

## LOGANIACEAE

马钱科 ma qian ke

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

Trees, shrubs, woody climbers, or herbs, sometimes epiphytes, sometimes with axillary spines or tendrils. Leaves opposite, occasionally alternate, rarely verticillate, fascicled, or whorled; stipules usually present, often reduced to lines connecting petiole bases, sometimes reduced to petiolar ocrea or a connate leaf-sheath; leaf blade usually entire, pinnately veined or 3–7-veined from base. Flowers in cymes often grouped into thyrses; cymes sometimes umbel-like, scorpioid, or reduced to a single flower; bracts usually small. Flowers usually bisexual. Calyx 4- or 5-lobed; lobes free or connate, mostly persistent, imbricate or valvate. Corolla sympetalous; lobes 4 or 5(–16), valvate, imbricate, or contorted in bud. Stamens inserted on corolla, included to exerted, equal in number to corolla lobes and alternating with them or sometimes fewer; filaments free, much shorter to much longer than anthers; anthers basifixed, 2–4-locular, dehiscent introrsely or extrorsely by longitudinal slits, base slightly to deeply parted. Disc ring-shaped or not. Ovary superior or rarely semi-inferior, (1 or)2(–4)-locular, placentation axile or parietal; ovules 1 to many per locule. Style simple, terminal, persistent or deciduous; stigma usually capitate, entire or shortly 2–4-cleft. Fruit a capsule, berry, or drupe, 1- to many seeded. Seeds sometimes winged; endosperm fleshy or horny; embryo minute, straight; cotyledons small.

Some 29 genera and about 500 species: mainly in tropical and subtropical regions of the world, absent from Europe; eight genera and 45 species (ten endemic) in China.

Li Ping-tao *in* Chang Mei-chen & Qiu Lian-qing, eds. 1992. Loganiaceae. Fl. Reipubl. Popularis Sin. 61: 223–309.

- 1a. Herbaceous, annual or perennial.
  - 2a. Flowers 5-merous; internodes of inflorescences shorter than flowers, sometimes elongating after anthesis and then slightly longer than fruits ..... 1. *Mitreola*
  - 2b. Flowers 4-merous; internodes of inflorescences much longer than flowers or inflorescences 1-flowered ..... 2. *Mitrasacme*
- 1b. Woody, shrubs, trees, or climbers.
  - 3a. Leaf blade with 1–3 pairs of distinct longitudinal secondary veins from or near base and curved along margin; if lianas then with axillary, simple, or double curled tendrils, sometimes with axillary thorns ..... 4. *Strychnos*
  - 3b. Leaf blade without 1–3 pairs of distinct longitudinal secondary veins from or near base; tendrils and thorns absent.
    - 4a. Flowers 5.5–6.5 cm; leaf blade fleshy to leathery, veins often inconspicuous ..... 8. *Fagraea*
    - 4b. Flowers less than 3 cm; leaf blade papery or leathery, veins mostly conspicuous.
      - 5a. Aestivation valvate; corolla rotate; fruit baccate ..... 5. *Gardneria*
      - 5b. Aestivation imbricate; corolla funnelform or salverform; fruit capsular (*Buddleja madagascariensis* is baccate).
        - 6a. Sepals connate; flowers 4-merous; leaf blade margin often serrate ..... 7. *Buddleja*
        - 6b. Sepals free or nearly so; flowers 5-merous; leaf blade margin entire.
          - 7a. Inflorescences axillary; corolla 2–5 mm ..... 3. *Geniostoma*
          - 7b. Inflorescences terminal; corolla 12–19 mm ..... 6. *Gelsemium*

### 1. MITREOLA Linnaeus, Opera Varia 214. 1758.

度量草属 du liang cao shu

*Cynoctonum* J. F. Gmelin.

Herbs, annual or perennial, erect to creeping, branched or not. Branches terete to 4-angled. Leaves opposite, sessile or petiolate; interpetiolar stipules well developed to reduced to a transverse ridge. Inflorescences terminal and/or axillary, usually long pedunculate, 2- or more branched, branches scorpioid; bracts small, sepal-like. Flowers sessile or short pedicellate, 5-merous. Calyx usually parted almost to base, lobes membranous at margin. Corolla urceolate to campanulate, tube as long as to longer than lobes, lobes imbricate in bud. Stamens inserted at base to middle of corolla tube, included; filaments ± as long as anthers to shorter; anthers usually ovate, introrse, 2-locular. Ovary semi-inferior, 2-locular, with many ovules per locule. Styles cleft at base; stigma capitate or 2-cleft. Capsule 2-horned or 2-lobed, with both carpels dehiscent along ventral suture; horns or lobes erect, divergent, or

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curved inward, terminating by style halves; many seeded. Seeds small, ± subglobose to ellipsoid; seed coat smooth, reticulate, or verrucose; endosperm fleshy; embryo linear.

Seven species: Africa, America, Asia, Pacific Islands; four species in China.

- 1a. Stems terete; internodes villous; interpetiolar stipules reduced to a transverse ridge ..... 1. *M. petiolatoides*  
1b. Stems 4-angled or nearly so when young; internodes glabrous; interpetiolar stipules triangular, ligulate or ocreate.  
2a. Annuals; stem erect; corolla tube ± as long as lobes; stamens inserted at base or nearly at base of corolla tube; capsule horns usually curved inward ..... 2. *M. petiolata*  
2b. Perennials; stem creeping; corolla tube longer than lobes; stamens inserted at middle to nearly at corolla mouth; capsule horns or lobes erect.  
3a. Leaf blade and petiole glabrous; stipules with glandular hairs at margin; peduncles 1–2.5 cm ..... 3. *M. reticulata*  
3b. Leaf blade and petiole abaxially pubescent when young; stipules glabrous at margin; peduncles 3–7 cm ..... 4. *M. pedicellata*

**1. *Mitreola petiolatoides*** P. T. Li, Acta Phytotax. Sin. 17(3): 116. 1979.

小叶度量草 xiao ye du liang cao

Annuals 5–10 cm tall, villous on stems, petioles, leaf blades, and corolla lobes inside at base. Stems terete; internodes 1–3 mm. Interpetiolar stipules reduced to a transverse ridge. Petiole 3–5 mm; leaf blade ovate, 0.5–2 cm × 3–10 mm, base rounded to obtuse, apex obtuse; lateral veins 4–6 per side. Inflorescences terminal, dichasial cymes, ca. 2 cm; peduncle to 1.5 cm, delicate; bracts and bracteoles lanceolate, 1–1.5 mm. Pedicel 2–3 mm. Calyx campanulate, lower 1/2 to 2/3 connate; lobes very narrowly ovate, ca. 1.5 × 1 mm. Corolla campanulate, ca. 3 mm, tube ca. 1.5 mm; lobes narrowly ovate, ca. 1.5 × 1 mm. Stamens inserted nearly at base of corolla tube; filaments ca. 0.5 mm; anthers ovate, apex adnate just below corolla mouth. Style ca. 0.5 mm, as long as ovary, free at base; stigma capitate. Fl. Apr.

\* Open grassy area on limestone; ca. 1600 m. S Yunnan.

**2. *Mitreola petiolata*** (J. F. Gmelin) Torrey & A. Gray, Fl. N. Amer. 2: 45. 1841.

度量草 du liang cao

*Cynoctonum petiolatum* J. F. Gmelin, Syst. Nat. ed. 13, 443. 1790; *C. mitreola* (Linnaeus) Britton; *C. oldenlandioides* (Wallich ex A. de Candolle) B. L. Robinson; *C. paniculatum* (Wallich ex G. Don) B. L. Robinson; *Mitreola inconspicua* Zollinger & Moritz; *M. oldenlandioides* Wallich ex A. de Candolle; *M. paniculata* Wallich ex G. Don; *Ophiorrhiza mitreola* Linnaeus; *Selenocera secundiflora* Zippellius ex Spanoghe.

Annuals 10–50 cm tall, glabrous except for sparsely appressed pubescent or puberulent young leaves, inside of corolla lobes at base, and fruit. Stems erect, simple or branched at base; branches 4-angled to narrowly 4-winged; internodes 1.5–6 cm. Interpetiolar stipules ± triangular, 1–2 mm. Petiole 3–10 mm; leaf blade ovate to narrowly ovate, 4–7 × 1.5–3 cm, membranous to papery, base cuneate, apex acuminate to obtuse; lateral veins 5–7 per side, inconspicuous. Inflorescences terminal or axillary, 6–10 cm, many flowered; peduncle to 7 cm; bracts and bracteoles narrowly elliptic, 1–2 mm. Pedicel very short. Calyx lobes ovate to triangular, ca. 1 × 0.5 mm.

Corolla white, ca. 3 mm, tube ± as long as lobes; lobes narrowly ovate, apex obtuse. Stamens inserted at or near base of corolla tube; anthers broadly ovate, apex at ± middle of corolla tube. Ovary ovoid to subglobose, smooth. Style shorter than ovary, free to base; stigma capitate. Capsule ca. 3 mm in diam., pincerlike due to incurved apical horns. Seeds ellipsoid, ca. 0.5 mm, concave on 1 side, smooth. Fl. May–Oct.

Sunny areas on limestone, open woodlands, forest edges, edge of trails, grassy plains, valleys; below 900 m. Guangxi, Guizhou, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, New Guinea, Philippines, Thailand, Vietnam; S Africa, N Australia, North America, South America].

