

## APOCYNACEAE

夹竹桃科 jia zhu tao ke

Li Ping-tao<sup>1</sup>; Antony J. M. Leeuwenberg<sup>2</sup>, David J. Middleton<sup>3</sup>

Trees, shrubs, or vines, rarely subshrubs or herbs, with latex or rarely watery juice. Leaves simple, opposite, rarely whorled or alternate, pinnately veined; stipules absent or rarely present. Inflorescences cymose, terminal or axillary, with bracteoles. Flowers bisexual, 5- [or 4]-merous, actinomorphic. Calyx 5- or rarely 4-partite, quincuncial, basal glands usually present. Corolla 5- or rarely 4-lobed, salverform, funnelform, urceolate, or rarely rotate, lobes overlapping to right or left, rarely valvate. Stamens 5 or rarely 4; filaments short; anthers mostly sagittate, free or connivent into a cone adherent to pistil head, dehiscing longitudinally, base rounded, cordate, sagittate, or prolonged into an empty spur; pollen granular; disc ringlike or cup-shaped, 2–5-lobed, or absent. Ovaries superior, rarely half-inferior, connate or distinct, 1- or 2-locular; ovules (1 or) 2–numerous per locule. Style 1; pistil head capitate, conical, or lampshade-shaped, base stigmatic, apex 2-cleft and not stigmatic. Fruit a berry, drupe, capsule, or follicle. Seeds with or without coma; endosperm thick and often horny, scanty, sometimes absent; embryo straight or nearly so, cotyledons often large, radicle terete.

About 155 genera and 2000 species distributed primarily in the tropics and subtropics, poorly represented in the temperate regions. Of the 44 genera and 145 species present in China, one genus and 38 species are endemic, and nearly 95% of the taxa grow in the southern and southwestern portions of the country.

Fruit type is highly diversified in the family, and it is diagnostic of many genera. Genera 1–4 produce 1, 2-celled berries from a flower; genus 5 produces 2, 1-celled berries from a flower; 6 and 7 produce mostly fleshy follicles containing deeply indented seeds with ruminant endosperm; 8 has follicles and winged seeds; 9 produces follicles and seeds with 2 comas; 10–12 have follicles with globose seeds; 13–18 have drupes mostly with fleshy mesocarp; 19 has samaroid fruit; 20 has spiny capsules with seeds winged all around; and 21–44 have free or fused follicles and comose seeds. Double flowers are known only from cultivated forms of *Nerium oleander*, *Tabernaemontana divaricata*, and *Wrightia religiosa*.

Plants of the Apocynaceae are often poisonous and are rich in alkaloids or glycosides, especially in the seeds and latex. Some species are valuable sources of medicine, insecticides, fibers, and rubber.

Tsiang Ying & Li Ping-tao. 1977. Apocynaceae. Fl. Reipubl. Popularis Sin. 63: 1–249.

- 1a. Herbs, sometimes with a woody base.
  - 2a. Plants with stolons; corolla violet ..... 12. *Vinca*
  - 2b. Plants without stolons; corolla mostly pink or white, sometimes bluish.
    - 3a. Leaf blade with pale venation; corolla tube narrow, 2–3 cm ..... 11. *Catharanthus*
    - 3b. Leaf blade without pale venation; corolla tube narrow or broad, up to 1 cm.
      - 4a. Corolla salverform, lobes overlapping to left; all leaves alternate ..... 10. *Amsonia*
      - 4b. Corolla campanulate or basin-shaped, lobes overlapping to right; usually some leaves opposite .... 36. *Apocynum*
- 1b. Trees, shrubs, or woody climbers.
  - 5a. Shrubs or climbers with straight spines ..... 1. *Carissa*
  - 5b. Plants without spines.
    - 6a. Leaves alternate.
      - 7a. Branchlets mostly 2–3 cm in diam.; flowers waxy; fruit a follicle; seeds winged ..... 8. *Plumeria*
      - 7b. Branchlets less than 1 cm in diam.; flowers not waxy; fruit a drupe; seeds wingless.
        - 8a. Corolla white, often with a deep pink-red or yellow throat, tube cylindrical or nearly so; fruit subglobose ..... 18. *Cerbera*
        - 8b. Corolla yellow, tube funnelform; fruit rhomboid or nearly so ..... 17. *Thevetia*
    - 6b. Leaves opposite or whorled.
      - 9a. Leaves whorled, at least toward tips of branches.
        - 10a. Corolla yellow, tube at least 4 cm; fruit globose, prickly ..... 20. *Allamanda*
        - 10b. Corolla variously colored, usually not yellow, tube up to 2.2 cm; fruit globose or not, smooth.
          - 11a. Corolla tube funnelform, 1.2–2.2 cm, with corona; leaves thick, lanceolate, with dark reticulate venation abaxially; fruit a united pair of follicles ..... 28. *Nerium*
          - 11b. Corolla tube almost cylindrical, mostly up to 1 cm, if longer than without a corona; leaves often not very thick, variously shaped; fruit a pair of drupes or free follicle.
            - 12a. Climbers, if erect shrubs then fruit moniliform with 1–4 drupelike articles.
              - 13a. Leaves with hairy domatia; fruit follicular, constricted; seeds comose ..... 39. *Parameria*
              - 13b. Leaves without hairy domatia; fruit moniliform, sometimes globose,

<sup>1</sup> Department of Forestry, South China Agricultural University, Wushan, Tianhe, Guangzhou, Guangdong 51064, People's Republic of China.

<sup>2</sup> Department of Plant Taxonomy, Wageningen Agricultural University, P. O. Box 8010, 6700 ED Wageningen, The Netherlands.

<sup>3</sup> Department of Botany, Trinity College, University of Dublin, Dublin 2, Ireland.

- transversely constricted into 2–5 drupelike articles ..... 14. *Alyxia*
- 12b. Erect trees or shrubs, fruit not moniliform.
  - 14a. Fruit slender follicles; seeds hairy; disc of 2 separate glands alternating with carpels, small annular, or absent; often big trees ..... 9. *Alstonia*
  - 14b. Fruit drupes; seeds not hairy; disc ringlike, cup-shaped, or absent; small trees or shrubs.
    - 15a. Corolla lobes overlapping to right, often suberect; disc absent; drupes mostly more than 3 cm; mesocarp fibrous ..... 16. *Ochrosia*
    - 15b. Corolla lobes overlapping to left, spreading; disc ringlike or cup-shaped; drupes up to 2 cm; mesocarp fleshy ..... 13. *Rauvolfia*
- 9b. All leaves opposite.
  - 16a. Corolla lobes overlapping to left.
    - 17a. Climbers.
      - 18a. Corolla tube cylindrical or narrowed at throat; fruit berrylike.
        - 19a. Disc absent; calyx without colleters inside; corolla with faucal corona scales, tube almost cylindrical ..... 3. *Melodinus*
        - 19b. Disc cylindrical, thick, fleshy; calyx with basal colleters inside; corolla without faucal corona scales, tube inflated at base, contracted at mouth ..... 4. *Bousigonia*
      - 18b. Corolla tube funnellform or nearly so, not narrowed at throat; fruit follicular.
        - 20a. Corolla tube 2–2.5 mm; follicles moniliform ..... 39. *Parameria*
        - 20b. Corolla tube ca. 12 mm; follicles narrowly fusiform ..... 42. *Parepigynum*
    - 17b. Trees or shrubs.
      - 21a. Leaf blades with numerous parallel secondary veins; fruit samaroid follicles ..... 19. *Cameraria*
      - 21b. Leaf blades with secondary veins clearly separate from each other and usually with tertiary veins; fruit berries or wingless follicles.
        - 22a. Stamens well exerted; corona usually present; fruit long dry follicles; seeds comose ..... 29. *Wrightia*
        - 22b. Stamens included or barely exerted; corona absent; fruit mostly berrylike; seeds not comose.
          - 23a. Inflorescences fascicled, axillary; fruit of united carpels ..... 2. *Acokanthera*
          - 23b. Inflorescences corymbose, terminal, at branch forks, or sometimes axillary; fruit of at least partly separated carpels.
            - 24a. Branching not dichotomous; submarginal leaf veins present; corolla tube ca. 7 × as long as calyx ..... 5. *Hunteria*
            - 24b. Branching dichotomous; submarginal leaf veins absent or obscure; corolla tube long or short.
              - 25a. Corolla tube slightly shorter or longer than calyx; calyx shed before fruit develops, lobes recurved ..... 6. *Voacanga*
              - 25b. Corolla tube at least 4 × as long as calyx; calyx persistent at fruit base, lobes erect in fresh flowers ..... 7. *Tabernaemontana*
  - 16b. Corolla lobes overlapping to right.
    - 26a. Trees or shrubs; corolla lobes not caudate.
      - 27a. Corolla tube 2.3–5 cm, very narrow; fruit drupaceous; seeds not comose ..... 15. *Kopsia*
      - 27b. Corolla tube up to 1.9 cm; fruit follicular; seeds comose.
        - 28a. Peduncle 0.9–1.7 cm; sepals mostly pubescent outside; corolla tube 0.9–1.9 cm; seeds not beaked ..... 35. *Holarrhena*
        - 28b. Peduncle absent or to 0.8 cm; sepals glabrous or sparsely puberulent outside; corolla tube up to 1.3 cm; seeds beaked.
          - 29a. Stamens exerted; pedicel 1.5–3 cm; corolla lobes 1.2–1.8 × as long as tube; domatia mostly absent ..... 33. *Kibatalia*
          - 29b. Stamens included; pedicel 2–8 mm; corolla lobes 0.4–0.9 × as long as tube; domatia consisting of pits ..... 34. *Funtumia*
    - 26b. Climbers, if plants erect, corolla lobes caudate (*Strophanthus*).
      - 30a. Corolla funnellform to subcampanulate and/or tube more than 2 cm, nearly urceolate (*Urceola*) or subrotate (*Vallaris*).
        - 31a. Corolla with corona, lobes caudate or sometimes (*S. gratus*) not; seeds beaked ..... 32. *Strophanthus*
        - 31b. Corolla without corona, lobes not caudate; seeds mostly not beaked.

- 32a. Stamens exerted.
- 33a. Filaments long, without a dorsal gland; corolla broadly funnelform ..... 30. *Beaumontia*
- 33b. Filaments short, with a dorsal gland; corolla subtrotate ..... 31. *Vallaris*
- 32b. Stamens included.
- 34a. Corolla tube 1–4 mm, nearly urceolate; inflorescences many flowered, lax ..... 38. *Urceola*
- 34b. Corolla tube at least 20 mm; inflorescences usually few flowered, not lax.
- 35a. Plants glabrous or nearly so ..... 21. *Mandevilla*
- 35b. Plants conspicuously hairy.
- 36a. Corolla tube cylindric, limb spreading horizontally, often very wide; follicles more than 5 × as long as wide ..... 24. *Chonemorpha*
- 36b. Corolla tube clearly widened toward throat, limb probably not horizontal; follicles ca. 3 × as long as wide ..... 25. *Amalocalyx*
- 30b. Corolla salverform, tube up to 1.4 cm (1.5–2.5 cm in *Aganosma benthamiana*).
- 37a. Stamens exerted.
- 38a. Corolla tube 7–13 mm; filaments straight; follicles very slender, of separate carpels ..... 27. *Pottsia*
- 38b. Corolla tube to 5 mm; filaments strongly twisted; follicles rather thick, of united carpels ..... 26. *Parsonsia*
- 37b. Stamens included.
- 39a. Anther apex with long soft hairs.
- 40a. Corolla tube 5–15 mm, 3–8.7 × as long as sepals ..... 44. *Sindechites*
- 40b. Corolla tube 1.6–2.5 mm, 1.3–2.3 × as long as sepals ..... 43. *Cleghornia*
- 39b. Anther apex glabrous.
- 41a. Disc divided into 5 erect segments or 5 free scales.
- 42a. Corolla tube ca. 5 × as long as sepals, 1.5–1.7 cm; inflorescences terminal ..... 41. *Epigynum*
- 42b. Corolla tube mostly to 3 × as long as sepals, to 1.4 cm; inflorescences axillary and/or terminal.
- 43a. Corolla tube 4.5–14 mm, lobes 5–14 mm, forming in bud a large, rather narrowly ovoid, subacuminate head much wider than tube which is clearly widened around or above middle of stamens ..... 22. *Trachelospermum*
- 43b. Corolla tube 2.5–3 mm, lobes 3–5 mm, forming in bud a small subglobose or ovoid, rounded or blunt head not or slightly wider than tube which is ± barrel-shaped ..... 40. *Ichnocarpus*
- 41b. Disc entire or shortly 5-lobed.
- 44a. Sepals more than twice as long as wide, acuminate or acute, often spreading and longer than corolla tube, if about half as long, then leaf blade with a submarginal vein (*A. marginata*) ..... 23. *Aganosma*
- 44b. Sepals less than twice as long as wide, acute to rounded, erect or apically slightly spreading, up to half as long as corolla tube.
- 45a. Corolla lobes neither twisted nor forming a head in bud; bud rounded, almost cylindric ..... 40. *Ichnocarpus*
- 45b. Corolla lobes twisted in bud, forming a large ovoid head; bud subacute.
- 46a. Corolla tube bottle-shaped, clearly narrowed at apex; follicles cylindric ..... 24. *Chonemorpha*
- 46b. Corolla tube cylindric or nearly so; follicles very narrowly ovoid ..... 37. *Anodendron*

**1. CARISSA** Linnaeus, Mant. Pl. 1: 52. 1767, nom. cons.

假虎刺属 jia hu ci shu

Shrubs, climbers, or small trees, mostly spiny. Branches dichotomous. Leaves opposite; petiole 2–3 mm. Cymes terminal or axillary, dichotomous, pedunculate, usually many flowered. Flowers 5- [or 4]-merous. Calyx without glands or rarely with many basal glands inside. Corolla salverform, tube cylindric, dilated at staminal insertion, lobes overlapping to left or to right. Stamens included in throat; anthers lanceolate, obtuse or apiculate, base not appendaged; disc absent. Ovary 2-loculed; ovules 1–4 in each locule, rarely numerous, biseriate. Style filiform; pistil head narrowly oblong or fusiform, apex shortly 2-cleft. Berries 1- or 2-loculed. Seeds 2 or more, peltate; endosperm fleshy; cotyledons ovate, radicle inferior.

About 30 species: tropics and subtropics of Africa, Asia, and Australia; four species in China.

- 1a. Corolla lobes overlapping to left, as long as or longer than tube ..... 1. *C. macrocarpa*  
 1b. Corolla lobes overlapping to right, shorter than tube.  
 2a. Lateral veins of leaf blade ca. 8 pairs; corolla puberulent inside; fruit ellipsoid, 1.5–2.5 × 1–2 cm ..... 4. *C. carandas*  
 2b. Lateral veins of leaf blade 3–5 pairs; corolla glabrous or pubescent inside; fruit globose, 0.5–1.2 cm in diam.  
 3a. Secondary veins conspicuous on adaxial leaf surface; branches and abaxial leaf surface puberulent ..... 3. *C. spinarum*  
 3b. Secondary veins of leaf blade inconspicuous; branchlets and leaves glabrous in plants introduced into China ..... 2. *C. edulis*

**1. *Carissa macrocarpa*** (Ecklon) A. de Candolle, Prodr. 8: 336. 1844.

大花假虎刺 da hua jia hu ci

*Arduina macrocarpa* Ecklon, S. African J. 1: 372. 1830; *A. grandiflora* E. Meyer; *Carissa grandiflora* (E. Meyer) A. de Candolle.

Shrubs or small trees to 5 m tall. Spines 1- or 2-forked, 2–4 cm, strong. Leaf blade broadly ovate, 2.5–7.5 × 2–5 cm, thick leathery, glabrous, base rounded to obtuse, apex mucronate, lateral veins obscure. Cymes terminal, (1–)3-flowered. Pedicel 2–3 mm. Flowers fragrant. Sepals very narrowly ovate, 3–6 mm. Corolla white or pink, tube 1.1–1.8 cm, pubescent inside; lobes oblong, 0.9–2.4 cm, overlapping to left. Ovules numerous. Berries bright red to violet, ovoid, 2–5 cm, ca. 16-seeded. Fl. Aug.  $2n = 66$ .

S Fujian and S Guangdong [introduced from S Africa].

Cultivated for its edible fruit.

**2. *Carissa edulis*** (Forsskål) Vahl, Symb. Bot. 1: 22. 1790.

甜假虎刺 tian jia hu ci

*Antura edulis* Forsskål, Fl. Aegypt.-Arab. 63. 1775; *Arduina edulis* (Forsskål) Spreng; *Carandas edulis* (Forsskål) Hiern; *Jasminonerium edule* (Forsskål) Kuntze.

Plants small trees or climbing in the wild, much branched shrubs to 5 m in cultivation; spines usually simple, straight or recurved, 2.5–5 cm. Leaf blade ovate to obovate or suborbicular, 2–5 × 2–4 cm, leathery, glabrous; lateral veins 3–5 pairs, inconspicuous. Sepals very narrowly oblong, 2–4.5 mm, ciliolate, glabrous outside. Corolla white or tinged with pink, glabrous outside, slightly hairy at mouth and on inner lobe surface, tube 0.9–2 cm; lobes ovate or oblong, 3–9 mm, convergent, anastomosing near margin. Cymes terminal, usually 3-flowered; peduncle 1.5–2.5 cm; bracteoles minute. Flowers fragrant. Pedicel about as long as calyx or slightly longer. Sepals 2.5–7 mm, with many basal glands inside.

acute at apex, overlapping to right. Berries purple to red, globose, 7–10 mm in diam. Seeds 2–4.  $2n = 22$ .

S Yunnan [native of tropical Africa and S Arabia].

Cultivated for its edible fruit.

**3. *Carissa spinarum*** Linnaeus, Mant. Pl. 2: 559. 1771.

假虎刺 jia hu ci

*Carissa diffusa* Roxburgh; *C. yunnanensis* Tsiang & P. T. Li.

Shrubs or small trees to 5 m tall; spines simple or forked, 1.2–6 cm. Leaf blade ovate to elliptic, 0.5–5.5 × 0.3–2.5 cm, leathery, finely puberulent abaxially, base rounded or acute, apex acute or short acuminate; lateral veins 3–5 pairs, conspicuous. Cymes terminal or axillary, 3–7-flowered, finely puberulent. Sepals ca. 2.5 × 1 mm, without glands. Corolla white, tube ca. 1 cm, lobes 5–7 mm, overlapping to right; ovules 1 in each locule. Berries shining black, subglobose, 5–12 mm. Seeds 3–5 mm. Fl. Mar–May, fr. Sep–Dec.  $2n = 22$ .

Bushes, roadsides, forest edges. Guizhou, Sichuan, Yunnan [India, Myanmar, Sri Lanka, Thailand].

The roots are used to treat hepatitis and rheumatoid arthritis.

**4. *Carissa carandas*** Linnaeus, Mant. Pl. 1: 52. 1767.

刺黄果 ci huang guo

*Arduina carandas* (Linnaeus) K. Schumann; *Damna-canthus esquirolii* H. Léveillé.

Shrubs, small trees, or climbers to 5 m tall. Spines simple or forked, to 5 cm. Leaf blade broadly ovate to oblong, 3–7 × 1.5–4 cm, base broadly cuneate to rounded, apex short apiculate; lateral veins ca. 8 pairs, ascending,

Corolla white or pale rose; tube to 2 cm, puberulent inside; lobes lanceolate, ca. 1 cm, acute, overlapping to right, puberulent, ciliate. Ovules numerous in each locule. Berries reddish purple, ellipsoid, 1.5–2.5 × 1–2 cm. Fl. Mar–Jun, fr.

Jul-Dec.  $2n = 22$ .

Fujian, Guangdong, Guizhou, Hainan, Taiwan [India, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand]. Cultivated for its edible fruit, which can be eaten raw, made into jelly, or used for pies.

## 2. ACOKANTHERA G. Don, Gen. Hist. 4: 485. 1838.

长药花属 chang yao hua shu

Shrubs or small trees, latex white. Leaves opposite. Corymbs short pedunculate or sessile, axillary, often fascicled. Flowers subsessile, usually sweet scented. Calyx small, without glands inside. Corolla white or pink tinged, salverform, tube slightly widened near mouth; lobes short, overlapping to left; corona absent. Stamens inserted in widened part of corolla tube; anthers ovate to oblong, connective produced into a short, minutely pilose point, shortly 2-lobed at base; disc absent. Ovary 1, 2-loculed; ovules 1 per locule. Style filiform; pistil head cylindrical or short conical, base with a ring of papillae, apex minutely 2-lobed. Berry globose or elliptic. Seeds 1 or 2, not comose; endosperm bony; cotyledons broadly ovate or subcordate, radicle superior.

Five species: S and tropical E Africa, Arabia; one species in China.

**1. Acokanthera oppositifolia** (Lamarck) Codd, Bothalia 7: 448. 1961.

长药花 chang yao hua

*Cestrum oppositifolium* Lamarck, Tabl. Encycl. 2: 5, t. 112, fig. 2. 1794.

Shrubs to 5 m tall. Branchlets compressed when young, terete with age. Petiole 2–6 mm; leaf blade mostly obovate, occasionally elliptic, 4–10 × 2–7 cm, lateral veins 6–10 pairs.

Inflorescences sessile or subsessile, clustered, glabrous or puberulent, usually many flowered; bracts brown or distal ones pinkish, ovate. Sepals ovate to very narrowly ovate. Corolla white to pink, tube 0.8–1.3 cm, glabrous or puberulent outside, hairy inside; lobes broadly ovate, 2–4.5 mm. Berry purplish black, globose, 2.5–3 cm in diam. Seeds semiglobose or semi-ellipsoid, 0.8–1.2 cm.  $2n = 22$ .

Beijing [native of S Africa].

Cultivated for medicine.

## 3. MELODINUS J. R. & G. Forster, Char. Gen. Pl. 37, t. 19. 1776.

山橙属 shan chen shu

Plants woody lianas or sometimes low shrubs, latex present. Leaves opposite. Cymes terminal or axillary. Flowers white. Calyx without glands. Corolla salverform; tube cylindrical, dilated at staminal insertion; lobes usually oblique-falcate, overlapping to left; corona scales 5 or 10, erect. Stamens inserted at or below middle of corolla tube, included; filaments very short; anthers free from pistil head, base rounded; disc absent. Ovary 2-loculed; ovules numerous. Style short; pistil head apex dilated, 2-cleft. Berry large, pulpy. Seeds numerous; coma absent.

About 50 species: tropical or subtropical Asia and Australia; 12 species in China.

- 1a. Flowers always axillary; apex of flower bud acuminate ..... 1. *M. axillaris*
- 1b. Flowers at least partly terminal; apex of flower bud rounded to subacute.
  - 2a. Leaves pubescent, at least abaxially.
    - 3a. Branchlets and leaf blade puberulent to glabrescent abaxially; lateral leaf veins ca. 15 pairs ..... 11. *M. fusiformis*
    - 3b. Branchlets and leaf blade densely pubescent abaxially; lateral leaf veins 8–10 pairs.
      - 4a. Leaf blade elliptic or oblong; sepals ca. 7 mm; corolla lobes narrowly elliptic, ca. 8 mm; berries ellipsoid; seeds narrowly elliptic, ca. 9 mm ..... 10. *M. hemsleyanus*
      - 4b. Leaf blade broadly ovate to orbicular; sepals 3–4 mm; corolla lobes oblong, falcate, ca. 13 mm; berries fusiform; seeds orbicular, ca. 6 mm ..... 12. *M. morsei*
  - 2b. Leaves glabrous or sparsely hairy along midvein only.
    - 5a. Leaf blade with lateral veins arcuate-ascending.
      - 6a. Fruit ca. 1.8 × 0.7 cm; shrubs to 0.6 m ..... 8. *M. chinensis*
      - 6b. Fruit 5.5–10.5 × 2–10.5 cm; woody lianas to 10 m.
        - 7a. Young branches and leaves scaly; sepals acute; fruit ca. 10.5 cm in diam. .... 2. *M. yunnanensis*
        - 7b. Plant glabrous except for inflorescences; sepals rounded; fruit to 9 cm.
          - 8a. Corolla lobes falcate with a distinct subterminal notch; fruit ± globose, to 8 cm in diam. .... 3. *M. suaveolens*
          - 8b. Corolla lobes ovate; fruit cylindrical-ellipsoid, ca. 5 cm wide ..... 9. *M. cochinchinensis*
    - 5b. Leaf blade with lateral veins closely parallel at 70–80° to midvein.
      - 9a. Material with flowers.

- 10a. Corolla lobes orbicular.  
 11a. Leaf blade very narrowly elliptic, up to 2.1 cm wide; (100–1000 m; Taiwan) ..... 4. *M. angustifolius*  
 11b. Leaf blade elliptic, 3(–4) cm wide; (1600–2900 m; Guizhou, Yunnan) ..... 5. *M. khasianus*  
 10b. Corolla lobes ovate, oblong, or obliquely obovate.  
 12a. Leaf blade thinly membranous; corolla exterior and corona scales glabrous ..... 6. *M. tenuicaudatus*  
 12b. Leaf blade somewhat leathery; corolla exterior and corona scales puberulent ..... 7. *M. magnificus*  
 9b. Material with fruit.  
 13a. Fruit ± fusiform, 2–3 cm wide, apex acuminate.  
 14a. Leaf blade very narrowly elliptic, ± leathery (100–1000 m; Taiwan) ..... 4. *M. angustifolius*  
 14b. Leaf blade oblong to narrowly oblong, membranous  
 (800–1800 m; Guangxi, Guizhou, Yunnan) ..... 6. *M. tenuicaudatus*  
 13b. Fruit ovoid or ellipsoid, 3–4 cm wide, apex rounded to subacute.  
 15a. Fruit ca. 5.5 cm; petiole glabrous; leaf blade 0.5–4 cm wide ..... 5. *M. khasianus*  
 15b. Fruit 6–8 cm; petiole pubescent; leaf blade 4–6.5 cm wide ..... 7. *M. magnificus*

**1. *Melodinus axillaris*** W. T. Wang ex Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 349. 1973.

腋花山橙 ye hua shan chen

Lianas to 3 m. Branchlets angular, slightly pubescent. Petiole 5–9 mm; leaf blade oblong, 10–18 × 3.5–6 cm, papery, glabrous, base obtuse, apex acute; lateral veins 17–20 pairs, slightly prominent on both surfaces. Inflorescences axillary, 2–5-branched, 3.5–8 cm, pubescent; peduncle 2–3 cm; bracts and bracteoles narrowly elliptic, 2–3 mm, puberulent outside. Pedicel 2–3 cm. Flower buds narrowly oblong, short pubescent outside, acuminate. Sepals ovate, 3–3.5 × ca. 2 mm, glabrous outside, ciliate, apex obtuse. Corolla white, ca. 1.2 cm, tube pubescent inside; lobes oblong; corona scales villous. Filaments pubescent. Ovary glabrous. Style filiform; pistil head conical. Fl. May.

- Humid forests; 1000 m. S Yunnan.

The generic placement of this species is uncertain because no fruits have been seen.

**2. *Melodinus yunnanensis*** Tsiang & P. T. Li, Acta Phy-totax. Sin. 11: 355. 1973.

雷打果 lei da guo

Lianas to 10 m. Branches dark gray, glabrous; young branchlets and leaves scaly. Petiole 5–10 mm; leaf blade oblong or narrowly elliptic, 7–18 × 2.5–5.2 cm, papery, base rounded, apex acuminate; lateral veins 10–15 pairs, nearly flat on both surfaces. Cymes umbellate, terminal and axillary, 5–6.5 cm; peduncle 1.5–2 cm, glabrous; bracts and bracteoles 3–7 mm. Pedicel 5–7 mm, pubescent. Flower buds cylindrical, ca. 2 cm, glabrous outside. Sepals broadly ovate, ca. 7 × 5 mm, ciliate, apex acute. Corolla white, tube ca. 1.2 cm, pubescent inside; lobes oblong, ca. 1.1 cm; corona scales linear, decurrent to lower part of corolla tube, included. Ovary glabrous. Style very short. Berries globose, ca. 10.5 cm in diam. Fl. May.

- Dense montane forests; 1500–2000 m. W Guangxi, S Yunnan. ciliate, pubescent outside. Corolla white, 6–10 mm in diam., tube 5–8 mm; lobes orbicular, ca. 6 × 6 mm; corona scales 5, apex 2-cleft, slightly exerted from throat. Berries fusiform, 5–9 × 2–3 cm. Seeds black, triangular, smooth. Fl. summer-autumn.

**3. *Melodinus suaveolens*** (Hance) Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 4: 333. 1852.

山橙 shan chen

*Lycimnia suaveolens* Hance in Walpers, Ann. Bot. Syst. 3: 31. 1852; *Melodinus laetus* Champion ex Bentham.

Lianas to 10 m, glabrous except for inflorescences. Petiole to 1.2 cm; leaf blade elliptic or ovate, 5–10 × 1.8–5 cm, leathery, base attenuate to rounded, apex short acuminate. Cymes terminal and axillary. Flower buds rounded or obtuse at apex, minutely pubescent outside. Flowers fragrant. Sepals ovate, ca. 3 mm, minutely pubescent outside, apex rounded or obtuse. Corolla white, tube 1–1.4 cm; lobes 0.5–1 × as long as tube, suborbicular, falcate, with a distinct notch near apex; corona campanulate or tubular, apex 5-cleft, exerted from throat. Berries globose, 5–8 cm in diam. Fl. May–Nov, fr. Aug–Dec.

Open forests, humid brushwood; 100–800 m. Guangdong, Guangxi, Hainan [Vietnam].

A fine, strong bast fiber, obtained from the inner bark, is used in making ropes and sacks. The fruit is used to treat abdominal pain, infantile malnutrition due to intestinal parasites, indigestion, and hernia.

**4. *Melodinus angustifolius*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 193. 1911.

台湾山橙 tai wan shan chen

Lianas to 5 m. Petiole 2–5 mm; leaf blade narrowly elliptic, 5–10 × 1–2.1 cm, somewhat leathery, base rounded to cuneate, apex acuminate; lateral veins subparallel, prominent on both surfaces. Cymes terminal and axillary, 1.5–2.5 cm, 3–12-flowered; bracts and bracteoles ovate, ca. 2 mm. Pedicel 2–4 mm. Sepals triangular, 1–2 mm,

- Thickets, coral rocks; 100–1000 m. Taiwan.

**5. *Melodinus khasianus*** J. D. Hooker, Fl. Brit. India 3: 629. 1882.

景东山橙 jing dong shan chen

Lianas to 10 m, glabrous except for flowers. Petiole 6–7 mm; leaf blade narrowly elliptic, 6–12 × 0.5–4 cm, base cuneate, apex short acuminate; lateral veins subparallel. Cymes or fascicles axillary near branch apex, 2.5–6.5 cm, few flowered; bracts ca. 3 mm. Sepals orbicular, ca. 3 mm, ciliate. Corolla white, tube ca. 6 mm; lobes orbicular, ca. 5.5 mm in diam., obliquely 2-lobed or 2-cleft at apex; corona scales 5, oblong. Berries ovoid, ca. 5.5 × 4 cm. Fl. Oct.

Humid forests, valleys; 1600–2900 m. Guizhou, Yunnan [India].

**6. *Melodinus tenuicaudatus*** Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 353. 1973.

薄叶山橙 bao ye shan chen

Lianas to 4 m. Branches gray; branchlets gray yellowish. Petiole ca. 5 mm; leaf blade oblong to narrowly so, 6–15 × 1.5–4 cm, membranous, glabrous, base cuneate or broadly so, apex caudate-acuminate, acumen 1–1.5 cm; lateral veins numerous, subparallel at 70–80° to midvein, flat on both surfaces. Cymes umbellate, terminal, 4–6 cm, 3–5-flowered; peduncle ca. 1.2 cm, puberulent; bracts and bracteoles narrowly elliptic, 2.5–4 mm. Pedicel ca. 5 mm. Sepals ovate. Corolla white, tube ca. 1.8 cm, glabrous outside, pubescent inside; lobes oblong, as long as tube; corona scales 10, narrowly elliptic. Filaments puberulent. Berries sub-fusiform, 6.5–7 × 1.8–2.5 cm, acuminate at both ends or base obtuse. Fl. May-Sep, fr. Sep-Dec.

• Dense montane forests, brushwoods; 800–1800 m. Guangxi, Guizhou, Yunnan.

**7. *Melodinus magnificus*** Tsiang, Sunyatsenia 3: 128. 1936.

茶藤 cha teng

Lianas to 6 m. Branchlets dark brown, rust-colored pubescent. Petiole 6–8 mm, pubescent; leaf blade narrowly oblong, 12–21 × 4–6.5 cm, somewhat leathery, glabrous, base cuneate, apex acuminate or rarely obtuse; lateral veins 15–20 pairs, subparallel, pubescent. Cymes terminal, shorter than leaves; bracteoles sublinear, 3–5 mm, short pubescent. Sepals oblong, pubescent outside. Corolla white, puberulent outside; tube 1.5–1.7 cm, pubescent inside; lobes obliquely obovate, 1.5–1.8 cm; corona scales thick, indistinct, minutely pilose, adnate to corolla throat, apex shortly 2-cleft. Berries ellipsoid, 6–8 × 3–4 cm. Fl. Jun-Aug, fr. Oct-Dec.

