apex acuminate. Inflorescences 2–8-flowered; peduncle 0–8 mm. Pedicel 5–10 mm, glabrous. Sepals linear, 2–3 mm, glabrous. Corolla 2.2–3 cm; tube base dark when dried, inflated for ca. 4 mm, upper part pale with conspicuous dark blotches, throat 5–8 mm wide; lobes ligulate-oblong or spatulate, dark at base and expanded tips, rest pale with elongated dark spots, 0.9–1.5 cm, glabrous, keeled inside, margin long ciliate. Outer corona cupular; lobes triangular, apex 2-toothed, hirsute ciliate; inner ligulate-linear, subobtusely, glabrous. Fl. Jun.

- Bushland; 600–900 m. Hubei (Badong), Sichuan.

**13. *Ceropegia pubescens*** Wallich, Pl. Asiat. Rar. 2: 81. 1831.

西藏吊灯花 xi zang diao deng hua

*Ceropegia tsaiana* Tsiang.

Rootstock a cluster of fusiform roots. Stems herbaceous, twining to 1 m, glabrescent. Petiole 3–4.5 cm, villous; leaf blade ovate or rarely oblong, 4–15 × 1–6 cm, membranous, adaxially villous, base rounded, apex acuminate; lateral veins ca. 5 pairs. Inflorescences shorter than leaves, ca. 8-flowered; peduncle ca. 2.5 cm, glabrescent. Pedicel ca. 1 cm, puberulent. Sepals lanceolate, ca. 1.5 × 0.5 cm. Corolla yellow, 5–5.5 cm; tube 3–3.5 cm, base slightly inflated, throat 3–5 mm in diam., narrower than base; lobes linear, 2–2.5 cm, basal ca. 1 cm orange-yellow, wider and strongly revolute, apical part ± subulate, purple. Outer corona obscurely 5-lobed, setose; inner lobes linear, much longer. Follicles narrowly fusiform, ca. 13 cm × 2 mm. Seeds lanceolate, ca. 10 × 1 mm; coma ca. 3.5 cm. Fl. Jul-Sep.  $2n = 20$ .

Mixed woods; 1500–3200 m. Guizhou, Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal].

**14. *Ceropegia monticola*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 198. 1920.

白马吊灯花 bai ma diao deng hua

*Ceropegia yunnanensis* Schlechter & Handel-Mazzetti.

Stems herbaceous, twining to 1.5 m, pale gray, hollow when dry, sparsely villous. Petiole 5–10 mm, densely hirsute; leaf blade broadly ovate to ovate-oblong, 4–10 × 3–5 cm, membranous, adaxially sparsely hirsute, abaxially glabrescent or sparsely hirsute along midvein, base rounded to broadly cuneate, margin ciliate, apex acuminate; lateral veins ca. 6 pairs. Inflorescences umbel-like; peduncle 4–15 mm, hirsute. Pedicel 0.5–1.5 cm, glabrous or minutely pubescent abaxially.

Sepals subulate-linear, ca. 5 mm, glabrous. Corolla mostly maroon or pink, 3–4 cm, glabrous outside; tube 1.5–2 cm, base slightly dilated, limb 2.5–3 mm wide above basal swelling widening to 6–10 mm at throat; lobes linear, ca. 1.5 cm, basal part pale, sparsely lanate, apical part sharply delineated, dark (?green), minutely pubescent. Outer corona lobes acutely 2-lobed, ciliate; inner lobes oblong, obtuse, ca. 3 × longer than outer. Fl. Apr-Aug.

Mixed woods, thickets along riversides; below 2000 m. Guizhou, Sichuan, Xizang, Yunnan [Thailand].

**15. *Ceropegia salicifolia*** H. Huber, Mem. Soc. Brot. 12: 51. 1957.

柳叶吊灯花 liu ye diao deng hua

Rootstocks a cluster of fusiform roots. Stems twining to 1.5 m, glabrous. Petiole ca. 1 cm, pubescent along 2 lines; leaf blade lanceolate, 6–15 × 1–2.1 cm, membranous, puberulent adaxially and abaxially along midvein, base broadly cuneate, margin ciliate, apex caudate-acuminate; lateral veins ca. 7 pairs. Inflorescences 13–20-flowered; peduncle 0–6 (–10) mm, pubescent along 2 lines. Sepals subulate-lanceolate, ca. 5 mm. Corolla relatively uniformly pale when dried, 3–3.6 cm, glabrous outside; tube puberulent inside, inflated base 4–6 mm wide narrowing to 2–3.5 mm, widening to 5–8.5 mm at throat; lobes 1.3–1.9 cm, ovate and slightly revolute so open flowers are widest above throat. Outer corona lobes triangular, notched at apex; inner lobes, linear, longer than outer. Fl. Jun.

- Montane forests; 500–1000 m. Guangxi, S Yunnan.

**16. *Ceropegia muliensis*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 199. 1920.

木里吊灯花 mu li diao deng hua

Rootstocks a cluster of fusiform roots. Stems twining to 1 m, slender, densely crisped pubescent. Petiole ca. 1 cm, pubescent; leaf blade lanceolate, 10–13 × 2–3 cm, base cuneate, adaxially crisped pubescent, abaxially glabrous except for midvein. Inflorescences lax branched, many flowered; peduncle (1.5–)2.5–4 cm. Pedicel ca. 1 cm, glabrous or sparsely pubescent. Sepals linear-lanceolate, 3–4 mm, glabrous. Corolla 2.7–3 cm, glabrous; tube ca. 2 cm, base fusiform, to 2.5 mm wide; tube < 1 mm wide, throat only slightly dilated, narrower than basal swelling; lobes linear-oblong, 7–9 mm. Outer corona teeth 2-lobed, ciliate; inner lobes linear-oblong. Follicles lanceolate, ca. 9 cm. Fl. Aug.

- Bushland; 3000 m. SW Sichuan.

**17. *Ceropegia hookeri*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 73. 1883.

匙冠吊灯花 chi guan diao deng hua

Stems twining, sometimes erect, sparsely pilose on 1 side. Petiole 4–12 mm, pilose; leaf blade lanceolate, 3.4–5.2 × 1.3–2.4 cm, pubescent, base broadly cuneate to rounded, apex acuminate. Inflorescences 1- or 2-flowered; peduncle 0–4 mm, pilose on 1 side. Pedicel 7–8 mm, glabrous. Sepals linear-lanceolate, 3–4.5 × 0.6–1 mm, glabrous. Corolla 1.8–2.2 cm, glabrous except for a band of ciliate hairs ca. 2/3 up tube

on inside; tube ovoid-fusiform, 1.1–1.4 cm, 4.7–6.3 mm wide, narrowing to throat 2.6–3.5 mm wide; lobes linear-spatulate, 7–8 mm. Outer corona reduced to ciliate flanges; inner lobes linear-oblong.

3000 m. ?Sichuan, Xizang [India, Nepal, Sikkim].

*Harry Smith 1901* (Sichuan) is probably a form of this species with unusually small flowers, ca. 1 cm, and often short,  $\pm$  impressed, corolla lobes which give the flower a peculiar appearance.