**3. *Mitreola reticulata*** Tirel, Adansonia ser. 2, 9: 119. 1969.

网子度量草 wang zi du liang cao

Perennials 30–50 cm tall. Stems creeping, branched at base. Branchlet 4-angled; flowering branch erect, glabrous. Interpetiolar stipules liguliform, ca. 1 mm, with glandular hairs at margin. Petiole 3–12 mm; leaf blade narrowly ovate, 4–9 × 1.5–3 cm, base broadly cuneate, apex acuminate; lateral veins 6–10 per side. Inflorescences terminal, helicoid cyme, 2- or 3-branched; peduncle 1–2.5 cm. Calyx 1.5 mm; lobes triangular. Corolla urceolate, 2–2.5 mm; tube 0.7–1.6 mm, mouth densely villous; lobes ovate to triangular, 0.4–0.8 mm, inside villous. Stamens inserted at middle of corolla tube; filaments short; anthers broadly ovate, ca. 0.5 mm. Ovary globose. Style very short or not; stigma sessile or subsessile, 2-cleft. Capsule with carpels ovate-triangular, connate for 1/3 to 1/2 length. Fl. May–Jun.

Open grassy places on limestone. SW Guangxi [Vietnam].

**4. *Mitreola pedicellata*** Bentham, J. Linn. Soc., Bot. 1: 91. 1857.

大叶度量草 da ye du liang cao

*Cynoctonum pedicellatum* (Bentham) B. L. Robinson; *Mitreola bodinieri* (H. Léveillé) H. Léveillé; *M. darrisii* (H. Léveillé) H. Léveillé; *Omphalodes bodinieri* H. Léveillé; *Ophiorrhiza darrisii* H. Léveillé; *O. marchandii* H. Léveillé; *Parophiorrhiza khasiana* C. B. Clarke ex Bentham; *Trigonotis bodinieri* (H. Léveillé) H. Léveillé.

Perennials to 60 cm tall but usually less, glabrous except sometimes for abaxial surface of young leaves, petioles, and mouth of corollas. Stems creeping. Branchlets 4-angled when young, becoming terete. Interpetiolar stipules reduced to a narrow rim, often with a few small slender lobes on each side. Petiole 1–2 cm; leaf blade lanceolate to oblanceolate, sometimes slightly oblong, 5–15 × 2–5 cm, membranous to papery, base cuneate, apex acuminate to obtuse; lateral veins 8–10 per side. Cymes terminal or axillary, 3-branched, many flowered; peduncle 3–7 cm; bracts and bracteoles narrowly elliptic, ca. 1

mm. Pedicel 1–3 mm. Calyx lobes narrowly ovate, ca. 1 × 0.5 mm. Corolla white, urceolate, tube ca. 1.5 mm; lobes ovate, ca. 0.5 mm. Stamens inserted near corolla mouth. Ovary subglobose, smooth. Styles ca. 0.5 mm, free to base; stigma capitate. Capsule subglobose, 2–2.5 mm in diam., apex horned, straight and divergent. Seeds brownish, glabrous, tuberculate. Fl. Mar–May.

Open woodlands in mountains; 400–2100 m. Guangdong, Guangxi, Guizhou, Hubei, Sichuan, Yunnan [Bhutan, India].

## 2. MITRASACME Labillardière, Nov. Holl. Pl. 1: 35. 1804.

尖帽花属 jian mao hua shu

Herbs annual or perennial. Leaves opposite along stem and/or in a whorl at base, sessile; stipules absent. Flowers axillary and/or terminal, solitary or in pedunculate umbel-like cymes which sometimes form irregular compound umbels, 4-merous, white or yellow, rarely pale blue. Calyx campanulate, 2–4-lobed; lobes valvate. Corolla campanulate [salverform or urceolate], often bearded at mouth, tube short to long; lobes exduplicate-valvate in bud. Stamens inserted on lower half of corolla tube; filaments much longer than anthers; anthers introrse, extrorse, or rarely latrorse, included to slightly exerted, 2-locular. Pistil glabrous. Ovary superior to slightly inferior; ovules many per locule. Style one, base usually parted, rarely 2 separate styles; stigma capitate or 2-cleft. Capsule globose to subglobose, opening by apical loculicidal slits, many seeded; horns 2, terminated by a style. Style split or remain partly connate. Seeds minute, cylindrical-ellipsoid to angular; seed coat thin reticulate to verrucose or almost very minutely papillate; endosperm fleshy.

About 40 species: mainly Australia, extending to E, S, and SE Asia and Pacific Islands; two species in China.

- 1a. Stems glabrous or very sparsely hairy, 4-ribbed to narrowly 4-winged; flowers always axillary, solitary, rarely 2 together in a sessile cluster; seed coat honey-comblike ..... 1. *M. indica*  
1b. Stems hairy at least near base, terete; flowers mostly terminal, usually in long pedunculate umbel-like cymes; seed coat finely reticulate to papillate ..... 2. *M. pygmaea*

1. *Mitrasacme indica* Wight, Icon. Pl. Ind. Orient. 4: 15. 1850.

尖帽花 jian mao hua

*Mitrasacme alsinoides* R. Brown var. *indica* (Wight) H. Hara.

Annuals, erect, to 15 cm tall. Stems usually branched, slender, distinctly 4-ribbed to narrowly 4-winged, glabrous or subglabrous; internodes 2–4 × as long as leaves. Leaf blade ovate to very narrowly ovate, 3–7 × 1.5–2.5 mm, herbaceous, glabrous or glabrescent, apex acute; midrib abaxially prominent, lateral veins inconspicuous on both surfaces. Flowers solitary in upper leaf axils. Pedicel filamentous, 3–8 mm, glabrous or scabrous. Calyx to 2 mm, glabrous, basally connate to ± half its length, lobes narrowly oblong. Corolla white, campanulate, 3–4 mm, shortly and sparsely bearded at mouth; lobes subrounded, ca. 1.5 mm. Stamens included; filaments ca. 1 mm; anthers introrse, ovate to rarely sagittate, ca. 0.7 mm, with an apical appendix. Pistil ca. 1.5 mm. Ovary ovoid, ca. 0.5 mm in diam. Style ca. 1 mm, base strongly parted, connate along apical half; stigma broadly truncate to 2-cleft. Fruiting pedicel 0.6–2.5 cm. Capsule subglobose, to 2 mm in diam.; style connate only at apex. Seeds angular, ovoid, coarsely reticulate. Fl. Feb–Jun.

Grassy open places; near sea level to 500 m. Fujian, Guangdong, Hainan, Jiangsu, Shandong, Taiwan [India, Indonesia, Japan, Korea,

Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; Australia].

2. *Mitrasacme pygmaea* R. Brown, Prodr. 453. 1810.

水田白 shui tian bai

Annuals or perennials 5–20 cm tall. Stems terete, erect or creeping, simple, branched, or caespitose, basally densely white hirsute, apically glabrous or glabrescent; internodes shorter to longer than leaves. Leaves opposite, usually at least some and occasionally all in a dense whorl, sessile; leaf blade ovate, oblong, or linear-lanceolate, 2–13 × 1–5 mm, herbaceous, abaxially hirsute on midrib, adaxially hirsute but glabrescent, rarely both surfaces ± glabrous, base broadly cuneate to attenuate, margin hirsute, apex obtuse to acuminate; lateral veins inconspicuous, 3 per side. Inflorescences terminal, sometimes also subterminal, long pedunculate, umbel-like, often irregularly compound, rarely reduced to a single long pedicellate flower; bracts ovate to ovate-lanceolate, ca. 3 mm, ciliate. Pedicel 5–9 mm. Calyx 1.5–2.8 mm; lobes narrowly triangular, as long as tube. Corolla white, pale yellow, or rarely bluish white, campanulate, 3–8 mm, inside often sparsely bearded; lobes suborbicular, to 1.5 mm. Stamens included; filaments 1.5–3 mm; anthers narrowly ovate to sagittate, apex acute. Pistil to 4.5 mm. Ovary ca. 1 mm. Styles free for lower 1/4 to 1/3; stigma 2-cleft. Fruiting pedicel ca. 1.5 cm. Capsule subglobose, ca. 3 mm in diam., base

enclosed by calyx, apex opening by loculicidal slits; style free or connate toward apex. Seeds ellipsoid to angular, minutely reticulate to papillate. Fl. May–Aug, fr. Aug–Dec.

200–600 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangsu, Jiangxi, Taiwan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam; Australia].

- 1a. Stems erect, simple or few branched from base, leaves some or all in congested whorls, at least partly hirsute when young but glabrescent; inflorescences much longer than vegetative part of stem ..... 2a. var. *pygmaea*
- 1b. Stems ascending, much branched from base; leaves all opposite, glabrous or subglabrous except sometimes for ciliate margins; inflorescences all ± as long as vegetative part of stem.
- 2a. Corolla 7–8 mm; leaf blade ovate or subovate, glabrous ..... 2b. var. *grandiflora*
- 2b. Corolla 4–5 mm; leaf blade very narrowly elliptic, glabrous except for ciliate margins ..... 2c. var. *confertifolia*

#### 2a. *Mitrasacme pygmaea* var. *pygmaea*

水田白(原变种) shi tian bai (yuan bian zhong)

*Androsace tonkinensis* Bonati; *Mitrasacme capillaris* Wallich; *M. chinensis* Grisebach; *M. galiifolia* Masamune & Syozi; *M. lutea* H. Léveillé; *M. malaccensis* Wight; *M. pygmaea* var. *malaccensis* (Wight) H. Hara.

Ephemerals to 20(–30) cm tall. Stems erect, simple or few branched from base. Leaves in a basal rosette or separated by internodes longer than leaves except for uppermost 2 pairs which form a whorl of 4 leaves; leaf blade ovate to oblong, less

often linear-lanceolate, hirsute at least when young. Corolla 3–6 mm. Fl. Jun–Jul, fr. Aug–Dec.

Grassy open places; 200–600 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangsu, Jiangxi, Taiwan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam; Australia].

Medicinal.

#### 2b. *Mitrasacme pygmaea* var. *grandiflora* (Hemsley) Leenhouts, Bull. Jard. Bot. Etat. 32: 455. 1962.

大花水田白 da hua shui tian bai

*Mitrasacme polymorpha* R. Brown var. *grandiflora* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 118. 1889.