• Sparse woods; 500–800 m. S Guangxi.

**8. *Melodinus chinensis*** P. T. Li & Z. R. Xu, Bull. Bot. Res., Harbin 5(2): 129. 1985.

贵州山橙 gui zhou shan chen

• Sparse montane woods; 500–1500 m. Guizhou, Sichuan, Yunnan.

**11. *Melodinus fusiformis*** Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 4: 332. 1852.

尖山橙 jian shan chen

*Melodinus edulis* H. Léveillé; *M. esquirolii* H. Léveillé;

Shrubs to 60 cm tall. Branchlets yellowish gray, glabrous. Petiole ca. 5 mm; leaf blade narrowly elliptic, 5–9 × 1.5–3 cm, base cuneate, apex acuminate, midvein elevated abaxially; lateral veins numerous, nearly flat on both surfaces, glabrous. Cymes dichotomous, ca. 3-flowered; peduncle ca. 1 cm, glabrous; bracteoles 2, triangular, ca. 1.5 × 1.5 mm, pubescent. Pedicel 7–outside 10 mm, pubescent. Sepals ovate to triangular, ca. 3 mm, pubescent, glabrous inside, apex subacute to rounded. Berries ellipsoid, ca. 1.8 cm × 7 mm. Fl. May.

• Montane limestone brushwoods; 800 m. SE Guizhou (Lipo).

**9. *Melodinus cochinchinensis*** (Loureiro) Merrill, Trans. Amer. Philos. Soc. 24(2): 310. 1935.

思茅山橙 si mao shan chen

*Oncinus cochinchinensis* Loureiro, Fl. Cochinch. 1: 123. 1790; *Melodinus henryi* Craib.

Lianas stout, to 10 m, glabrous except for inflorescences. Branches dark brown. Petiole 6–10 mm; leaf blade elliptic or narrowly so, 6–19 × 2.2–6.5 cm, papery, base cuneate, apex acute or acuminate; lateral veins numerous, convergent, conspicuous. Cymes paniculate, terminal, 3-branched, 4–5.5 cm, minutely pilose; bracts and bracteoles minute. Pedicel short. Sepals orbicular or broadly elliptic, ca. 2 mm, ciliate, apex subacute to rounded. Corolla white; tube ca. 6 mm, pilose except at base; lobes ovate, ca. 3.5 mm; corona large, lobes 2-cleft, villous. Ovary glabrous. Style ca. 3 mm. Berries narrowly ellipsoid, ca. 9 × 5 cm. Seeds oblong or ovate, ca. 1.3 cm. Fl. Apr-May, fr. Sep-Nov.

Montane forests; 800–2800 m. S Yunnan [Myanmar, Thailand, Vietnam].

The fruit are used to treat infantile meningitis and fractures.

**10. *Melodinus hemsleyanus*** Diels, Bot. Jahrb. Syst. 29: 539. 1900.

川山橙 chuan shan chen

*Trachelospermum esquirolii* H. Léveillé.

Lianas stout, to 8 m, juvenile parts densely minutely tomentose. Petiole ca. 5 mm; leaf blade elliptic, oblong, or narrowly so, 7–15 × 4–5 cm, somewhat leathery, lustrous and glabrous adaxially, pubescent near veins abaxially, base cuneate or obtuse, apex acuminate; lateral veins ca. 10 pairs, conspicuous on both surfaces. Cymes terminal. Sepals ovate-oblong, ca. 7 mm, densely pubescent outside, apex acuminate. Corolla white, tube ca. 1 cm, puberulent on both surfaces; lobes narrowly elliptic, ca. 8 mm; corona scales minute, unequal. Berries ellipsoid, to 7.5 × 3 cm. Seeds narrowly elliptic, ca. 9 mm. Fl. May-Aug, fr. Jul-Dec.

*M. flavus* H. Léveillé; *M. seguinii* H. Léveillé; *M. wrightioides* Handel-Mazzetti.

Lianas stout, to 10 m, juvenile parts pubescent, later glabrescent. Bark gray-brown. Petiole 4–6 mm; leaf blade elliptic or oblong, rarely narrowly elliptic, 4.5–12 × 1–5.3 cm, somewhat leathery, base cuneate or rounded, apex acuminate; lateral veins ca. 15 pairs, obliquely spreading and reticulate

toward margin. Cymes terminal, 3–5 cm, 6–12-flowered. Pedicel 5–10 mm. Sepals ovate, 4–5 mm, acute. Corolla white, tube 1.2–2 cm; lobes obliquely narrow ovate or obovate, (0.8–)1.1–2 cm × 3.5–9 mm; corona scales 5, indistinct, exserted, villous, apex 2- or 3-cleft. Stamens inserted near base of corolla tube. Berries fusiform, 3.5–5.3 × 2.2–4 cm. Fl. Apr-Sep, fr. Jun-Dec.

• Sparse montane woods, valleys; 300–1500 m. Guangdong, Guangxi, Guizhou.

The plant is used for the treatment of rheumatism and injury. The fruit is poisonous.

**12. *Melodinus morsei*** Tsiang, Sunyatsenia 6: 110. 1941.

龙州山橙 long zhou shan chen

Lianas to 3 m. Branchlets tomentose. Petiole ca. 5 mm; leaf blade broadly ovate or orbicular, 4.5–9 × 2–7 cm, leathery, glabrescent and shiny adaxially, tomentose abaxially, base rounded or truncate, apex short acuminate; lateral veins 8–10 pairs, flat adaxially, slightly prominent abaxially. Cymes terminal, 6–8-flowered; peduncle 1–2 cm, tomentose. Pedicel ca. 3 mm. Sepals ovate, 3–4 × 2–2.5 mm, ciliate, villous outside, acute. Corolla white, tube ca. 1.5 cm, minutely tomentose; lobes oblong, falcate, ca. 13 × 4 mm; corona scales 5, oblong, pilose, apex 2-cleft. Filaments pilose. Ovary glabrous. Berries fusiform, ca. 8.5 × 2 cm, acuminate at both ends. Seeds orbicular, ca. 6 mm in diam. Fl. Aug-Oct, fr. Sep-Dec.

• Montane forests. N Guangdong, SW Guangxi.

**4. BOUSIGONIA** Pierre in Planchon, Prodr. Apoc. 324. 1894.

奶子藤属 nai zi teng shu

Lianas woody, latex white. Leaves opposite, veins parallel. Cymes axillary or terminal, long pedunculate. Flowers 5-merous. Calyx deeply divided, with basal glands inside. Corolla salverform, tube cylindrical, swollen at base, throat without corona scales; lobes overlapping to left. Stamens inserted at middle of corolla tube; filaments stout; anthers included, narrowly oblong, free from pistil head, lobes rounded at base; disc shorter than ovary, short cylindrical, fleshy, thick, apex entire or emarginate. Ovary entire, 1-loculed, placentas 2; ovules 2 on each placenta. Style short; pistil head dilated, apex 2-cleft. Fruit berrylike, pulpy. Seeds 3 or 4, not comose; embryo large, radicle short.

Two species: China, Laos, Vietnam; both in China.

- 1a. Lateral veins of leaf blade 8–12 pairs; disc puberulent ..... 1. *B. mekongensis*  
1b. Lateral veins of leaf blade 20–25 pairs; disc glabrous ..... 2. *B. angustifolia*

**1. *Bousigonia mekongensis*** Pierre in Planchon, Prodr. Apoc. 324. 1894.

奶子藤 nai zi teng

Lianas to 10 m. Young branches puberulent. Petiole 1.5–1.8 cm; leaf blade oblong, 6–15 × 2–4.8 cm, somewhat leathery, apex short acuminate, acumen less than 5 mm; lateral veins 8–12 pairs, subparallel, subhorizontally spreading. Cymes terminal and axillary, shorter than leaves; peduncle 5–11 cm; bracts and bracteoles triangular, ca. 1 mm. Pedicel 2–10 mm, puberulent. Sepals ovate, ca. 1.5 mm, ciliate. Corolla white, tube ca. 7 mm; lobes ovate, ca. 2 mm. Disc shorter than ovary, apex puberulent. Fruit globose or subglobose, 3–5 × 3–4 cm. Fl. Apr-Jun, fr. Aug-Dec.

Mixed forests or brushwoods; 500–1000 m. S Yunnan [Vietnam].

**2. *Bousigonia angustifolia*** Pierre in Spire & A. Spire, Contr. Apocyn. 129. 1905.

闷奶果 men nai guo

Lianas to 8 m, glabrous. Petiole 1–1.5 cm; leaf blade oblong or narrowly so, 7–15 × 2–4 cm, apex caudate-acuminate, acumen 5–10 mm; lateral veins 20–25 pairs, subparallel, subhorizontally spreading. Cymes 4–5.5 cm; peduncle 3–4 cm; bracts and bracteoles triangular, ca. 2 mm. Pedicel 2–3 mm. Sepals ovate, ca. 3 mm, subacute. Corolla white, tube ca. 7 mm; lobes broadly ovate, ca. 3 × 3 mm. Anthers oblong-lanceolate, ca. 2 mm; disc glabrous. Fruit ovoid, 2–3 × 1.5–3 cm. Fl. spring-summer.

Mixed forests, forest edges; 800–1400 m. S Yunnan [Laos, Thailand, Vietnam].

**5. HUNTERIA** Roxburgh, Fl. Ind. ed. 1832 1: 695. 1832.

仔榄树属 zi lan shu shu

Trees or shrubs, latex present. Branches slender, terete. Leaves decussate, leathery, glabrous, with a conspicuous marginal vein and numerous, straight lateral veins. Cymes corymbose or subpaniculate, terminal or axillary. Flowers 5-merous. Calyx small, without glands. Corolla salverform, tube cylindrical, inflated in distal half; lobes shorter than tube, overlapping to left; corona absent. Stamens inserted in inflated portion of corolla tube, included; anthers narrowly ovate; disc absent. Ovaries distinct or connate at base; ovules 2–4 per locule. Style filiform; pistil head thickened, apex minute, 2-cleft. Berry 1- or 2-seeded. Seeds ovate or oblong,

without coma; cotyledons leaflike, radicle erect.

Ten species: tropical Africa, one extending into tropical Asia, including China.

**1. *Hunteria zeylanica*** (Retzius) Gardner ex Thwaites, Enum. Pl. Zeyl. 191. 1860.

仔榄树 *zi lan shu*

*Cameraria zeylanica* Retzius, Observ. Bot. 4: 24. 1786;  
*Hunteria corymbosa* Roxburgh.

Trees to 15 m tall. Trunk often fluted; branches slender, glabrous. Petiole 1–1.5 cm; leaf blade oblong, elliptic, or narrowly ovate, 5–18 × 1–9 cm, base broadly cuneate to rounded, apex acuminate; lateral veins more than 30 pairs, subparallel, joining marginal veins. Flowers strongly fragrant,

white. Pedicel usually longer than calyx. Sepals ovate, 1.5–1.7 mm, acute. Corolla tube 7–10 mm, pubescent inside. Berries yellow, globose, usually paired, 1–2 cm in diam. Seeds brownish, ovoid, ca. 1.2 cm × 8 mm. Fl. Apr–Sep, fr. May–Dec.  $2n = 22$ .

Dense montane forests; low to middle altitudes. Hainan [India, Indonesia, Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam; E Africa].

The leaves are used externally for the treatment of wounds and cuts, the fruit are edible, and the wood is used for making chopsticks in Hainan.

## 6. VOACANGA Du Petit-Thouars, Gen. Nov. Madagasc. 10. 1806.

马铃薯属 *ma ling guo shu*

Trees or robust erect shrubs, latex present, branches dichotomous. Leaves opposite; petioles or leaf bases of a node often connate into a short ocrea, with a single row of colleters in axils. Cymes terminal, pedunculate. Flowers often fragrant. Calyx campanulate to cylindrical, with many basal glands inside. Corolla white or yellow, salverform, large, tube widened at base and at or above middle, shorter or only slightly longer than calyx, throat with a fleshy ring, not scaly, lobes spreading or recurved, overlapping to left. Stamens inserted in distal widening of corolla tube, exerted or included; anthers sessile, sagittate, coherent to pistil head; disc ringlike or of five lobes adnate to ovaries. Ovaries 2, free or fused basally; ovules numerous. Pistil head lampshade-shaped, apex shortly 2-cleft. Follicles 2, pendulous. Seeds numerous, embedded in pulp, not comose.

Twelve species: seven in Africa, five in SE Asia; two species cultivated in China.

- 1a. Calyx (when lobes erect) 5–7 mm, lobes 1.5–2.5 × as long as tube, 2.5–3.5 × as long as wide; follicles partly united, transversely broad ellipsoid, green or yellow; leaf blade with fishbone-like venation ..... 2. *V. chalitiana*  
1b. Calyx (when lobes erect) 7–19 mm, lobes 0.8–1.3 × as long as tube, 0.7–1.3(–1.7) × as long as wide; follicles free, obliquely subglobose, with pale green spots; leaf blade with less regular venation ..... 1. *V. africana*

**1. *Voacanga africana*** Stapf, J. Linn. Soc., Bot. 30: 87. 1894.

非洲马铃薯 *fei zhou ma ling guo*

Trees to 10(–25) m tall. Bark pale gray-brown; branches lenticellate. Petiole short or absent; leaf blade obovate-oblong or obovate-elliptic, 7–41 × 3–20 cm, base cuneate or decurrent, apex obtuse or acute, glabrous on both surfaces or pubescent abaxially; lateral veins 8–22 pairs. Cymes 6–25 cm, usually many flowered. Calyx 0.7–1.9 cm, lobes broadly ovate to oblong. Corolla yellow or white, tube 0.7–1.5 cm, twisted; lobes obovate or elliptic, recurved, twisted in bud. Follicles obliquely subglobose, with pale green spots. Seeds dark brown, obliquely ellipsoid, 7–10 × 3.5–5 mm.  $2n = 22$ . S Yunnan [introduced from W Africa].

Cultivated for its latex which is used as rubber adulterant.

**2. *Voacanga chalitiana*** Pierre ex Stapf in Dyer, Fl. Trop. Afr.

4(1): 158. 1902.

马铃薯 *ma ling guo*

Trees to 35 m tall, glabrous throughout except for corolla. Trunk to 80 cm in diam.; bark pale gray-brown; branches with some large lenticels. Petiole 1–3 mm; leaf blade elliptic to narrowly elliptic, 5.5–21 × 1.5–6.5 cm, base obtuse, apex acuminate; lateral veins 10–25 pairs. Pedicel 0.6–1.5 cm. Calyx lobes narrowly triangular, recurved. Corolla white, throat pale ochre; tube 5–7 mm, appressed pubescent inside, not twisted; lobes obliquely oblong, spreading, recurved later, not twisted in bud. Fruit green or yellow and yellow spotted, transversely broadly ellipsoid, 2.5–3 × 4.5–6.5 cm, 2–3 cm in diam., follicles fused at base. Seeds dark brown.

S Guangdong [native of Africa].

Cultivated for wood.

## 7. TABERNAEMONTANA Linnaeus, Sp. Pl. 1: 210. 1753.

狗牙花属 *gou ya hua shu*

*Ervatamia* (A. de Candolle) Stapf; *Pagiantha* Markgraf; *Rejoua* Gaudichaud-Beaupré.

Shrubs or small trees, latex white. Stems repeatedly dichotomously branched. Leaves opposite; adaxial surface of petiole often with a basal semicircular or semiamplexicaul ocrea. Cymes corymbose or umbellate, at branch forks, many or rarely 1-flowered. Calyx divided halfway down or deeper, with few to many basal glands inside. Corolla salverform, widened at or near middle, lobes sharply overlapping to left [or right]. Stamens inserted in widened part of corolla tube; filaments short or almost none; anthers oblong or narrowly triangular, free from pistil head, base sagittate or deeply cordate and not spurred; disc absent. Ovaries 2, free; ovules numerous. Style filiform; pistil head with a subglobose or lampshade-shaped basal part and stigmoid, 2-cleft apical part. Follicles 2, divaricate. Seeds with a red or orange fleshy aril; coma absent.

Ninety-nine species: Africa, Asia, North America, Pacific Islands, South America; five species in China.

- 1a. Corolla double; plants cultivated ..... 4. *T. divaricata*  
 1b. Corolla single.  
 2a. Corolla lobes pubescent inside all over or only in basal half, ciliate, often pubescent outside ..... 3. *T. corymbosa*  
 2b. Corolla lobes glabrous inside or pubescent only at extreme base, mostly not ciliate.  
 3a. Corolla tube not twisted; stamens inserted at lower 1/4–1/3 of corolla tube ..... 4. *T. divaricata*  
 3b. Corolla tube mostly twisted; stamens inserted at middle or upper half of corolla tube.  
 4a. Sepals rounded, obtuse or sometimes acute; corolla tube 8–23 × as long as calyx  
 (see also *T. bufalina*).  
 5a. Corolla tube glabrous inside, twisted 0.25–0.5 turn just below anthers, up to 11 × as long  
 as calyx; fruit 1.2–7.1 cm, 2–40-seeded, if smaller and few seeded then with a lateral ridge  
 along each side ..... 5. *T. pandacaqui*  
 5b. Corolla tube pubescent or pilose inside around anthers, if twisted, 10–23 × as long as calyx;  
 fruit 1–1.6 cm, 1–3-seeded, not ridged when mature (see also *T. corymbosa*) ..... 1. *T. bovina*  
 4b. Sepals acuminate, awl-shaped or not; corolla tube 4–7 × as long as calyx.  
 6a. Corolla of mature bud with a subglobose or broadly ovoid, rounded or obtuse head, glabrous  
 inside; midvein and secondary veins mostly paler than blade on both leaf surfaces ..... 5. *T. pandacaqui*  
 6b. Corolla of mature bud with an ovoid, acuminate or acute head, hairy or glabrous inside;  
 veins not paler than blade.  
 7a. Peduncle rather robust; bracts scalelike; corolla head of mature bud 6–12 mm ..... 4. *T. divaricata*  
 7b. Peduncle slender; bracts not scaly; corolla head of mature bud mostly up to 5 mm ..... 2. *T. bufalina*

**1. *Tabernaemontana bovina*** Loureiro, Fl. Cochinch. 1: 118. 1790.

药用狗牙花 yao yong gou ya hua

*Ervatamia bovina* (Loureiro) Markgraf; *E. officinalis* Tsiang; *E. tonkinensis* (Pierre ex Pitard) Markgraf; *Tabernaemontana officinalis* (Tsiang) P. T. Li; *T. tonkinensis* Pierre ex Pitard.

Shrubs or small trees 0.5–5 m tall, glabrous except for flowers. Petiole 2–8 mm; leaf blade deep green adaxially, pale green abaxially, elliptic or narrowly so, 3–21 × 1–6 cm, papery, apex caudate or acuminate; lateral veins 4–12 pairs. Cymes shorter than leaves. Flower buds with a globose head, rounded at apex. Corolla white, tube 1.2–2.8 cm; lobes obliquely elliptic, 0.5–1.5 cm, puberulent on both surfaces. Stamens inserted above middle of corolla tube. Ovary glabrous. Follicles oblong, 1.5–2.4 × 0.6–1 cm, apex mostly acuminate. Fl. May–Jun, fr. Aug–Dec.

Sparse montane forests; 200–1000 m. W Guangxi, Hainan, Yunnan [Thailand, Vietnam].

**2. *Tabernaemontana bufalina*** Loureiro, Fl. Cochinch. 1: 117. 1790.

尖蕾狗牙花 jian lei gou ya hua

*Ervatamia bufalina* (Loureiro) Pichon; *E. ceratocarpa* Kerr; *E. chengkangensis* Tsiang; *E. hainanensis* Tsiang; *Tabernaemontana ceratocarpa* (Kerr) P. T. Li; *T.*

*cheng-kiangensis* (Tsiang) P. T. Li; *T. hainanensis* (Tsiang) P. T. Li; *T. jasminoides* Tsiang.

Shrubs or small trees 0.5–4 m tall, glabrous throughout. Petiole 1–8 mm; leaf blade elliptic or narrowly so, 4–17 × 1–6 cm, papery, apex acuminate; lateral veins 5–12 pairs. Cymes di- or trichotomous; bracts not scaly. Flower buds with an ovoid head, apex acute. Corolla white or yellow-white, tube 0.8–1.7 cm; lobes obliquely elliptic, mostly falcate, 5–15 × 3–10 mm. Stamens inserted at or above middle of corolla tube. Ovary glabrous. Follicles obliquely and narrowly ellipsoid, oblong, or very narrowly oblong, 2–12 × 0.5–1.5 cm, beak 1–2 cm. Fl. May–Aug, fr. Jul–Nov.

Mixed forests; 100–1000 m. Guangdong, Guangxi, Hainan, S Yunnan [Cambodia, Myanmar, Thailand, Vietnam].

The roots are used in Hainan to treat hypertension, snake poisoning, and rheumatism.

**3. *Tabernaemontana corymbosa*** Roxburgh ex Wallich, Bot. Reg. 15: t. 1273. 1829.

伞房狗牙花 san fang gou ya hua

*Ervatamia chinensis* (Merrill) Tsiang; *E. continentalis* Tsiang; *E. continentalis* var. *pubiflora* Tsiang; *E. corymbosa* (Roxburgh ex Wallich) King & Gamble; *E. kwangsiensis* Tsiang; *E. kweichowensis* Tsiang; *E. tenuiflora* Tsiang; *E. yunnanensis* Tsiang; *E. yunnanensis* var. *heterosepala* Tsiang; *Pagiantha corymbosa* (Roxburgh ex Wallich) Markgraf; *Tabernaemontana chinensis* Merrill; *T. continentalis* (Tsiang) P. T. Li; *T. continentalis* var. *pubiflora* (Tsiang) P. T.

Li; *T. kwangsiensis* (Tsiang) P. T. Li; *T. kweichowensis* (Tsiang) P. T. Li; *T. tsiangiana* P. T. Li; *T. yunnanensis* (Tsiang) P. T. Li; *T. yunnanensis* var. *heterosepala* (Tsiang) P. T. Li.

Shrubs or small trees 0.8–8 m tall, glabrous except for flowers. Petiole 0.3–2 cm; leaf blade ovate to obovate, 7–30 × 2–14 cm, papery, apex acuminate; lateral veins 6–16 pairs. Cymes shorter or longer than leaves; di- or trichotomous. Flower buds with a globose head, rounded at apex. Calyx lobes ovate, ciliate. Corolla white, puberulent to glabrous, tube 1.8–3.1 cm; lobes obliquely elliptic, mostly falcate, 9–16 × 4–10 mm. Stamens inserted above middle of corolla tube. Follicles obliquely ellipsoid, 2–4.5 × 0.6–3 cm, beaked or rounded, sometimes stipitate. Fl. May-Sep, fr. Jul-Dec.

Mixed woods, brushwoods; 500–1700 m. W Guangxi, S Guizhou, S Yunnan [Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

The bark and leaves are used in Guangxi for the treatment of fractures.

**4. *Tabernaemontana divaricata*** (Linnaeus) R. Brown ex Roemer & Schultes, Syst. 4: 427. 1819.

狗牙花 *gou ya hua*

*Nerium divaricatum* Linnaeus, Sp. Pl. 1: 209. 1753; *Ervatamia coronaria* (Jacquin) Stapf; *E. divaricata* (Linnaeus) Burkill; *E. flabelliformis* Tsiang; *N. coronarium* Jacquin; *Tabernaemontana coronaria* (Jacquin) Willdenow; *T. flabelliformis* (Tsiang) P. T. Li.

Shrubs or small trees 0.5–5 m tall, glabrous. Petiole 3–10 mm; leaf blade elliptic or narrowly so, 3–18 × 1–6 cm, apex acuminate; lateral veins 5–17 pairs. Cymes dichotomous, 1–8-flowered; bracts scalelike. Flower buds with an ovoid head, apex acute or obtuse. Calyx lobes often ciliate. Corolla white, tube 1.5–2.7 cm; lobes simple or double, obovate or broadly so, 1.5–2.7 × 0.8–2 cm. Stamens inserted at basal third

of corolla tube. Follicles obliquely and narrowly ellipsoid, 2–7 × 0.6–1.5 cm. Fl. Apr-Sep, fr. Jul-Nov.  $2n = 22^*$ .

Montane brushwoods, sparse forests; 100–1600 m. S Yunnan (cultivated in Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan) [Bangladesh, Bhutan, India, Myanmar, Nepal, Thailand; cultivated in tropical and subtropical Asia].

All parts of the plant are poisonous. The roots, leaves, and flowers are used in Guangdong and Guangxi against snake and scorpion poisoning. In modern medicine, the roots are used to treat hypertension, headache, and scabies.

**5. *Tabernaemontana pandacaqui*** Lamarck, Tabl. Encycl. 1(2): 299. 1792.

平脉狗牙花 *ping mai gou ya hua*

*Ervatamia mucronata* (Merrill) Markgraf; *E. pandacaqui* (Lamarck) Pichon; *E. puberula* Tsiang & P. T. Li; *Pagiantha pandacaqui* (Lamarck) Markgraf; *Tabernaemontana guangdongensis* P. T. Li; *T. mollis* Hooker & Arnott; *T. mucronata* Merrill; *T. subglobosa* Merrill; *T. thailandensis* P. T. Li.

Shrubs or small trees 1–14 m tall. Branchlets pubescent to glabrous. Petiole 0.3–2 cm; leaf blade elliptic or narrowly so, 3–25 × 1–10 cm, sometimes pubescent abaxially, apex acuminate, caudate, or obtuse; lateral veins 4–16 pairs. Cymes 3–16 cm. Flower buds with a broadly ovate head, apex rounded or obtuse. Corolla white, tube 0.8–2.2 cm; lobes obliquely oblong, falcate, 0.6–1.9 cm. Stamens inserted at or above middle of corolla tube. Ovary glabrous. Follicles obliquely ellipsoid, 1.2–7 × 0.5–3 cm, apex beaked or rounded. Fl. May-Jul, fr. Jul-Nov.

Open forests, brushwoods; low to middle altitudes. S Guangdong, Taiwan, S Yunnan [Indonesia, Malaysia, Philippines, Thailand; Australia, Pacific Islands].

## 8. **PLUMERIA** Linnaeus, Sp. Pl. 1: 209. 1753.

鸡蛋花属 *ji dan hua shu*

Trees with copious latex. Branchlets 2–3 cm thick, nearly fleshy. Leaves alternate, long petiolate. Cymes terminal, 2- or 3-branched, pedunculate; bracts usually large, deciduous before anthesis. Flowers fragrant, waxy. Calyx small, without glands. Corolla white, yellowish, pink-red, or rose-purple, funnelform; tube narrow, hairy inside, faucal scales absent; lobes overlapping to left. Stamens inserted at or near base of corolla tube; anthers free from pistil head, oblong, rounded at base; disc absent. Ovaries 2, distinct; ovules numerous, multiseriate on each placenta. Style short; pistil head with obtusely 2-cleft apex. Follicles 2. Seeds many, flat proximally, with a membranous wing; endosperm fleshy; cotyledons oblong, radicle short.

Seven species: tropical America, two cultivated in China.

- 1a. Leaf blade acute or acuminate at apex, matte adaxially, glaucous ..... 1. *P. rubra*  
1b. Leaf blade rounded at apex, shiny adaxially, dark green ..... 2. *P. obtusa*

**1. *Plumeria rubra*** Linnaeus, Sp. Pl. 1: 209. 1753.

鸡蛋花 *ji dan hua*

*Plumeria acuminata* Aiton; *P. acutifolia* Poiret; *P. rubra* var. *acutifolia* (Poiret) L. H. Bailey.

Trees to 8 m tall. Bark pale green, smooth, thin. Petiole to 7 cm; leaf blade elliptic to very narrowly so, 14–30 × 6–8 cm, glaucous adaxially, apex acute or acuminate; lateral veins 30–40 pairs, slightly elevated abaxially. Corolla tinged with pink or purple at least outside, 4–6 cm in diam.; lobes pink, yellow, or white, with a yellow base, 3–4.5 × 1.5–2.5 cm,

obliquely spreading. Follicles oblong, 11–25 × 2–3 cm. Fl. Mar-Sep, fr. Jun-Dec.  $2n = 36$ .

Fujian, Guangdong, Guangxi, Hainan, Yunnan [native to Mexico and Central America].

Widely cultivated for medicine and as ornamental. The flowers are used for the treatment of dysentery. The small, white-flowered form is more valued medicinally in China than other forms of the species.

**2. *Plumeria obtusa*** Linnaeus, Sp. Pl. 1: 210. 1753.

钝叶鸡蛋花 *dun ye ji dan hua*

Trees to 5 m tall. Branchlets pale green, thick, fleshy. Petiole puberulent; leaf blade obovate to narrowly so, dark green and shiny adaxially, tertiary venation strongly prominent abaxially, apex rounded. Corolla white, ca. 4 cm in diam., throat yellow; lobes spreading, slightly recurved. Follicles to 15 × 1.5 cm.  $2n = 36$ .

Guangdong, Guangxi, Hainan, S Yunnan [native of the Caribbean Islands].

Cultivated for medicine and as an ornamental.

**9. ALSTONIA** R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 75. 1811, nom. cons.

鸡骨常山属 *ji gu chang shan shu*

*Blaberopus* A. de Candolle; *Winchia* A. de Candolle.

Trees or shrubs, latex present. Branches whorled, mostly 4 or 5 together. Leaves whorled, rarely opposite; lateral veins numerous, ending in a marginal vein. Cymes terminal, usually 1–5 in thyrses or compound umbels, terminal. Flowers white, yellow, or pink. Calyx without glands inside, lobes connate at base. Corolla salverform, tube cylindric, dilated in distal half, pubescent inside, lobes overlapping to right or left. Stamens included, inserted near or above middle of corolla tube; anthers ovate, free from pistil head, not caudate; disc absent or of scales. Ovaries 2, distinct or connate, ovules numerous. Follicles 2, free or connate. Seeds oblong or linear, long bearded at both ends; endosperm thin; cotyledons up to twice as long as radicle.

About 60 species: tropical Asia, Africa, C America, N Australia, Pacific Islands; eight species in China.

1a. Trees; disc absent or small annular.

2a. Lateral leaf veins widely spaced, (3–)5–12 mm apart, ascending; corolla lobes in bud overlapping to right; seeds acuminate at 1 end ..... 2. *A. macrophylla*

2b. Lateral leaf veins close together, 1–6 mm apart, horizontal or almost so; corolla lobes in bud overlapping to left; seeds obtuse or rounded at both ends.

3a. Leaf apex long acuminate; ovary syncarpous; follicles solitary ..... 1. *A. rostrata*

3b. Leaf apex rounded to short acuminate; ovary of 2 separate carpels; follicles paired ..... 3. *A. scholaris*

1b. Shrubs; disc of 2 scales alternating with ovaries.

4a. Leaves sessile, blade thick, papery to ± leathery, lateral veins at almost 90° to midvein.

5a. Leaves pubescent abaxially; corolla to 3 cm ..... 5. *A. neriifolia*

5b. Leaves glabrous abaxially; corolla ca. 1.1 cm ..... 6. *A. rupestris*

4b. Leaves petiolate, blade thin, membranous, lateral veins at 45° to midvein.

6a. Leaves pubescent on both surfaces; corolla pink to red ..... 4. *A. yunnanensis*

6b. Leaves glabrous; corolla white or yellow.

7a. Colleters few and inconspicuous; corolla white, to 3 cm, tube 1–2 cm; disc lower than ovary ..... 7. *A. mairei*

7b. Colleters numerous, becoming ± indurated at base and persisting; corolla yellow, ca. 1 cm; tube ca. 0.8 cm; disc as long as ovary ..... 8. *A. henryi*

**1. *Alstonia rostrata*** C. E. C. Fischer, Bull. Misc. Inform. Kew 1929: 315. 1929.

盆架树 *pen jia shu*

*Alstonia glaucescens* (Wallich ex G. Don) Monachino; *Alstonia pachycarpa* Merrill & Chun; *Alyxia glaucescens* Wallich ex G. Don, not Wallich; *Winchia calophylla* A. de Candolle, not *Alstonia calophylla* Miquel; *W. glaucescens* (Wallich ex G. Don) K. Schumann.

Trees evergreen, glabrous, to 30 m tall. Branches greenish, angled when young. Leaves in whorls of 3 or 4, rarely opposite; petiole 1–2 cm; leaf blade narrowly elliptic, 7–20 × 2.5–4.5 cm, thick papery, lustrous adaxially, paler abaxially, apex caudate or acuminate; lateral veins 20–50 pairs, at 80–90° to midvein.

Cymes glabrous, ca. 4 cm; peduncle 1.5–3 cm. Pedicel to 3 mm. Corolla white, pubescent, tube 5–6 mm; lobes broadly ovate, 3–4 mm, overlapping to left. Disc absent. Ovaries connate. Follicles connate, 18–35 × 1–1.2 cm. Seeds narrowly elliptic; cilia brown-yellow, to 2 cm. Fl. Apr-Jul, fr. Aug-Dec.

Monsoon or montane rain forests; 300–1100 m. Hainan, S Yunnan [India, Indonesia, Malaysia, Myanmar, Thailand].

The wood is used for making furniture and stationery, and the leaves and bark are used to treat acute bronchitis.

**2. *Alstonia macrophylla*** Wallich ex G. Don, Gen. Hist. 4: 87. 1837.

大叶糖胶树 *da ye tang jiao shu*

Trees to 20 m tall. Bark smooth; branches nearly 4-angled. Leaves in whorls of 3 or 4; petiole 1–4 cm; leaf blade narrowly obovate or narrowly elliptic, 10–53 × 4–19 cm, leathery, pubescent abaxially, apex usually acuminate; lateral veins 16–33 pairs, at 60–70° to midvein. Cymes terminal, 3-branched, 5–9 together, pubescent; peduncle 4–6 cm. Pedicel 4–5 mm. Corolla tube slightly longer than lobes, 4.5–6 mm; lobes overlapping to right, ciliate; disc absent. Ovaries distinct, glabrous. Follicles linear, to 61 cm × 2–5 mm. Seeds pubescent, ends with deltoid wings, with long stiff hairs all around. Fl. Oct–Nov.  $2n = 22$ .

S Guangdong, S Yunnan [Indonesia, Malaysia, Philippines, Thailand, Vietnam].

Cultivated for medicine.

**3. *Alstonia scholaris*** (Linnaeus) R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 76. 1811.

糖胶树 tang jiao shu

*Echites scholaris* Linnaeus, Mant. Pl. 1: 53. 1767; *Pala scholaris* (Linnaeus) Roberty.

Trees to 40 m tall, glabrous. Bark gray; branchlets copiously lenticellate. Leaves in whorls of 3–10; petiole 1–3 cm; leaf blade narrowly obovate to very narrowly spatulate, 7–28 × 2–11 cm, leathery, base cuneate, apex usually rounded; lateral veins 25–50 pairs, at 80–90° to midvein. Cymes dense, pubescent; peduncle 4–7 cm. Pedicel usually as long as or shorter than calyx. Corolla white, tube 6–10 mm; lobes broadly ovate or broadly obovate, 2–4.5 mm, overlapping to left. Ovaries distinct, pubescent. Follicles distinct, linear, to 57 cm × 2–5 mm. Seeds oblong, margin ciliate, ends with tufts of hairs 1.5–2 cm. Fl. Jun–Nov, fr. Oct–Dec.  $2n = 22, 44^*$ .

Mixed forests, village groves; 200–1000 m. SW Guangxi, S Yunnan; cultivated in Fujian, Guangdong, Hainan, Hunan, Taiwan [Cambodia, India, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia].

The bark and leaves are used to treat headache, influenza, bronchitis, and pneumonia. The wood is used for making coffins.

**4. *Alstonia yunnanensis*** Diels, Notes Roy. Bot. Gard. Edinburgh. 5: 165. 1912.

鸡骨常山 ji gu chang shan

*Alstonia esquirolii* H. Léveillé; *Acronychia esquirolii* H. Léveillé.

Shrubs erect, to 3 m tall. Branches conspicuously lenticellate, puberulent when young. Leaves in whorls of 3–5, petiolate; blade very narrowly obovate or oblong, 6–19 × 1.3–5 cm, thin papery, pubescent on both surfaces, apex acuminate; lateral veins 15–35 pairs, at 45° to midvein. Cymes puberulent; peduncle 0.5–2 cm. Pedicel to 8 mm. Corolla pink to red, tube 1–1.3 cm; lobes oblong, 2–6 mm, overlapping to left. Disc lobes 2, ligulate, as long as or longer than ovaries. Follicles distinct, linear, 3–5 cm × ca. 4 mm. Seeds oblong, ends with

very short cilia. Fl. Mar–Jun, fr. Jun–Nov.  $2n = 44^*$ .

• Montane brush fields, 800–2400 m. Guangxi, Guizhou, Yunnan.

The roots are used to cure hypertension and the leaves to treat hemostasis and fracture. The seeds yield up to 18% industrial oil.

**5. *Alstonia nerifolia*** D. Don, Prodr. Fl. Nepal. 131. 1825.

竹叶羊角棉 zhu ye yang jiao mian

*Alstonia guangxiensis* D. Fang & X. X. Chen.

Shrubs erect, to 2 m tall, glabrous except for leaves. Branches gray-brown, lenticellate. Leaves in whorls of 3 or 4, sessile; blade very narrowly elliptic or sublinear, 6–22 × 1–2.5 cm, thick papery, abaxially pubescent, apex acuminate; lateral veins 100–170 pairs, nearly at a right angle to midvein. Cymes to 10 cm. Calyx lobes ciliate. Corolla white, tube ca. 2 cm; lobes ca. 1 cm, overlapping to left. Stamens inserted at apex of corolla tube; disc shorter than ovaries. Follicles 6–13 × 2–4 cm. Seeds ciliate at ends, 5–10 mm.

Montane brush fields. SW Guangxi [India, Indonesia, Malaysia, Sri Lanka].

The leaves and roots are used to cure abscesses.

**6. *Alstonia rupestris*** Kerr, Bull. Misc. Inform. Kew. 1937: 43. 1937.

岩生羊角棉 yan sheng yang jiao mian

*Blaberopus rupestre* (Kerr) Pichon

Shrubs erect, to 4 m tall, glabrous. Bark gray-brown; branches lenticellate. Leaves in whorls of 3–5, sessile; blade very narrowly elliptic or sublinear, 4.5–10 × 0.5–1.5 cm, thick papery, glabrous, apex acuminate; lateral veins 45–80 pairs, nearly at a right angle to midvein. Cymes crowded. Pedicel ca. 3 mm. Corolla white, tube 7–8 mm; lobes oblong, 2.5–3 mm, overlapping to left. Disc lobes as long as ovary. Ovaries distinct. Follicles red-brown, linear, 7–10 cm. Seeds with brown cilia. Fl. May–Oct.

Limestone rocks in brushwoods or forests; 500–1800 m. W Guangxi [Thailand].

**7. *Alstonia mairei*** H. Léveillé, Cat. Pl. Yun-Nan 9. 1915.

羊角棉 yang jiao mian

*Alstonia paupera* Handel-Mazzetti; *Wikstroemia hems-leyana* H. Léveillé.

Shrubs erect, to 2 m tall, glabrous. Branchlets lenticellate. Leaves in whorls of 3–5; petiole 0.5–1.5 cm; leaf blade very narrowly obovate or elliptic, 4–14 × 0.8–3 cm, thin papery, glabrous, apex acuminate or caudate; lateral veins 27–70 pairs, at 45–60° to midvein. Cymes longer than leaves; peduncle 1.5–3.5 cm. Pedicel to 2–15 mm. Corolla white, tube 1–2 cm; lobes oblong, 6–10 mm. Disc lobes shorter than ovary. Ovaries distinct, ca. 1.5 mm. Follicles distinct, linear, 5–10 cm × 3–5 mm. Seeds oblong, ca. 7 mm; cilia at seed apex cream, to 5 mm. Fl. May–Oct.

• Rocky places in open evergreen forests; 700–1500 m. Guizhou, Sichuan, Yunnan.

The roots and leaves are used to stop external bleeding.

**8. *Alstonia henryi*** Tsiang, Sunyatsenia 6: 112. 1941.

黄花羊角棉 huang hua yang jiao mian

*Alstonia sebusii* (Van Heurck & Mueller-Argoviensis) Monachino var. *szemaoensis* Monachino.

Shrubs erect, to 3 m tall, glabrous except for flowers.

Branchlets lenticellate. Leaves in whorls of 3 or 4; petiole to 1.2 cm; leaf blade very narrowly elliptic, 5–11 × 1–2.5 cm, papery, apex acuminate; lateral veins to 70 pairs, at 45–60° to midvein. Cymes 3-branched; peduncle 2–3 cm. Pedicel 0.8–1.2 cm. Calyx lobes ciliate. Corolla yellow; tube ca. 8 mm, dilated above middle, densely villous inside; lobes broadly ovate, ca. 2 mm. Disc lobes as long as ovary. Ovaries distinct. Fl. Jun.

• Montane forests, 1500 m. S Yunnan (Simao).

**10. AMSONIA** Walter, Fl. Carol. 98. 1788.

水甘草属 shui gan cao shu

Herbs annual or perennial, erect, with latex, without stolons. Leaves alternate, membranous. Cymes thyrsoid or corymbose, terminal. Flowers blue or bluish. Sepals narrowly acuminate, usually without glands. Corolla blue or bluish, salverform; tube cylindrical, dilated above middle, villous inside; lobes overlapping to left. Stamens inserted inside dilated portion of corolla tube; anthers ovate or oblong, free from pistil head, base rounded. Carpels united by a filiform style; ovules numerous, biseriate on each placenta. Pistil head with a basal membranous appendage. Follicles 2, cylindrical-fusiform, erect. Seeds cylindrical, end obliquely truncate; coma absent.

About 20 species: North America, SE Asia; one species in China.

**1. *Amsonia elliptica*** (Thunberg ex Murray) Roemer & Schultes, Syst. Veg. 4: 432. 1819.

水甘草 shui gan cao

*Tabernaemontana elliptica* Thunberg ex Murray, Syst. Veg. ed. 14, 255. 1784; *Amsonia sinensis* Tsiang & P. T. Li.

Herbs perennial, to 40 cm tall, glabrous. Stems terete. Petiole 3–5 mm; leaf blade elliptic or narrowly so, 2.2–5 cm ×

5–8 mm, base and apex acuminate, lateral veins almost flat on both surfaces. Inflorescences terminal, short thyrses. Pedicel ca. 4 mm. Sepals ca. 2 mm. Corolla bluish, tube ca. 1 cm, villous inside and densely so at throat; lobes oblong, ca. 6 mm. Anther apex included. Ovary glabrous. Style ca. 5 mm. Fl. Jun.  $2n = 22$ .

Grasslands. Anhui, Jiangsu [Japan].

Decoction of all parts is used to cure chills and to induce sweat.

**11. CATHARANTHUS** G. Don, Gen. Hist. 4: 95. 1837.

长春花属 chang chun hua shu

Herbs erect, perennial and often woody at base, juice watery. Leaves opposite; petiole short, intra- and interpetiolar glands present; leaf blade herbaceous to somewhat leathery, entire. Flowers terminal and axillary, solitary or rarely in 2- or 3-flowered cymes. Sepals small, narrowly oblong, awl-shaped, without glands. Corolla purple, red, pink, or white, salverform; tube glabrous or sparsely puberulent, throat constricted, woolly to velvety; lobes spreading, obliquely obovate, overlapping to left, apex apiculate. Stamens inserted in widened portion of corolla tube; anthers free, oblong, base obtuse; disc of 2 glands. Ovaries 2; ovules numerous. Style filiform; pistil head with a cylindrical base and reflexed hyaline frill. Follicles 2, cylindrical, apex acute. Seeds black, oblong, testa rugose.

Eight species: seven endemic to Madagascar, one restricted to India and Sri Lanka; one species cultivated in China.

**1. *Catharanthus roseus*** (Linnaeus) G. Don, Gen. Hist. 4: 95. 1837.

长春花 chang chun hua

*Vinca rosea* Linnaeus, Syst. Nat. ed. 10. 944. 1759; *Ammocallis rosea* (Linnaeus) Small; *Catharanthus roseus* var. *albus* G. Don; *Lochnera rosea* (Linnaeus) Reichenbach ex Endlicher; *L. rosea* var. *alba* (G. Don) Hubbard; *L. rosea* var. *flava* Tsiang; *Pervinca rosea* (Linnaeus) Moench; *V. rosea* var. *alba* (G. Don) Sweet.

Subshrubs or perennial herbs to 1 m tall, erect

or decumbent. Young stems puberulent. Leaves obovate or elliptic, 2.5–9 × 1–3.5 cm, herbaceous, apex minutely apiculate; lateral veins 7–11 pairs. Corolla red to pink or white and then mostly with a pink or less often yellow eye; tube 2.5–3 cm, pilose inside, throat villous; lobes broadly obovate, 1.2–2 cm. Follicles 2–3.8 cm × ca. 3 mm. Fl. spring-autumn.  $2n = 16$ .

Fujian, Guizhou, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang [native to Madagascar, cultivated or naturalized in all tropical countries].

Cultivated for medicine. Decoction of all parts is used in the

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treatment of malaria, skin diseases, Hodgkin's disease, diarrhea, hypertension, and diabetes.

**12. VINCA** Linnaeus, Sp. Pl. 1: 209. 1753.

蔓长春花属 man chang chun hua shu

Herbs with stolons and watery juice. Leaves opposite, entire, short petiolate, intra- and interpetiolar glands present. Flowers solitary or rarely in 2-flowered cymes, axillary. Calyx small, without glands. Corolla violet, funnelform, tube cylindric, hairy or with scales at throat; lobes obliquely obovate, spreading, shorter than tube, overlapping to left. Stamens inserted just below middle of corolla tube. Disc glands 2, ligulate, alternating with ovaries. Ovules 6—many. Style filiform; pistil head ringlike, apex densely hairy. Follicles 2, erect or spreading, cylindric, striate. Seeds glabrous.

About five species: W Asia, Europe; two species cultivated in China.

- 1a. Leaf blade truncate or subcordate at base, margin and calyx lobes ciliate; pedicel 3–5 cm ..... 1. *V. major*
- 1b. Leaf blade narrow at base, margin and calyx lobes glabrous; pedicel 1–1.5 cm ..... 2. *V. minor*

**1. Vinca major** Linnaeus, Sp. Pl. 1: 209. 1753.

Cultivated for medicine.

蔓长春花 man chang chun hua

*Vinca major* var. *variegata* Loudon.

Herbs to 1 m tall, flowering stems to 30 cm. Leaf blade elliptic, ovate, or broadly ovate, 2–9 × 2–6 cm, base truncate or subcordate, margin ciliate with hairs 0.1–1 mm; lateral veins to 5 pairs. Pedicel 3–5 cm. Sepals narrowly triangular, ca. 9 mm, densely ciliate. Corolla bluish purple, tube 1.2–1.5 cm, limb 3–5 cm in diam., lobes obliquely truncate. Anthers short, applanate, apex puberulent. Follicles spreading, ca. 5 cm. Fl. Mar-May.  $2n = 92$ .

Jiangsu, Taiwan, Yunnan, Zhejiang [native to Europe].

**2. Vinca minor** Linnaeus, Sp. Pl. 1: 209. 1753.

花叶蔓长春花 hua ye man chang chun hua

Herbs perennial. Flowering stems to 20 cm. Leaf blade oblong, ovate, or elliptic, 1–4.5 × 0.5–2.5 cm, base rounded or cuneate, margin not ciliate. Pedicel 1–1.5 cm. Sepals narrowly elliptic, 3–5 mm. Corolla lilac-blue, tube 0.9–1.1 cm, limb 2.5–3 cm in diam., lobes obliquely truncate. Filaments longer than anthers; anthers puberulent at apex. Follicles erect. Fl. May.  $2n = 46$ .

Jiangsu [introduced from Europe].

Cultivated for medicine.

**13. RAUVOLFIA** Linnaeus, Sp. Pl. 1: 208. 1753.

萝芙木属 luo fu mu shu

Trees or shrubs with latex. Leaves whorled, rarely opposite, with glands axillary and sometimes on petiole. Cymes pedunculate, terminal or axillary, each branch ends in as many inflorescences and/or branches as leaves in a whorl. Calyx deeply divided, without glands. Corolla white, yellow, green, or pink, rarely with a red tube, salverform or campanulate; tube cylindric, swollen on 1 side at or above middle, villous inside distal half, throat not scaly, often with long hairs inside; lobes overlapping to left. Stamens inserted in widening of corolla tube; filaments very short; anthers ovate, free from pistil head, base rounded; disc ringlike or cup-shaped, entire or lobed at apex. Ovaries 2, free or connate. Style filiform; pistil head drum-shaped, with a pendulous ring, apex shortly 2-cleft. Drupes 2, distinct or connate. Seed 1, without coma.

About 60 species: Africa, Asia, America; seven species in China.

- 1a. Trees; lateral veins 30–45 pairs, subparallel, nearly at right angles to midvein ..... 1. *R. sumatrana*
- 1b. Shrubs; lateral veins 5–20 pairs, arcuate ascending.
  - 2a. Ovaries and fruit of connate carpels, often only at base.
    - 3a. Leaves ovate or elliptic, tomentose when young; corolla tube 2–3 mm; fruit entire at apex ..... 2. *R. tetraphylla*
    - 3b. Leaves narrowly elliptic or obovate, glabrous; corolla tube 10–20 mm; fruit forked at apex.
      - 4a. Leaves usually narrowly elliptic, 7–20 cm, membranous; petiole 10–15 mm; inflorescences solitary; peduncle, pedicel, calyx, and corolla red or reddish; corolla lobes 1.5–3.5 mm; stamens inserted at middle of corolla tube ..... 3. *R. serpentina*
      - 4b. Leaves obovate, 1–6 cm, leathery; petiole 2–4 mm; peduncle, pedicel, and calyx green; corolla tube white, lobes 10–14 mm; stamens inserted at corolla throat ..... 4. *R. cubana*
  - 2b. Ovaries and fruit of free carpels.
    - 5a. Corolla white, tube widened at middle; stamens inserted at middle of corolla tube ..... 7. *R. verticillata*
    - 5b. Corolla reddish, green, or yellow, tube widened at top; stamens inserted at corolla throat.
      - 6a. Lateral veins of leaf blade prominent; inflorescences long, at least some branches puberulent;

- corolla greenish or green ..... 5. *R. vomitoria*  
 6b. Lateral veins of leaf blade inconspicuous; inflorescences short, glabrous; corolla yellow .... 6. *R. tiaolushanensis*

**1. *Rauvolfia sumatrana*** Jack, Malayan Misc. 1(5): 22. 1820.

苏门答腊萝芙木 *su men da la luo fu mu*

Trees to 20 m tall. Leaves in whorls of 3–5; petiole 2–3 cm; leaf blade oblong or narrowly obovate, 12–20 × 4–8 cm, leathery, glabrous, apex apiculate or nearly so; lateral veins 30–45 pairs, subparallel, nearly at a right angle to midvein. Inflorescences dense, 8–12 × 12–15 cm; peduncle 5–8 cm. Corolla white, tube cylindric, 4–6 mm; lobes broadly ovate, 1.2–1.7 mm; throat villous. Disc less than 0.5 mm. Ovaries distinct, ca. 1 mm. Drupes subglobose, 1.5–1.8 × 1.8–2.4 cm. Seeds 1 or 2.

S Guangdong [Indonesia, Malaysia, Philippines, Thailand].

Cultivated for medicine. The wood is used to make rapier scabbards in Java.

**2. *Rauvolfia tetraphylla*** Linnaeus, Sp. Pl. 1: 208. 1753.

四叶萝芙木 *si ye luo fu mu*

Shrubs to 2 m tall, pubescent or tomentose when young, glabrescent with age. Leaves in whorls of 3–5; petiole 2–5 mm; leaf blade ovate, narrowly ovate, or oblong, 1–15 × 0.8–4 cm, membranous, base broadly cuneate to rounded, apex acute or obtuse; lateral veins 5–12 pairs. Peduncle 1–4 cm. Corolla white, tube urceolate, 2–3 mm, long hairy inside distal half; lobes ovate or suborbicular. Stamens inserted at corolla throat. Ovaries connate. Drupes subglobose, 5–10 mm in diam., glabrous, connate. Seeds 2. Fl. May, fr. Jun-Aug.  $2n = 66$ .

S Guangdong, SW Guangxi, Hainan, S Yunnan [native to tropical America].

Cultivated for medicine.

The latex has been reported to be emetic, cathartic, and expectorant and is used for treating dropsy. The fruit juice is used as a substitute for ink.

**3. *Rauvolfia serpentina*** (Linnaeus) Benth. ex Kurz, Forest Fl. Burma 2: 171. 1877.

蛇根木 *she gen mu*

*Ophioxylon serpentinum* Linnaeus, Sp. Pl. 2: 1043. 1753; *O. majus* Hasskarl.

Shrubs to 1 m tall, erect, glabrous. Stems usually unbranched, slender, straw colored. Leaves grouped near stem apex, in whorls of 3–5; petiole 1–1.5 cm; leaf blade narrowly elliptic or obovate, membranous, 7–17 × 2–9 cm, base cuneate, apex acuminate or rarely obtuse; lateral veins 7–15 pairs. Cymes congested; peduncle 5–13 cm, red or reddish. Pedicel and calyx red or reddish. Corolla white, tube cylindric, 1–1.8 cm, inflated at middle and pilose inside distal half; lobes obliquely suborbicular, 1.5–3.5 mm. Stamens inserted at middle of corolla tube. Ovaries connate in basal half. Drupes

ellipsoid, ca. 8 mm, connate for half their length. Fl. Feb-Oct, fr. May-Dec.  $2n = 22$ .

Montane forests; 800–1500 m. S Yunnan (Gengma, Jing-hong), cultivated in S Guangdong, S Guangxi, Hainan [India, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand].

The roots are used as a sedative and in the treatment of hypertension. The bark, leaves, and roots are used against snake and scorpion poisoning.

**4. *Rauvolfia cubana*** A. de Candolle, Prodr. 8: 339. 1844.

古巴萝芙木 *gu ba luo fu mu*

Shrubs to 5 m tall, glabrous. Leaves usually in whorls of 3; petiole 2–4 mm; leaf blade obovate, 1–6 × 1–2 cm, leathery; lateral veins inconspicuous. Peduncle 2–4 cm. Pedicel 6–11 mm. Corolla white, tube cylindric, ca. 2 cm; lobes obovate-elliptic, 1–1.4 cm. Stamens inserted at corolla throat. Ovaries connate in basal half. Drupes obovoid, 1–1.2 cm × 5–7 mm, connate along lower half, apex 2-forked. Seeds rugose. Fl. Jul.

S Yunnan [introduced from Cuba].

Cultivated for medicine.

**5. *Rauvolfia vomitoria*** Afzelius, Stirp. Guinea Med. 1. 1817.

催吐萝芙木 *cui tu luo fu mu*

Shrubs to 5 m tall, glabrous. Stems erect, stiff. Leaves whorled; leaf blade broadly ovate or ovate-elliptic, 5–12 × 3–6 cm; lateral veins 8–17 pairs. Cymes usually 4 together. Corolla greenish or pale green, tube subcylindric, 6–12 mm, inflated at throat, pubescent inside; lobes dolabriform, 1–2 mm. Stamens inserted at corolla throat; disc ringlike, shorter than ovaries. Ovaries distinct. Style filiform, pubescent at base; pistil head fleshy, base membranous. Drupes 2, distinct, ovoid or ellipsoid, 0.8–1.4 cm × 6–9 mm. Fl. Aug-Oct, fr. Oct-Dec.  $2n = 22, 66$ .

S Guangdong, S Guangxi, S Yunnan [native to tropical Africa].

Cultivated for medicine. All parts are poisonous. The roots and leaves are reported to have emetic and cathartic properties, and the bark is used as a remedy for fever and indigestion.

**6. *Rauvolfia tiaolushanensis*** Tsiang, Sci. Rep. Kwantung Coll. Forest. 1: 10. 1962.

吊罗山萝芙木 *diao luo shan luo fu mu*

Shrubs to 1 m tall. Stems dark brown. Leaves opposite or in whorls of 3 or 4; petiole ca. 8 mm; leaf blade elliptic to oblong, 8–17 × 1.6–4 cm, lateral veins inconspicuous. Cymes ca. 2 cm; peduncle ca. 6 mm. Calyx lobes ca. 2.5 mm. Corolla yellow, tube cylindric, ca. 8 × 2 mm, dilated at throat, pubescent inside; lobes oblong or ovate, ca. 3.5 × 2.5 mm. Stamens inserted at corolla throat; filaments short; anthers broadly ovate, base rounded, apex short acuminate; disc cup-shaped, shorter than ovary. Ovaries distinct. Style filiform; pistil head club-shaped to capitate, base with a ringlike

membrane. Drupes distinct, ellipsoid, 1–1.7 cm × 5–8 mm. Fl. Mar, fr. May.

- Montane forests; 300–600 m. Hainan (Baoting, Waning).

**7. *Rauvolfia verticillata*** (Loureiro) Baillon, Hist. Pl. 10: 170. 1889.

萝芙木 *luo fu mu*

*Dissolena verticillata* Loureiro, Fl. Cochinch. 1: 137. 1790; *Cerbera chinensis* Sprengel; *Ophioxylon chinense* Hance; *Rauvolfia altodiscifera* Miau, *R. brevistyla* Tsiang; *R. cambodiana* Pierre ex Pitard; *R. chinensis* (Sprengel) Hemsley; *R. latifrons* Tsiang; *R. perakensis* King & Gamble; *R. superaxillaris* P. T. Li & S. Z. Huang; *R. taiwanensis* Tsiang; *R. verticillata* var. *hainanensis* Tsiang; *R. verticillata* var. *oblanceolata* Tsiang; *R. verticillata* var. *officinalis* Tsiang; *R. yunnanensis* Tsiang.

Shrubs to 3 m tall, erect, glabrous. Branchlets pale gray, lenticellate. Lower leaves opposite, terminal leaves in whorls of 3 or 4; petiole 0.5–1.5 cm; leaf blade narrowly to broadly ovate or oblong, 3.5–25 × 5–13 cm, nearly papery to membranous; lateral veins 6 or 7 pairs. Cymes rather lax, 3–9 together; peduncle 2–15 cm. Pedicel 3–6 mm. Corolla white, tube cylindric, 1–1.8 cm, inflated and villous from middle to throat; lobes broadly elliptic or ovate, 1–4.5 mm. Stamens inserted at middle of corolla tube. Ovaries distinct. Drupes ellipsoid or ovoid, distinct, ca. 10 × 5 mm. Seed 1. Fl. Feb–Oct, fr. Apr–Dec.  $2n = 22^*$ .

Lowland, montane rain forests, monsoon forests, brush fields, river banks, rice fields, seashores; 0–1700 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

Used in China to treat snake poisoning, malaria, and typhus. The roots are used to treat hypertension and as a sedative.

**14. ALYXIA** Banks ex R. Brown, Prodr. 469. 1810, nom. cons.

链珠藤属 *lian zhu teng shu*

Plants woody lianas or erect to trailing shrubs, with latex. Leaves in whorls of 3 or 4, rarely opposite. Cymes terminal and/or axillary, sometimes in clusters or short thyrses. Flowers small, 5-merous. Calyx deeply divided, without basal glands. Corolla white or rarely yellow, salverform, tube cylindric, widened at stamens insertion, lobes overlapping to left; corona scales absent. Stamens included, inserted at or above middle of corolla tube; filaments very short; anthers free from pistil head; disc absent. Ovaries 2, distinct; ovules biseriate, 4–6 in each ovary. Style filiform; pistil head capitate, apex shortly 2-cleft. Fruit usually paired, moniliform, transversely constricted into 1–5 drupelike articles, or not jointed. Seeds ovate or oblong; endosperm horny, ruminate; cotyledons leaflike, erect or curved.

About 70 species: tropical Asia, Australia, Pacific Islands; 12 species in China.

- 1a. Leaves densely pubescent abaxially; cymes spicate ..... 3. *A. villilimba*
- 1b. Leaves glabrous abaxially; cymes fascicled.
  - 2a. Inflorescences 2–10.5 cm.
    - 3a. Corolla pubescent ..... 1. *A. menglungensis*
    - 3b. Corolla glabrous.
      - 4a. Inflorescences 8–10.5 cm ..... 2. *A. siamensis*
      - 4b. Inflorescences 3–5 cm ..... 4. *A. reinwardtii*
  - 2b. Inflorescences 0.5–2 cm.
    - 5a. Leaf apex rounded, obtuse, or rarely retuse.
      - 6a. Leaves usually in whorls of 4; leaf blade 5.5–10 × 2.5–3.5 cm; petiole 10–15 mm; corolla tube 7–10 mm ..... 5. *A. insularis*
      - 6b. Leaves opposite or in whorls of 3; leaf blade 1.5–3.5 × 0.8–2 cm; petiole ca. 2 mm; corolla tube 2–3 mm ..... 6. *A. sinensis*
    - 5b. Leaf apex caudate, acuminate, or acute.
      - 7a. Leaf apex caudate or acuminate, acumen ca. 1.5 cm ..... 7. *A. fascicularis*
      - 7b. Leaf apex acute or short acuminate.
        - 8a. Leaf blade with marginal veins ..... 8. *A. marginata*
        - 8b. Leaf blade without marginal veins.
          - 9a. Ovary glabrous; articles of fruit ca. 6 × 4 mm ..... 9. *A. taiwanensis*
          - 9b. Ovary hairy; articles of fruit 7–22 × 5–10 mm.
            - 10a. Articles of fruit ca. 7 mm; corolla yellow ..... 11. *A. schlechteri*
            - 10b. Articles of fruit 10–22 mm; corolla greenish white or greenish yellow.
              - 11a. Sepals acuminate, 1.5–3 mm; corolla greenish white, tube ca. 3 mm; articles of fruit 10–13 × 8–10 ..... 10. *A. levinei*
              - 11b. Sepals obtuse or acute, 1.7–8 mm; corolla greenish yellow, tube 3–15 mm; articles of fruit 10–22 × 5–8 mm ..... 12. *A. odorata*

1. **Alyxia menglungensis** Tsiang & P. T. Li, Acta Phyto-tax. Sin. 11: 364. 1973.

勐龙链珠藤 meng long lian zhu teng

Lianas woody, to 4 m. Branchlets gray-green. Leaves opposite or in whorls of 3; petiole ca. 1 cm; leaf blade elliptic to narrowly so, 9–12 × 3–4.2 cm, papery, abaxially glabrous; lateral veins numerous, inconspicuous abaxially. Cymes terminal or axillary, solitary or umbellate in groups of 3 or 4, 2–6.7 cm, pubescent; peduncle 1–4 cm. Sepals ovate, ca. 2 mm, obtuse, densely pubescent. Corolla white, pubescent on both surfaces, tube ca. 6 mm; lobes ovate, ca. 2 mm. Stamens inserted at corolla throat. Ovary glabrous. Style filiform. Fl. Sep.

• Dense montane forests; 2000 m. S Yunnan.

2. **Alyxia siamensis** Craib, Bull. Misc. Inform. Kew 1911: 412. 1911.

长序链珠藤 chang xu lian zhu teng

*Alyxia balansae* Pitard; *A. yunkuniana* Tsiang.

Lianas stout, woody, to 8 m. Bark dull gray, glabrous, warty. Leaves opposite or in whorls of 3 or 4; petiole 1–1.5 cm; leaf blade elliptic to narrowly so, 7–19 × 3–4.4 cm, abaxially glabrous, base cuneate, margin revolute, apex short acuminate; lateral veins numerous, subparallel, slender, elevated on abaxial surface, obscure adaxially. Cymes fascicled, terminal or axillary, thyrsoid, 8–10.5 cm, puberulent. Sepals ovate, ca. 1 mm, acute or short acuminate, puberulent outside. Corolla yellow, glabrous, tube ca. 2 mm; lobes obliquely ovate, ca. 1 mm. Stamens inserted above middle of corolla tube. Ovary pubescent. Style filiform, ca. 1.5 mm; pistil head subcapitate. Fruit moniliform, paired or solitary, ellipsoid or ovoid-oblong, 3–4.5 × 1.2–1.5 cm. Fl. May-Jul.

Humid forests, valleys, brushwoods; 250–1000 m. Guang-dong, Guangxi, Yunnan [Thailand, Vietnam].

3. **Alyxia villilimba** C. Y. Wu ex Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 366. 1973.

毛叶链珠藤 mao ye lian zhu teng

*Alyxia villilimba* var. *macrophylla* P. T. Li.

Shrubs to 3 m tall, densely pubescent. Leaves usually in whorls of 3; petiole 1–2 cm; leaf blade elliptic or narrowly so, 7–20 × 1.5–4.5 cm, papery, glabrous adaxially, pubescent abaxially; lateral veins 30–40 pairs, subparallel. Cymes spikelike, axillary; peduncle 2–4 cm; bracts and bracteoles ovate. Sepals narrowly elliptic, acuminate, pubescent. Corolla white, ca. 1.5 mm. Stamens inserted at middle of corolla tube. Ovary glabrous. Fruit moniliform, articles ellipsoid, ca. 2.5 × 1 cm.

• Limestone in humid forests; 500–1000 m. W Guangxi, SE Yunnan.

4. **Alyxia reinwardtii** Blume, Catalogus 43. 1823.