Annuals 6–14 cm tall. Stems ascending, much branched from base. Leaves all opposite, separated by internodes longer than leaves; leaf blade ovate to subovate, glabrous or subglabrous. Corolla 7–8 × ca. 5 mm. Fl. May–Aug, fr. Aug–Nov.

Grassy open places; 200–600 m. S Guangxi [Thailand, Vietnam].

#### 2c. *Mitrasacme pygmaea* var. *confertifolia* Tirel in Aubréville, Fl. Cambodge, Laos & Vietnam 13: 88. 1972.

密叶水田白 mi ye shui tian bai

Perennials. Stems woody at base, ascending, much branched. Leaves all opposite, overlapping; leaf blade very narrowly elliptic, slightly leathery, glabrous except for ciliate margins. Corolla 4–5 mm. Fl. Jun–Aug, fr. Aug–Dec.

Grassy open places; 200–600 m. Guangdong, Guangxi [Cambodia, Vietnam].

### 3. GENIOSTOMA J. R. Forster & G. Forster, Char. Gen. Pl. 23. 1776.

髯管花 ran guan hua shu

Shrubs or small trees. Branchlets subterete, rarely 4-angled, sometimes 4-winged. Leaves opposite, petiolate or rarely sessile; petiole base with a short ocrea; leaf blade margin entire. Inflorescences axillary, sometimes directly from main branches, 1- to many flowered, cymose, congested or not; bracts scalelike to sepal-like. Flowers 5-merous. Sepals mostly free or nearly so, inside usually with glands at base. Corolla campanulate to rotate, tube somewhat fleshy; lobes thick, imbricate or contorted and then overlapping to left in bud. Stamens inserted at corolla mouth, exerted, recurved after anthesis; filaments usually short; anthers suborbicular to narrowly ovate, often with a distinct appendage. Ovary 2-locular; ovules many per locule. Style often very short; stigma clavate, ellipsoid, or subglobose, ± as large as ovary. Capsule ellipsoid to globose, 2-valved, septicidal or septifragal, many seeded. Seeds brown to black, ellipsoid to subglobose, concave on hilar side, minutely warty, embedded in a juicy yellow to red pulp; embryo small; endosperm papery to starchy.

About 20 species: E and SE Asia, N Australia, Mascarenes Islands, Pacific Islands; one species in China.

#### 1. *Geniostoma rupestre* J. R. Forster & G. Forster, Char. Gen. Pl. 24. 1776.

髯管花 ran guan hua

*Geniostoma kasyotense* Kanehira & Sasaki.

Shrubs or small trees to 6 m tall. Branchlets glabrous or when young shortly brown to tawny tomentose. Petiole ca. 1 cm; leaf blade narrowly ovate to narrowly elliptic, 7–16 × 3.5–6 cm, papery to subleathery, abaxially glabrous or sparsely hairy along midrib, base rounded to narrowly cuneate, apex obtuse, acute, or acuminate; lateral veins 6–10 per side. Cymes sometimes partly on old branches, 3–18-flowered, often

congested, rarely lax paniculate or umbelliform, ca. 1 cm, glabrous or with sparse short appressed hairs; peduncle ca. 5 mm; bracts ovate to triangular, 0.5–1 mm. Pedicel 3–5 mm. Sepals ovate to triangular, ca. 2 mm, outside glabrous to densely short tomentose. Corolla campanulate, 2–5 mm, outside glabrous or rarely papillose-hairy, inside pubescent at mouth and sometimes with a second ring of hairs near base of tube; lobes ovate, 1.5–1.8

1.5–1.8 mm. Anthers narrowly ovate. Ovary ovoid, 0.4–1 mm, glabrous to densely short tomentose. Style and stigma glabrous or slightly pubescent. Capsule globose, 5–10 mm in diam. Fl. May–Jun, fr. Aug–Oct.

Thickets, along forest edges; ca. 300 m. Taiwan (Lan Yu, Lü Dao) [Indonesia, Malaysia, Philippines; Australia, W Pacific Islands].

#### 4. STRYCHNOS Linnaeus, Sp. Pl. 1: 189. 1753.

马钱属 ma qian shu

Shrubs, trees, or lianas, armed or unarmed; lianas with axillary simple or double curled tendrils, sometimes with axillary thorns. Stipules often reduced to a straight ciliate ridge connecting petiole bases. Leaves petiolate to sometimes sessile; leaf blade margin entire; basal veins 3–7; secondary veins distinct, 1–3 per side, from or near base and curved along margin. Inflorescences terminal and/or axillary, thyrsoïd; bracts scalelike to sepal-like. Flowers pedicellate or sessile, 4- or 5-merous. Corolla rotate to salverform; lobes valvate in bud, spreading to reflexed when open. Stamens inserted at corolla throat to middle of corolla tube, exerted to included; filaments long to short, mostly filiform; anthers orbicular to narrowly oblong, base mostly slightly 2-cleft, introrse, 2-locular and separate. Ovary (1 or)2-locular; ovules few to many per locule. Style cylindrical; stigma capitate or faintly 2-cleft. Berry orange or red when ripe in species represented, usually globose to ellipsoid, thin to thick walled, outside smooth to minutely warty, glabrous; pulp fleshy, usually orange; 1–15-seeded. Seeds ± flattened to saucer-shaped, circular to elliptic in outline; seed coat sericeous, felty, or scabrous and glabrous; embryo spatulate; endosperm horny; cotyledon leaflike.

About 190 species: tropics and subtropics; 11 species in China.

Many species are medicinal and poisonous.

- 1a. Trees, tendrils absent.
  - 2a. Petiole 2–4 mm; leaf blade abaxially granular; young plants spiny; inflorescences terminal ..... 3. *S. lucida*
  - 2b. Petiole 5–15 mm; leaf blade abaxially smooth; plants never spiny; inflorescences axillary.
    - 3a. Sepals ovate, outside densely pubescent; fruit 2–4 cm in diam. .... 1. *S. nux-vomica*
    - 3b. Sepals narrowly oblong, subglabrous; fruit 6–8 cm in diam. .... 2. *S. nux-blanda*
- 1b. Lianas, sometimes with axillary tendrils.
  - 4a. Flowering specimen.
    - 5a. Flower buds 3–4.5 mm.
      - 6a. Flowers 4(or 5)-merous; anthers exerted; inflorescences 6–12 cm ..... 5. *S. umbellata*
      - 6b. Flowers 5-merous; anthers included; inflorescences 1–5 cm.
        - 7a. Corolla inside pubescent at mouth and on base of lobes, lobes longer than tube; leaf blade 8–13 cm ..... 4. *S. ovata*
        - 7b. Corolla inside with a row of erect bristlelike hairs at base or to middle of lobes, lobes ± as long as tube; leaf blade 2–10 cm ..... 7. *S. axillaris*
    - 5b. Flower buds 8–17 mm.
      - 8a. Corolla lobes ± as long as tube; filaments longer than anthers ..... 6. *S. angustiflora*
      - 8b. Corolla lobes shorter than tube; filaments shorter than anthers.
        - 9a. Corolla 0.8–1.2 cm, tube glabrous inside ..... 8. *S. cathayensis*
        - 9b. Corolla 1.4–1.7 cm, tube pubescent inside.
          - 10a. Corolla tube pubescent at mouth; style villous ..... 9. *S. nitida*
          - 10b. Corolla tube pubescent on lower half; style glabrous.
            - 11a. Inflorescences axillary; anther connective apiculate at apex; sepal margin glabrous ..... 10. *S. ignatii*
            - 11b. Inflorescences terminal; anther connective obtuse or rounded at apex; sepal margin ciliate ..... 11. *S. wallichiana*
  - 4b. Fruiting specimen.
    - 12a. Seeds 0.6–1.8 cm.
      - 13a. Fruit to 2 cm in diam., 1–3-seeded.
        - 14a. Leaf apex acute to rounded; inflorescences 6–12 cm ..... 5. *S. umbellata*
        - 14b. Leaf apex acuminate; inflorescences 1–5 cm ..... 7. *S. axillaris*
      - 13b. Fruit 2–5.5 cm in diam., often more than 3-seeded.
        - 15a. Branchlets spiny; tendrils absent; petiole ca. 1.5 cm; leaf blade 8–13 cm ..... 4. *S. ovata*

- 15b. Branchlets not spiny but older branches spiny; tendrils present; petiole 0.4–0.6 cm; leaf blade 3–8 cm ..... 6. *S. angustiflora*
- 12b. Seeds 2–3 cm.
- 16a. Fruit wall not woody, to 3 mm thick.
- 17a. Fruit 1.5–3 cm in diam., 2–7-seeded; petiole 2–4 mm ..... 8. *S. cathayensis*
- 17b. Fruit 4–6 cm in diam., many seeded; petiole 5–7 mm ..... 11. *S. wallichiana*
- 16b. Fruit wall woody, ca. 5 mm thick.
- 18a. Tendrils double; leaf blade base cuneate to broadly cuneate ..... 9. *S. nitida*
- 18b. Tendrils single; leaf blade base obtuse to rounded ..... 10. *S. ignatii*

**1. *Strychnos nux-vomica* Linnaeus, Sp. Pl. 1: 189. 1753.**

马钱子 ma qian zi

*Strychnos nux-vomica* var. *oligosperma* Dop; *S. spireana* Dop.

Trees to 25 m tall. Branchlets slightly pubescent, glabrescent. Petiole 0.5–1.5 cm; leaf blade suborbicular, broadly elliptic, or ovate, 5–18 × 4–12.5 cm, papery, abaxially minutely hairy especially on veins, adaxially glabrous and shiny, base rounded to cordate, apex short acuminate to acute and often mucronulate; basal veins 3–5. Thyrses axillary, 3–6 cm; peduncle puberulent; bracteoles pubescent. Flowers 5-merous. Pedicel puberulent. Calyx lobes ovate, outside densely pubescent. Corolla greenish white to white, salverform, ca. 1.3 cm; tube longer than lobes, outside glabrous, inside sparsely villous at base or on lower half; lobes narrowly ovate, ca. 3 mm, margin thickened and puberulent. Stamens inserted at mouth or corolla tube; filaments very short; anthers elliptic, ca. 1.7 mm, apex exerted. Pistil 1–1.2 cm. Ovary ovoid, glabrous. Style to 1.1 cm, glabrous; stigma capitate. Berry orange when ripe, globose, 2–4 cm in diam., glabrous, 1–4-seeded. Seeds orbicular to elliptic, 2–4 cm wide, densely sericeous. Fl. spring to summer.