长花链珠藤 chang hua lian zhu teng

*Alyxia flavescens* Pierre; *A. forbesii* King & Gamble; *A. lucida* Wallich var. *meiantha* Stapf; *A. reinwardtii* var. *meiantha* (Stapf) Markgraf.

Lianas woody, to 3 m, glabrous except for inflorescences. Juvenile branchlets triangular, later terete. Leaves opposite or in whorls of 3 or 4; petiole to 5 mm; leaf blade narrowly elliptic or oblong, 8–11 × 1.5–2.5 cm, sub-leathery to leathery, abaxially glabrous, apex narrowly long acuminate, lateral veins obscure abaxially. Cymes fascicled, axillary, pubescent, 3–5 cm; peduncle 1–1.3 cm; bracteoles very narrowly ovate. Sepals ovate or narrowly so, ca. 2 × 1 mm, obtuse or acute, pubescent to subglabrous. Corolla yellowish white, glabrous, tube ca. 8.5 mm; lobes ovate, ca. 4 mm. Ovary villous. Fruit oblong-ellipsoid, ca. 1.5 cm × 5 mm. Fl. May-Oct, fr. Aug-Dec.

Forests, brushwoods; 800–1700 m. S Yunnan [Indonesia, Malaysia, Philippines, Thailand, Vietnam].

5. **Alyxia insularis** Kanehira & Sasaki, Trans. Nat. Hist. Soc. Taiwan 24: 402. 1934.

兰屿链珠藤 lan yu lian zhu teng

Shrubs to 3 m tall, trailing, glabrous. Branchlets 4-angled. Leaves usually in whorls of 4; petiole 1–1.5 cm; leaf blade ovate or narrowly so, 5.5–10 × 2.5–3.5 cm, thick leathery, abaxially glabrous, apex obtuse or rounded; midvein elevated abaxially, lateral veins inconspicuous. Cymes fascicled, axillary; peduncle short. Sepals ovate to triangular, 3–4 mm, apex obtuse. Corolla tube 7–10 mm, densely pubescent inside at middle; lobes ovate, ca. 5 mm. Stamens inserted above middle of corolla tube. Ovary pubescent. Fruit ellipsoid, 1–2 × 0.6–1.5 cm. Seeds 1 or 2. Fl. May.

• Brushwoods. Taiwan (Lanyu and Lutaou).

6. **Alyxia sinensis** Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 4: 334. 1852.

链珠藤 lian zhu teng

Lianas woody, to 3 m, glabrous except for inflorescences. Leaves opposite or in whorls of 3; petiole ca. 2 mm; leaf blade orbicular, elliptic, ovate, or obovate, 1.5–3.5 × 0.8–2 cm, leathery, abaxially glabrous, margin revolute, apex rounded or retuse; lateral veins inconspicuous. Cymes fascicled, axillary or subterminal, less than 2 cm. Flowers densely crowded, 5–6 cm. Sepals ovate, ca. 1.5 mm, obtuse, pubescent. Corolla reddish to white, constricted at apex, tube 2–3 mm; lobes ovate, ca. 1.5 mm. Ovary villous. Fruit moniliform, stipitate, with 2 or 3 ellipsoid articles ca. 10 × 5 mm. Fl. Jul.  $2n = 36^*$ .

• Brushwoods, forest margins; 200–500 m. Fujian, Guang-dong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Taiwan, Zhejiang.

The roots are used for the treatment of injury, toothache, and rheumatoid arthritis.

7. **Alyxia fascicularis** Bentham in Bentham & J. D. Hooker, Gen. Pl. 2: 698. 1876.

尾尖链珠藤 wei jian lian zhu teng

Lianas woody, to 2 m. Bark pale, warty; branchlets gray, glabrous. Leaves opposite or in whorls of 3; petiole 3–5 mm; leaf blade oblong-elliptic, oblong, or oblanceolate, 6–10 × 1.7–3 cm, glabrous, base broadly cuneate, apex caudate-acuminate, acumen ca. 1.5 cm; veins numerous, parallel, slender, raised. Cymes fascicled, short pedunculate, densely flowered, glabrous or puberulent. Sepals ovate. Corolla tube ca. 3 mm; lobes small, rounded. Fruit moniliform, stipitate, with 2–4 cylindrical-ellipsoid articles ca. 2 × 1 cm. Fl. Sep-Nov.

Mixed forests; 1800 m. SE Xizang (Motuo) [India (Khasia Mountain), Thailand].

**8. *Alyxia marginata*** Pitard in Lecomte & Humbert, Fl. Indo-Chine 3: 1123. 1933.

陷边链珠藤 xian bian lian zhu teng

*Alyxia funingensis* Tsiang & P. T. Li.

Lianas woody, to 3 m, glabrous except for inflorescences. Branchlets dark gray, warty. Leaves opposite or in whorls of 3; petiole 3–10 mm; leaf blade elliptic, narrowly elliptic, or obovate, 7–17 × 1.4–5 cm, papery, abaxially glabrous; lateral veins numerous, inconspicuous abaxially, marginal veins present. Cymes axillary, 1–2 cm, puberulent. Sepals ovate, 3–3.5 mm, acute, pubescent outside. Corolla white or creamy white, tube 5–10 mm, densely pubescent inside, lobes ovate, ca. 3 mm. Ovary puberulent. Fruit moniliform, articles subglobose, 1–1.6 × 0.8–1.1 cm. Fl. Sep-Nov, fr. Oct-Dec.

Dense forests, brushwood, forest borders; 200–1800 m. SW Guangxi, Yunnan [Cambodia, Laos, Vietnam].

**9. *Alyxia taiwanensis*** Lu & Yang, Bot. Bull. Acad. Sin. 19: 195. 1978.

台湾链珠藤 tai wan lian zhu teng

Shrubs scandent. Branches pubescent. Leaves opposite or in whorls of 3 or 4; petiole 1–2.5 mm; leaf blade narrowly elliptic, 2–2.5 × 1–1.5 cm, leathery, abaxially glabrous, base acute, apex acuminate; lateral veins inconspicuous. Cymes fascicled, terminal, less than 2 cm. Sepals ovate to triangular, 2–3 mm, pubescent. Corolla tube 4–5 mm, pubescent; lobes obliquely ovate, ca. 2 mm. Stamens inserted above middle of corolla tube. Ovary glabrous. Fruit with 1–4 articles; drupes ovoid, ca. 6 × 4 mm. Seeds ovoid, hairy.

• Edges of open forests; 1200–1300 m. Taiwan (Taichung).

**10. *Alyxia levinei*** Merrill, Philipp. J. Sci. 15: 254. 1920.

筋藤 jin teng

*Alyxia acutifolia* Tsiang; *A. kweichowensis* Tsiang & P. T. Li.

Shrubs scandent, to 3 m. Branches and branchlets slender, somewhat angled or striate, later terete. Leaves opposite or in whorls of 3; petiole 4–7 mm; leaf blade elliptic, narrowly

elliptic, or oblong, 3.5–8 × 1.2–3 cm, papery to somewhat leathery, abaxially glabrous, apex acuminate or acute; lateral veins obsolete. Cymes fascicled, axillary, solitary to trichasial; peduncle 0.5–2 cm, puberulent; bracteoles 2 or more, elliptic-ovate. Sepals 1.5–3 mm, villous, ciliate, apex acuminate. Corolla greenish white; tube ca. 3 mm, glabrous; lobes broadly elliptic, ca. 1.5 mm. Ovary villous. Fruits with 1–3, drupelike, ellipsoid or globose articles 1–1.3 cm × 0.8–1 cm. Fl. Mar-Aug, fr. Sep-Dec.

• Montane sparse woods, brushwoods; 300–500 m. Guang-dong, Guangxi, Guizhou.

All parts of the plant are used to cure infantile malnutrition due to intestinal parasites, rheumatism, and furunculosis.

**11. *Alyxia schlechteri*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 453. 1911.

狭叶链珠藤 xia ye lian zhu teng

*Alyxia schlechteri* var. *salicifolia* P. T. Li.

Lianas woody, to 3 m. Branches gray, with many lenticels; branchlets puberulent, later glabrous. Leaves opposite or in whorls of 3 or 4, usually crowded on upper branchlets; petiole 2–4 mm, glabrous or pubescent; leaf blade narrowly to very narrowly elliptic, 2–12 × 0.5–1.5 cm, leathery, usually glabrous, base broadly cuneate, margin recurved, apex acuminate or acute; lateral veins inconspicuous abaxially. Cymes fascicled, axillary, 0.5–1 cm. Sepals narrowly elliptic, ca. 2.5 mm, keeled, minutely puberulent, apex long acute. Corolla yellow. Fruit with 2 or 3 ellipsoid articles ca. 7 × 5 mm.

Sparse woods, brushwoods; 500–1500 m. Guangxi, Guizhou, Yunnan [Thailand].

**12. *Alyxia odorata*** Wallich ex G. Don, Gen. Hist. 4: 97. 1837.

海南链珠藤 hai nan lian zhu teng

*Alyxia euonymifolia* Tsiang; *A. hainanensis* Merrill & Chun; *A. jasminea* Tsiang & P. T. Li; *A. leitungensis* Tsiang; *A. nitens* Kerr; *A. vulgaris* Tsiang.

Lianas woody, to 4 m. Branches slightly angled when young, later terete, puberulent or glabrous. Leaves opposite or in whorls of 3; petiole 3–10 mm; leaf blade elliptic, oblong, narrowly elliptic, or obovate, 2–12 × 1–4.5 cm, papery, glabrous, apex acute or short acuminate; lateral veins numerous, usually inconspicuous. Cymes fascicled, terminal and axillary, 1–2 cm, pubescent. Pedicel and calyx pubescent. Sepals ovate to narrowly elliptic, 1.7–8 mm, obtuse or acute, long pubescent, ciliate. Corolla yellowish green, glabrous or sometimes puberulent inside, tube 3–15 mm; lobes ovate, 1.5–4 mm. Stamens inserted at or above middle of corolla tube. Ovary pubescent. Fruit with 1–3 ellipsoid-globose articles 1–2.2 cm × 5–8 mm. Fl. Mar-Oct, fr. Jun-Dec.

Sparse woods, brushwoods; 200–2000 m. Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Yunnan [Myanmar, Thailand].

**15. KOPSIA** Blume, Catalogus 12. 1823, nom. cons.

蕊木属 rui mu shu

Trees or shrubs with white latex. Leaves opposite. Cymes terminal, 3- to many flowered, bracteate; peduncle long or short; bracteoles small or large. Flowers white or rose, 5-merous. Calyx small, deeply divided, without glands. Corolla salverform, tube 2.3-5 cm, narrow, dilated at or below apex; throat without scales, pilose inside; lobes overlapping to right. Stamens inserted above middle of corolla tube; filaments very short; anthers narrowly oblong or ovate, included, free from pistil head, base rounded; disc scales alternate with ovaries. Ovaries 2, distinct; ovules 2 per locule. Style filiform; pistil head thickened, with a short basal collar and apiculate apex. Drupes 1 or 2, ellipsoid, 1- or 2-seeded. Seeds oblong, testa membranous, not comose.

About 20 species: SE Asia, three in China.

- 1a. Flowers many, ± crowded into corymbose, several-branched cymes; peduncle to 14 cm; disc longer than ovary; mature drupes blue-black ..... 1. *K. arborea*
- 1b. Flowers few, in little-branched, ± monochasial cymes; peduncle up to 1 cm; disc up to as long as ovary; mature drupe orange or red (color not known in *K. fruticosa*).
  - 2a. Lateral veins of leaf blade more than 20 pairs; corolla white; calyx and ovary glabrous ..... 2. *K. hainanensis*
  - 2b. Lateral veins of leaf blade 10-15 pairs; corolla pink; calyx and ovary pubescent ..... 3. *K. fruticosa*

1. **Kopsia arborea** Blume, Catalogus 13. 1823.

蕊木 rui mu

*Kopsia lancibracteolata* Merrill; *K. officinalis* Tsiang & P. T. Li.

Trees to 15 m tall. Branches greenish, terete, slightly compressed, puberulent when young. Petiole 5-15 cm; leaf blade elliptic, narrowly elliptic, or narrowly ovate, 8-24 × 3.5-8.5 cm, glabrous, apex acute or short acuminate; lateral veins 10-20 pairs. Cymes corymbose, many flowered; peduncle to 14 cm, puberulent or glabrous; bracteoles narrowly oblong, puberulent or glabrous. Pedicel 3-4 mm. Sepals narrowly oblong, 4-6 mm, puberulent or glabrous. Corolla white, tube ca. 2.5 cm; lobes narrowly oblong, 1.5-2 cm. Disc scales narrowly oblong, longer than ovary, fleshy. Ovary ovoid, puberulent. Drupes black or blue-black, ellipsoid, 2.5-3.5 × 1.5-2 cm. Fl. Apr-Sep, fr. Jul-Dec.  $2n = 72$ .

Montane forests, often along moist ravines; 400-1000 m. S Guangdong, SE Guangxi, Hainan, S Yunnan [Indonesia, Malaysia, Philippines, Thailand, Vietnam; N Australia].

A decoction of bark is used as an enema. The leaves and fruit are used to treat sore throat and tonsillitis.

2. **Kopsia hainanensis** Tsiang, Sunyatsenia 2: 111. 1934.

海南蕊木 hai nan rui mu

Shrubs or trees to 7 m tall, glabrous except for flowers. Branchlets gray-white, terete. Petiole 0.5-1.9 cm; leaf blade lustrous green adaxially, pale green abaxially, narrowly elliptic, 5-13.5 × 1-4.5 cm, apex obtuse or with a short acumen; lateral

veins more than 20 pairs. Cymes 6- or 7-flowered; peduncle 2-10 mm. Pedicel 1-2 mm. Sepals ovate, ca. 1.5 mm, obtuse, glabrous. Corolla white, glabrous outside, pilose inside to anthers; tube ca. 2.3 cm, ca. 1 mm in diam.; lobes oblong, ca. 1.5 cm. Disc scales sublinear, shorter than or as long as ovary. Ovary glabrous, 2-loculed; ovules 1 per locule. Drupes red or orange, subellipsoid, ca. 2.5 × 1 cm. Fl. Apr-Dec.

• Densely wooded ravines at lower and middle altitudes. Hainan.

3. **Kopsia fruticosa** (Ker Gawler) A. de Candolle, Prodr. 8: 352. 1844.

红花蕊木 hong hua rui mu

*Cerbera fruticosa* Ker Gawler, Bot. Reg. 5: t. 391. 1819; *Kopsia vinciflora* Blume.

Shrubs evergreen, to 4 m tall, glabrous except for inflorescences. Petiole ca. 1 cm; leaf blade narrowly elliptic or narrowly oblong, 10-23 × 2.5-9 cm, apex acute or obtusely caudate; lateral veins 10-15 pairs. Inflorescences few flowered, puberulent; peduncle to 1 cm; bracteoles to 1.5 mm, pubescent. Pedicel 5-7 mm. Sepals ovoid, 1.5-2.5 mm, pubescent, apex obtuse. Corolla pink, tube 3-5 cm, throat pubescent; lobes oblong, 1.5-2.5 cm. Disc scales sublinear, as long as or shorter than ovary. Ovary tomentose. Style 3-4 cm. Drupe ellipsoid, usually solitary, 1-seeded, to 2.5 × 2 cm, pubescent.  $2n = 36$ .

S Guangdong [India, Indonesia, Malaysia, Philippines, Thai-land].

Cultivated for medicine.

16. **OCHROSIA** Jussieu, Gen. Pl. 144. 1789.

玫瑰树属 mei gui shu shu

Trees with latex. Branches stout. Leaves in whorls of 3-5, rarely opposite; lateral veins numerous, subparallel, almost at a right angle to midvein. Cymes subterminal, pedunculate. Calyx deeply divided, usually without glands. Corolla salverform; tube slightly dilated above middle, to 1 cm, throat without scales; lobes overlapping to right. Stamens inserted in widening of corolla tube; anthers free from pistil head, narrowly oblong, rounded at base; disc absent. Ovaries 2, free or basally connate; ovules 2-6, biseriolate on each side of a prominent placenta. Style filiform; pistil head shortly 2-cleft at apex. Drupes 1 or 2, smooth;

endocarp thick, hard. Seeds 2–4 per locule, flat, not comose; endosperm none; cotyledons large, flat.

About 25 species: Malaysia, W Pacific Islands; three species cultivated in China.

- 1a. Sepals minutely ciliate; leaf apex usually rounded ..... 1. *O. borbonica*  
 1b. Sepals mostly not ciliate; leaf apex abruptly acuminate or obtuse.  
 2a. Corolla tube longer than lobes; leaves narrowly obovate to broadly elliptic ..... 2. *O. elliptica*  
 2b. Corolla tube as long as lobes; leaves elliptic ..... 3. *O. coccinea*

**1. *Ochrosia borbonica*** J. F. Gmelin, Syst. Nat. 2: 439. 1796.

玫瑰树 mei gui shu

Trees to 15 m tall. Trunk to 40 cm in diam. Terminal leaves in whorls of 3 or 4, others opposite; petiole 0.5–3.5 cm; leaf blade obovate or elliptic, 8–25 × 3–5 cm, apex usually rounded. Cymes many flowered; peduncle 2–12 cm. Flowers fragrant, short pedicellate or sessile. Sepals ovate, 2.5–3 mm, rounded, minutely ciliate. Corolla throat white, pink, or red, tube 7.5–10 mm; lobes oblong, 4–9 mm. Drupes 2, red, ca. 4.5 × 3.5 cm. Fl. throughout the year but mainly Jan–Jun.

S Guangdong [Indonesia, Malaysia, Singapore, Sri Lanka, Vietnam; Africa (Mascarenes)].

Cultivated for medicine.

**2. *Ochrosia elliptica*** Labillardière, Sert. Austro-Caledon. 25, t. 30. 1824.

古城玫瑰树 gu cheng mei gui shu

Trees to 6 m tall, glabrous. Petiole 1.5–2 cm; leaf blade obovate to broadly elliptic, 8–15 × 3–5 cm, apex obtuse or short acuminate. Cymes corymbose. Flowers sessile. Sepals ovate, ca. 2 mm, not ciliate, apex obtuse. Corolla white, cylindrical, tube ca. 1 cm; lobes linear, ca. 6 mm. Anthers narrowly oblong. Drupes ellipsoid, 2–4 × ca. 1 cm. Seeds

suborbicular, narrow margined. Fl. Jun.

S Guangdong, Taiwan [introduced from Australia].

Cultivated for medicine.

**3. *Ochrosia coccinea*** (Teijsmann & Binnendijk) Miquel, Ann. Mus. Bot. Lugduno-Batavum 4: 138. 1869.

光萼玫瑰树 guang e mei gui shu

*Lactaria coccinea* Teijsmann & Binnendijk, Natuurk. Tijdschr. Ned. Indië. 29: 249. 1867; *Bleekeria coccinea* (Teijsmann & Binnendijk) Koidzumi; *Excavatia coccinea* (Teijsmann & Binnendijk) Markgraf.

Trees to 6 m, glabrous. Branchlets subangular, smooth. Leaves opposite or whorled; blade elliptic, 7–20 × 3–5 cm, apex abruptly acuminate. Cymes repeatedly dichasial, ending monochasial, many flowered; peduncle to 3 cm. Pedicel 2–4 mm. Sepals ovate, ca. 2 mm, glabrous, apex rounded. Corolla white, tube ca. 4 mm, as long as lobes. Stamens inserted near mouth of corolla tube. Ovaries distinct, oblong. Drupes 2, bright red, ellipsoid, 2.5–5 × 2–2.5 cm, spreading horizontally. Seeds 2 on each placenta.  $2n = 22$ .

S Guangdong [Malaysia, New Guinea, Singapore].

Cultivated for medicine.

**17. THEVETIA** Linnaeus, Opera Var. 212. 1758, nom. cons.

黄花夹竹桃属 huang hua jia zhu tao shu

*Cascabela* Rafinesque; *Plumeriopsis* Rusby & Woodson.

Trees or much-branched shrubs, evergreen, erect, latex white. Leaves alternate, rather densely together on slender branchlets. Cymes terminal and leaf opposed. Calyx deeply divided, with many basal glands inside. Corolla yellow, funnelform, lobes overlapping to left, throat with 5, narrow, long-hairy scales. Stamens inserted in distal narrow part of corolla tube; filaments very short; anthers narrowly oblong, small, free from pistil head, cells not appendaged proximally; disc absent. Ovary 2-loculed, placenta prominent. Style filiform; pistil head disclike, thick, dilated, apex shortly 2-cleft. Drupes depressed globose; endocarp hard, woody or fleshy. Seeds 2 per locule, wingless, not comose, without endosperm; cotyledons suborbicular, fleshy, radicle short.

Eight species: tropical America, two species cultivated in China.

- 1a. Leaves narrowly obovate; corolla tube longer than lobes ..... 1. *T. ahouai*  
 1b. Leaves very narrowly oblong; corolla tube shorter than lobes ..... 2. *T. peruviana*

**1. *Thevetia ahouai*** (Linnaeus) A. de Candolle, Prodr. 8: 345. 1844.

阔叶竹桃 kuo ye zhu tao

*Cerbera ahouai* Linnaeus, Sp. Pl. 1: 208. 1753.

Shrubs to 3 m tall. Wood with an offensive smell. Leaf blade narrowly obovate, glabrous adaxially, pubescent abaxially, apex obtuse. Sepals ovate, reflexed, glabrous, apex

acute. Corolla tube dilated distally, longer than lobes, closed at mouth, marked with 5 deep grooves; lobes oval, oblique or overlapping, with undulate margin; corona scales absent. Stamens inserted at apex of corolla tube, included. Style filiform; pistil head turbinate, apex 2-cleft. Fl. almost throughout the year.

S Guangdong [introduced from Brazil].

Cultivated for medicine. The sap and seeds are deadly poisonous to domestic animals.

**2. *Thevetia peruviana*** (Persoon) K. Schumann in Engler & Prantl, Nat. Pflanzenfam. 4(2): 159. 1895.

黄花夹竹桃 huang hua jia zhu tao

*Cerbera peruviana* Persoon, Syn. Pl. 1: 267. 1805; *Cascabela thevetia* (Linnaeus) Lippold; *Cerbera thevetia* Linnaeus; *Thevetia linearis* A. de Candolle; *T. neriifolia* Jussieu ex Steudel; *T. neriifolia* Jussieu ex A. de Candolle; *T. thevetia* (Linnaeus) Millspaugh.

Trees to 6 m tall. Bark chocolate-brown, lenticellate; lower branches pendulous, young branches greenish gray. Petiole ca. 3 mm; leaf blades lustrous green adaxially, light green abaxially, very narrowly oblong, 10–15 × 0.5–1.2 cm, somewhat leathery, glabrous, apex acuminate, lateral veins obscure. Pedicel 2.5–5 cm. Flowers fragrant. Sepals green, narrowly triangular, apex acuminate. Corolla 6–7 × 4.5–5.5 cm; tube 4–5 cm, shorter than lobes; corona scales present, connected by a transverse row of long white hairs, lobes obliquely obovate. Drupes compressed triangular-globose, 2.5–4 cm in diam. Seeds light gray, lenticular, ca. 2 × 3.5 cm. Fl. May-Dec.  $2n = 20$ .

Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [native to Central and South America].

Cultivated for medicine. The sap and seeds are deadly poisonous to domestic animals. The seeds yield oil for industry and soap making. The bark is a powerful antiperiodic and febrifuge. A handsome ornamental.

## 18. *CERBERA* Linnaeus, Sp. Pl. 1: 208. 1753.

海芒果属 hai mang guo shu

Trees with latex. Branches stout. Leaves alternate, lateral veins 20–30 pairs, diverging almost at right angles to midvein. Cymes terminal, long pedunculate. Calyx deeply divided, without glands inside. Corolla white, funnelform, throat slightly dilated, ribbed, or with 5 pubescent scales; lobes broad, overlapping to left. Stamens inserted at corolla throat; anthers narrowly oblong, apiculate, free from pistil head, lobes rounded at base; disc absent. Ovaries 2, free, ovules 4 in each locule. Style filiform, dilated distally; pistil head shortly 2-cleft. Drupes 1 or 2, large, ellipsoid or globose, 1- or 2-loculed, with a thick, woody-fibrous endocarp. Seeds 1 or 2 per locule, wingless, not comose, without endosperm; cotyledons thin, radicle very short.

Three species: Africa, tropical Asia, Australia, Pacific Islands; one species in China.

**1. *Cerbera manghas*** Linnaeus, Sp. Pl. 1: 208. 1753.

海芒果 hai mang guo

Trees to 8 m tall. Bark gray-brown; branches whorled, marked with leaf scars. Petiole 2.5–6 cm; leaf blade narrowly ovate, 6–37 × 2.3–7.8 cm, base cuneate, apex acuminate. Peduncle stout, 5–21 cm. Pedicel terete, 1–2 cm. Flowers 4–7 cm wide. Corolla white, pinkish in center; tube 2.5–4 cm, villous inside; lobes ovate, falcate, 1.5–2.5 cm. Drupes 5–8 ×

4–6 cm, smooth. Seeds usually single. Fl. Mar-Oct, fr. Jul-Dec.  $2n = 40$ .

Seashore, tidal river banks. S Guangdong, S Guangxi, Hainan, S Taiwan [Cambodia, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Thailand, Vietnam; Australia, Pacific Islands].

The fruit, and especially the seed, are very poisonous and contain hydrocyanic acid and the cardiac glycosides thevetin and cerberin. The wood is used for fine charcoal, and the seeds are used in Hainan to stupefy fish. The bark, latex, and leaves are sometimes used as an emetic and a purgative.

## 19. *CAMERARIA* Linnaeus, Sp. Pl. 1: 210. 1753.

鸭蛋花属 ya dan hua shu

Trees or shrubs. Leaves opposite, with numerous, parallel secondary veins. Cymes corymbose, axillary, terminal, or at branch forks, 1- to many flowered. Calyx small, without glands; lobes ovate, apex acute. Corolla yellow or white, funnelform or salverform; tube long, cylindrical, swollen on 1 side at base or apex, throat not scaly; lobes unequal sided, overlapping to left. Stamens inserted above middle of corolla tube; anthers subsessile, acuminate, free from pistil head, exerted or included, connective extending into a long, bristly appendage. Ovaries 2, distinct; ovules numerous on each placenta. Style short or long, filiform; pistil head conical, 2-partite. Follicles 2, samaroid, reflexed or horizontal, obtuse. Seeds numerous, ovate.

Four species: Caribbean, one species cultivated in China.

**1. *Cameraria latifolia*** Linnaeus, Sp. Pl. 1: 210. 1753.

鸭蛋花 ya dan hua

Trees to 10 m tall. Branches forked. Leaves elliptic or ovate, ca. 4 cm, membranous, lateral veins numerous, densely parallel. Cymes corymbose, terminal, few flowered. Sepals 1–1.5 mm. Corolla white, yellow at base, salverform; tube cylindrical, 5–8 mm; lobes obovate, 0.6–1.5 cm. Anthers oblong, as long as appendages. Style filiform. Follicles 1 or 2,

4–5 cm. Seeds ovate, with a membranous wing at proximal end.

Guangdong [introduced from Cuba].

Cultivated for medicine and frequently used in the preparation of poultice.

## 20. ALLAMANDA Linnaeus, Mant. Pl. 2: 146. 1771.

黄蝉属 huang chan shu

Shrubs erect or trailing. Leaves whorled, with axillary glands. Flowers large, in terminal or seemingly axillary corymbs. Calyx deeply divided, without basal glands. Corolla yellow, funnelform, narrow part with fringed scales, limb campanulate, lobes overlapping to left. Stamens inserted at narrow part of corolla; filaments very short; anthers narrowly oblong, base rounded, coherent with pistil head; disc cup-shaped, obscurely 5-lobed or entire, fleshy, thick. Ovary 1-loculed, with two parietal placentae; ovules numerous. Style filiform; pistil head thick, with a membranous, reflexed rim, apex conical, shortly 2-lobed. Capsules globose, glabrous, sharply spiny, 2-valved. Seeds numerous, imbricate, compressed, winged or with a membranous margin; radicle short.

Fourteen species: tropical America, two cultivated in China.

- 1a. Erect shrubs with clear sap; lateral veins elevated on abaxial leaf surface; corolla tube ca. 3 cm, distinctly swollen at base ..... 1. *A. schottii*  
1b. Climbing shrubs with white latex; lateral veins flattened on abaxial leaf surface; corolla tube 4–8 cm, not swollen at base ..... 2. *A. cathartica*

**1. Allamanda schottii** Pohl, Pl. Bras. Icon. Descr. 1: 73. 1827.

黄蝉 huang chan  
*Allamanda neriifolia* Hooker.

Shrubs erect, to 2 m tall, with clear sap. Leaves in whorls of 3–5, subsessile; leaf blade elliptic or narrowly obovate, 5–14 × 2–4 cm, minutely hispid along veins; lateral veins elevated on abaxial surface. Flowers 4–6 cm. Corolla tube rather narrowly funnelform, ca. 3 cm, distinctly swollen at base, limb ca. 4 cm in diam.; lobes pale yellow, ovate or orbicular, ca. 2 cm, obtuse. Capsules globose, ca. 3 cm in diam., long spiny. Seeds ca. 2 × 1.5 cm. Fl. May–Aug, fr. Oct–Dec.  $2n = 18$ .

Fujian, Guangdong, Guangxi, Hainan, Taiwan [introduced from Brazil].

Cultivated for medicine and as an ornamental.

**2. Allamanda cathartica** Linnaeus, Mant. Pl. 2: 214. 1771.

软枝黄蝉 ruan zhi huang chan

*Allamanda hendersonii* Bulliard ex Dombrain; *A. cathartica* var. *hendersonii* (Bulliard ex Dombrain) L. H. Bailey & Raffill.

Shrubs trailing, to 4 m, with white latex. Stems glabrous. Leaves opposite or in whorls of 3–5; petiole ca. 5 mm; leaf blade obovate, narrowly obovate, or oblong, 6–15 × 4–5 cm, glabrous or villous along veins on abaxial surface, lateral veins flattened. Peduncle short. Flowers 7–14 cm. Corolla yellow; tube 4–8 cm, funnelform, cylindrical in proximal half, campanulate in distal half, limb 9–14 cm in diam.; lobes obovate-truncate to orbicular. Capsules subglobose, 3–7 × 3–5 cm, with spines to 1 cm. Seeds compressed, winged or with a membranous margin. Fl. spring–summer.  $2n = 18$ .

Fujian, Guangdong, Guangxi, Hainan, Taiwan [native to South America].

Cultivated for medicine.

## 21. MANDEVILLA Lindley, Bot. Reg. 26: t. 7. 1840.

文藤属 wen teng shu

Lianas usually glabrous, with latex. Leaves opposite; stipules interpetiolar, reduced to many linear segments. Racemes axillary, few flowered. Flowers large. Calyx deeply divided, with many basal glands inside. Corolla funnelform; tube narrow, more than 2 cm, limb campanulate; faucal scales absent; lobes overlapping to right. Stamens inserted and included in widened part of corolla tube; filaments short; anthers oblong, adherent at middle to pistil head, cells obtusely caudate; disc 5-cleft. Ovaries free, glabrous; ovules numerous. Style glabrous; pistil head with a 2-cleft mucro. Follicles long, slender. Seeds narrowly oblong, not beaked, comose.

About 120 species: Central and South America, one species cultivated in China.

**1. Mandevilla laxa** (Ruiz & Pavon) Woodson, Ann. Missouri Bot. Gard. 19: 68. 1932.

文藤 wen teng

*Echites laxa* Ruiz & Pavon, Fl. Peruv. 2: 19, pl. 134.

1799; *Mandevilla suaveolens* Lindley.

Branchlets glabrous. Petiole long; leaf blade narrowly cordate, herbaceous, glabrous adaxially, glaucous and bearded at vein axils abaxially, apex acuminate. Racemes long pedunculate, nodding, simple, many flowered. Flowers fragrant. Sepals narrow, 0.7–1.3 cm, acute. Corolla white or pale

pink, limb 10-folded inside; lobes oblong, undulate at margin, apiculate. Filaments broad, pubescent, much shorter than glabrous anthers; disc apex obtuse or truncate, glabrous.

S Guangdong [native of Argentina].

Cultivated for medicine.

## 22. TRACHELOSPERMUM Lemaire, Jard. Fleur. 1: 61. 1851.

络石属 *luo shi shu*

Lianas woody, latex white. Leaves opposite. Cymes lax, terminal, pseudoaxillary, or axillary. Flowers white or purplish, 5-merous. Calyx small, deeply divided, basal glands 5–10, apex usually denticulate. Corolla salverform; tube cylindrical, 5-angled, dilated at staminal insertion, throat constricted; lobes sharply overlapping to right. Stamens inserted at lower third of corolla tube; anthers sagittate, connivent, adherent to pistil head, anther tips included or exerted, cells spurred at base; disc scales 5, free. Ovaries 2, free, usually longer than disc; ovules numerous in each ovary. Style short; pistil head conical. Follicles 2, linear or fusiform, divergent or parallel. Seeds linear-oblong, not beaked, coma silky white; endosperm copious; cotyledons linear, flat, radicle short.