Cultivated in Fujian, Guangdong, Guangxi, Hainan, Taiwan, and S Yunnan [native in India, cultivated throughout tropical Asia].

Medicinal; tools.

**2. *Strychnos nux-blanda* A. W. Hill, Bull. Misc. Inform. Kew 1917: 189. 1917.**

山马钱 shan ma qian

*Strychnos nux-blanda* var. *hirsuta* A. W. Hill; *S. nux-vomica* Linnaeus var. *grandifolia* Dop.

Trees to 15 m tall. Branchlets glabrous or glabrescent. Petiole 1–1.5 cm; leaf blade broadly ovate, elliptic, or suborbicular, 9–22 × 7–16 cm, papery, glabrous, base rounded, apex acute to acuminate; basal veins 5–7. Thyrses axillary, 4–6 cm; bracteoles puberulent. Flowers 5-merous. Pedicel puberulent. Calyx lobes narrowly oblong, 1.5–2 mm, outside puberulent. Corolla white, salverform, 1.2 cm; tube ca. 9 mm, outside villous near base; lobes narrowly elliptic, ca. 3 mm, outside glandular. Stamens inserted at corolla mouth; filaments very short; anthers subovate, ca. 2 mm, apex exerted. Ovary ovoid, glabrous. Style to 1.2 cm, glabrous; stigma capitate. Berry globose, 6–8 cm in diam., 4–15-seeded. Seeds ovoid, suborbicular, or ellipsoid, 1.5–2.2 × 1.3–2 cm, compressed. Fl. Mar–Jun, fr. Aug–Dec.

300–600 m. Cultivated in S and SW Guangdong [native in Cambodia, India, Laos, Myanmar, Thailand, and Vietnam].

**3. *Strychnos lucida* R. Brown, Prodr. 469. 1810.**

腺叶马钱 xian ye ma qian

Trees to 12 m tall, with spines when young. Branchlets sparsely pubescent or glabrous; branches grayish, rough with many small lenticels. Petiole 2–4 mm; leaf blade 2.5–10 × 1.5–6 cm, thin papery, glabrous, abaxially granular, base cuneate to slightly cordate, apex rounded, obtuse, or acute; basal veins 3–5. Thyrses terminal, ca. 9-flowered, pubescent. Calyx lobes broadly ovate. Corolla salverform, 1–1.5 cm; tube 7–12 mm, outside pubescent. Stamens inserted at corolla mouth, glabrous; filaments short; anthers oblong, 1.5–1.7 mm, apex exerted. Ovary globose, ca. 1 mm in diam. Style ca. 1.2 mm; stigma truncate. Berry globose, 2–2.5 cm in diam., smooth, glabrous, 2- or 3-seeded. Seeds nearly disc-shaped, 1.2–1.5 × 1–1.2 cm, densely pubescent. Fl. Mar–Jun, fr. Aug–Nov.

300–500 m. Cultivated in Hainan [native in Australia, Indonesia, and Thailand].

**4. *Strychnos ovata* A. W. Hill, Bull. Misc. Inform. Kew 1909: 360. 1909.**

密花马钱 mi hua ma qian

*Strychnos confertiflora* Merrill & Chun.

Lianas to 10 m. Stems to 4 cm in diam.; branchlets spiny, glabrous. Petiole ca. 1.5 cm; leaf blade ovate, elliptic, or oblong, 8–13 × 3–8 cm, papery, glabrous, base obtuse to rounded, apex acute to acuminate; basal veins 3–5, lateral veins more delicate than midrib, reticulate veins slightly conspicuous on both surfaces. Thyrses axillary and terminal, 1.5–2.5 cm, many flowered, sparsely pubescent. Flowers 5-merous. Pedicel 2–3 mm, pubescent. Calyx lobes broadly ovate, ca. 1 mm, outside slightly puberulent, apex obtuse. Corolla rotate, 3–4.5 mm, thin to fairly thick, fleshy especially lobes, outside pubescent, inside pubescent at mouth and on base of lobes, tube 1–1.5 mm; lobes ovate-elliptic, 2.5–3 mm. Stamens inserted at corolla mouth, included; filaments short; anthers oblong, ca. 1.2 mm, base bearded, connective mucronate. Ovary ovoid, ca. 1 mm, glabrous or apically villous. Style ca. 2 mm, basally hairy; stigma capitate. Berry orange when ripe, globose, 2–5.5 cm in diam., smooth, thin walled, 1- or 2-seeded. Seeds orbicular, flat, ca. 1 cm in diam., surface feltlike. Fl. Mar–Jun.

Forests and thickets in mountains; 200–600 m. S Guangdong, Hainan [Indonesia, Malaysia, Philippines].

**5. *Strychnos umbellata*** (Loureiro) Merrill, Philipp. J. Sci. 15: 252. 1919.

伞花马钱 san hua ma qian

*Cissus umbellata* Loureiro, Fl. Cochinch. 1: 84. 1790;  
*Strychnos paniculata* Champion ex Benth.

Lianas to 10 m. Branchlets glabrous. Petiole 4–6 mm; leaf blade 4–9 × 2–3.5 cm, ovate to narrowly elliptic, leathery, glabrous, base obtuse, apex acute to rounded; basal veins 3–7. Thyrses terminal or axillary, 6–12 cm; peduncle pubescent. Flowers 4(or 5)-merous. Pedicel 1–4 mm, pubescent. Calyx lobes broadly ovate, ca. 1 × 1 mm, outside glabrous. Corolla campanulate, ca. 4 mm, outside glabrous; tube 0.5–1 mm, mouth pubescent; lobes narrowly oblong, 1.5–3 mm. Stamens inserted at corolla mouth, exerted; filaments ca. 1.5 mm; anthers narrowly ovate, ca. 1 mm, cordate, base bearded. Ovary ovoid, ca. 3 mm, glabrous or apically villous. Style 2.5–3 mm; stigma capitate. Berry globose, ca. 1.2 cm in diam., 1–3-seeded. Seeds pale yellowish gray, orbicular, ca. 7 mm, very finely sericeous. Fl. Mar–Jun.

Forests and thickets in mountains; 200–500 m. S Guangdong, SE Guangxi, Hainan [Vietnam].

The seeds and roots contain the poisonous alkaloids strychnine and brucine.

**6. *Strychnos angustiflora*** Benth., J. Linn. Soc., Bot. 1: 102. 1857.

牛眼马钱 niu yan ma qian

*Strychnos usitata* Pierre ex Dop var. *cirrosa* Dop.

Lianas to 10 m, glabrous except for inflorescences and flowers. Branchlets with axillary tendrils 2–5 cm; older branches with axillary thorns. Petiole 4–6 mm; leaf blade ovate, elliptic, or suborbicular, 3–8 × 2–4 cm, leathery, base obtuse to rounded or sometimes slightly cordate, apex acute to obtuse; basal veins 3–5, lateral veins more delicate than midrib. Thyrses terminal, 2–4 cm, pubescent. Flowers 5-merous, 8–11 mm. Calyx lobes ovate to triangular, 1–1.5 mm, outside puberulent. Corolla white, salverform; tube 4–5 mm, throat and base of lobes long woolly; lobes narrowly oblong, ± as long as tube. Stamens inserted at mouth or corolla tube, ca. 2 mm; filaments filiform, longer than anthers; anthers oblong, exerted, base glabrous. Pistil ca. 1 cm, glabrous. Ovary ovoid, ca. 0.7 mm. Style slender. Berry orange when ripe, globose, 2–4 cm in diam., smooth, 1–6-seeded. Seeds pale yellowish gray, orbicular, flat, 1–1.8 cm in diam., covered with extremely fine sericeous hairs. Fl. Apr–Jun, fr. Jul–Dec.

Open woodlands, scrub; 300–800 m. Fujian, Guangdong, Guangxi, Hainan, S Yunnan [Philippines, Thailand, Vietnam].

The seeds, bark, and young leaves contain the poisonous alkaloids strychnine and brucine, which are used to treat sore throats and for antismelling.

**7. *Strychnos axillaris*** Colebrooke, Trans. Linn. Soc. London 12: 356. 1819.

腋花马钱 ye hua ma qian

Lianas to 20 m. Branchlets puberulent or glabrous; axillary spines spirally curved apically. Petiole to 1 cm; leaf blade elliptic, narrowly elliptic, ovate, or suborbicular, 2–10 × 1–5 cm, papery to leathery, abaxially pubescent or glabrous, adaxially glabrous or pubescent only on midrib, base attenuate to subcordate, apex acuminate; basal veins 3–5. Cymes axillary and/or terminal, 2- or 3-branched, 1–5 cm, many flowered, pubescent or glabrous. Flowers 5-merous. Calyx 1–2 mm, outside pubescent or glabrous, inside glabrous; lobes ovate to suborbicular. Corolla 3–4 mm; tube ± as long as lobes, glabrous or outside puberulent; lobes narrowly ovate, outside glabrous or very rarely puberulent, inside with a row of erect bristlelike hairs at base or to middle of lobes, apically strongly thickened. Stamens inserted at middle of corolla tube, included; filaments very short; anthers ovate, apex apiculate, base bearded to ciliate. Pistil 1.5–2 mm, glabrous. Ovary globose, ca. 1 mm in diam. Berry ovoid to globose, to 2 cm in diam., 1- or 2-seeded. Seeds ellipsoid to rounded, 6–12 mm in diam. Fl. Mar–Aug, fr. Jun–Dec.