About 15 species: one in North America, the others in Asia; six species in China.

- 1a. Anther apex exerted or slightly so ..... 1. *T. asiaticum*  
1b. Anther apex included or reaching corolla mouth.  
2a. Corolla tube dilated at throat or middle.  
3a. Stamens inserted at corolla throat ..... 2. *T. bodinieri*  
3b. Stamens inserted at middle of corolla tube ..... 3. *T. jasminoides*  
2b. Corolla tube dilated at base.  
4a. Follicles divergent, linear, 3–5 mm in diam. .... 4. *T. brevistylum*  
4b. Follicles parallel, cylindrical to fusiform, 10–15 mm in diam.  
5a. Leaves usually obovate or narrowly so; flowers purplish; ovaries and fruit glabrous ..... 5. *T. axillare*  
5b. Leaves oblong, narrowly ovate, or elliptic; flowers white; ovaries and fruit pubescent ..... 6. *T. dunnii*

**1. *Trachelospermum asiaticum*** (Siebold & Zuccarini) Nakai in T. Mori, Enum. Pl. Corea 293. 1922.

亚洲络石 *ya zhou luo shi*

*Malouetia asiatica* Siebold & Zuccarini, Abh. Math. Phys. Cl. Königl. Bayer. Akad. Wiss. 4: 163. 1846; *Melodinus cavaleriei* H. Léveillé; *Trachelospermum asiaticum* var. *brevisepalum* (C. K. Schneider) Tsiang; *T. divaricatum* var. *brevisepalum* C. K. Schneider; *T. foetidum* (Matsumura & Nakai) Nakai; *T. gracilipes* J. D. Hooker; *T. gracilipes* var. *cavaleriei* (H. Léveillé) Tsiang; *T. gracilipes* var. *hupehense* Tsiang & P. T. Li; *T. jasminoides* (Lindley) Lemaire subsp. *foetidum* Matsumura & Nakai; *T. lanyuense* C. E. Chang; *T. siamense* Craib.

Lianas woody, to 10 m, glabrous or pubescent when young. Petiole 2–10 mm; leaf blade elliptic, narrowly ovate, or subobovate, 2–10 × 1–5 cm, membranous to papery, base acute or broadly cuneate, apex obtuse to acute, rarely caudate; lateral veins 6–10 pairs. Cymes terminal and axillary. Sepals appressed to corolla tube, 1.5–3 mm, puberulent to glabrous outside, apex obtuse to subacute; basal glands 10. Corolla white, tube 6–10 mm, dilated at throat, glabrous or puberulent inside facing stamens; lobes obovate, as long as tube. Stamens inserted at or near corolla throat; anther apex exerted or slightly so; disc scales shorter than to as long as ovary. Ovary glabrous. Follicles linear, 10–30 cm × 3–5 mm. Seeds oblong, 2–2.5 cm, coma to 3.5 cm. Fl. Apr-Jul, fr. Aug-Nov.  $2n = 20$ .

Dense or open montane forests, brushwoods, often clinging to trees; 100–1000 m. Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan [India, Japan, Korea, Thailand].

**2. *Trachelospermum bodinieri*** (H. Léveillé) Woodson in Rehder, J. Arnold Arbor. 15: 312. 1934.

贵州络石 *gui zhou luo shi*

*Melodinus bodinieri* H. Léveillé, Repert. Spec. Nov. Regni Veg. 2: 113. 1906; *Trachelospermum cathayanum* C. K. Schneider; *T. cathayanum* var. *longipedicellatum* Lingelsheim; *T. cathayanum* var. *tetanocarpum* (C. K. Schneider) Tsiang & P. T. Li; *T. formosanum* Y. C. Liu & C. H. Ou; *T. longipedicellatum* (Lingelsheim) Woodson; *T. tetanocarpum* C. K. Schneider; *T. wenchowense* Tsiang; *T. yunnanense* Tsiang & P. T. Li.

Lianas woody, to 15 m, minutely tomentose to glabrous or glabrescent. Petiole 3–10 mm long; leaf blade elliptic, narrowly elliptic, or narrowly obovate, 3–10 × 1–4 cm, thick papery; lateral veins 8–13 pairs. Cymes paniculate, terminal or axillary, to 10 cm. Sepals narrowly elliptic, 2–3 mm, glabrous, ciliate, apex appressed to corolla or slightly spreading, acute or obtuse. Corolla white, tube 5–14 mm; throat dilated, pilose, glabrous outside; lobes obliquely obovate or narrowly obovate, as long as tube. Anthers apex reaching corolla throat; disc

5-lobed, shorter than ovary. Ovary glabrous. Follicles linear, 12–41 cm × 2–5 mm. Seeds oblong, ca. 1.5 cm, coma 2–3.5 cm. Fl. May-Aug, fr. Aug-Dec.

• Mixed woods, brushwoods; 500–2600 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang.

**3. *Trachelospermum jasminoides*** (Lindley) Lemaire, *Jard. Fleur.* 1: t. 61. 1851.

络石 luo shi

*Rhynchospermum jasminoides* Lindley, *J. Hort. Soc. London* 1: 74. 1846; *Trachelospermum adnascens* Hance; *T. jasminoides* var. *heterophyllum* Tsiang; *T. jasminoides* var. *variogatum* W. T. Miller.

Lianas woody, to 10 m. Stem brownish, lenticellate; young branchlets pubescent, glabrous when older. Petiole 3–12 mm long; leaf blade ovate to obovate or narrowly elliptic, 2–10 × 1–4.5 cm, papery, glabrous or sometimes sparsely pubescent abaxially. Cymes paniculate, terminal and axillary; peduncle 2–6 cm, puberulent to glabrous. Sepals narrowly oblong, 2–5 mm, spreading or reflexed, pubescent outside, ciliate, apex obtuse or acute. Corolla white, tube dilated at middle, 5–10 mm, throat glabrous or pilose facing stamens; lobes obovate, as long as tube. Stamens included, inserted at middle of corolla tube; ovary glabrous. Follicles linear, 10–25 cm × 3–10 mm. Seeds oblong, 1.5–2 cm, coma 1.5–4 cm. Fl. Mar-Aug, fr. Jun-Dec.  $2n = 20$ .

Sunny edges of forests, brushwoods; 200–1300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Korea, Vietnam].

A strong bast fiber obtained from the inner bark is used in making rope, sacks, and paper. The stem is used for the treatment of rheumatism and injury. The flowers yield perfumed oil. The whole plant is poisonous.

**4. *Trachelospermum brevistylum*** Handel-Mazzetti, *Akad. Wiss. Wien. Sitzungsber., Math.-Naturwiss., Kl., Abt. 1*, 58: 228. 1921.

短株络石 duan zhu luo shi

*Trachelospermum cuneatum* Tsiang; *T. suaveolens* Chun.

Lianas woody, to 5 m, glabrous. Branches lenticellate. Petiole 5–8 mm; leaf blade narrowly elliptic, 5–10 × 1.2–3 cm, base obtuse, apex acuminate or caudate-acuminate; lateral veins 10–14 pairs. Cymes terminal and axillary; peduncle 1–2 cm. Pedicel 5–7 mm. Sepals narrowly elliptic, 1–2 mm, glabrous, apex acute, slightly spreading. Corolla white, tube ca. 4.5 mm, strigose-pilose inside; lobes obliquely obovate, 6–7 mm. Stamens included, inserted near base of corolla tube; disc rectangular, 5-lobed, free. Ovary glabrous. Follicles linear, divergent, 11–24 cm × 3–5 mm. Seeds oblong, 1–3 cm, coma

ca. 3 cm. Fl. Apr-Jul, fr. Aug-Dec.

• Open forests, often climbing on trees; 600–1100 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Xizang.

**5. *Trachelospermum axillare*** J. D. Hooker, *Fl. Brit. India* 3: 668. 1882.

紫花络石 zi hua luo shi

*Maesa scandens* H. Léveillé; *Melodinus chaffanjonii* H. Léveillé; *Periploca astacus* H. Léveillé.

Lianas woody, to 10 m, glabrous except for young shoots and inflorescences. Stems densely lenticellate. Petiole 3–5 mm; leaf blade obovate, narrowly obovate, or narrowly elliptic, 8–15 × 3–4.5 cm, leathery, base cuneate or rounded, apex acute, abruptly caudate, or acuminate; lateral veins to 15 pairs. Cymes axillary or sometimes subterminal, to 3 cm. Pedicel 3–8 mm. Sepals appressed to corolla tube, ovate, obtuse, basal glands ca. 10. Corolla purplish, tube ca. 5 mm; lobes narrowly obovate, 5–7 mm. Stamens inserted at base of corolla tube, included. Follicles connate, cylindrical to fusiform, 10–15 × 1–1.5 cm, glabrous. Seeds broadly ovate, ca. 1.5 cm, coma ca. 5 cm. Fl. May-Jul, fr. Aug-Oct.

• Brushwoods, sunny open forests; 500–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang.

A fine, strong fiber is obtained from the inner bark and used in making paper. The whole plant is used in Guangxi as medicine for the treatment of injury, pulmonary tuberculosis, bronchitis, and rheumatism.

**6. *Trachelospermum dunnii*** (H. Léveillé) H. Léveillé, *Fl. Kouy-Tchéou* 31. 1914.

绣毛络石 xiu mao luo shi

*Melodinus dunnii* H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 9: 453. 1911. *Trachelospermum eglanulatum* D. Fang; *T. rubrinerve* H. Léveillé; *T. tenax* Tsiang.

Lianas woody, to 20 m, rust colored tomentose. Petiole 3–5 mm; leaf blade oblong, elliptic, or narrowly so, 6–10 × 2–3 cm, base obtuse or subcordate to subauriculate-cordate, apex short acuminate or acute, lateral veins 10–14 pairs. Cymes terminal or axillary; peduncle 1.2–1.5 cm. Pedicel 1–2.5 cm. Sepals slightly spreading, narrowly elliptic, 3–4 mm, tomentose, apex acute, recurved. Corolla white, tube 5–6 mm, pilose; lobes obliquely obovate or elliptic, falcate, 8–9 mm. Stamens inserted near base of corolla tube; disc 5-lobed, as long as ovary. Follicles connate, cylindrical to fusiform, 8–9 × 1.2 cm, pubescent. Seeds ca. 1 cm, coma 3–4 cm. Fl. Mar-Aug, fr. Jun-Dec.

Open forests, brushwoods; 300–1600 m. Guangxi, Guizhou, Hunan, Yunnan, Zhejiang [Vietnam].

The young leaves are used in Guangxi as medicine for injury.

**23. AGANOSMA (Blume) G. Don, Gen. Hist. 4: 77. 1837.**

香花藤属 xiang hua teng shu

*Echites* sect. *Aganosma* Blume, *Bijdr.* 1040. 1826; *Amphineurion* (A. de Candolle) Pichon.

Lianas woody, with white latex. Leaves opposite, interpetiolar line evident. Cymes terminal or axillary, corymblike; bracts and bracteoles sepal-like. Flowers large. Calyx divided halfway or deeper, with 5 or more basal glands inside, sepals usually longer than corolla tube. Corolla white, salverform; tube long cylindrical, widened at base; lobes overlapping to right. Stamens inserted at lower third of tube; anthers included, sagittate, adherent to pistil head, cells with a rigid, empty basal tail; disc ringlike or tubular, lobed or dentate, surrounding ovary. Ovaries 2, distinct; ovules numerous. Style short; pistil head conical, apex 2-cleft. Follicles linear, terete. Seeds flat, not beaked, coma early deciduous.

About 12 species: tropical and subtropical Asia, five species in China.

- 1a. Corolla tube longer than sepals; calyx with a continuous row of basal glands inside; leaves with a strong intramarginal vein ..... 1. *A. marginata*  
 1b. Corolla tube shorter than sepals; calyx with basal glands only inside sepal edges; leaves without a strong intramarginal vein.  
 2a. Corolla glabrous at throat; all parts densely tomentose ..... 2. *A. cymosa*  
 2b. Corolla pubescent at throat; all parts glabrous or minutely pubescent, rarely tomentose.  
 3a. Corolla lobes 2.4–3.5 cm ..... 3. *A. siamensis*  
 3b. Corolla lobes 0.4–1.6 cm.  
 4a. Corolla lobes obovate, apex rounded ..... 4. *A. schlechteriana*  
 4b. Corolla lobes elliptic, apex acuminate ..... 5. *A. breviloaba*

**1. *Aganosma marginata*** (Roxburgh) G. Don, Gen. Hist. 4: 77. 1837.

香花藤 xiang hua teng

*Echites marginata* Roxburgh, Fl. Ind. ed. 1832 2: 15. 1832; *Aganosma acuminata* (Roxburgh) G. Don; *Amphi-neurion acuminatum* (Roxburgh) Pichon; *E. acuminata* Roxburgh.

Lianas to 8 m. Stems and branches lenticellate. Petiole ca. 1 cm; leaf blade oblong, 4.5–12 × 2–4 cm, abaxially pubescent especially along veins, base acute to rounded, apex acuminate or caudate; lateral veins 12–15 pairs, elevated abaxially. Cymes axillary, 3-branched; peduncle puberulent; bracts and bracteoles sublinear. Pedicel puberulent. Calyx with a continuous row of numerous basal glands inside; sepals sublinear, 5–7 mm, puberulent outside. Corolla white or yellowish, tube 8–10 mm, densely villous inside; lobes very narrowly elliptic, 1.5–2 cm × 2–3.5 mm. Stamens inserted below middle of corolla tube; disc ringlike, shorter than ovary. Ovary glabrous. Follicles 2, cylindrical, 15–40 × ca. 1 cm. Seeds oblong, flat, ca. 1 cm, coma ca. 2.7 cm. Fl. Mar-Sep, fr. Jun-Dec.

Montane forests, seashore brushwoods. Guangdong, Hainan [Cambodia, India, Indonesia, Laos, Malaysia, Philippines, Thailand, Vietnam].

**2. *Aganosma cymosa*** (Roxburgh) G. Don, Gen. Hist. 4: 77. 1837.

云南香花藤 yun nan xiang hua teng

*Echites cymosa* Roxburgh, Fl. Ind. ed. 1832 2: 16. 1832; *Aganosma cymosa* var. *fulva* Craib; *A. cymosa* var. *glabra* A. de Candolle; *A. cymosa* var. *lanceolata* J. D. Hooker; *A. harmandiana* Pierre in Spire & A. Spire.

Lianas to 10 m, pale brownish tomentose. Petiole 1–2 cm; leaf blade broadly ovate or orbicular, 5–16 × 4–12 cm, base rounded or obtuse, apex acuminate or obtuse, rarely retuse;

lateral veins 8–10 pairs. Cymes terminal, many flowered; peduncle to 6 cm; bracts and bracteoles very narrowly elliptic, 0.9–1.1 cm. Pedicel ca. 5 mm. Calyx with several glands inside margin of sepals; sepals very narrowly elliptic, 0.9–1.1 cm, pubescent on both surfaces. Corolla white, minutely tomentose outside, glabrous at throat; tube shorter than sepals, 6–7 mm; lobes oblong, as long as tube. Disc longer than ovary. Ovary pubescent at apex. Follicles 2, cylindrical, to 30 × 0.8–1.2 cm, yellow hirsute. Seeds oblong, 1–2 cm × ca. 5 mm, coma 2–4.5 cm. Fl. May-Aug, fr. Sep-Dec.

Open woods in humid valleys. SW Guangxi, S Yunnan [Bangladesh, Cambodia, India, Laos, Myanmar, Thailand, Vietnam].

The species is represented in China by var. *cymosa*. *Aganosma cymosa* var. *elegans* (G. Don) J. D. Hooker, which is readily distinguished by its densely pubescent corolla throat and smaller leaves, is restricted to southern India and Sri Lanka.

**3. *Aganosma siamensis*** Craib, Bull. Misc. Inform. Kew 1915: 433. 1915.

广西香花藤 guang xi xiang hua teng

*Aganosma kwangsiensis* Tsiang.

Lianas to 10 m. Juvenile branchlets and inflorescences pubescent. Petiole 1–1.5 cm; leaf blade dark green adaxially, greenish abaxially, elliptic or narrowly so, 5–10(–15) × 1.7–5(–6.7) cm, papery, glabrescent, base obtuse, apex acute or acuminate; lateral veins (6 or) 7–10 pairs, obliquely ascending, flattened abaxially. Cymes terminal, ca. 10 cm, 9–15-flowered. Pedicel 0.5–1.6 cm. Calyx with several basal glands inside margin of sepals; sepals unequal, sublinear, 1.5–2(–2.8) cm, longer than corolla tube. Corolla white, tube 7–12 mm, dilated at base, pubescent on both surfaces; lobes oblong, falcate, 2.4–3.5 cm. Stamens inserted at base of corolla tube. Ovary pubescent. Style short; pistil head conical. Follicles ca. 14 cm × 7 mm, appressed strigillose. Fl. May-Jun.

Dense montane forests, moist sparse woods; 300–1500 m.

Guangxi, Guizhou, Yunnan [Thailand].

**4. *Aganosma schlechteriana*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 325. 1911.

海南香花藤 hai nan xiang hua teng

*Aganosma montana* Kerr; *A. navaillei* (H. Léveillé) Tsiang; *A. odora* Tsiang; *A. radiata* Merrill; *A. schlechteriana* var. *breviloba* Tsiang; *A. schlechteriana* var. *leptantha* Tsiang; *Trachelospermum navaillei* H. Léveillé.

Lianas to 9 m. Young branchlets puberulent, soon glabrous. Petiole 1–1.5 cm; leaf blade elliptic, narrowly elliptic, or ovate, 6–14 × 2.5–5.5 cm, leathery, glabrous or puberulent when young, base cuneate or broadly so, apex acute to acuminate; lateral veins ca. 10 pairs. Cymes terminal, 3-branched, 4–9 × 6.5–15 cm, pubescent. Calyx pubescent, with several basal glands inside margin of sepals; sepals 1–1.2 cm, longer than corolla tube. Corolla white, tube 5–9 mm, slightly dilated at base, glabrous at throat; lobes obovate, 4–16 mm, apex rounded to obtuse. Stamens inserted at base of corolla tube; disc cup-shaped or 5-lobed. Ovary pubescent, shorter than disc. Follicles 2, cylindrical, to 30 cm × 5–10 mm, pubescent when young, glabrous when older. Seeds oblong,

flat, ca. 2 cm, coma 3.5–5 cm. Fl. Mar-Jul, fr. Aug-Dec.

Sparse woods, montane forests, brushwoods; 200–1800 m. Guangxi, Guizhou, Hainan, Sichuan, Yunnan [India, Myanmar, Thailand, Vietnam].

**5. *Aganosma breviloba*** Kerr, Bull. Misc. Inform. Kew 1937: 92. 1937.

贵州香花藤 gui zhou xiang hua teng

Stems sparsely strigose when young, glabrescent. Leaf blade elliptic, 5.5–10.6 × 2.2–4.9 cm, glabrous or sparsely strigose along petiole and midvein abaxially, base cuneate to obtuse, apex acuminate; lateral veins 5–10 pairs. Inflorescences terminal panicles 5.3–8 cm. Pedicel 3–10 mm. Calyx with several basal glands inside margin of sepals; sepals linear, 1–1.5 cm, pubescent, with narrow colleters at corners. Corolla white, glabrous at throat, tube 6.7–12 mm; lobes narrowly elliptic, acuminate, 5–11 × 1.8–2.6 mm. Stamens inserted in corolla tube 2–2.8 mm from base; disc narrow at top, 5-dentate. Ovary pubescent. Follicles un-known.

Forests. Guizhou [Myanmar, Thailand].

## 24. *CHONEMORPHA* G. Don, Gen. Hist. 4: 76. 1837, nom. cons.

鹿角藤属 lu jiao teng shu

*Rhynchodia* Benth.

Lianas stout, woody, with latex. Leaves large, opposite; interpetiolar lines and colleters present. Cymes lax, paniculate or racemose, terminal or subaxillary. Flowers large. Calyx tubular, shortly 5-toothed or 5-partite, basal glands large, denticulate. Corolla white or reddish, funnelliform, tube cylindrical, throat not scaly; lobes overlapping to right. Stamens inserted near base or middle of corolla tube; anthers sagittate, connivent, adherent to pistil head, cells spurred at base; disc ringlike, fleshy, shorter than ovary, apex 5-cleft. Ovaries 2, free; ovules numerous in each ovary. Style filiform; pistil head club-shaped, slightly thickened, apex 2-cleft. Follicles 2, elongated, cylindrical. Seeds ovate-oblong, flat, short beaked, beak with a long coma.

About 15 species: tropical and subtropical Asia, eight species in China.

- 1a. Calyx less than 7 mm; corolla tube less than 1 cm ..... 8. *C. verrucosa*
- 1b. Calyx more than 7 mm; corolla tube more than 2 cm.
  - 2a. Calyx divided to middle or near base ..... 7. *C. griffithii*
  - 2b. Calyx shortly 5-toothed.
    - 3a. Corolla pink or reddish; style glabrous.
      - 4a. Calyx 1.5–1.8 cm; cymes to 35 cm; follicles to 25 cm ..... 2. *C. splendens*
      - 4b. Calyx 1.8–3 cm; cymes to 17 cm; follicles to 34 cm ..... 3. *C. megacalyx*
    - 3b. Corolla white; style often hairy.
      - 5a. Base of leaf blade cordate; calyx glabrescent outside; corolla limb up to 8 cm in diam. .... 1. *C. fragrans*
      - 5b. Base of leaf blade rounded or cuneate; calyx pubescent to tomentose outside; corolla limb up to 5 cm in diam.
        - 6a. Corolla pubescent throughout; disc longer than ovary; seed coma ca. 7 cm ..... 4. *C. eriostylis*
        - 6b. Corolla glabrous throughout; disc shorter than ovary; seed coma 4–5 cm.
          - 7a. Leaves thick leathery, obovate, densely floccose; calyx ca. 1 cm; corolla tube ca. 2 cm, lobes ca. 1.7 cm ..... 5. *C. floccosa*
          - 7b. Leaves membranous, elliptic, densely hirsute; calyx ca. 1.5 cm; corolla tube ca. 2.8 cm, lobes ca. 2.5 cm ..... 6. *C. parviflora*

**1. *Chonemorpha fragrans*** (Moon) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 203. 1929.

大叶鹿角藤 da ye lu jiao teng

*Echites fragrans* Moon, Cat. Pl. Ceylon 20. 1824; *Chonemorpha grandiflora* G. Don; *C. macrophylla* G. Don; *C. mollis* Miquel; *C. rheedei* Ridley; *E. macrophylla*

Roxburgh, not Kunth.

Lianas to 30 m, hirsute except for flowers. Petiole to 2 cm; leaf blade suborbicular to broadly ovate, 15–45 × 13–45 cm, papery, base cordate, apex acute or rounded, cuspidate; lateral veins 10–12 pairs. Calyx tubular, ca. 1 cm, apex toothed, glabrescent outside. Corolla white, limb to 8 cm wide; tube 3.5–4.5 cm, dilated at base, glabrous outside, throat villous; lobes obliquely obovate, ca. 3.5 cm. Filaments short pubescent. Follicles cylindrical to fusiform, to 30 × 2 cm. Seeds oblong, coma ca. 5 cm. Fl. May-Jul.  $2n = 20$ .

Dense montane forests, often clinging to trees. Guangxi, Yunnan; cultivated in Fujian and Guangdong [India, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand].

**2. *Chonemorpha splendens*** Chun & Tsiang in Tsiang, *Sunyatsenia* 2: 157. 1934.

海南鹿角藤 hai nan lu jiao teng

Lianas to 20 m, yellow tomentose. Petiole 1.5–2 cm; leaf blade usually broadly ovate or obovate, 18–20 × 12–14 cm, base rounded to shallowly cordate, apex acute; lateral veins 11 or 12 pairs. Cymes racemelike, to 35 cm, 9–13-flowered. Calyx tubular, 1.5–1.8 cm, apex toothed, erose-denticulate. Corolla pink or reddish, limb ca. 4 cm in diam., tube ca. 2.5 cm. Stamens inserted ca. 1 cm from base of corolla tube. Ovary and style glabrous. Follicles fusiform, ca. 25 × 2 cm, tomentose, eventually glabrescent. Seeds with silky coma to 5 cm. Fl. May-Jul, fr. Aug-Dec.

• Sparse woods, often clinging to trees; 300–800 m. Hainan, Yunnan.

The separation of this species from *Chonemorpha megacalyx* is not that clear.

**3. *Chonemorpha megacalyx*** Pierre in Spire, *Contr. Apocyn.* 76. 1905.

长萼鹿角藤 chang e lu jiao teng

Lianas to 20 m, yellowish brown tomentose. Petiole 1.5–3.5 cm; leaf blade obovate to narrowly ovate, 17–29 × 11–22 cm, base rounded, apex acute; lateral veins 8–12 pairs. Cymes terminal, to 17 cm; peduncle 3.5–9 cm. Calyx tubular, 1.8–3 cm, apex toothed. Corolla pink or reddish, limb ca. 4 cm in diam., tube ca. 4 cm, glabrous outside, hispid inside; lobes obovate, ca. 3.5 × 2 cm wide. Ovary and style glabrous. Follicles cylindrical, to 34 × 2 cm. Seeds with silky coma to 5.5 cm. Fl. spring-summer.

Borders of montane forests; 900–1500 m. S Yunnan [Laos, Thailand].

The stem is used in Yunnan as a medicine to treat backache and leg pain caused by rheumatism, fractures, and injury. The seed coma is used externally to treat hemostasis.

**4. *Chonemorpha eriostylis*** Pitard in Lecomte & Humbert, *Fl. Indo-Chine* 3: 1247. 1933.

鹿角藤 lu jiao teng

Lianas to 30 m, hirsute. Petiole 1.2–1.5 cm; leaf blade obovate or broadly oblong, 12–34 × 7–23 cm, papery, base

rounded, apex abruptly acute, adaxial surface pubescent; lateral veins 9–11 pairs. Cymes terminal, ca. 12 cm, 7–15-flowered. Calyx tubular, ca. 1.4 cm, tomentose outside, apex toothed. Corolla white, limb ca. 4 cm in diam., tube ca. 2 cm, pubescent on both surfaces; lobes obovate, ca. 2 cm. Stamens inserted near base of corolla tube; filaments puberulent; disc cup-shaped, longer than ovary, apex undate. Ovary glabrous. Style densely hirsute. Follicles linear, 25–40 × 1.5–2 cm, yellowish brown downy. Seeds ovate-lanceolate, flat, ca. 2.6 cm, coma ca. 7 cm. Fl. May-Jul, fr. Aug-Dec.

Sparse woods, humid valleys; 300–1000 m. Guangdong, Guangxi, S Yunnan [Vietnam].

The stem is used in Guangxi as medicine for rheumatgia.

**5. *Chonemorpha floccosa*** Tsiang & P. T. Li, *Acta Phyto-tax. Sin.* 11: 387. 1973.

丛毛鹿角藤 cong mao lu jiao teng

Lianas to 25 m. Branches, branchlets, and leaves densely yellowish brown floccose. Petiole 1.2–1.5 cm; leaf blade obovate, 10–14 × 6–10 cm, thick leathery, floccose, base broadly cuneate; lateral veins ca. 10 pairs. Calyx tubular, ca. 1 cm; apex toothed, pubescent outside. Corolla white, glabrous, tube ca. 2 cm; lobes obdeltoid, ca. 1.7 cm. Stamens inserted at base of corolla tube; disc ringlike, shorter than ovary, apex retuse. Ovary and style bearing bristles. Follicles linear, to 35 × 1 cm, densely yellowish brown pubescent. Seeds ovate-lanceolate, flat, ca. 2.5 cm, coma ca. 4 cm. Fl. May-Aug, fr. Aug-Dec.

• Mixed woods; 500–800. S Guangxi.

**6. *Chonemorpha parviflora*** Tsiang & P. T. Li, *Acta Phyto-tax. Sin.* 11: 389. 1973.

小花鹿角藤 xiao hua lu jiao teng

Lianas to 20 m. Branches, branchlets, and leaves densely yellow hirsute. Petiole 1.4–2 cm; leaf blade elliptic, 13–22 × 6–12 cm, membranous, hirsute, base broadly cuneate, apex acute; lateral veins 10–12 pairs. Cymes terminal. Pedicel ca. 1 cm, pubescent. Calyx tubular, ca. 1.5 cm, pubescent outside, apex 5-toothed. Corolla white, glabrous, tube ca. 2.8 cm; lobes narrowly obovate, ca. 2.5 cm. Stamens inserted near base of corolla tube; disc cup-shaped, shorter than ovary. Ovary and style villous. Follicles linear, 24–26 × ca. 1 cm, pubescent. Seeds narrowly ovate, flat, ca. 2.2 cm, coma ca. 5 cm. Fl. May-Aug, fr. Aug-Dec.

• Mixed woods; 500–1000 m. S Guangxi, S Yunnan.

**7. *Chonemorpha griffithii*** J. D. Hooker, *Fl. Brit. India* 3: 662. 1882.

漾鼻鹿角藤 yang bi lu jiao teng

*Chonemorpha valvata* Chatterjee.

Lianas woody, to 20 m. Branchlets obscurely len-ticellate, tawny pubescent. Petiole 1.5–5 cm; leaf blade broadly ovate or suborbicular, 12–33 × 7–20 cm, abaxially pubescent, base broadly cuneate to rounded, apex rounded or acute; lateral

veins 9–12 pairs, subparallel, ascending. Cymes paniculate, terminal, to 15-flowered; bracteoles lanceolate, apex acute, ca. 1 mm. Calyx ca. 1.1 cm, eventually divided to base; lobes valvate, narrowly ovate, 8–12 × 3–4.5 mm, puberulent outside. Corolla reddish; tube cylindrical, ca. 7 cm, dilated at middle, distal half densely pubescent inside; lobes obovate to obtriangular, 3.5–4 × 3.5–4.3 cm. Stamens inserted at middle of corolla tube; filaments densely pubescent; disc ringlike, shallowly divided at apex, shorter than ovary. Ovary glabrous; style puberulent at apex. Follicles cylindrical, glabrous, ca. 34 × 1.2 cm. Fl. spring-summer.

Dense montane forests, moist valleys; 900–1600 m. E Xizang, S Yunnan [India, Myanmar, Nepal, Thailand].

The stem is used in Yunnan as medicine for the treatment of fractures and rheumatism.

**8. *Chonemorpha verrucosa*** (Blume) D. J. Middleton, *Novon* 3: 455. 1993.

尖子藤 *jian zi teng*

**25. AMALOCALYX** Pierre, *Bull. Mens. Soc. Linn. Paris*, ser. 2, 1: 28. 1898.

毛车藤属 *mao che teng shu*

Lianas woody, latex white. Leaves opposite. Cymes axillary, long pendunculate, with 2 or 3 monochasial branches. Calyx deeply divided, with basal glands inside. Corolla subcampanulate, tube cylindrical, slightly inflated distally, throat without scales, lobes overlapping to right. Stamens inserted at middle of corolla tube; filaments short; anthers sagittate, included, adherent to pistil head at middle, cells with an empty tail; disc ringlike, as long as ovary, apex entire or 5-lobed. Ovaries 2, free. Style filiform; pistil head cylindrical, apex long pubescent. Follicles 2, ellipsoid to narrowly so, connate. Seeds ovate, apex comose.

One species: China, Laos, Myanmar, Thailand, Vietnam.

**1. *Amalocalyx microlobus*** Pierre in Spire, *Contr. Apocyn.* 93. 1905.

毛车藤 *mao che teng*

*Amalocalyx burmanicus* Chatterjee; *A. yunnanensis* Tsiang.

Lianas to 10 m, densely rust colored villous when young, glabrous when older. Stems sometimes with corky wings. Petiole 1–3 cm; leaf blade broadly obovate or elliptic, 5–15 ×

*Tabernaemontana verrucosa* Blume, *Bijdr.* 1029. 1826; *Echites rhynchosperma* Wallich; *Rhynchodia rhynchosperma* (Wallich) K. Schumann; *R. verrucosa* (Blume) Woodson; *Trachelospermum verrucosum* (Blume) Boerlage.

Lianas to 10 m. Branches dark purple; branchlets glabrous, lenticellate. Petiole 1–3 cm; leaf blade broadly to narrowly ovate, 12–22 × 5–12 cm, abaxially pubescent, base obtuse to rounded, apex acute to caudate; lateral veins 7–15 pairs. Cymes 7–13 × 5–11 cm, puberulent. Calyx less than 7 mm. Corolla white, tinged pink; tube 5-angled, ca. 6 mm, densely pubescent inside; lobes obovate or obdeltoide, ca. 8 × 6 mm, apex rounded or truncate. Stamens inserted at middle of corolla tube. Follicles elongated, compressed, 19–40 cm × 7–10 mm. Seeds oblong, ca. 15 × 5 mm, coma 4.5–6 cm. Fl. Apr–Jun, fr. Aug–Dec.