Montane forests, forest edges; 500–800 m. S Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Thailand, Vietnam; Australia].

**8. *Strychnos cathayensis*** Merrill, Lingnan Sci. J. 13: 14. 1934.

华马钱 hua ma qian

Lianas to 8 m. Young branchlets pubescent, glabrescent, with axillary double tendrils or erect spines. Petiole 2–4 mm; leaf blade elliptic to narrowly oblong, 2–10 × 0.5–4 cm, abaxially puberulent, adaxially green, glabrous, and shiny, base obtuse to rounded, apex acute to acuminate; basal veins 3(–5), veins adaxially impressed. Cymes terminal or axillary, 3–4 cm, many flowered; peduncle puberulent; bracteoles ovate to triangular, ca. 1 mm. Flowers 5-merous, 0.8–1.2 cm. Pedicel ca. 2 mm, puberulent. Calyx lobes ovate, ca. 1–0.5 mm, outside puberulent. Corolla white, salverform, ca. 1.2 cm, glabrous, outside sometimes papillose, tube ca. 9 mm; lobes oblong, to 3.5 mm, slightly thickened. Stamens inserted at corolla mouth, ca. 2 mm; filaments ca. 0.5 mm; anthers oblong, 1.5–2 mm, glabrous. Pistil to 1.1 cm, glabrous. Ovary ovoid, ca. 1 mm. Style slender, to 1 cm; stigma capitate. Berry globose, 1.5–3 cm in diam., 2–7-seeded. Seeds saucer-shaped, 2–2.5 cm wide, densely puberulent. Fl. Mar–Jun, fr. Jun–Dec.

300–800 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [N Vietnam].

- 1a. Branchlets with tendrils; leaf blade 6–10 cm ..... 8a. var. *cathayensis*
- 1b. Branchlets with spines; leaf blade ca. 2 cm ..... 8b. var. *spinata*

**8a. *Strychnos cathayensis* Merrill var. *cathayensis***

华马钱(原变种) hua ma qian (yuan bian zhong)

*Strychnos henryi* Merrill & Yamamoto.

Branchlets with axillary double tendrils. Leaf blade 6–10 × 2–4 cm. Fl. Apr–Jun, fr. Jun–Dec.

Open woodlands, scrub; 300–800 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [N Vietnam].

The roots and seeds are medicinal, and the leaves and seeds are poisonous.

**8b. *Strychnos cathayensis* var. *spinata*** P. T. Li, J. South China Agr. Coll. 1: 126. 1980.

刺马钱 *ci ma qian*

Branchlets with erect spines 1–1.5 cm. Leaf blade ca. 2 cm × 5 mm. Fl. Mar–Jun, fr. Jun–Dec.

\* Open woodlands; 300–500 m. S Guangdong.

**9. *Strychnos nitida*** G. Don, Gen. Hist. 4: 66. 1837.

毛柱马钱 *mao zhu ma qian*

*Strychnos cheliensis* Hu; *S. kerrii* A. W. Hill; *S. wallichiana* Steudel ex A. de Candolle var. *intermedia* A. W. Hill; *S. wallichiana* var. *ovata* A. W. Hill; *S. yunnanensis* S. Y. Pao.

Lianas to 7 m. Branchlets terete to sometimes subangular, pubescent, glabrescent, with axillary double tendrils. Petiole 5–7 mm, adaxially ciliate; leaf blade oblong to elliptic, 8–14 3–6 cm, abaxially pubescent or glabrous, adaxially dark green, glabrous, and shiny, base cuneate to broadly cuneate, apex obtuse to acute; basal veins 3, reticulate veins present. Thyrses terminal, 4–8 cm; peduncle pubescent. Flowers 5-merous. Pedicel 2–3 mm, pubescent. Calyx lobes broadly ovate, ca. 1 mm, outside puberulent, margin membranous and ciliate, apex rounded. Corolla greenish, salverform, 1.4–1.5 cm, outside glabrous or glabrescent; tube ca. 1.2 cm, villous at mouth; lobes narrowly oblong, ca. 2.5 1.5 mm, inside usually papillose. Stamens inserted at corolla mouth; filaments shorter than anthers; anthers oblong, ca. 1 mm, glabrous, base 2-cleft, apex rounded. Ovary ovoid, ca. 3 mm, glabrous. Style ca. 1.2 cm, villous; stigma slightly concave. Berry globose, 3–5 cm in diam., smooth, usually 3-seeded; exocarp woody, thick. Seeds ovoid to suborbicular, flat, 2–3 1.8–2 cm, puberulent. Fl. Mar–Jul.

Forests in mountains, scrub; 200–1800 m. Guangxi, S and SW Yunnan [Bangladesh, India, Laos, Myanmar, Thailand, Vietnam].

The fruit are medicinal, and the seeds are poisonous.

**10. *Strychnos ignatii*** P. J. Bergius, Mat. Med. 1: 146. 1778.

吕宋果 *lu song guo*

*Ignatia amara* Linnaeus f.; *Ignatiana philippinica* Loureiro; *Strychnos hainanensis* Merrill & Chun; *S. ovalifolia* Wallich ex G. Don.

Lianas to 20 m. Branches grayish brown, lenticellate, glabrous; branchlets usually with axillary simple tendrils 3–7 cm. Petiole 7–10 mm; leaf blade ovate to elliptic, 6–17 × 3.5–7 cm, papery to leathery, glabrous, shiny, base obtuse to rounded, apex acute to acuminate; basal veins 3–5, reticulate veins present. Thyrses axillary, 2.5–3 cm, 10–20-flowered, minutely pubescent. Flowers fragrant, 5-merous. Calyx lobes ovate, ca. 1 mm, outside pubescent. Corolla yellowish, salverform, 1.5–1.7 cm, papillose; tube outside glabrous, inside with long woolly hairs basally, ca. 3 × as long as lobes; lobes oblong to elliptic, 4–5 mm, apex slightly thickened. Stamens inserted at corolla mouth; filaments very short; anthers oblong, 1.2–1.8 mm, glabrous, base shallowly 2-cleft, connectives apiculate at apex. Pistil ca. 1.5 cm. Ovary ovoid, ca. 1 mm. Style ca. 1.4 cm; stigma capitate. Berry orange when ripe, globose, 4–10 cm in diam., 1–15-seeded; pericarp to 5 mm thick, hard, woody, smooth, glabrous. Seeds ovate, flat, 2–2.5 × 1.5–1.8 cm, sericeous. Fl. Apr–Jun.

Open woodlands on limestone, scrub, sometimes along river banks; 400–800 m. Guangdong, Guangxi, Hainan, Yunnan [Indonesia, Malaysia, Philippines, Thailand, Vietnam].

Medicinal.

**11. *Strychnos wallichiana*** Steudel ex A. de Candolle, Prodr. 9: 13. 1845.

长籽马钱 *chang zi ma qian*

*Strychnos bourdillonii* Brandis; *S. cinnamomifolia* Thwaites; *S. cinnamomifolia* var. *wightii* A. W. Hill; *S. cirrhosa* Stokes; *S. gauthierana* Pierre ex Dop; *S. pierriana* A. W. Hill; *S. rheedei* C. B. Clarke; *S. tubiflora* A. W. Hill.

Lianas to 20 m. Stems grayish white, rugose; branchlets terete, smooth, usually with axillary simple or double tendrils. Petiole 5–7 mm; leaf blade 5–17 × 3–5 cm, base cuneate to subrounded, apex acuminate to acute; basal veins 3, reticulate veins present. Thyrses terminal, 4–5 cm; peduncle pubescent. Flowers 5-merous. Pedicel pubescent. Calyx lobes ovate, 1–1.3 mm, outside puberulent, margin ciliate. Corolla yellowish to yellow-white, salverform, ca. 1.4 cm, outside papillose; tube ca. 1.1 cm, inside basally villous; lobes oblong, ca. 4 mm, apex slightly thickened. Stamens inserted at corolla mouth; filaments very short; anthers oblong, ca. 1.5 mm, connectives obtuse to rounded at apex. Pistil ca. 8 mm. Ovary ovoid, ca. 1 mm in diam. Style slender; stigma capitate. Berry orange when ripe, globose, 4–6 cm in diam., many seeded; pericarp to 2–3 mm thick. Seeds orbicular, elliptic, or oblong, flat, 2–3 cm, densely pale brown-gray sericeous. Fl. Apr–Jun.

Tropical evergreen forests, mixed woodlands on limestone; 200–600 m. SE Yunnan [Bangladesh, India, Indonesia, Sri Lanka, Vietnam].

Medicinal, poisonous.

## 5. GARDNERIA Wallich in Roxburgh, Fl. Ind. 1: 400. 1820.

蓬莱葛属 *peng lai ge shu*



*Pseudogardneria* Raciborski.

Shrubs scandent, mostly climbing or creeping. Branchlets terete, sometimes with 4 faint ridges. Leaves opposite, petiolate, connected by interpetiolar stipular rims; leaf blade margin entire. Flowers axillary, solitary, paired, or in few-flowered cymes sometimes grouped into a thyrse; bracteoles small, narrowly triangular. Flowers 4- or 5-merous. Calyx small, deeply lobed; lobes imbricate, connate, inside with colleters at base. Corolla rotate to subcampanulate; tube thin, fleshy; lobes thin to thick, fleshy, valvate in bud. Stamens exerted; filaments very short, flat; anthers 2- or 4-locular, connate or free, introrse, base 2-parted. Ovary small, 2-locular; ovules 1–4 per locule. Style mostly long, slender; stigma capitate or 2-cleft. Berry red, globose, 1- or more seeded. Seeds ellipsoid to orbicular, concave on hilar side, convex on other side; seed coat thin; embryo tiny, almost cylindrical; endosperm thick, horny.

Five species: Bhutan, India, Indonesia, Japan, Korea, Malaysia, Nepal, Sri Lanka, Thailand; five species in China.