Dense montane forests, ravines; 300–1000 m. Guangdong, Hainan, S Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

2–10.5 cm, base truncate or subauriculate to cordate; lateral veins 8 or 9 pairs. Cymes longer than leaves, 15–30-flowered; peduncle 7–14 cm; bracts and bracteoles narrowly elliptic, ca. 1 cm. Pedicel 0.5–1.5 cm. Corolla whitish outside, pink to purple inside, glabrous, tube ca. 2.2 cm; lobes ovate, shorter than tube. Disc apex 5-lobed. Ovary glabrous. Follicles 8–10 × 1.2–1.5 cm. Seeds ovate, ca. 10 × 3 mm, coma ca. 4 cm. Fl. Apr–Oct, fr. Sep–Dec.

Sparse woods, often clinging to trees; 800–1000 m. S Yunnan (Simo, Jinghong) [Laos, Myanmar, Thailand, Vietnam].

**26. PARSONSIA** R. Brown, *Mem. Wern. Nat. Hist. Soc.* 1: 64. 1811, nom. cons.

同心结属 *tong xin jie shu*

Lianas woody, latex white. Leaves opposite. Cymes corymbose or paniculate, dichotomous, terminal or axillary, pedunculate. Flowers small. Calyx with basal glands inside or 5-scaled. Corolla salverform, tube short, hairy inside distally, faucal scales absent, lobes overlapping to right. Stamens inserted at middle of corolla tube or at throat; filaments long, strongly intertwisted or geniculate; anthers narrowly sagittate, exerted, glutinous, connivent into a subcylindrical cone, adherent to middle of pistil head, cells with an empty tail; disc 5-lobed or 5-scaled. Ovaries 2; ovules numerous in each carpel. Style filiform; pistil head thickened, apex entire or 2-cleft. Follicles 2, terete, parallel or divergent. Seeds linear or oblong, apex crowned with coma; endosperm scanty; cotyledons very narrowly oblong, flat, radicle superior.

About 50 species: SE Asia, Pacific Islands; two species in China.

- 1a. Leaf blade ovate to subelliptic; petiole 2–4 cm; stamens inserted at middle of corolla tube ..... 1. *P. alboflavescens*  
1b. Leaf blade narrowly or very narrowly elliptic; petiole 0.5–1 cm; stamens inserted at corolla throat ..... 2. *P. goniostemon*

**1. *Parsonsia alboflavescens*** (Dennstedt) Mabberley, Taxon 26: 532. 1977.

海南同心结 hai nan tong xin jie

*Periploca alboflavescens* Dennstedt, Schlüssel Hortus Malab. 12, 23, 35. 1818; *Echites laevigata* Moon; *Heligme spiralis* (Wallich ex G. Don) Thwaites; *Parsonsia helicandra* Hooker & Arnott; *P. howii* Tsiang; *P. laevigata* (Moon) Alston; *P. spiralis* Wallich ex G. Don.

Lianas woody, to 10 m, glabrous except for inflorescences. Branches pale gray. Petiole 2–4 cm; leaf blade ovate or subelliptic, 4–12 × 3–7.5 cm, base cuneate to shallowly cordate; lateral veins 5–7 pairs. Cymes 8–15 × 8–11 cm; peduncle 3–9 cm. Sepals ca. 2 mm, glands broadly triangular, membranous. Corolla white or greenish, tube ca. 5 mm, limb 1–2 cm wide, lobes ca. 6 mm. Anthers ca. 3.5 × 0.6 mm, inserted at middle of corolla tube. Ovary as long as or slightly shorter than disc, glabrous. Follicles 2, linear-cylindric, parallel, 7–16 × 1–2 cm. Seeds oblong 1.5–1.8 cm × ca. 2 mm, coma 2–4.5 cm. Fl. Apr–Oct, fr. Sep–Dec.

**27. POTTSIA** Hooker & Arnott, Bot. Beechey Voy. 198. 1837.

帘子藤属 lian zi teng shu

Lianas woody, latex white. Leaves opposite. Cymes racemose or paniculate, 3–5-branched, terminal or axillary. Flowers usually small, 5-merous. Calyx deeply divided, with many basal glands inside. Corolla salverform, tube cylindric, throat narrowed, without scales, lobes overlapping to right. Stamens inserted at apex of corolla tube; filaments short; anthers exerted, sagittate, connivent at middle, adherent to pistil head, cells spurred at base; disc 5-parted. Ovaries 2, free, shorter than disc; ovules numerous in each ovary. Style thickened at middle or near base; pistil head ovoid or fusiform, apex short conical. Follicles 2, elongated, linear. Seeds linear, elongated, not beaked, apex comose; endosperm copious; cotyledons linear, flat, radicle superior.

About four species: SE Asia, two species in China.

- 1a. Corolla ca. 7 mm, lobes spreading; style thickened at middle; ovary pilose ..... 1. *P. laxiflora*  
1b. Corolla ca. 13 mm, lobes reflexed; style thickened near base; ovary glabrous ..... 2. *P. grandiflora*

**1. *Pottisia laxiflora*** (Blume) Kuntze, Revis. Gen. Pl. 2: 416. 1891.

帘子藤 lian zi teng

*Vallis laxiflora* Blume, Bijdr. 1043. 1826; *Pottisia cantonensis* Hooker & Arnott; *P. hookeriana* Wight; *P. laxiflora* var. *pubescens* (Tsiang) P. T. Li; *P. ovata* A. de Candolle; *P. pubescens* Tsiang.

Lianas to 10 m. Branches and branchlets slender, pubescent or glabrous. Petiole 1.5–4 cm; leaf blade ovate, narrowly ovate, or elliptic, 6–12 × 3–7 cm, base obtuse to rounded or subcordate, pubescent or glabrous on both surfaces; lateral veins 4–6 pairs. Cymes to 25 cm, long pedunculate, many flowered. Corolla purple or rose, ca. 7 mm; tube glabrous, longer than lobes; lobes narrowly ovate, ca. 2 mm, spreading. Ovary pilose. Style thickened at middle. Follicles linear, to 55 cm × 3–5 mm, pubescent to glabrous. Seeds linear, ca. 2 cm, coma 2.5–3 cm. Fl. Apr–Aug, fr. Aug–Oct.

Open forests, forest borders, brushwoods; 200–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Laos, Malaysia, Thailand,

Mixed montane woods; 200–500 m. Fujian, Guangdong, Hainan, Taiwan [Cambodia, India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

**2. *Parsonsia goniostemon*** Handel-Mazzetti in Tsiang, Sunyatsenia 2: 165. 1934.

广西同心结 guang xi tong xin jie

Lianas woody, to 13 m, glabrous except for inflorescences. Branches slender, lenticellate. Petiole 5–10 mm; leaf blade narrowly elliptic, 6–10 × 2–3 cm, base cuneate to narrowly rounded; lateral veins 5–7 pairs. Cymes to 7 × 7 cm; peduncle 2–3.5 cm. Pedicel 4–10 mm. Calyx ca. 1.5 mm, broader at base. Corolla greenish, ca. 5 mm. Stamens inserted at corolla throat; disc cupular. Ovary obscurely 2-lobed. Style long; pistil head ovoid. Follicles ca. 12 cm, connate, narrowly fusiform, glabrous. Seed coma ca. 4 cm. Fl. May–Aug, fr. Aug–Dec.

- Rocky areas; 500–800 m. Guangxi (Longjin, Lingyun).

Vietnam].

The stem and leaves are used to treat fractures and injury and the latex and roots for anemia and rheumatism.

**2. *Pottisia grandiflora*** Markgraf in Diels, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1029. 1926.

大花帘子藤 da hua lian zi teng

Lianas to 5 m. Branches and branchlets greenish, terete. Petiole 1–2.2 cm; leaf blade ovate to subovate, 6.5–12 × 3–7 cm, somewhat leathery, base rounded, sometimes decurrent into petiole, glabrous; lateral veins ca. 6 pairs. Cymes up to 20 cm, glabrous, long pedunculate, many flowered. Corolla ca. 1.3 cm, purple or rose, glabrous, tube ca. 6 mm; lobes obovate, slightly longer than tube, reflexed. Ovary glabrous. Style ca. 6 mm, thickened near base; pistil head conical. Follicles 2, linear, to 42 cm × 6 mm. Seeds linear, coma yellowish, to 4.5 cm. Fl. Apr–Aug, fr. Aug–Dec.

- Montane forests, brushwoods; 400–1100 m. Fujian, Guangdong, Guangxi, Hunan, Yunnan, Zhejiang.

**28. NERIUM** Linnaeus, Sp. Pl. 1: 209. 1753.夹竹桃属 *jia zhu tao shu*

Trees or shrubs, evergreen, juice watery. Leaves in whorls of 3, midvein prominent abaxially, lateral veins numerous, parallel. Inflorescences corymbose, terminal. Corolla funnelform, cylindric near base, throat open, wide, lobes overlapping to right; corona segments 5, petal-like, large, fringed. Stamens inserted at apex of corolla tube; anthers sagittate, with a bristly, filiform apical appendage, pilose, connivent, adherent to pistil head; disc absent. Ovaries 2, distinct; ovules numerous in each locule. Follicles united until just before dehiscence. Seeds numerous, densely pilose, coma at truncate apex.

One species: Asia, Europe, North Africa.

**1. Nerium oleander** Linnaeus, Sp. Pl. 1: 209. 1753.夹竹桃 *jia zhu tao*

*Nerium indicum* Miller; *N. odorum* Solander.

Stem to 6 m tall. Leaves very narrowly elliptic, 5–21 × 1–3.5 cm, leathery, base cuneate or decurrent on petiole, apex acuminate or acute. Flowers showy, fragrant. Sepals narrowly triangular to narrowly ovate, 3–10 mm. Corolla purplish red,

pink, white, salmon, or yellow, tube 1.2–2.2 cm; lobes 1.3–3 cm, single or double. Follicles cylindric, 12–23 cm. Seeds oblong, coma 0.9–1.2 cm. Fl. spring-autumn. *2n* = 22.

Yunnan, widely cultivated and naturalized in tropical, sub-tropical, and temperate parts [Asia, Europe, North America].

All parts of the plant are extremely toxic. The seed-oil content is up to 58.5%.

**29. WRIGHTIA** R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 73. 1811.倒吊笔属 *dao diao bi shu*

Trees or shrubs with latex. Leaves opposite, petiolate; glands axillary. Cymes terminal or subterminal, dichasial, few to many flowered. Sepals quincuncial, with 5–10, basal, scalelike glands inside. Corolla salverform, funnelform, subrotate, or rotate, tube cylindric to campanulate; lobes overlapping to left; corona ligulate, fringed, or cup-shaped, entire or subentire at apex, shallowly or deeply divided, sometimes absent. Stamens inserted at middle, apex, or rarely base of corolla tube; anthers sagittate, connivent and adherent to pistil head, exerted, spurred at base; disc absent. Ovaries 2, distinct or connate; ovules numerous in each locule. Style filiform; pistil head ovoid, usually dilated at base. Follicles 2, connate or divaricate. Seeds narrowly fusiform, with an apical coma directed toward fruit base, beakless.

About 23 species: tropical Africa, Asia, Australia; six species in China.

- 1a. Shrubs; corona obsolete; seeds (excluding coma) ca. 0.8 cm ..... 6. *W. religiosa*  
 1b. Trees; corona scales present; seeds (excluding coma) 1–2 cm.  
 2a. Leaves densely pubescent or tomentose abaxially.  
 3a. Corona lobes much shorter than stamens, glabrous inside; fruit lenticellate, usually glabrous ..... 1. *W. arborea*  
 3b. Corona lobes about as long as stamens, puberulent inside; fruit not lenticellate, usually minutely puberulent ..... 2. *W. pubescens*  
 2b. Leaves glabrous or minutely pubescent abaxially along veins.  
 4a. Ovaries and fruit connate.  
 5a. Apex of leaf blade short acuminate; corona with 10 scales, longer than anthers ..... 2. *W. pubescens*  
 5b. Apex of leaf blade caudate-acuminate; corona cup-shaped, shorter than anthers ..... 3. *W. coccinea*  
 4b. Ovaries and fruit distinct.  
 6a. Corolla funnelform, white; corona with 25–35 scales ..... 4. *W. laevis*  
 6b. Corolla rotate or subrotate, yellowish; corona with 10 scales ..... 5. *W. sikkimensis*

**1. Wrightia arborea** (Dennstedt) Mabberley, Taxon 26: 533. 1977.烟木 *yan mu*

*Periploca arborea* Dennstedt, Schlüssel Hortus Malab. 13, 23, 25. 1818; *Nerium tomentosum* Roxburgh; *Wrightia tomentosa* (Roxburgh) Roemer & Schultes.

Trees to 20 m tall. Branches gray or brown, pubescent, lenticellate. Petiole 2–10 mm; leaf blade elliptic to broadly so or obovate, 6–18 × 3–8.5 cm, pubescent to glabrescent adaxially, tomentose abaxially; lateral veins 10–15 pairs. Cymes pubescent; peduncle to 2 cm. Pedicel 1–1.5 cm. Sepals ovate or broadly so, ca. 3 mm. Corolla yellowish, pinkish, or

salmon, rotate or subrotate; tube 3–7 mm, glabrous; lobes narrowly elliptic to ovate, 0.8–1.6 cm, papillate; corona scales 10, shorter than anthers, glabrous inside, apex dentate. Ovaries connate. Follicles connate, cylindric, 14–21 × 3–4 cm, lenticellate. Seeds linear-fusiform, ca. 2 cm, coma ca. 3.5 cm. Fl. May-Oct, fr. Aug-Dec. *2n* = 22.

Deciduous or mixed forests; stream banks; 200–1500 m. Guangxi, Guizhou, Yunnan [India, Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

**2. Wrightia pubescens** R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 73. 1811.倒吊笔 *dao diao bi*

*Anasser laniti* Blanco; *Wrightia annamensis* Eberhardt & Dubard; *W. kwangtungensis* Tsiang; *W. laniti* (Blanco) Merrill; *W. pubescens* subsp. *laniti* (Blanco) Ngan.

Trees to 35 m tall. Trunk to 60 cm in diam.; bark yellowish brown; young branchlets yellowish pubescent, glabrate with age, densely lenticellate. Petiole ca. 1 cm; leaf blade narrowly oblong, ovate, or narrowly ovate, 5–10 × 3–6 cm, papery, puberulent to glabrous adaxially, densely pubescent to puberulent or glabrous except along veins abaxially, veins 8–15 pairs. Cymes ca. 5 cm, pubescent. Sepals ovate to broadly so, 2–5 mm. Corolla white or pinkish white, funnellform, tube 5–6.5 mm; lobes oblong, 1–2 cm; corona fringed, scales 10, as long as or longer than anthers, puberulent inside. Stamens pubescent, inserted at mouth of corolla; anthers exerted. Ovaries connate, glabrous. Follicles connate, sublinear, 15–30 × 1–2 cm, not lenticellate. Seeds narrowly fusiform, coma to 3.5 cm. Fl. Apr-Aug, fr. Aug-Dec.

Secondary rain forests, dry woods; 400 m. Guangxi, Guangxi, Guizhou, Hainan, Yunnan [Cambodia, India, Indonesia, Malaysia, Philippines, Thailand, Vietnam; Australia].

The wood is used for making furniture, poles, seals, and musical instruments. Bark fibers are used for making paper and artificial cotton. Extracts from the roots and bark are used to treat scrofula and rheumatic arthralgia.

**3. *Wrightia coccinea*** (Loddiges) Sims, Bot. Mag. 53: t. 2696. 1826.

云南倒吊笔 yun nan dao diao bi

*Nerium coccineum* Loddiges, Bot. Cab. 9: t. 894. 1824.

Trees to 20 m tall. Bark pale gray to brownish; branchlets lenticellate, glabrous. Petiole ca. 5 mm; leaf blade elliptic to ovate, 5–17 × 3–8 cm, glabrous or puberulent along veins abaxially, base obtuse to acute, apex caudate-acuminate; lateral veins 8–14 pairs. Flowers solitary or in cymes, 2–3.5 cm. Sepals broadly ovate, 5–9 mm. Corolla reddish, funnellform; tube campanulate, shorter than calyx; lobes broadly obovate, papillate; corona crimson, cup-shaped, apex incised. Anthers exerted. Ovaries connate. Follicles linear, connate, 14–20 cm, conspicuously lenticellate. Seeds linear, ca. 2 cm, coma to 4 cm. Fl. Jan-May, fr. Jun-Dec.  $2n = 22$ .

Dense montane forests; 300–1800 m. SE Guangxi, S Yunnan [India, Myanmar, Pakistan, Thailand].

**4. *Wrightia laevis*** J. D. Hooker, Fl. Brit. India 3: 654. 1882.

蓝树 lan shu

*Wrightia hainanensis* Merrill; *W. hainanensis* var. *variabilis* Tsiang; *W. tinctoria* R. Brown var. *laevis* (J. D. Hooker) Pichon.

Trees to 40 m tall, glabrous except for flowers. Bark dark gray, branchlets brownish, lenticellate. Petiole 5–7 mm; leaf blade oblong or narrowly elliptic, rarely ovate, 7–18 × 2.5–8 cm, apex acuminate to caudate-acuminate; lateral veins 5–11 pairs. Cymes ca. 6 cm; peduncle ca. 1 cm, puberulent to glabrous. Pedicel 1–1.5 cm. Sepals broadly ovate, ca. 1 mm, pubescent outside, apex rounded or obtuse. Corolla white or

yellowish, funnellform, tube 1.5–3 mm; lobes narrowly elliptic, 5.5–13.5 mm, papillate; corona fringed, scales 25–35, linear, puberulent. Anthers as long as corona, puberulent. Ovaries 2, distinct. Follicles cylindrical, distinct, 20–35 cm × ca. 7 mm, lenticellate. Seeds sublinear, 1.5–2 cm, coma to 4 cm. Fl. Apr-Aug, fr. Jul-Dec.  $2n = 22$ .

Montane forests, valley thickets; 200–1000 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam; N Australia].

The roots and leaves are used to treat injury and cuts, and the fruits are used to cure pulmonary tuberculosis. A blue dye is extracted from the leaves.

**5. *Wrightia sikkimensis*** Gamble, Bull. Misc. Inform. Kew 1908: 447. 1908.

个溲 ge pu

*Wrightia hainanensis* Merrill var. *chingii* Tsiang; *W. schlechteri* H. Léveillé.

Trees to 12 m tall. Branchlets dark brown, puberulent to glabrous. Petiole ca. 5 mm; leaf blade ovate to obovate, 6–17 × 3–6 cm, glaucescent, glabrous except along veins on abaxial surface, apex caudate-acuminate; lateral veins 9–15 pairs. Cymes puberulent; peduncle to 3 cm. Pedicel ca. 1 cm. Sepals ovate, ca. 2.5 mm. Corolla yellowish, rotate or subrotate, tube 2–2.5 mm; lobes oblong or narrowly obovate, 1.2–1.4 cm, papillate; corona scales 10, the 5 inserted at base of corolla lobes ca. 6 mm, entire at apex, the 5 at corolla throat ca. 2.5 mm, 2-cleft at apex. Anthers puberulent, exerted. Ovaries distinct. Follicles cylindrical, distinct, to 35 cm × 4–7 mm, lenticellate. Seeds narrowly fusiform, 1.5–2 cm, coma to 4 cm. Fl. Apr-Jun, fr. Jun-Dec.

Montane forests, valleys, limestone brushwoods; 500–1500 m. Guangxi, Guizhou, Hainan, Yunnan [NE India, Sikkim, Vietnam].

**6. *Wrightia religiosa*** (Teijsmann & Binnendijk) Bentham in Bentham & J. D. Hooker, Gen. Pl. 2: 713. 1876.

无冠倒吊笔 wu guan dao diao bi

*Echites religiosa* Teijsmann & Binnendijk, Natuurk. Tijdschr. Ned. Indië 27: 34. 1864.

Shrubs to 3 m tall. Branchlets thin, terete, often with many lateral short branchlets, minutely puberulent. Petiole 2–4 mm; leaf blade elliptic, ovate, or narrowly oblong, 2.5–7.5 × 1.5–3 cm, pubescent along midvein; lateral veins 5–7 pairs. Cymes often on short, few-leaved branches, short pedunculate, 1–13-flowered. Pedicel 1.5–2 cm, thin, finely hairy. Sepals ovate, ca. 1.5 mm. Corolla white, subrotate; tube 3–4 mm, glabrous; lobes ovate, ca. 7 mm, densely pubescent on both surfaces; corona obsolete. Stamens inserted at mouth of corolla tube. Ovaries free. Follicles linear, free, 12–17 cm. Seeds narrowly fusiform, ca. 8 mm, coma to 3.5 cm. Fl. all year.  $2n = 22$ .

S Guangdong [Cambodia, Laos, Malaysia, Thailand, Vietnam].

Cultivated for medicine.

**30. BEAUMONTIA** Wallich, Tent. Fl. Nepal. 14. 1824.

清明花属 *qing ming hua shu*

Lianas woody, robust, with latex. Leaves opposite, usually with petiolar glands. Inflorescences terminal or axillary cymes; bracteoles leafy, large. Flowers large, fragrant. Sepals free, bearing many basal glands inside; lobes leafy, large. Corolla white, funnellform, tube short or long, limb widely campanulate, throat not scaly, lobes overlapping to right. Stamens inserted at distal narrow portion of corolla tube; filaments arcuate, long, thickened distally; anthers sagittate, usually exerted, connivent, adherent to pistil head, cells spurred at base; disc ringlike, shallowly 5-lobed. Ovaries 2, connate, surrounded by disc; ovules numerous in each locule. Style long; pistil head fusiform. Follicles elongated, thick, hard. Seeds compressed, apex attenuate, coma silky; cotyledons leaflike or thick, radicle short.

Nine species: E and SE Asia, five species in China.

- 1a. Leaves densely pubescent abaxially; corolla tube 1–2.7 cm, lobes rounded at apex ..... 1. *B. khasiana*  
 1b. Leaves pubescent abaxially when young, glabrous or glabrescent when older; corolla tube 4–13 cm, lobes acute or short acuminate at apex.  
 2a. Corolla tube puberulent inside.  
 3a. Sepals broadly elliptic or obovate, 3.5–5.3 × 2–3.3 cm; corolla ca. 12 cm in diam. .... 2. *B. brevituba*  
 3b. Sepals narrowly elliptic, 1.5–2.5 × 0.3–0.6 cm; corolla ca. 5 cm in diam. .... 3. *B. pitardii*  
 2b. Corolla tube glabrous inside.  
 4a. Corolla funnellform, limb attenuate at base; stamens white, filaments 3.2–6 cm ..... 4. *B. grandiflora*  
 4b. Corolla broadly campanulate, limb abruptly constricted at base; stamens yellow or orange, filaments 1.5–2.5 cm ..... 5. *B. murtonii*

**1. *Beaumontia khasiana*** J. D. Hooker, Fl. Brit. India 3: 661. 1882.

云南清明花 *yun nan qing ming hua*

*Beaumontia yunnanensis* Tsiang & W. C. Chen.

Lianas to 15 m. Trunk stout; branches lenticellate, branchlets densely dark brown pubescent. Petiole 1–4 cm; leaf blade elliptic or obovate, 8–25 × 5–13.5 cm, sparsely puberulent or glabrescent adaxially, densely tomentose or velvety abaxially; midvein and lateral veins densely hairy. Cymes 13–20 cm, 9–13-flowered, densely pubescent; peduncle 6.5–12 cm. Pedicel 3.5–6 cm. Sepals narrowly ovate, 1–1.6 cm. Corolla white, tube 1–2.7 cm, cylindric proximally, broadly campanulate distally; lobes broadly ovate, 2.5–4 cm, rounded at apex. Stamens exerted; filaments 2–3 cm. Ovary pubescent. Style 2–3 cm, pubescent. Fl. spring-summer.

Dense montane forests; 1500–1800 m. SW Yunnan (Longling, Cangyuan) [India, Myanmar].

**2. *Beaumontia brevituba*** Oliver, Hooker's Icon. Pl. 16: t. 1582. 1887.

断肠花 *duan chang hua*

Lianas to 12 m. Branchlets pale yellow or gray, pubescent when young, glabrescent, lenticellate. Petiole 1–3 cm; leaf blade narrowly obovate, 7–25 × 3–11 cm, base cuneate, apex acuminate to cuspidate, glabrous or sometimes pubescent along veins or when young. Cymes 13.5–21.5 cm, 3–6-flowered, puberulent; peduncle to 4 cm. Pedicel to 6 cm. Sepals pale yellow, broadly elliptic or obovate, 3.5–5.5 × 2–3.2 cm, puberulent on both surfaces. Corolla white, ca. 12 cm in diam.; tube 6–8.5 cm, puberulent, cylindric proximally, broadly obconical distally; lobes 4–5.5 × 3.5–5 cm, acute. Stamens exerted; filaments 5.5–6 cm; disc cup-shaped, apex sparsely puberulent. Ovary tomentose. Style 5.5–7 cm, glabrous. Follicles oblong, to 16 × 4 cm. Seeds brown, oblong, ca. 1.5 cm, coma to 4 cm. Fl. spring-summer.

• Montane forests, thickets, river banks; 300–1000 m. Guangxi, Hainan.

The leaves and latex are poisonous.

**3. *Beaumontia pitardii*** Tsiang, Sunyatsenia 2: 160. 1934.

广西清明花 *guang xi qing ming hua*

*Beaumontia campanulata* Pitard, not K. Schumann.

Lianas to 10 m. Branchlets dark brown, densely to sparsely pubescent. Petiole 1.5–3 cm; leaf blade obovate or oblong, 10–21 × 5.5–12 cm, glabrous or densely hairy along veins adaxially, puberulent abaxially; lateral veins 11–14 pairs. Cymes 14–17 cm, 5–9-flowered, minutely tomentose; peduncle 1–2.5 cm. Flowers fragrant; pedicel 2–3 cm. Sepals narrowly elliptic, 1.5–2.5 cm × 3–6 mm, minutely tomentose on both sides. Corolla white, ca. 5 cm in diam.; tube 7–10 cm, cylindric proximally, narrowly campanulate distally, puberulent on both surfaces; lobes broadly ovate, 2–3 cm, apex acute or acuminate. Stamens included; filaments 4.5–5 cm; disc cup-shaped. Ovary and style puberulent. Style 6–7 mm. Follicles oblong, ca. 29 × 3.5 cm. Seeds narrowly ellipsoid, 1.6–2.3 cm, coma ca. 5.5 cm. Fl. Mar-May.

Montane forests, valley brushwoods; 800–1500 m. SW Guangxi, S Yunnan [Vietnam].

**4. *Beaumontia grandiflora*** Wallich, Tent. Fl. Nepal. 15, t. 7. 1824.

清明花 *qing ming hua*

*Echites grandiflora* Roxburgh.

Lianas to 20 m. Bark corky; young branches rusty pubescent; branchlets dark brown, pubescent to glabrous. Petiole to 3 cm; leaf blade narrowly obovate or narrowly elliptic, 6–30 × 3.5–15 cm, sparsely to densely pubescent when young, glabrous when older; lateral veins 8–20 pairs. Cymes 12–25 cm, 3–19-flowered, sparsely

to densely pubescent; peduncle 2.5–9 cm; bracts leafy, pale green. Pedicel 2.5–4.5 cm. Sepals pale green, 3–6 mm. Corolla white, creamy, or pale yellow, base pale green; tube funnellform, 6.5–13 cm, glabrous inside; limb ca. 10 cm in diam., attenuate at base, sparsely to densely pubescent outside, glabrous inside; lobes suborbicular to broadly ovate, 1.7–4 cm, apex acuminate. Stamens white; filaments 3.2–6 cm; anthers 1.5–1.7 cm, included; disc ringlike, apex sparsely puberulent. Ovary tomentose. Style 7–9 cm. Follicles usually narrowly ellipsoid, 22–31 × 5–6 cm. Seeds 1.5–2.5 cm, coma 4–7 cm. Fl. spring-summer.  $2n = 24$ .

Humid montane forests, valleys, river banks; 300–1500 m. SW Guangxi, S Yunnan; cultivated in Fujian, Guangdong [Bangladesh, Bhutan, India, Laos, Myanmar, Nepal, Thailand, Vietnam].

Cultivated as an ornamental. The young branches are used for making coarse ropes. The roots and leaves are used in the treatment of fractures, injury, and backache and leg pain caused by rheumatism.

**5. *Beaumontia murtonii*** Craib, Bull. Misc. Inform. Kew 1914: 282. 1914.

思茅清明花 *si mao qing ming hua*

*Beaumontia fragrans* Pierre ex Pitard.

Lianas evergreen, woody, to 20 cm. Branchlets pale gray or dark brown, sparsely to densely rusty pubescent when young, glabrous when older. Petiole 1–3 cm; leaf blade obovate, narrowly obovate, or broadly elliptic, 10–30 × 3.5–15 cm, glabrous to pubescent abaxially; lateral veins 11–18 pairs. Cymes 12–20 cm, 6–12-flowered, pubescent; peduncle 3–9 cm. Pedicel 3–5 cm. Sepals pale green, elliptic, 2.7–4.5 cm, sparsely pubescent on both surfaces. Corolla white, broadly campanulate; tube 4–6.5 cm, cylindrical proximally, glabrous inside; limb ca. 5 × 5 cm, abruptly constricted at base; lobes ovate or tongue-shaped, 1.9–3 cm, apex acute. Stamens yellow or orange; filaments 1.5–2.5 cm. Ovary pubescent. Style to 4 cm, pubescent. Follicles oblong, 14–18 × 3–5 cm. Seeds narrowly ellipsoid, ca. 2 cm, coma 3–8 cm. Fl. spring-summer.

Mixed forests, montane thickets, river banks; 1000–1500 m. S Yunnan (Menghai) [Cambodia, Laos, Malaysia, Thailand, Vietnam].

The latex is used as an arrow poison.

### 31. VALLARIS N. Burman, Fl. Indica 51. 1768.

纽子花属 *niu zi hua shu*

*Parabeaumontia* (Baillon) Pichon.

Shrubs trailing or scandent, latex white. Leaves opposite, dotted. Cymes umbellate or compound corymbose, axillary or terminal. Sepals free, with or without basal glands inside. Corolla subrotate, limb spreading, throat without scales; lobes broad, overlapping to right. Stamens inserted at apex or middle of corolla tube; filaments short, with a large subapical dorsal gland; anthers sagittate, partially or completely exerted, connivent, adherent to pistil head, cells with rigid basal spurs; disc ringlike or cup-shaped, 5-lobed, lobes sometimes free, ciliate. Ovaries 2, distinct. Follicles 2, free. Seeds numerous, biseriate, apex crowned with coma; endosperm starchy; embryo straight; cotyledons elliptic, base subcordate, apex rounded.

Three species: India, Indonesia, Sri Lanka; two species in China.

- 1a. Sepals 9–15 mm; corolla limb 3–4 cm in diam., tube 1.3–1.5 cm, lobes mucronate at apex ..... 1. *V. indecora*  
 1b. Sepals 2–7 mm; corolla limb 1.4–2.5 cm in diam., tube 0.5–1 cm, lobes rounded at apex ..... 2. *V. solanacea*

**1. *Vallaris indecora*** (Baillon) Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 375. 1973.

大纽子花 *da niu zi hua*

*Beaumontia indecora* Baillon, Bull. Mens. Soc. Linn. Paris 1: 759. 1888; *Parabeaumontia indecora* (Baillon) Pichon; *Vallaris grandiflora* Hemsley & E. H. Wilson.

Shrubs trailing or scandent, to 6 m tall. Bark pale gray. Petiole 1–6 mm; leaf blade elliptic or obovate, 7–14 × 3–9 cm, base cuneate or rounded, pubescent, glabrescent, or glabrous on both surfaces; lateral veins 6–8 pairs. Cymes 3- or 4-flowered; peduncle 0.7–1.5 cm. Flowers fetid; pedicel 0.7–2 cm. Sepals oblong, 0.9–1.5 cm. Corolla pale yellow, tube 1.3–1.5 cm; limb 3–4 cm in diam., pubescent inside including throat; lobes mucronate at apex. Anthers and dorsal glands exerted from throat. Ovary and style pilose. Follicles narrowly ovoid, 6.5–14 × 1.5–3.5 cm. Seeds rhomboid or ellipsoid, ca. 2 cm, coma ca. 2.2 cm. Fl. Mar–Jun.

• Dense montane forests; 700–3000 m. Guangxi, Guizhou,

Sichuan, Yunnan.

All parts are used to treat worm diseases.

**2. *Vallaris solanacea*** (Roth) Kuntze, Revis. Gen. Pl. 2: 417. 1891.

纽子花 *niu zi hua*

*Peltanthera solanacea* Roth, Nov. Pl. Sp. 132. 1821; *Vallaris heynei* Sprengel; *V. solanacea* (Roth) K. Schumann.