- 1a. Flowers 4-merous.
  - 2a. Flowers in pedunculate cymes or thyrses; anthers connate ..... 4. *G. ovata*
  - 2b. Flowers solitary or paired, sometimes in lax cymes; anthers free ..... 5. *G. angustifolia*
- 1b. Flowers 5-merous.
  - 3a. Flowers in pedunculate cymes ..... 1. *G. multiflora*
  - 3b. Flowers solitary or paired.
    - 4a. Anthers free ..... 2. *G. nutans*
    - 4b. Anthers connate ..... 3. *G. lanceolata*

**1. *Gardneria multiflora*** Makino, Bot. Mag. (Tokyo) 15: 103. 1901.

蓬莱葛 peng lai ge

*Gardneria chinensis* Nakai; *G. hongkongensis* Hayata; *G. nutans* Siebold & Zuccarini f. *multiflora* (Makino) Matsuda; *G. shimadai* Hayata; *Marlea cavaleriei* H. Léveillé; *Paederia bodinieri* H. Léveillé; *Pseudogardneria multiflora* (Makino) Pampanini; *Rhamnus pasteurii* H. Léveillé; *Sabia esquirolii* H. Léveillé.

Lianas or scandent shrubs, to 8 m, glabrous. Branchlets terete, with prominent leaf scars. Petiole 1–1.5 cm; leaf blade elliptic to narrowly elliptic, sometimes ovate to very narrowly elliptic, 5–15 × 2–6 cm, papery to thin leathery, base obtuse to rounded, apex acuminate; lateral veins 6–10 per side. Cymes 3-branched, 2–4 cm, many flowered; bracteoles 2 per flower. Flowers 5-merous. Pedicel 5–10 mm. Sepals suborbicular, 1–1.5 mm in diam., ciliate. Corolla yellow to yellow-white, tube short; lobes narrowly to very narrowly elliptic, 5–6 1–1.5 mm, thick, fleshy, spreading. Stamens inserted near base of corolla tube; filaments short; anthers oblong, ca. 2.5 mm, 4-locular, loosely connivent. Ovules 1 per locule. Berry 6–8 mm in diam., blackish when ripe. Seeds black, orbicular. Fl. Mar–Jul.

Dense forests, scrub; 300–2100 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

Medicinal.

**2. *Gardneria nutans*** Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4: 165. 1846.

线叶蓬莱葛 xian ye peng lai ge

*Gardneria insularis* Nakai; *G. linifolia* C. Y. Wu & S. Y. Pao; *G. liukuensis* Hatusima; *Pseudogardneria nutans* (Siebold & Zuccarini) Raciborski.

Lianas or scandent shrubs to 4 m, glabrous except for calyx and corolla. Branchlets terete. Petiole ca. 5 mm; leaf blade oblong, narrowly oblong, or almost linear, 4–12 × 1–3 cm, flat on both surfaces or abaxially slightly elevated, base obtuse to rounded, apex acuminate; lateral veins 8–10 per side. Flowers axillary, solitary or paired, 5-merous, usually pendulous. Pedicel 1.5–2 cm, 2-bracteolate near base. Sepals broadly ovate, ca. 1 × 1.5 mm, ciliate. Corolla yellow-white or white; tube ca. 1 mm, inside pubescent; lobes narrowly elliptic, ca. 8 × 3 mm. Stamens inserted at base of corolla tube; anthers oblong, ca. 5 mm, 4-locular. Style short; stigma exerted, apex shallowly 2-cleft. Ovules 1 per locule. Berry ca. 7 mm in diam., 1-seeded. Fl. Apr–Jul.

Dense forests, woodlands on limestone; 500–2000 m. Anhui, Guangxi, Guizhou, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

Medicinal.

The description is based on specimens from the Chinese mainland. This species was incorrectly called *Gardneria angustifolia* in vol. 61 of Fl. Reipubl. Popularis Sin. (1992). Material from Japan and Korea, including the type of *G. nutans*, as well as specimens recently reported from Taiwan (Yang & Peng, Bot. Bull. Acad. Sinica 35: 223–227. 1994) apparently differ from mainland Chinese material by having only 3–6 pairs of lateral veins and pedicels only 7–9 mm. The status of the mainland Chinese material needs further investigation and may be better separated as *G. linifolia*.

**3. *Gardneria lanceolata*** Rehder & E. H. Wilson in Sargent, Pl. Wilson. 1: 563. 1913.

柳叶蓬莱葛 liu ye peng lai ge

<sup>1</sup> Missouri Botanical Garden, c/o Department of Botany, The Natural History Museum, Cromwell Rd., London SW7 5BD, United Kingdom

Shrubs scandent, to 4 m, glabrous. Branchlets terete. Petiole 5–10 mm; leaf blade narrowly oblong, 5–12 × 2–4 cm, base obtuse, apex acuminate; lateral veins 7–9 per side. Flowers axillary, solitary, 5-merous. Pedicel 1.5–2 cm, 2-bracteolate at middle to near base; bractlets narrowly triangular, ca. 1 cm. Sepals broadly ovate ca. 1.5 mm, ciliate. Corolla white, ca. 1 cm, tube ca. 3 mm; lobes narrowly elliptic, ca. 8 mm, glabrous. Stamens inserted at base of corolla tube; filaments very short, flat; anthers narrowly oblong, ca. 7 mm, 4-locular, connate, base 2-cleft, apex obtuse. Ovary globose, ca. 1.2 mm; ovules 1 per locule. Style 4–5 mm; stigma apex obtuse. Berry ca. 1 cm in diam., 1-seeded. Fl. Jul.

\* Forests, scrub; 1000–3000 m. Anhui, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang.

**4. *Gardneria ovata*** Wallich in Roxburgh, Fl. Ind. 1: 400. 1820.

卵叶蓬菜葛 luan ye peng lai ge

*Gardneria wallichii* Wight ex Wallich.

Shrubs scandent, to 5 m, glabrous except for corolla lobes. Branches gray-brown, terete. Petiole 1–1.5 cm; leaf blade ovate, narrowly ovate, or elliptic, 8–16 × 3–8 cm, thin leathery, base broadly cuneate and sometimes decurrent, apex obtuse to acute; lateral veins 6–8 per side. Flowers in 3–7-flowered pedunculate cymes, sometimes grouped along axillary branches into conical thyrses; peduncle 2–4 cm. Flowers 4-merous. Pedicel 0.5–2 cm, 2-bracteolate. Sepals orbicular, 1.5–2 mm in diam., ciliate. Corolla yellow to orange, waxy, tube 1–1.5 mm; lobes narrowly ovate, 4–5 mm, thick, fleshy, inside papillose-pubescent. Stamens inserted at base of corolla tube; anthers narrowly oblong, ca. 4 mm, 2-locular, connate.

Ovary globose 1–1.5 mm in diam.; ovules 1 per locule. Style and stigma ca. 2 mm; stigma usually 2-parted. Berry 7–8 mm in diam., 1- or 2-seeded. Seeds dull gray, orbicular, ca. 5 mm in diam., smooth. Fl. Mar–Jun.

Forest edges, among limestone rocks; 600–2000 m. Guangxi, Xizang, S Yunnan [NE and SE India, Indonesia, Malaysia, Sri Lanka, Thailand].

**5. *Gardneria angustifolia*** Wallich in Roxburgh, Fl. Ind. 2: 318. 1824.

狭叶蓬菜葛 xia ye peng lai ge

*Gardneria distincta* P. T. Li; *G. glabra* R. Brown ex D. Don; *Pseudogardneria angustifolia* (Wallich) Raciborski.

Shrubs scandent, to 4 m, glabrous except for corolla. Branches terete. Petiole 3–5 mm; leaf blade oblong to elliptic, 3–7 × 1–2 cm, papery, base obtuse, apex acuminate; midrib slightly elevated on both surfaces; lateral veins 7 or 8 per side. Flowers solitary or in dichasial cymes to 6-flowered and ca. 3 cm; peduncle 5–10 mm. Flowers 4-merous. Pedicel 5–10 mm, 2-bracteolate. Sepals ovate to triangular, ca. 1 × 1 mm. Corolla subcampanulate, outside glabrous, inside pubescent, tube 2–3 mm; lobes ovate to triangular, 3–4 × ca. 2.5 mm. Stamens inserted at base of corolla tube; filaments very short; anthers distinct, oblong, ca. 5 mm, introrse, 2-locular. Pistil ca. 3 mm. Ovules 1 per locule. Style terete; stigma apex 2-cleft. Berry globose, ca. 7 mm in diam., 1- or 2-seeded.

Forests. Yunnan [Bhutan, India, Nepal].

The type of *Gardneria angustifolia* in the Wallich herbarium at Kew has 4-merous flowers and is indistinct from *G. distincta*. Material treated as *G. angustifolia* in vol. 61 of Fl. Reipubl. Popularis Sin. (1992) is *G. nutans*.

**6. GELSEMIUM** Jussieu, Gen. Pl. 150. 1789.

钩吻属 gou wen shu

Shrubs or straggling to twining climbers. Leaves opposite, rarely verticillate; stipules reduced to an interpetiolar line; leaf blade margin entire. Inflorescences axillary and terminal, many-flowered thyrses, few-flowered fascicles, or 1-flowered. Flowers 5-merous. Sepals imbricate. Corolla funnellform; lobes imbricate. Stamens inserted at base to middle of corolla tube; filaments strap-shaped to filiform; anthers narrowly ovate to narrowly oblong, included to exserted, 2-locular, base sagittate. Ovary 2-locular; ovules several per locule. Style filiform; stigma 4-cleft. Capsule ovoid to narrowly ellipsoid, septicial, 4-valvate, several seeded. Seeds winged.

Three species: two in North America, one in E and SE Asia; one species in China.

**1. *Gelsemium elegans*** (Gardner & Champion) Benth, J. Linn. Soc., Bot. 1: 90. 1857.

钩吻 gou wen

*Medicia elegans* Gardner & Champion, Hooker's J. Bot. Kew Gard. Misc. 1: 325. 1849.

Climbers twining, to 12 m. Petiole 6–12 mm; leaf blade ovate to very narrowly ovate, 5–12 × 2–6 cm, membranous to papery, base broadly cuneate to subrounded, apex acuminate; lateral veins 5–7 per side. Thyrses with main nodes each having 2 lateral

cymes and a continuing main axis; bracts acute triangular to subulate, to 4 mm, ciliate. Pedicel 3–8 mm. Corolla yellow to orange, 1.2–1.9 cm; tube 7–10 mm, outside brownish, mouth with reddish spots; lobes ovate, 5–9 mm, apex blunt to acute. Stamens inserted at middle of corolla tube; filaments 3.5–4 mm; anthers narrowly ovate, 1.5–2 mm, exserted. Ovary narrowly ovoid, 2–2.5 mm. Style 0.8–1.2 cm; stigma pubescent. Capsule ellipsoid to ovoid, 1–1.4 cm × 6–8 mm, smooth, glabrous. Seeds elliptic to reniform, ca. 5.5 mm in

diam., central part hairy, winged all around. Fl. May–Nov.

Zhejiang [India, Indonesia, Laos, Malaysia, N Myanmar, N Thailand, Vietnam].

Scrubby forests, thickets; 200–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Taiwan, Yunnan,

Poisonous.

### 7. BUDDLEJA Linnaeus, Sp. Pl. 1: 112. 1753.

醉鱼草属 zui yu cao shu

Shrubs, less often trees, lianas, or suffrutescent herbs. Branches terete, 4-angled, or 4-winged. Leaves opposite, rarely alternate; stipules usually leafy, suborbicular and auriculate or reduced to a transverse line; petiole often short; leaf blade margin entire, crenate, or dentate. Inflorescences terminal and/or axillary, usually many flowered; bracts mostly leafy; bracteoles resembling sepals. Flowers 4-merous, bisexual or unisexual. Calyx campanulate or subcampanulate, less often cupular or obconical, tube usually longer than lobes. Corolla campanulate, cupular, salverform, or funnellform; tube cylindric, straight to curved, usually longer than lobes; lobes imbricate, rarely valvate. Stamens inserted on corolla tube, usually included, alternate with corolla lobes; filaments shorter to longer than anthers; anthers introrse, 2-locular, base usually deeply cordate. Ovary 2(–4)-locular; ovules several to many per locule. Style short to long; stigma often large, clavate, capitate, or less often 2-lobed. Fruit a septicidal 2-valved capsule or (in *Buddleja madagascariensis*) many-seeded berry. Seeds small, often winged; endosperm fleshy; embryo straight.

About 100 species: tropics and subtropics of America, Africa, and Asia; 20 species and five hybrids in China.

Within China at least five recognizable hybrids are occasionally found of which three have been given hybrid epithets. These hybrids are intermediate between parental species and are essentially impossible to key out.

- 1a. Leaves alternate (see also *B. ×wardii*) ..... 1. *B. alternifolia*
- 1b. Leaves opposite (sometimes apical leaves alternate in *B. asiatica*).
  - 2a. Corolla 2.3–3 cm, throat to 9 mm in diam., tube (1.2–)1.7–2.1 cm; fruit a capsule 1–1.6 cm ..... 2. *B. colvilei*
  - 2b. Corolla to 2 cm, throat to 3.5 mm in diam., tube to 1.3 cm (to 1.7 cm in *B. lindleyana*); fruit a capsule (3–)4–8(–1.2) cm or a globose berry 2–2.5 mm (*B. madagascariensis*).
    - 3a. Inflorescences dense spikes with many bracts of which some are longer than flowers ..... 3. *B. yunnanensis*
    - 3b. Inflorescences not dense spikes or if so then only some pairs of bracts exceeding flowers (see *B. asiatica* and *B. crispa*).
      - 4a. Corolla mostly curved, outside covered with a short indumentum; anthers mostly inserted at or below middle of corolla tube (above middle in *B. brachystachia*); inflorescences usually spicate (thyrsoid in *B. brachystachia*).
        - 5a. Leaf blade 1–3.5 × 0.5–1.7 cm, apex acute to slightly obtuse; inflorescences 1.5–3 × 1.5–2.5 cm; ovary stellate tomentose except glabrous at base ..... 4. *B. brachystachya*
        - 5b. Leaf blade 3–16 × 1.5–7 cm (occasionally smaller), apex acuminate to less often acute (sometimes obtuse in *B. curviflora*; inflorescences 4–20 × 2–4 cm; ovary glabrous.
          - 6a. Branchlets terete or occasionally obscurely angular, (1–)2–3 mm in diam. when dry; leaf margin entire to subentire; calyx and corolla outside short stellate tomentose to stellate pubescent and with some glandular hairs ..... 5. *B. curviflora*
          - 6b. Branchlets quadrangular to subquadrangular, 1(–2) mm in diam. when dry; leaf margin coarsely sinuate-dentate or entire; calyx and corolla outside pubescent with glandular hairs which may be accompanied by some stellate hairs ..... 6. *B. lindleyana*
- 4b. Corolla straight, outside glabrous, partly hairy, or entirely stellate tomentose; anthers inserted at or above middle of corolla tube or if inserted lower to middle of corolla tube then outside glabrous or only partly hairy (*B. forestii* and *B. davidii*); inflorescences not spicate or if spicate then corolla tube less than 5 mm (*B. asiatica* and *B. myriantha*), or broadly cylindric and 8–11 × 2–3.2 mm (*B. macrostachya*), or leaves ± lobed (*B. crispa*) (see also *B. brachystachya*).
  - 7a. Leaf blade ovate to triangular or narrowly so, base mostly rounded to cordate and abruptly narrowed into petiole; seeds not winged ..... 7. *B. crispa*
  - 7b. Leaf blade narrowly elliptic to ovate, base mostly cuneate or decurrent but never abruptly narrowed or cordate; seeds winged (not winged in *B. madagascariensis*).
    - 8a. Corolla tube outside glabrous or partly hairy (portion included in the calyx tube always glabrous).
      - 9a. Inflorescences paniculate, rather lax ..... 8. *B. delavayi*
      - 9b. Inflorescences thyrsoid or spiciform, occasionally paniculate in *B. forestii*, mostly rather dense.
        - 10a. Corolla tube broadly cylindric, 7–11 × (1.2–)2–3.5 mm ..... 9. *B. forestii*

- 10b. Corolla tube obconic and to 6.5 mm or narrowly cylindric and 6–11.5 × ca. 1 mm.
- 11a. Corolla tube obconic, 4–6.5 mm; stamens inserted just inside corolla mouth; corolla lilac ..... 10. *B. albiflora*
- 11b. Corolla tube narrowly cylindric or nearly so, 6–11.5 mm; stamens inserted at ± middle or near base of corolla tube; corolla white to dark purple (see also *B. davidii* × *B. fallowiana*) ..... 11. *B. davidii*
- 8b. Corolla tube outside entirely stellate tomentose.
- 12a. Corolla tube 2.5–6 mm, if more than 5 mm then mostly over 2 mm wide; inflorescences thyrsoïd or spicate (paniculate sometimes in *B. nivea*).
- 13a. Ovary glabrous or scaly.
- 14a. Inflorescences spiciform; lower branches not longer than others; corolla mostly white; leaf blade mostly remotely serrate-dentate ..... 12. *B. asiatica*
- 14b. Inflorescences almost cylindric; lower branches exceeding others; corolla mostly purple; leaf blade mostly serrate ..... 13. *B. myriantha*
- 13b. Ovary stellate tomentose.
- 15a. Calyx and corolla outside short stellate tomentose; calyx lobes not obscured by indumentum; corolla tube 1–1.3 wide ..... 13. *B. myriantha*
- 15b. Calyx and corolla outside densely stellate tomentose; calyx lobes often obscured by indumentum; corolla tube mostly 1.8 mm wide or wider.
- 16a. Leaf blade adaxially bullate to rugose; stamens often inserted at middle of corolla tube ..... 14. *B. candida*
- 16b. Leaf blade adaxially not bullate or rugose; stamens inserted just 1–1.5 mm inside corolla mouth ..... 15. *B. nivea*
- 12b. Corolla tube (6–)7–13.5 mm, if less than 8 mm then mostly less than 2 mm wide; inflorescences paniculate, thyrsoïd, or spicate (see also *B. davidii*).
- 17a. Inflorescences racemose, spiciform, or thyrsoïd and calyx lobes acuminate.
- 18a. Inflorescences racemose or spiciform, continuous and dense or less often interrupted and rather lax; corolla tube mostly broadly cylindric and at least 2 mm wide; branchlets quadrangular and often 4-winged ..... 16. *B. macrostachya*
- 18b. Inflorescences thyrsoïd, sometimes interrupted; corolla tube cylindric, 1–1.5 mm wide; branchlets terete ..... 17. *B. fallowiana*
- 17b. Inflorescences paniculate or thyrsoïd, if thyrsoïd then calyx lobes acute or obtuse.
- 19a. Inflorescences lax paniculate; corolla tube 10–13.5 mm, often glabrous just above calyx; calyx lobes acuminate ..... 8. *B. delavayi*
- 19b. Inflorescences paniculate or thyrsoïd, lax or congested; corolla tube 6–10 mm, outside entirely stellate tomentose; calyx lobes acute or obtuse.
- 20a. Corolla dark yellow, orange, or salmon; anthers barely included; fruit baccate ..... 19. *B. madagascariensis*
- 20b. Corolla white to pale purple; anthers with apex at least 1 mm below corolla mouth; fruit capsular.
- 21a. Corolla tube 1.2–1.6(–2) mm in diam., inside pilose up to insertion of stamens or up to just inside mouth; leaf blade margin entire or less often serrate, apex acuminate to rarely acute ..... 18. *B. paniculata*
- 21b. Corolla tube (1.6–)2–2.2 mm in diam., inside densely pilose up to mouth or less often just inside mouth; leaf blade margin entire or sinuate to repand dentate, apex mostly acute to obtuse ..... 20. *B. officinalis*

**1. *Buddleja alternifolia*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Pétersbourg 26: 494. 1880.

互叶醉鱼草 hu ye zui yu cao

*Buddleja legendrei* Gagnepain; *B. minima* S. Y. Pao.