Shrubs climbing, often twining, to 10 m. Bark dirty whitish gray; flowering branchlets, slender, grayish pubescent. Petiole 0.2–2 cm; leaf blade elliptic to narrowly so, 2–15 × 0.8–6 cm, densely pubescent on both surfaces, base cuneate or rounded; lateral veins 5–12 pairs. Cymes di- or trichasial; peduncle 0.5–3 cm. Flowers fragrant; pedicel 0.5–2.5 cm. Sepals ovate or narrowly elliptic, 2–7 mm. Corolla white or pale yellow, limb 1.4–2.5 cm in diam., tube 5–10 mm, lobes rounded at apex. Staminal glands yellow, globose; disc shorter than ovary, apex pilose. Follicles oblong, 8–14 × 1.5–3.5 cm. Seeds ellipsoid, 9–10 mm, coma 3–4 cm. Fl. Mar–Jul.  $2n =$

22.

India, Indonesia, Laos, Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam].

Forests, thickets, stream banks; 0–2700 m. Hainan [Cambodia,

**32. STROPHANTHUS** de Candolle, Bull. Soc. Philom. Paris 3: 122. 1802.

羊角拗属 yang jiao niu shu

Lianas or erect or stolon-bearing shrubs, rarely trees, with latex. Leaves opposite or in whorls of 3. Cymes mostly dichasial, terminal, pedunculate or sessile. Flowers large. Sepals free or connate at base, imbricate or quincuncial, basal glands 5 to many. Corolla funnellform, usually turning darker and dark streaked at anthesis; tube short, throat wide; lobes overlapping and mostly twisted to right, distal portions mostly forming filiform, involute long tails; corona 10-lobed, inserted at base of corolla lobes. Stamens inserted at apex of corolla tube; filaments short; anthers sagittate, connivent, adherent to pistil head, spurred at base; disc absent. Ovaries 2, ± connate at base; ovules numerous in each locule. Style filiform. Follicles 2, divaricate. Seeds numerous, with beaked apical coma.

Thirty-eight species: tropical Africa, Asia; six species in China.

- 1a. Apex of corolla lobes rounded ..... 1. *S. gratus*  
 1b. Apex of corolla lobes long tailed.  
 2a. Plant densely hispid throughout ..... 2. *S. hispidus*  
 2b. Plant glabrous except for flowers.  
 3a. Anther connectives included.  
 4a. Corolla tube puberulent outside; ovary glabrous; latex clear or yellowish ..... 3. *S. divaricatus*  
 4b. Corolla tube glabrous outside; ovary puberulent; latex clear or white ..... 4. *S. sarmentosus*  
 3b. Anther connectives exerted.  
 5a. Sepals linear, recurved, densely puberulent; bracts 2 or 3 pairs, puberulent; corolla lobes including tails 1.8–5.5 cm; style 6–8.5 mm ..... 5. *S. wallichii*  
 5b. Sepals ovate or narrowly triangular, erect or suberect, glabrous; bracts 1 pair, glabrous or puberulent; corolla lobes including tails 4.3–25.5 cm; style 9–15 mm ..... 6. *S. caudatus*

**1. *Strophanthus gratus*** (Wallich & Hooker) Baillon, Hist. Pl. 10: 171. 1889.

旋花羊角拗 xuan hau yang jiao niu

*Roupellia grata* Wallich & Hooker, Bot. Mag. 75: t. 4466. 1849; *Strophanthus gratus* (Wallich & Hooker) Franchet.

Lianas woody, to 25 m, latex white. Trunk to 10 cm in diam.; branches dark or purplish brown, densely lenticellate, branchlets glabrous. Petiole 0.5–3.2 mm; leaf blade ovate, elliptic, or obovate, 5–18 × 2–9 cm, leathery, glabrous; lateral veins 5–11 pairs. Cymes 3–32-flowered, glabrous. Flowers fragrant. Sepals obovate or broadly so, 0.7–1.8 cm. Corolla white, turning yellow at base, reddish or purple above, throat reddish; tube 2.5–4.5 cm, inflated in distal half; lobes orbicular or nearly so, 1.5–3.5 × 1.5–3.2 cm, apex rounded; corona lobes pink, awl-shaped, 0.5–1.5 cm, exerted. Filaments pubescent adaxially, connective glabrous, extending into a tail 6–12 mm. Follicles divergent at 180°, cylindric, 23–41 × 3–4.3 cm. Seeds to 2 cm, beak 1.6–6.2 cm, coma to 5 cm. Fl. Feb.  $2n = 18$ .

Taiwan [native to W and WC Africa].

Cultivated for medicine. The juice is used as an arrow poison.

**2. *Strophanthus hispidus*** de Candolle, Bull. Soc. Philom. Paris 3: 123. 1802.

箭毒羊角拗 jian du yang jiao niu

Lianas or stolon-bearing shrubs when cut, to 5 m tall, densely hispid; latex clear, reddish or white. Petiole 1–5 mm; leaf blade ovate to obovate, 3–22 × 1.5–12 cm, base rounded or subcordate; lateral veins 6–11 pairs. Cymes 3–72-flowered. Sepals ovate, inner ones often linear, 1.3–3.5 cm. Corolla yellow, tube 1–2.2 cm; lobes including tails 15–22.5 cm, proximal part ovate, tail pendulous, puberulent on both sides, to 1 mm wide; corona lobes yellow spotted with red, purple, or brown, tongue-shaped. Anthers included, glabrous. Ovary hispid. Style to 1.2 cm. Follicles very narrowly oblong, to 54 × 3 cm, densely lenticellate. Seeds narrowly ellipsoid, beak 2.3–7.7 cm, coma to 5 cm. Fl. Feb–Apr, fr. Jun–Dec.  $2n = 18$ .

S Guangdong, S Guangxi, Hainan, S Yunnan [native to WC Africa].

Cultivated for medicine. All parts of the plant are deadly poisonous. The juice is used as an arrow poison and the seeds as heart stimulant and diuretic.

**3. *Strophanthus divaricatus*** (Loureiro) Hooker & Arnott, Bot. Beechey Voy. 199. 1837.

羊角拗 yang jiao niu

*Pergularia divaricata* Loureiro, Fl. Cochinch. 1: 169. 1790; *Emericia divaricata* (Loureiro) Roemer & Schultes; *Nerium chinense* Hunter ex Roxburgh; *Periploca divaricata* (Loureiro) Sprengel; *Strophanthus chinensis* (Hunter ex Roxburgh) G. Don; *S. dichotomus* de Candolle var. *chinensis* Ker Gawler; *S. divergens* Graham; *Vallaris divaricata*

(Loureiro) G. Don.

Lianas or sarmentose shrubs, stolon bearing when pruned, to 4.5 m tall, glabrous except for corolla, latex clear or yellowish. Trunk to 4 cm in diam.; branches dark gray, densely lenticellate, branchlets reddish brown. Petiole 5–10 mm; leaf blade elliptic or slightly obovate, 3–10 × 1.5–5 cm; lateral veins 4–9 pairs. Cymes 3–15-flowered; peduncle to 1.5 cm; bracts linear or narrowly ovate, deciduous. Pedicel to 1 cm. Sepals narrowly triangular, 4–11 mm. Corolla yellow, tube 0.9–1.6 cm, puberulent on both sides or glabrous inside; lobes with a red basal spot inside, ovate, to 10 cm, abruptly narrowed into pendulous tails to 1 mm wide; corona lobes 10, greenish yellow, triangular or awl-shaped, 0.9–3 mm. Anthers included, connective tail to 0.6 mm. Ovary glabrous. Follicles ellipsoid-oblong, 9–15 × 2–3.5 cm, hard, woody, divergent at 180–250°. Seeds fusiform, 1.3–2 cm, beak 1.2–3.4 cm, coma 3.5–5.5 cm. Fl. Mar-Jul.  $2n = 18$ .

Forests, thickets; 100–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Laos, Vietnam].

Various parts of the plant are used as heart stimulant and to treat injury and snake bites.

**4. *Strophanthus sarmentosus*** de Candolle, Bull. Soc. Philom. Paris 3: 123. 1802.

西非羊角拗 xi fei yang jiao niu

Shrubs stolon bearing, to 4 m tall, deciduous, latex clear or white. Branches densely lenticellate, branchlets dark or reddish brown. Petiole 0.2–2.1 cm; leaf blade elliptic or ovate, 2–15 × 1.5–7 cm, papery or thinly leathery, apex acuminate, acumen 0.2–2 cm; lateral veins 3–6 pairs, glabrous. Pedicel to 1.2 cm, puberulent. Sepals ovate or elliptic, 0.5–2 cm, puberulent. Corolla yellow-white outside, purple-yellow inside; tube 1.7–4 cm, glabrous outside; lobes including tail to 13.5 cm, pendulous. Anthers included. Ovary puberulent. Follicles 10–28 × 2.2–4.4 cm, apex obtuse. Seeds 0.8–2 cm, beak to 8 cm, coma 2.5–10.5 cm. Fl. Dec-May.  $2n = 18$ .

S Yunnan [native to WC Africa].

Cultivated for medicine.

**5. *Strophanthus wallichii*** A. de Candolle, Prodr. 8: 418. 1844.

云南羊角拗 yun nan yang jiao miu

Lianas woody, to 8 m, glabrous except for inflorescences, latex white. Trunk to 8 cm in diam.; branches sparsely to densely lenticellate. Petiole 5–10 mm; leaf blade elliptic or obovate, 4–13 × 2.5–6 cm, papery; lateral veins 5–9 pairs, base cuneate or rarely rounded. Cymes 5–25-flowered, puberulent to glabrous; peduncle to 7.5 cm; bracts 2 or 3 pairs, linear, 4–15 mm, spreading or recurved, puberulent. Pedicel 4–10 mm. Sepals linear or nearly so, 0.6–1.8 cm, puberulent on both sides. Corolla pinkish; tube 1–1.5 cm, puberulent inside, glabrous outside; lobes ovate, abruptly narrowed to tail, 1.8–5.5 cm, tail ca. 1 mm wide, glabrous to sparsely puberulent inside; corona lobes triangular, 2.8–6.5 mm. Stamens puberulent; filaments 6–8.5 mm, connective linear, exerted, 8.5–12.5 mm. Ovary minutely puberulent. Style 6–8.5 mm. Follicles oblong, 11–25 × 2.5–3 cm, woody, densely lenticellate, divergent at 180°. Seeds 1–1.8 cm, beak 2.2–4.4 cm, coma 5.5–9 cm. Fl. Mar-Jun, fr. Jul-Dec.  $2n = 22$ .

Mixed woods, brushwoods; 500–1500 m. S Yunnan [Bangladesh, India, Laos, Malaysia, Thailand, Vietnam].

**6. *Strophanthus caudatus*** (Linnaeus) Kurz, J. Asiat. Soc. Beng., Pt. 2, Nat. Hist. 46: 257. 1877.

卵萼羊角拗 luan e yang jiao niu

*Echites caudata* Linnaeus, Mant. Pl. 52. 1767; *Nerium caudatum* (Linnaeus) Lamarck.

Lianas woody, to 12 m, glabrous except for flowers, latex clear or white. Trunk to 1.5 cm in diam.; branches dark brown, lenticellate. Petiole 3–13 mm; leaf blade elliptic, obovate, or ovate, 5–24 × 2.5–11 cm, leathery or papery; lateral veins 5–13 pairs. Cymes 5–15 cm, 5–25-flowered; bracts 2, linear, 2–12 mm, deciduous. Pedicel 7–11 mm. Sepals ovate or narrowly triangular, 0.3–1.9 cm, glabrous. Corolla white, turning yellow then red, red or purple streaked inside, glabrous or only distal part puberulent, tube 1.2–2.6 cm; lobes broadly ovate, abruptly narrowed to tail, 4.3–25.5 cm, tail pendulous, 1.5–3.2 mm wide; corona lobes tongue- or awl-shaped, 3–10 mm. Stamens puberulent, connective exerted. Ovary glabrous or puberulent. Style 0.9–1.5 cm. Follicles oblong, 10–30 × 3–4.8 cm, divergent at 150–200°. Seeds 1–2.5 cm, beak 2.3–4.6 cm, coma 5–9 cm. Fl. Apr-Jun.  $2n = 20$ .

500–900 m. S Guangxi, cultivated in Taiwan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam].

### 33. KIBATALIA G. Don, Gen. Hist. 4: 86. 1837.

倒纓木属 dao ying mu shu

*Paravallaris* Pierre ex Hua.

Trees or shrubs, with latex. Leaves opposite. Cymes axillary, almost umbel-like; peduncle short. Pedicel long. Calyx with many basal glands inside. Corolla ± funnellform or salverform; tube terete, constricted below throat, throat without scales; lobes overlapping to right. Filaments short, broad; anthers exerted [or included], sagittate, connivent, adherent to pistil head, lobes spurred at base; disc ringlike or cup-shaped, fleshy, margin 5-lobed, membranous. Ovaries 2, free; ovules numerous in each locule. Style linear. Follicles 2, reflexed, long, thick, hard, leathery. Seeds narrowly oblong, apex naked, base with a very fragile, long beak bearing reflexed coma.

Fifteen species: Asia, one species in China.

**1. *Kibatalia macrophylla*** (Pierre ex Hua) Woodson, Philipp. J. Sci. 60: 214. 1936.

倒纓木 dao ying mu

*Paravallaris macrophylla* Pierre ex Hua, Bull. Soc. Bot. France 51: 272. 1904; *Kibatalia anceps* (Dunn & R. Williams) Woodson; *P. yunnanensis* Tsiang & P. T. Li; *Trachelospermum anceps* Dunn & R. Williams; *Vallaris anceps* (Dunn & R. Williams) C. E. C. Fischer; *V. arborea* C. E. C. Fischer.

Trees to 15 m tall. Branchlets slightly compressed when young, terete when older, glabrous. Petiole 1–1.5 cm; leaf blade oblong or elliptic, 11–38 × 4–13 cm, base rounded to cuneate, abaxial surface glabrous or glabrescent; lateral veins 13–21 pairs, at a right angle to midvein. Cymes 4–7 cm,

3–12-flowered; peduncle 0.3–1.5 cm. Pedicel 1.5–3 cm, straight and slender at anthesis, curved and thick in fruit. Corolla white, salverform; tube 1.1–1.3 cm, cylindrical, throat villous; limb campanulate; lobes oblong, 1.2–1.4 cm, puberulent on both surfaces. Filaments with a pair of dorsal swellings; anthers exerted; disc cup-shaped, fleshy, apex 5-lobed. Ovary ovoid, puberulent. Style cylindrical, 0.9–1.2 cm. Follicle very narrowly ellipsoid, 8–24 cm × 7–9 mm. Seeds narrowly ellipsoid, flat, 1.5–2 cm × 2.5–3 mm, beak ca. 4 cm, coma 1.5–4.5 cm. Fl. Apr-Sep, fr. Sep-Dec.

Montane forests, stream banks, valleys, roadsides; 200–700 m. S Yunnan (Xishuangbanna, Hekou, Zhenkang, Chengjiang) [Cambodia, Laos, Myanmar, Thailand, Vietnam].

### 34. FUNTUMIA Stapf, Hooker's Icon. Pl. 27: t. 2694. 1901.

丝胶树属 si jiao shu shu

Trees or shrubs, evergreen, bark and pith with white latex, domatia present. Leaves opposite, margin undulate or revolute. Cymes axillary or terminal, many flowered. Calyx deeply divided, with basal glands inside. Corolla salverform, tube swollen on 1 side at middle; throat much constricted, without scales; lobes overlapping to right. Stamens inserted near middle of corolla tube; anthers sagittate, included, adherent to pistil head, lobe with an empty tail; disc cup-shaped, deeply 5-cleft. Ovaries 2, free; ovules numerous, pendulous. Style glabrous; pistil head club-shaped. Follicles 2, divaricate. Seeds with a slender comose beak directed toward base of fruit.

Two species: tropical Africa, one cultivated in China.

**1. *Funtumia elastica*** (Preuss) Stapf, Hooker's Icon. Pl. 27: t. 2694. 1901.

丝胶树 si jiao shu

*Kickxia elastica* Preuss, Notizbl. Königl. Bot. Gart. Berlin 2: 353. 1899.

Trees to 35 m tall. Trunk to 50 cm in diam.; bark greenish brown to gray. Petiole 0.5–1.5 cm; leaf blade oblong or narrowly so, 6–27 × 1.5–10 cm, leathery, margin undulate; lateral veins 7–11 pairs, with axillary domatia abaxially,

glabrous. Cymes short, glabrous; peduncle ca. 1 cm. Pedicel 2–8 mm. Sepals 4–5 mm, elliptic to broadly ovate, glabrous, glandular adaxially. Corolla tube pale green to white, 7–9 mm, glabrous; lobes 5–6 mm, apex obtuse. Anthers appressed pilose abaxially. Follicles narrowly spatulate, 8–19 cm, woody. Seeds fusiform, 4.5–7 cm, beak 3–5 cm, coma 4.5–7 cm. *2n* = 22.

Cultivated in S Yunnan [native to tropical Africa from Senegal to Tanzania].

A valuable source of rubber.

### 35. HOLARRHENA R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 62. 1811.

止泻木属 zhi xie mu shu

Trees or shrubs with milky latex. Leaves opposite. Cymes terminal or axillary, many flowered. Calyx small, glandular inside at base, glands alternating with lobes. Corolla salverform, tube cylindrical, slightly inflated near base, lobes overlapping to right. Stamens inserted near base of corolla tube; filaments short; anthers narrowly ovate, free from pistil head, lobes rounded at base; disc absent. Ovaries 2, distinct; ovules numerous on each placenta. Style short. Follicles 2, distinct, cylindrical, dehiscent. Seeds numerous, linear, with coma at 1 end; endosperm scanty.

Four species: tropical Africa, SE Asia; one species in China.

**1. *Holarrhena pubescens*** Wallich ex G. Don, Gen. Hist. 4: 78. 1837.

止泻木 zhi xie mu

*Chonemorpha antidysenterica* (Roth) G. Don; *Echites antidysenterica* Roth, not (Linnaeus) Roxburgh ex Fleming; *E. pubescens* Buchanan-Hamilton, not Willdenow ex Roemer

& Schultes; *Holarrhena antidysenterica* Roth; *H. codaga* G. Don; *H. malaccensis* Wight; *H. villosa* Aiton ex Loudon.

Shrubs or trees to 10 m tall. Trunk to 20 cm in diam.; branchlets with whitish, dotlike lenticels. Petiole 1–5 mm, grooved, glandular inside groove; leaf blade ovate or elliptic, 10–24 × 4–11.5 cm, membranous, pubescent, sometimes densely so abaxially, base rounded, apex acute or obtuse;

lateral veins 10–15 pairs. Cymes 5–8 cm; peduncle 1–2 cm. Pedicel 0.3–3 cm. Sepals elliptic to linear, 2–12 mm. Corolla white, pubescent, tube 0.9–1.9 cm; lobes oblong, 1–3 cm. Anthers included, narrowly ovate, base rounded. Follicles linear, 20–43 × 0.5–1.5 cm, with whitish, dotlike lenticels. Seeds 0.9–1.6 cm, coma 2.5–4.5 cm. Fl. Apr-Jul, fr. Jun-Dec.

$2n = 22$ .

Montane forests; 500–1000 m. S Yunnan; cultivated in S Guangdong, Guangxi, Hainan, Taiwan [Bangladesh, Cambodia, India, Laos, Myanmar, Nepal, Thailand, Vietnam; Africa].

The bark and roots are used as a remedy for fever and dysentery.

### 36. APOCYNUM Linnaeus, Sp. Pl. 1: 213. 1753.

罗布麻属 *luo bu ma shu*

*Poacynum* Baillon; *Trachomitum* Woodson.

Herbs perennial, sometimes shrubs, latex white. Rhizomes fibrous. Leaves opposite, rarely alternate, margin denticulate. Inflorescences thyrselike, terminal. Corolla campanulate or basin-shaped; throat wide, open; lobes overlapping to right. Stamens inserted at base of corolla tube, alternate with corona lobes; anthers adherent to pistil head; disc scales fleshy. Ovary half-inferior; carpels 2, free; ovules numerous in each locule. Follicles 2, slender, divaricate. Seeds numerous, apically comose; embryo straight, cotyledons as long as radicle.

Nine species: temperate regions of North America, Europe, and Asia; two species in China.

- 1a. Corolla campanulate, deeper than wide; leaves usually opposite ..... 1. *A. venetum*  
 1b. Corolla basin-shaped, wider than deep; leaves usually alternate ..... 2. *A. pictum*

#### 1. *Apocynum venetum* Linnaeus, Sp. Pl. 1: 213. 1753.

罗布麻 *luo bu ma*

*Apocynum lancifolium* Russanov; *A. venetum* var. *ellipticifolium* Beguinot & Belanger; *A. venetum* var. *microphyllum* Beguinot & Belanger; *Trachomitum lancifolium* (Russanov) Pobedimova; *T. venetum* (Linnaeus) Woodson; *T. venetum* var. *ellipticifolium* (Beguinot & Belanger) Woodson; *T. venetum* var. *microphyllum* (Beguinot & Belanger) Woodson.

Stems to 4 m tall, glabrous except for inflorescences; branches and branchlets whitish gray, terete, finely striate. Leaves usually opposite; petiole 3–6 mm; leaf blade narrowly elliptic to narrowly ovate, 1–8 × 0.5–2.2 cm, base rounded or cuneate, margin denticulate, apex acute or obtuse, mucronate. Sepals narrowly elliptic or narrowly ovate, ca. 1.5 mm. Corolla purplish red or pink; tube campanulate, 6–8 mm, granulose; lobes 3–4 mm. Disc fleshy, 5-lobed; lobes rounded, base adnate to ovary. Follicles slender, 8–20 cm × 2–3 mm. Seeds ovoid or ellipsoid, 2–3 mm, coma 1.5–2.5 cm. Fl. Apr-Sep, fr. Jul-Dec.  $2n = 22$ .

Salt-barren zone, desert margins, alluvial flats, riversides. Gansu, Hebei, Henan, Jiangsu, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang, Xizang [India, Japan, Mongolia, Pakistan, Russia; SW Asia, Europe].

The strong bast fibers obtained from the inner bark are used

in making cloth, strings, sails, fishing nests, and high-quality paper. The leaves yield up to 5% gum, which is used for making rubber, and a medicine used as a sedative and to treat hypertension. The species has fragrant flowers and is grown as a honey plant.

#### 2. *Apocynum pictum* Schrenk, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 2: 115. 1844.

白麻 *bai ma*

*Apocynum hendersonii* J. D. Hooker; *Poacynum hender-sonii* (J. D. Hooker) Woodson; *P. pictum* (Schrenk) Baillon.

Stems to 2 m tall. Branchlets pubescent when young, soon glabrous. Leaves usually alternate; petiole 2–5 mm, rarely shorter; leaf blade oblong to ovate, 1.5–4 × 0.2–2.3 cm, closely denticulate, granulose. Sepals ovate or triangular, 1.5–4 mm. Corolla pink or purplish red, often with distinct darker markings; tube basin-shaped, 2.5–7 mm; lobes broadly triangular, 2.5–4 mm; corona inserted at base of corolla tube, lobes broadly triangular, apex long acuminate. Follicles slender, pendulous, 10–30 cm × 3–4 mm. Seeds narrowly ovoid, 2.5–3 mm; coma 1.5–2.5 cm. Fl. Apr-Sep, fr. Jul-Dec.

Salt-barren areas, desert margins, riversides. Gansu, Qinghai, Xinjiang [Kazakhstan, Mongolia].

Same uses as the preceding species.

### 37. ANODENDRON A. de Candolle, Prodr. 8: 443. 1844.

鳝藤属 *shan teng shu*

*Formosia* Pichon.

Lianas with white latex. Leaves opposite, lateral veins usually wrinkled above. Cymes paniculate, terminal or axillary. Flowers small. Calyx deeply divided, with basal glands inside. Corolla salverform; tube cylindrical, slightly dilated at staminal insertion, throat constricted, faucal scales absent; lobes overlapping and twisted to right. Stamens included, inserted just below

middle of corolla tube; filaments short; anthers sagittate, connivent, adherent to pistil head, cells spurred at base; disc ringlike or cup-shaped, apex truncate or shortly 5-lobed. Ovaries 2, distinct, slightly higher than disc; ovules numerous in each ovary. Style short; pistil head thick, base with a ringlike membrane. Follicles divaricate, thick, narrowly ovoid, apex acuminate. Seeds compressed, ovate or oblong; beak with a long apical coma.

About 16 species: India, Malaysia, Sri Lanka, Vietnam; five species in China.

- 1a. Lateral leaf blade veins ca. 30 pairs ..... 5. *A. formicinum*  
 1b. Lateral leaf blade veins 6–16 pairs.  
 2a. Corolla tube 15–25 mm, lobes 15–25 mm; coma ca. 2 cm ..... 1. *A. benthamianum*  
 2b. Corolla tube 1.5–4.5 mm, lobes 3–5.5 mm; coma 4–6 cm.  
 3a. Branchlets, midvein, and petiole pubescent when young; fruit pilose ..... 2. *A. howii*  
 3b. Branchlets, midvein, and petiole glabrous; fruit glabrous.  
 4a. Leaves abaxially punctate with minute, sessile, brownish peltate glands; corolla tube shorter than lobes; follicles ca. 1 cm thick ..... 3. *A. punctatum*  
 4b. Leaves not punctate; corolla tube as long as or longer than lobes; follicles 1.6–3 cm thick ..... 4. *A. affine*

**1. *Anodendron benthamianum*** Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 98. 1889.

台湾鱗藤 tai wan shan teng

*Formosia benthamiana* (Hemsley) Pichon.

Lianas glabrous except for flowers. Branches dark brown, branchlets pale gray. Petiole 0.5–1.5 cm; leaf blade narrowly oblong or narrowly ovate, 5–14 × 1–5 cm, leathery, apex obtuse or acute; lateral veins 5–7 pairs. Cymes terminal, 5–15 × 8–9 cm, ca. 20-flowered. Sepals ovate, 3–4 × ca. 3 mm. Corolla tube 1.5–2.5 cm, pubescent inside; lobes oblong, 1.5–2.5 cm. Stamens inserted at base of corolla tube; disc cup-shaped, apex undulate. Ovary glabrous. Follicles narrowly oblong or ovoid-cylindric, 6–12 × ca. 1.5 cm. Seeds ca. 2 cm × 5 mm; beak ca. 2.5 mm; coma ca. 2 cm, recurved. Fl. Mar-Jun.

- Thickets, forests; 400 m. N Taiwan.

**2. *Anodendron howii*** Tsiang, Sunyatsenia 3: 141. 1936.

保亭鱗藤 bao ting shan ten

Lianas to 30 m. Young branchlets terete, rust colored pubescent, glabrescent when older, minutely lenticellate. Petiole 0.8–1.3 cm, pubescent when young; leaf blade elliptic to oblong, 10–15 × 4–6 cm, papery, base rounded or broadly cuneate, decurrent on petiole, apex acute, densely pubescent along veins abaxially; lateral veins 14–16 pairs. Cymes paniculate, axillary, 14–20-flowered, ca. 3.5 × 4 cm; peduncles paired or solitary, 2–2.5 cm, puberulent. Sepals ovate, ca. 1 mm. Corolla greenish white, tube ca. 1.5 mm; lobes falcate, oblong, ca. 5.5 mm, pilose inside, glabrous outside. Disc ringlike, apex obscurely 5-lobed. Follicles linear or nearly so, 11–12 × ca. 1 cm, shortly crisp pilose. Seeds ovate, ca. 2 cm, coma ca. 5 cm. Fl. May-Jun, fr. Jun-Aug.

- Sparse woods or brushwoods, usually in valleys. Guangxi, Hainan.

**3. *Anodendron punctatum*** Tsiang, Sunyatsenia 2: 129. 1934.

腺叶鱗藤 xian ye shan teng

Lianas to 20 m, glabrous except for corolla tube. Branches dark brown. Petiole 6–10 mm; leaf blade oblong or subovate,

5–9 × 2–3 cm, base obtuse or cuneate, apex acute, adaxially lustrous, abaxially with minute, scattered, peltate, brownish sessile glands; lateral veins ca. 13 pairs, wrinkled. Cymes thyrselike, axillary; peduncle ca. 6 cm. Pedicel ca. 0.5 mm. Sepals ovate to elliptic, ca. 2 mm. Corolla tube ca. 3 mm; lobes narrowly oblong, ca. 4 mm, apex slightly falcate; disc ringlike, 5-lobed. Ovary as long as disc. Style very short; pistil head thick, conical, 5-angled. Follicles paired, linear, 11–12 × ca. 1 cm, base sometimes slightly dilated. Seeds brown, ovate, ca. 2 cm × 5 mm, coma ca. 4 cm. Fl. Apr-May, fr. Jun-Dec.

- Dense montane forests; 300–800 m. Guangxi, Hainan, Sichuan.

**4. *Anodendron affine*** (Hooker & Arnott) Druce, Bot. Soc. Exch. Club Brit. Isles 4: 605. 1917.

鱗藤 shan teng

*Holarrhena affinis* Hooker & Arnott, Bot. Beechey Voy. 198. 1837; *Aganosma laevis* Champion ex Benth; *Anodendron affine* var. *effusum* Tsiang; *A. affine* var. *pingpienense* Tsiang & P. T. Li; *A. fangchengense* Tsiang & P. T. Li; *A. laeve* (Champion ex Benth) Maximowicz ex Franchet & Savatier; *A. salicifolium* Tsiang & P. T. Li; *A. suishaense* Hayata.

Lianas to 10 m, glabrous except for corolla. Branches pale gray. Petiole 0.5–2 cm; leaf blade deep green adaxially, lighter abaxially, narrowly oblong to narrowly ovate, 3–14 × 1.2–5 cm, papery or somewhat leathery; lateral veins 6–12 pairs, usually wrinkled in dry state. Cymes paniculate, terminal or axillary, 3–26 × 3–13 cm, long pedunculate. Sepals ovate, 2–3 mm. Corolla white or yellowish green, pilose inside, tube 3–4.5 mm; lobes falcate, narrowly oblong, as long as or shorter than tube. Stamens inserted at base of corolla tube; disc cup-shaped, shallowly 5-lobed or entire, attached to ovaries. Follicles narrowly ellipsoid, dilated at base, 8–13 × 1.6–3 cm. Seeds tawny, beaked, ca. 2 cm × 6 mm, coma ca. 6 cm. Fl. Apr-Nov.

- Sparse woods, brushwoods; 200–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Sichuan, Taiwan, Yunnan, Zhejiang [India, Japan, Vietnam].

**5. *Anodendron formicinum*** (Tsiang & P. T. Li) D. J. Middleton, Novon 4: 152. 1994.

平脉藤 ping mai teng

*Micrechites formicina* Tsiang & P. T. Li, Acta Phyto-tax. Sin. 11: 385. 1973.

Lianas to 15 m, glabrous except for sepals. Petiole 5–13 mm; leaf blade oblong or narrowly so, 6–17 × 1.5–4 cm, base rounded, apex acute; lateral veins ca. 30 pairs, nearly at a right angle to midvein, flattened on both surfaces. Cymes

paniculate, terminal and axillary, 5-branched, ca. 14.5 × 19 cm, many flowered. Flowers small. Sepals ovate, puberulent outside. Corolla yellowish green, lobes longer than tube. Stamens inserted at base of corolla tube; disc ringlike, apex obscurely 5-cleft. Ovary glabrous, half sunken in disc. Style short; pistil head beaklike. Fl. May–July.

- Dense montane forests; 1800 m. S Yunnan.

### 38. URCEOLA Roxburgh, Asiat. Res. 5: 169. 1799, nom. cons.

水壶藤属 shui hu teng shu

*Chunechites* Tsiang; *Ecdysanthera* Hooker & Arnott; *Parabarium* Pierre in Spire; *Xylinabariopsis* Lý.

Lianas woody, latex white. Leaves opposite. Cymes paniculate, terminal or axillary, 3-branched. Flowers small. Calyx deeply divided, with basal glands inside. Corolla suburceolate, throat without scales; lobes short, overlapping to right. Stamens included, inserted at base of corolla tube; filaments short; anthers narrowly oblong, sagittate, connivent, adherent to pistil head, cells spurred at base; disc ringlike, entire or 5-lobed. Ovaries 2, longer than disc, villous at apex; ovules numerous in each locule. Style short; pistil head ovoid, conical or oblong, apex 2-cleft. Follicles cylindrical or narrowly ellipsoid, spreading, thick, acuminate. Seeds numerous, oblong or linear, compressed, pubescent, coma long; endosperm scanty; cotyledons oblong or ovate, leaflike, radicle short.

Fifteen species: SE Asia, eight species in China.

- 1a. Leaf blade pubescent abaxially, denser along veins.
  - 2a. Leaf blade very narrowly elliptic, lateral veins 5–7 pairs; corolla glabrous outside, lobe margin 1-toothed; fruit linear or nearly so, ca. 0.5 cm in diam. .... 1. *U. xylinabariopsoides*
  - 2b. Leaf blade ovate or narrowly elliptic, lateral veins ca. 10 pairs; corolla pubescent outside, lobe margin entire; fruit narrowly ovoid, 1.5–2 cm in diam. .... 2. *U. huaitingii*
- 1b. Leaf blade glabrous, sometime with hairy domatia in axils of lateral veins.
  - 3a. Petiole puberulent; corolla lobes 1-toothed near base; fruit ovoid ..... 3. *U. micrantha*
  - 3b. Petiole glabrous; corolla lobes entire; fruit sublinear or oblong, if ovoid then long beaked.
    - 4a. Leaf blade papillate abaxially, petiole 3–5 mm ..... 4. *U. quintaretii*
    - 4b. Leaf blade not papillate abaxially, petiole 6–25 mm.
      - 5a. Leaf blade narrowly oblong, 11–18 cm; fruit ca. 2 cm in diam. .... 5. *U. tournieri*
      - 5b. Leaf blade broadly elliptic, elliptic, or narrowly ovate, 3–10 cm; fruit 0.4–1 cm in diam.
        - 6a. Inflorescences glabrous ..... 8. *U. linearicarpa*
        - 6b. Inflorescences pubescent or puberulent.
          - 7a. Sepals ca. 4 mm; corolla lobes ± symmetrical, slightly longer than tube; follicles to 15 cm, terete, not stipitate ..... 6. *U. rosea*
          - 7b. Sepals ca. 0.8 mm; corolla lobes strongly asymmetrical, ca. 2 × longer than tube; follicles 5–7 cm, strongly stipitate ..... 7. *U. napeensis*

**1. *Urceola xylinabariopsoides*** (Tsiang) D. J. Middleton, Novon 4: 151. 1994.

乐东藤 le dong teng

*Chunechites xylinabariopsoides* Tsiang, Sunyatsenia 3: 306. 1937; *Ecdysanthera xylinabariopsoides* (Tsiang) P. T. Li; *Xylinabariopsis ventii* Lý; *X. xylinabariopsoides* (Tsiang) Lý.

Liana to 1.5 m, densely pubescent. Bark dark brown. Petiole 2–3 mm; leaf blade narrowly elliptic, 3–6 × ca. 1.7 cm, somewhat leathery, base broadly cuneate, apex short acuminate, glabrous adaxially except along veins, pubescent abaxially, denser along veins; lateral veins 5–7 pairs. Cymes paniculate, axillary and terminal, 3-branched, 5–8 cm. Sepals narrowly elliptic, ca. 1 mm, acute. Corolla reddish yellow, tube

ca. 1 mm; lobes sublinear, unequally falcate, 1.5–2 mm, 1-toothed at middle of margin, apex rounded or obtuse. Disc ringlike, obscurely 5-lobed. Ovary apex pilose. Follicles sublinear, 5–7 cm × ca. 5 mm, puberulent to glabrous. Seeds narrowly oblong, ca. 1 cm, pubescent, coma ca. 3 cm. Fl. Jun–Sep, fr. Sep–Dec.

Open montane forests. Hainan [Vietnam].

**2. *Urceola huaitingii*** (Chun & Tsiang) D. J. Middleton, Novon 4: 151. 1994.

毛杜仲藤 mao du zhong teng

*Parabarium huaitingii* Chun & Tsiang, J. Arnold Arbor. 28: 245. 1947.

Lianas to 15 m, minutely tomentose or densely pubescent. Petiole ca. 5 mm; leaf blade ovate or elliptic, 2.5–7.5 × 1.5–3.5

cm, papery; lateral veins ca. 10 pairs. Cymes corymbose, axillary or terminal, 4–6 cm; bracts leaflike, 1–3 × 0.5–1 mm. Sepals narrowly oblong, ca. 2 mm. Corolla yellow, tube ca. 2 mm; lobes obliquely oblong, falcate, longer than or as long as tube, entire. Disc 5-partite. Ovary pilose; ovules ca. 10 in each carpel. Follicles narrowly ovoid, 6–7 × 1.5–2 cm, dilated at base. Seeds very narrowly oblong, 1–1.5 cm × 2–3 mm, coma ca. 3 cm. Fl. Apr-Jun, fr. Jun-Dec.

• Open forests, moist valleys; 200–1000 m. Guangdong, Guangxi, Guizhou, Hainan.

The bark and roots are used to treat rheumatism and injury. The leaves are used externally to stop bleeding.

**3. *Urceola micrantha*** (Wallich ex G. Don) D. J. Middleton, *Novon* 4: 151. 1994.

杜仲藤 du zhong teng

*Echites micrantha* Wallich ex G. Don, *Gen. Hist.* 4: 75. 1837; *Ecdysanthera brachiata* A. de Candolle; *E. micrantha* (Wallich ex G. Don) A. de Candolle; *E. multiflora* King & Gamble; *E. utilis* Hayata & Kawakami; *Parabarium micranthum* (Wallich ex G. Don) Pierre; *P. multiflorum* (King & Gamble) Lý; *P. spireanum* Pierre; *P. utile* (Hayata & Kawakami) Lý; *P. utile* var. *kerrii* Lý.

Lianas to 50 m. Stems 10–30 cm in diam.; branches often lenticellate. Petiole puberulent, 1.5–3 cm; leaf blade elliptic or narrowly ovate, 5–15 × 1.5–6 cm, base obtuse, apex narrowly acuminate, glabrous; lateral veins 3–7 pairs. Cymes paniculate, compact, to 9 cm; peduncle pubescent. Sepals ovate, ca. 0.8–1 mm, apex subacute. Corolla pink, lobes oblong, as long as to longer than tube, to 2 mm, 1-toothed near base. Filaments ca. 0.5 mm; disc ringlike. Ovary pilose. Pistil head conical. Follicles narrowly ovoid, 9–23 × (0.4–)1–1.2 cm, base dilated. Seeds oblong, 2–4 cm, coma ca. 4 cm. Fl. Mar-Jun, fr. Jun-Dec.

Mixed forests, brushwoods; 300–1000 m. Fujian, Guangdong, Guangxi, Hainan, Sichuan, Taiwan, Xizang, Yunnan [India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Nepal, Thailand, Vietnam].

The bark and roots are used for the treatment of infantile paralysis, rheumatism, injury, and fractures.

**4. *Urceola quintaretii*** (Pierre) D. J. Middleton, *Novon* 4: 151. 1994.

华南杜仲藤 hua nan du zhong teng

*Ecdysanthera quintaretii* Pierre, *Rev. Cultures Col.* 11: 228. 1902; *E. micrantha* Quintaret, not (Wallich ex G. Don) A. de Candolle; *E. parameroides* Tsiang; *Parabarium chunianum* Tsiang; *P. hainanense* Tsiang; *P. handelianum* Tsiang; *P. quintaretii* (Pierre) Pierre.

Lianas to 10 m, glabrous except for inflorescences. Branches dark brown when young, dark gray when older. Petiole ca. 5 mm; leaf blade glaucous at first, deep lustrous green adaxially, pale green and with scattered black papillae abaxially, elliptic, narrowly elliptic, ovate, or obovate, 4.5–11 × 1.6–3 cm, apex short acuminate; lateral veins 5–7 pairs. Cymes paniculate, compact, terminal and axillary, 2- or

3-branched, as long as or longer than leaves. Sepals narrowly ovate, ca. 2 mm, pilose, apex obtuse. Corolla pilose, tube ca. 1 mm, lobes ca. 1 mm. Disc short, fleshy, ringlike or obscurely 5-lobed. Ovary pilose. Follicles very narrowly oblong, 4.5–6 cm × 7–10 mm. Seeds oblong, 1.3–1.6 cm, tomentose, coma 1.5–2.5 cm. Fl. Jan-Jun, fr. Aug-Dec.

Dense montane forests; 300–500 m. Guangdong, Guangxi, Hainan [Laos, Vietnam].

**5. *Urceola tournieri*** (Pierre) D. J. Middleton, *Novon* 4: 151. 1994.

云南水壶藤 yun nan shui hu teng

*Ecdysanthera tournieri* Pierre, *Rev. Cultures Colon.* 11: 228. 1902; *Parabarium burmanicum* Lý; *P. tournieri* (Pierre) Pierre.

Lianas stout, to 20 m, glabrous except for branches and inflorescences. Bark brown, prominently lenticellate; branches puberulent. Petiole 6–8 mm; leaf blade oblong, narrowly so, 11–18 × 2.5–6 cm, apex cuspidate; lateral veins 7–9 pairs. Cymes corymbose, axillary, 8–16 cm, puberulent. Pedicel 2–2.5 mm, puberulent. Sepals ovate, 0.5–0.7 mm. Corolla white, 1.6–2.2 mm, tube 1–1.5 mm; lobes 0.5–0.7 mm, asymmetric. Ovary villous. Follicles narrowly ovoid, to 10 × 2 cm, stout, nearly woody, with many lenticels. Seeds oblong, ca. 1.5 cm × 3 mm, coma yellowish, ca. 3 cm. Fl. summer-autumn.

Forests; 800–1800 m. S Yunnan [Laos, Myanmar].

**6. *Urceola rosea*** (Hooker & Arnott) D. J. Middleton, *Novon* 4: 151. 1994.

酸叶胶藤 suan ye jiao teng

*Ecdysanthera rosea* Hooker & Arnott, *Bot. Beechey Voy.* 198. 1837; *Antirrhoea esquirolii* H. Léveillé.

Lianas to 20 m. Stem dark brown, lenticels absent; branches tawny gray, young ones brownish. Petiole 0.8–1.2 cm; leaf blade broadly elliptic, rarely subovate, 3–7 × 1–4 cm, apex acute, glabrous, ± lustrous adaxially, glaucous abaxially, lateral veins 4–6 pairs. Sepals ovate, ca. 3 mm, obtuse. Corolla pink, tube ca. 4 mm; lobes ± symmetrical, slightly longer than tube, acute. Disc ringlike, entire. Ovary pubescent. Follicles to 15 cm, terete, densely spotted. Seeds oblong, ca. 1 cm, coma ca. 3 cm. Fl. Apr-Dec, fr. Jun-Dec.  $2n = 20^*$ .

Ravines at low and middle altitudes, scattered in montane forests. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Sichuan, Taiwan, Yunnan [Indonesia, Thailand, Vietnam].

All parts are used to treat endosteum, injury, and rheumatism.

**7. *Urceola napeensis*** (Quintaret) D. J. Middleton, *Blumea* 39: 89. 1994.

华南水壶藤 hua nan shui hu teng

*Micrechites napeensis* Quintaret, *Compt. Rend. Hebd. Séances Acad. Sci.* 134: 438. 1902; *Ecdysanthera napeensis* (Quintaret) Pierre; *Parabarium napeense* (Quintaret) Pierre; *Xylinabaria reynaudii* Jumelle; *Xylinabariopsis napeensis*

(Quintaret) F. P. Metcalf; *X. reynaudii* (Jumelle) Pitard.

Lianas 5–20 m. Petiole 1–1.5 cm; leaf blade ovate, elliptic, or lanceolate, 5–9 cm, base rounded or obtuse, apex acuminate or obtuse; lateral veins 6–8 pairs. Inflorescences axillary, corymbose cymes 5–7 cm, pubescent; bracteoles linear. Pedicel 2–4 mm. Sepals ovate, ca. 0.8 mm, ciliate, obtuse. Corolla rose or white; lobes strongly asymmetrical, ca. 2 × longer than tube. Disc ringlike, with 5 rounded lobes. Follicles ovoid, long beaked, 5–7 cm × 6–7 mm, strongly stipitate. Seeds ca. 1.5 cm. Fl. Oct–May, fr. Dec–Aug.

Forests. Guangdong, Guangxi, Hainan [Laos, Thailand, Vietnam].

**8. *Urceola linearicarpa*** (Pierre) D. J. Middleton, Novon 4: 151. 1994.

线果水壶藤 *xian guo shui hu teng*

*Ecdysanthera linearicarpa* Pierre, Rev. Cultures Colon. 11: 228. 1902; *Parabarium linearicarpum* (Pierre) Pichon.

Lianas to 8 m, glabrous. Branches lenticellate. Petiole 6–10 mm; leaf blade green adaxially, greenish abaxially, elliptic or narrowly ovate, 6–8 × 3–3.5 cm, base broadly cuneate or nearly rounded, apex acute to caudate; lateral veins 5 or 6 pairs. Cymes axillary. Flowers small. Sepals ovate, ca. 0.5 × 0.5 mm, apex subacute. Corolla campanulate, yellowish, tube ca. 1.5 × 1.5 mm; lobes erect or incurved, ca. 1 × 0.7 mm. Disc ringlike, shorter than ovary. Ovary pilose. Pistil head ovoid. Follicles linear, 13–14 cm × 5–10 mm. Seeds brownish, oblong, ca. 1.5 cm, coma ca. 3 cm. Fl. Aug–Nov, fr. Oct–Dec.

Tropical rain forests, humid sparse woods; 500–1500 m. SE Xizang, S Yunnan [Laos].

### 39. PARAMERIA Bentham in Bentham & J. D. Hooker, Gen. Pl. 2: 715. 1876.

长节珠属 *chang jie zhu shu*

Lianas woody, latex white. Leaves opposite. Cymes broadly paniculate, terminal or axillary, pedunculate. Flowers small. Calyx deeply divided, with many nectar glands inside. Corolla salverform or subcampanulate, tube short; throat broad, not scaly; lobes overlapping to left, spreading or reflexed. Stamens inserted at base of corolla tube; filaments short; anthers included, sagittate, connivent, adherent at middle to pistil head, cells with an empty tail; disc scales 5. Ovaries 2, free, longer than disc; ovules numerous in each locule. Style short; pistil head conical, apex obscurely 2-cleft. Follicles moniliform, with widely separated swellings, pendulous, elongated. Seeds fusiform, coma apical, early deciduous; endosperm scanty; cotyledons oblong, radicle short.

About four species: SE Asia, one species in China.

**1. *Parameria laevigata*** (Jussieu) Moldenke, Revista Sudameric. Bot. 6: 76. 1940.

长节珠 *chang jie zhu*

*Aegiphila laevigata* Jussieu, Ann. Mus. Natl. Hist. Nat. 7: 76. 1806; *Parameria barbata* (Blume) K. Schumann; *Parsonsia barbata* Blume.

Lianas evergreen, to 10 m. Stems pale gray; branchlets shortly hairy when young, soon glabrescent. Petiole 2–4 cm; leaf blade narrowly oblong or subovate, rarely elliptic or ovate, 5–13 × 2–5 cm, glabrous; lateral veins 5 or 6 pairs, with domatia. Cymes 5–16 × 5–16 cm, puberulent distally. Sepals

broadly ovate, 0.5–1 mm, glabrous or pubescent, apex obtuse or acute. Corolla reddish to white, ca. 7 mm in diam., tube 2–2.5 mm; lobes broadly ovate or nearly orbicular, ca. 3 × 3 mm; disc shorter than ovary. Ovary pubescent. Follicles to 45 cm. Seeds ca. 1 cm, pubescent, coma ca. 3 cm. Fl. Jun–Oct, fr. Oct–Dec.

Montane forests, ravines; 800–1500 m. S Guangxi, S Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

All parts of plant are used to treat rheumatism, nephritis, and injury.

### 40. ICHNOCARPUS R. Brown, Mem. Wern. Nat. Hist. Soc. 1: 61. 1811, nom. cons.

腰骨藤属 *yao gu teng shu*

*Lamechites* Markgraf; *Micrechites* Miquel; *Otopetalum* Miquel; *Springia* Heurck & Müller Argoviensis.

Plants scramblers or woody lianas, with latex. Leaves opposite. Inflorescences cymose, terminal and/or axillary. Flowers small. Calyx with basal glands inside, lobes free. Corolla white, yellowish, or red, salverform; tube widened near base, throat hairy; lobes oblong, falcate, overlapping to right, in bud with inflexed distal halves. Stamens included, inserted at or below middle of corolla tube; filaments very short; anthers sagittate, adherent to pistil head, cells spurred at base; disc entire, 5-crenate or 5-dentate, or deeply divided into 5 erect segments. Ovaries adnate basally to disc, pubescent; ovules numerous. Pistil head ovoid or cup-shaped. Follicles 2, spreading or divaricate. Seeds numerous, linear, compressed, not or hardly beaked, comose; endosperm copious; cotyledons long, flat, radicle superior.

Twelve species: SE Asia, N Australia, Pacific Islands; four species in China.

1a. Disc lobes free and narrow, longer than ovary; anthers appearing elliptic ..... 1. *I. frutescens*

- 1b. Disc entire, 5-lobed or dentate, shorter than ovary or, rarely, of 5 wide separate lobes shorter than ovary; anthers narrow triangular.
- 2a. Ovary ± glabrous; corolla red; stems, underside of leaves, and inflorescences densely rufous tomentose ... 2. *I. jacquetii*
- 2b. Ovary densely pubescent; corolla white, cream, or yellow; indumentum variable.
- 3a. Lateral leaf veins ca. 25 pairs; corolla yellow, tube 7–8 mm ..... 3. *I. malipoensis*
- 3b. Lateral leaf veins 10–15 pairs; corolla white, tube ca. 3 mm ..... 4. *I. polyanthus*

**1. *Ichnocarpus frutescens*** (Linnaeus) W. T. Aiton, Hortus Kew. ed. 2, 2: 69. 1811.

腰骨藤 yao gu teng

*Apocynum frutescens* Linnaeus, Sp. Pl. 1: 213. 1753; *Echites frutescens* Wallich ex Roxburgh; *Gardenia volubilis* Loureiro; *Ichnocarpus ovatifolius* A. de Candolle; *I. volubilis* (Loureiro) Merrill; *Micrechites sinensis* Markgraf.

Lianas to 10 m. Branchlets pubescent when young, soon glabrous. Petiole 0.5–1.5 cm; leaf blade 5–11 × 2.5–4.5 cm, pubescent or glabrous abaxially; lateral veins 5–7 pairs. Inflorescences many flowered, 3–8 cm, most flowers in pedunculate heads. Calyx densely pubescent. Corolla tube ca. 2.5 mm; lobes narrowly oblong, ca. 5 mm. Anthers elliptic; disc lobes free, linear, longer than ovary. Ovaries pubescent. Follicles cylindric, 8–15 cm × 4–5 mm, slightly torulose, pubescent. Seeds linear, coma ca. 2.5 cm. Fl. May–Aug, fr. Aug–Dec.  $2n = 20$ .

Sparse woods, brushwoods; 200–900 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Australia].

A fine, strong fiber obtained from the inner bark is used in making ropes and sacks. The seeds are used for the treatment of rheumatism and the stem and leaves for acute urticaria.

**2. *Ichnocarpus jacquetii*** (Pierre) D. J. Middleton, Novon 4: 152. 1994.

少花腰骨藤 shao hua yao gu teng

*Micrechites jacquetii* Pierre in Spire, Contr. Apocyn. 48. 1905; *Ichnocarpus oliganthus* Tsiang.

Lianas to 20 m, rust colored tomentose. Petiole ca. 1 cm; leaf blade narrowly elliptic, 4–8 × 1.5–4 cm, thinly leathery; lateral veins 5–9 pairs. Cymes 2-forked, ca. 2 cm, 3–9-flowered, lower part bracteate; bracts many, ovate, ca. 2 mm, persistent. Calyx glands 20. Corolla red, ca. 4 × 6.5 mm, villous inside at throat and facing stamens; tube ca. 3 mm, dilated at middle; lobes long falcate, ca. 3 × 1.2 mm. Stamens inserted near base of corolla tube; anthers triangular; disc 5-lobed, slightly united at base, shorter than ovary. Ovary glabrous. Follicles linear-cylindric, 12–18 cm × ca. 5 mm, densely brown tomentose. Seeds dark brown, linear, 1–2 cm × ca. 1 mm, coma creamy white, to 3 cm. Fl. Aug, fr. Aug–Oct.

Montane sparse woods, brushwoods; 300–500 m. S Guangdong, Guangxi, Hainan [Laos, Vietnam]. The bark is used to treat rheumatism.

**3. *Ichnocarpus malipoensis*** (Tsiang & P. T. Li) D. J. Middleton, Novon 4: 152. 1994.

麻栗坡少花藤 ma li po xiao hua teng

*Micrechites malipoensis* Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 381. 1973.

Lianas to 6 m. Branches and branchlets pubescent. Petiole stout, densely pubescent; leaf blade narrowly elliptic, 8–32 × 2.5–8.5 cm, base cuneate, apex caudate-acuminate, pubescent abaxially; lateral veins ca. 25 pairs. Cymes axillary, paniculate, to 5 cm, densely rust colored pubescent; peduncle to 4.5 cm. Corolla yellow, hirsute inside, tube 7–8 mm; lobes oblong, falcate, as long as tube, glabrous, margin 1-toothed at base. Stamens inserted near base of corolla tube; anthers triangular; disc ringlike, shorter than ovary, apex 5-cleft. Ovary densely hirsute. Fl. May–Nov.

- Dense montane forests; 1000–1200 m. SE Yunnan.

**4. *Ichnocarpus polyanthus*** (Blume) P. I. Forster, Austral. Syst. Bot. 5: 544. 1992.

小花藤 xiao hua teng

*Tabernaemontana polyantha* Blume, Bijdr. 1029. 1826; *Ichnocarpus baillonii* (Pierre) L'Y; *I. himalaicus* T. Yamazaki; *I. pubiflorus* J. D. Hooker; *Micrechites baillonii* Pierre; *M. elliptica* J. D. Hooker; *M. elliptica* var. *scortechinii* King & Gamble; *M. ferruginea* Pitard; *M. lachnocarpa* Tsiang; *M. malipoensis* Tsiang & P. T. Li var. *parvifolia* Tsiang & P. T. Li; *M. polyantha* (Blume) Miquel; *M. radicans* Markgraf; *M. rehderiana* Tsiang; *M. scortechinii* (King & Gamble) Ridley.

Lianas to 30 m, glabrous except for inflorescences. Petiole 1–2 cm; leaf blade narrowly ovate or narrowly elliptic, 6–13 × 2.5–5 cm, base broadly cuneate, apex short acuminate; lateral veins 10–15 pairs. Cymes paniculate, terminal and axillary; peduncle to 9 cm, pubescent. Pedicels 2–4 mm long. Sepals ovate, ca. 2.5 mm, pubescent outside. Corolla white; tube ca. 3 mm, pubescent inside; lobes narrowly oblong, ca. 2 mm. Stamens inserted near base of corolla tube; disc ringlike, apex shortly 5-cleft, shorter than ovary. Ovary densely pubescent. Follicles linear, 25–40 cm × ca. 5 mm, glabrous. Fl. Apr–Jun, fr. Sep–Dec.

Dense moist forests, often along valleys; montane brushwoods; 200–1800 m. Guangdong, Guangxi, Hainan, Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

#### 41. EPIGYNUM Wight, Icon. Pl. Ind. Orient. 4(2): 4. 1848.

思茅藤属 si mao teng shu

Lianas woody, latex white. Leaves opposite. Cymes terminal, corymbose or paniculate. Calyx deeply divided, basal glands inside present or absent. Corolla salverform; tube cylindrical, ca. 5 × as long as sepals, inflated at base; throat villous, not scaly; lobes overlapping to right. Stamens inserted below middle of corolla tube; filaments short; anthers sagittate, included, adherent at middle to pistil head, cells with an empty tail; disc deeply 5-lobed, longer than ovary. Carpels 2, distinct. Ovaries half-inferior or nearly inferior; ovules numerous in each carpel. Style filiform; pistil head long conical. Follicles 2, terete, free. Seeds oblong or narrowly so, flat, comose.

About 14 species: SE Asia, one species in China.

**1. Epigynum auritum** (C. K. Schneider) Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 397. 1973.

思茅藤 si mao teng

*Trachelospermum auritum* C. K. Schneider in Sargent, Pl. Wilson. 3: 341. 1916; *Epigynum lachnocarpum* Pichon.

Liana to 8 m. Branchlets slightly reddish brown, densely minutely hirsute-villous when young. Petiole 5–10 mm; leaf blade broadly elliptic or slightly obovate, 8–15 × 4.5–11.5 cm,

base acuminate-cordate, villous on both surfaces; lateral veins ca. 10. Cymes as long as or longer than leaves, densely tawny pubescent; peduncle up to 8 cm. Pedicel ca. 1 cm. Corolla white, tube 1.5–1.7 cm; lobes obliquely obovate or narrowly spatulate, 1.2–1.3 cm. Disc 5-lobed. Ovaries pubescent at apex. Follicles 2, oblong, to 16 × 1–1.5 cm, densely tawny, apex distinctly recurved. Seeds oblong, to 2 cm, coma to 3.5 cm. Fl. Apr-Jul, fr. Aug-Dec.

Dense montane forests, clinging to trees. S Yunnan [Malaysia, Thailand].

## 42. PAREPIGYNUM Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 394. 1973.

富宁藤属 fu ning teng shu

Lianas woody, large, latex white. Leaves opposite. Cymes corymbose, terminal and axillary, long pedunculate. Calyx glandular between sepals. Corolla salverform; tube terete, constricted below middle, with densely antrorse setae; lobes narrowly elliptic, overlapping to left. Stamens inserted near base of corolla tube; filaments short; anthers sagittate, included, adherent at middle to pistil head, cells spurred at base; disc fleshy, 5-partite, lobes nearly 4-angled, as long as ovary. Carpels 2, connate. Ovaries semi-inferior or nearly inferior; ovules numerous in each carpel. Style cylindrical, dilated at apex; pistil head conical. Follicles 2, narrowly fusiform, connate, parted distally when mature. Seeds narrowly elliptic, short beaked, coma silky.

One species: endemic to China.

**1. Parepigynum funingense** Tsiang & P. T. Li, Acta Phytotax. Sin. 11: 395. 1973.

富宁藤 fu ning teng

Lianas to 10 m, juvenile parts and inflorescences pubescent. Petiole 1.5–2 cm; leaf blade narrowly elliptic to oblong; 8–15 × 2.5–4.5 mm; lateral veins 10–13 pairs.

Inflorescences 6–13-flowered. Sepals narrowly elliptic, ca. 7 × 2 mm, pubescent on both sides. Corolla yellow, tube ca. 1.2 cm; lobes ca. 11 × 8 mm. Ovary hirsute at apex. Style ca. 3.5 mm. Follicles very narrowly fusiform, 14–18 × ca. 1.5 cm, stipe 2–3 cm. Seeds dark brown, narrowly ellipsoid, 2–3 cm × 2–6 mm; coma white, silky, ca. 2 cm. Fl. Apr-Sep, fr. Aug-Dec.

• Dense montane forests; 1000–1800 m. Guizhou, SW Yunnan.

## 43. CLEGHORNIA Wight, Icon. Pl. Ind. Orient. 4(2): 5. 1848.

金平藤属 jin ping teng shu

Lianas woody, with milky latex. Leaves opposite, lateral veins parallel. Inflorescences paniculate-corymbose, axillary or terminal, few to many flowered. Flowers small. Calyx glands present. Corolla yellow or white, salverform, tube cylindrical; lobes spreading, as long as or shorter than tube, overlapping to right. Stamens included, inserted at base of corolla tube; filaments very short; anthers sagittate, adnate to pistil head, connective narrowly oblong, densely pilose at apex; disc large, fleshy, obscurely 5-lobed, as long as or shorter than ovary. Ovaries 2, distinct; ovules numerous. Style short; pistil head club-shaped, apex 2-cleft. Follicles 2, slender. Seeds numerous, apically comose.

Four species: Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam; one species in China.

**1. Cleghornia malaccensis** (J. D. Hooker) King & Gamble in Ridley, Mat. Fl. Malay. Penins. 491. 1907.

金平藤 jin ping teng

*Baissea malaccensis* J. D. Hooker, Fl. Brit. India 3: 663. 1882; *Giadotrum malaccense* (J. D. Hooker) Pichon.

Lianas to 35 m, glabrous throughout except for corolla throat. Stems to 5 cm in diam., dark brown; branchlets pale

brown. Petiole 0.7–2 cm; leaf blade elliptic, oblong, or subobovate, rarely narrowly ovate, 7–16 × 2–6.5 cm, base cuneate or rounded, apex caudate-acuminate; lateral veins 10–14 pairs, at ca. 90° to midvein. Cymes 4–7 cm, usually 3-branched. Corolla yellow or yellowish; tube short cylindrical, 1.6–2.5 mm, throat pubescent; lobes oblong, 1–3.2 × 0.1–1 mm. Stamens inserted near base or below middle of corolla tube; filaments minutely pubescent adaxially; anthers sagittate, ca.

2.5 mm; disc shorter than ovary. Follicles 2, linear, 7–22 × (0.5–)1–1.5 cm. Seeds narrowly fusiform, 2–3 cm, coma to 4 cm. Fl. Apr–Jul, fr. Jul–Oct.

Montane forests, brushes along river banks or streamsides; 500–1600 m. Guizhou, S Yunnan [Laos, Malaysia, Thailand,

Vietnam].

The species was treated in FRPS as *Bai-sea acuminata* (Wight) Bentham ex J. D. Hooker (*C. acuminata* Wight), which is a very different species not found in China.

#### 44. SINDECHITES Oliver, Hooker's Icon. Pl. 18: t. 1772. 1888.

毛药藤属 mao yao teng shu

Lianas woody, with milky latex. Leaves opposite, veins parallel or nearly so. Cymes paniculate or corymbose, terminal and axillary, few to many flowered. Flowers small. Calyx glandular inside. Corolla white, salverform, dilated at throat or middle of tube; lobes shorter than tube, overlapping to right. Stamens inserted above middle of corolla tube, included; filaments short; anthers sagittate, connivent, adherent to pistil head, connective usually pilose at apex, cells spurred at base; disc large, fleshy, entire or 5-lobed, shorter than or as long as ovary. Ovaries 2, distinct, usually dense pubescent on distal part; ovules numerous. Style long; pistil head club-shaped, apex 2-cleft. Follicles 2, narrowly cylindrical, slightly torulose, slender. Seeds comose apically.

Two species: Laos, Thailand; both in China.

- 1a. Lateral leaf veins 15–25 pairs; stamens inserted near corolla throat; corolla tube 5–8 mm; ovary densely pubescent; disc shorter than ovary ..... 1. *S. henryi*  
1b. Lateral leaf veins 4–6 pairs; stamens inserted at middle of corolla tube; corolla tube 9–15 mm; ovary glabrous; disc as long as ovary ..... 2. *S. chinensis*

**1. *Sindechites henryi*** Oliver, Hooker's Icon. Pl. 18: t. 1772. 1888.

毛药藤 mao yao teng

*Antirhea martinii* H. Léveillé; *Cleghornia henryi* (Oliver) P. T. Li; *Parameria esquirolii* H. Léveillé; *Sindechites esquirolii* (H. Léveillé) Woodson; *S. henryi* var. *parvifolia* Tsiang.

Lianas to 8 m, glabrous except for flowers. Petiole 4–10 mm; leaf blade narrowly oblong or narrowly ovate, 5.5–12.5 × 1.5–3.7 cm, membranous, base cuneate or rounded, apex long acuminate; lateral veins 15–25 pairs, subparallel, anastomosing near blade margin. Cymes 3–7 cm, di- or trichasial. Mature flower buds 7.5–9 mm, apex conical. Corolla white; tube 5–8 mm, throat dilated, pubescent inside; lobes ovate or broadly ovate. Stamens inserted near corolla throat; disc shorter than ovary. Ovary densely pubescent. Style long. Follicles 3–14 cm × 2–3 mm. Seeds narrowly oblong, ca. 1.3 cm, coma ca. 2.5 cm. Fl. May–Jul, fr. Jul–Oct.

• Forests, bushes, mountains, roadsides, near streams; 500–1500 m. Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

**2. *Sindechites chinensis*** (Merrill) Markgraf & Tsiang in Tsiang, Sunyatsenia 3: 152. 1936.

坭藤 ni teng

*Epigynum chinense* Merrill, Philipp. J. Sci. 23: 262. 1923; *Cleghornia chinensis* (Merrill) P. T. Li.

Lianas to 6 m. Branches brown or pale brown. Petiole 2–4 mm; leaf blade ovate or narrowly ovate, 4–9 × 2–4.5 cm, membranous, base rounded, apex acute or obtuse; lateral veins 4–6 pairs, minutely pubescent along veins abaxially when young, otherwise glabrous on both surfaces. Cymes 4–5 cm. Mature flower buds 1.2–1.7 cm, apex globose. Corolla white, tube 0.9–1.5 cm, slightly dilated at middle, densely pubescent at throat, sparsely so proximally; lobes broadly ovate, minutely pubescent outside. Stamens inserted at middle of corolla tube; disc as long as ovary. Ovary glabrous. Style long. Follicles 7–16 cm × 3–5 mm. Seeds dark brown, very narrowly oblong, flat, 1–1.5 cm; coma 2.5–3 cm. Fl. Mar–Jul, fr. Jun–Dec.

Dense montane forests, brushes along river banks; 100–700 m. Hainan [Laos, Thailand].