Shrubs 1–4(–9) m tall. Branchlets 4-angled to subterete, stellate tomentose, glabrescent; long branchlets delicate, declinate on apical parts. Leaves alternate; leaf

blade short stellate tomentose on both surfaces or adaxially glabrescent, margin entire or undulate-dentate. Leaves on long vegetative branchlets with petiole 1–2 mm; leaf blade very narrowly elliptic to almost linear, 3–10 cm × 2–13 mm, base cuneate, apex acuminate to obtuse. Leaves on floriferous branchlets short petiolate to sessile; leaf blade 5–15 × 2–10 mm, base cuneate to decurrent, apex rounded to obtuse. Inflorescences only on short lateral branchlets, paniculate cymes or glomerules, 1–4.5 1–3 cm; peduncle very short, usually with 2 leaflets at base. Flowers fragrant. Calyx campanulate, 2.5–4 mm, outside stellate tomentose and with some glandular hairs, inside with a few minute glandular hairs on apical half; lobes triangular, 0.5–1.7 mm. Corolla lilac, violet, or purple, with an orange throat, tube 6–10 1.2–1.8 mm; lobes suborbicular to broadly ovate, 1.2–3 1.2–3 mm, both surfaces stellate tomentose but glabrescent. Stamens inserted at middle of corolla tube; anthers oblong, 1–1.8 mm. Ovary ovoid to subovoid, 1–2 mm, glabrous. Style ca. 1 mm; stigma large, clavate. Capsule ellipsoid, ca. 5 2 mm, glabrous. Seeds narrowly oblong, 1.5–2 mm, winged all around. Fl. Mar–Jul.

\* Thickets on river banks, along dry river beds; 1500–4000 m. Gansu, Hebei, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang.

Ornamental.

*Buddleja ×wardii* C. Marquand has been named for what is probably a hybrid between *B. alternifolia* and *B. crispa* (Marquand, J. Linn. Soc., Bot. 48: 203. 1929). This hybrid species has been collected in SE Xizang and has the following characteristics: Shrubs 1–5 m tall. Branchlets stellate tomentose, glabrescent. Leaves opposite or alternate; leaf blade elliptic to subelliptic, 0.5–5 × 0.3–2 cm, short stellate tomentose, margin repand-crenate, apex acuminate to acute. Inflorescences cymose, 1.5–2 cm in diam. Calyx campanulate, tube ca. 2 mm; lobes triangular, 0.5–0.7 mm, outside densely stellate tomentose. Corolla lilac, with an orange throat, tube 6–7 × 1–1.5 mm. Stamens inserted at middle of corolla tube, included. Ovary subglobose, ca. 1 mm in diam., stellate tomentose. Style longer than ovary. Capsule subellipsoid, ca. 5 mm in diam., stellate tomentose.

**2. *Buddleja colvilei*** J. D. Hooker & Thomson in J. D. Hooker, Ill. Himal. Pl. t. 18. 1855.

大花醉鱼草 da hua zui yu cao

*Buddleja sessilifolia* B. S. Sun ex S. Y. Pao.

Shrubs or small trees 2–6 m tall. Branchlets subquadrangular to subterete, with scattered stellate and glandular hairs, glabrescent. Leaves sessile or with petiole to 1 cm and with same indument as branchlets; leaf blade narrowly elliptic to subelliptic, 7–16 2–6 cm, with stellate and scattered glandular hairs when young, glabrescent, base cuneate to rounded or decurrent, margin serrate, apex acuminate. Inflorescences terminal and in axils of upper leaves, paniculate or thyrsoid cymes, 7–23

4–6 cm. Calyx campanulate, 6–8 4–8 mm, tube 4–5 mm; lobes ovate to triangular, 1.5–3 1.5–3 mm, outside densely stellate tomentose with glandular

hairs or with glandular and ± scattered stellate hairs, inside with glandular hairs. Corolla purple to wine red, 2.3–3 cm; tube broadly cylindrical, (1.2–) 1.7–2.1 cm, base 5–8 mm in diam., throat to 9 mm in diam.; lobes suborbicular, 5–10 5–10 mm, outside with some stellate and glandular hairs but soon glabrescent, inside pilose at throat, margin crenate. Stamens inserted 2–6 mm below mouth; anthers oblong, 2.5–5 mm, apex obtuse to apiculate. Ovary ovoid, 5–8 mm, stellate tomentose. Style long, thick, glabrous or basally stellate tomentose; stigma capitate. Capsule ellipsoid, 1–1.6 cm 6–8 mm, glabrous or stellate tomentose. Seeds oblong, 1–1.5 mm, not winged. Fl. Jun–Sep.

Open forests, thickets, open places; 1600–4200 m. S Xizang, Yunnan (Mojiang Hanizu Zizhi Xian, Luxi Xian) [Bhutan, India, Nepal, Sikkim].

**3. *Buddleja yunnanensis*** Gagnepain, Notul. Syst. (Paris) 2: 187. 1912.

云南醉鱼草 yun nan zui yu cao

Shrubs 0.5–4 m tall. Branchlets nearly 4-angled, stellate pubescent, glabrescent. Leaves subsessile to petiole 5 mm; leaf blade elliptic, ovate, or narrowly ovate, 2–12 × 1–4.5 cm, abaxially densely stellate tomentose, adaxially glabrous or with scattered stellate hairs, base cuneate to decurrent, margin subentire to coarsely dentate-serrate, apex acuminate; lateral veins 4–6 per side. Inflorescences terminal, densely spicate, 2–6 × 1.5–2 cm. Flowers sessile. Calyx campanulate, 4–6 mm, outside densely stellate and glandular hairy, inside often glabrous; lobes triangular, 1–2 mm. Corolla lilac, 1–1.2 cm; tube 8–9.5 mm, outside densely stellate and glandular hairy, inside stellate pilose and with some glandular hairs except for base; lobes oblong, 2–2.5 × ca. 1.5 mm. Stamens inserted near base of corolla tube; anthers ovate. Ovary ovoid, 2–3 × ca. 2 mm, stellate tomentose except for lower third; stigma subcapitate. Capsule ellipsoid, 4–5 × 2.3–3 mm, stellate pubescent. Seeds obliquely ovoid to ellipsoid, not winged. Fl. Jun–Oct.

\* Forest edges, thickets in mountains; 1000–2500 m. Yunnan.

**4. *Buddleja brachystachya*** Diels, Notes Roy. Bot. Gard. Edinburgh 5: 249. 1912.

短序醉鱼草 duan xu zui yu cao

*Buddleja nana* W. W. Smith; *B. purdomii* W. W. Smith; *B. purdomii* var. *fulvotomentosa* Z. Y. Zhang.

Shrubs to 1 m tall. Branchlets subquadrangular to subterete, stellate tomentose, glabrescent. Leaves sessile or petiolate; petiole to 7 mm, stellate tomentose; leaf blade elliptic to ovate or very narrowly so, 1–3.5 0.5–1.7 cm, abaxially sparsely to densely stellate tomentose and with some glandular hairs, adaxially sparsely so subglabrous, base rounded, cuneate, or decurrent, margin entire or obscurely sinuate, apex acute to slightly obtuse; lateral veins 4 or 5 per side. Inflorescences terminal

thyrsoid cymes, 6–12-flowered, 1.5–3 1.5–2.5 cm. Calyx outside short stellate tomentose; lobes triangular to narrowly so, 1–4 mm. Corolla lavender; tube often curved, 0.8–1.3 cm 1.5–2 mm, outside short stellate tomentose, inside pilose or sometimes glabrous at base; lobes suborbicular, 3–5 3–5 mm, inside glabrous, margin entire or subcrenate. Stamens inserted slightly above middle of corolla tube, included; anthers oblong to suboblong. Ovary ellipsoid, 1.5–2 mm, stellate tomentose except for glabrous base. Stigma clavate. Capsule ovoid to ellipsoid, 5–6 ca. 2 mm, glabrous or stellate tomentose. Seeds ovate, ca. 1 mm, not winged. Fl. Mar–Jun.

\* Scrub in mountains, along dry river banks; 1000–2700 m. Gansu, Sichuan, Yunnan.

**5. *Buddleja curviflora*** Hooker & Arnott, Bot. Beechey Voy. 267. 1838.

台湾醉鱼草 tai wan zui yu cao

*Buddleja formosana* Hatusima; *B. venenifera* Makino.

Shrubs 1–1.5 m tall; leaves, petioles, and inflorescences tawny tomentose or pubescent with stellate hairs, glabrescent. Stems brown; branchlets terete or occasionally obscurely angular. Petiole 0.5–2 cm; leaf blade ovate, less often narrowly ovate to elliptic, 5–16 2–7 cm, base cuneate, rounded, or subtruncate, margin entire, subentire, or with some obscure teeth, apex acuminate, acute, or sometimes obtuse; lateral veins 5–7 per side. Inflorescences terminal, spicate or thyrsoid cymes, 5–20 2–4 cm. Calyx campanulate, 2–3.5 mm, outside stellate tomentose and with minute glandular hairs; lobes ovate to triangular, 0.5–1 mm, inside glabrous. Corolla purple, 1.1–2 cm; tube dilated and curved, apically 1.4–2.5 mm in diam., basally 1.2–1.5 mm in diam.; lobes suborbicular, 1.5–2.5 1.5–2.5 mm, outside stellate tomentose or pubescent and with minute glandular hairs. Stamens inserted near or at middle of corolla tube; anthers oblong, 1.4–2 mm. Pistil glabrous. Ovary ovoid to subovoid, 1.8–2.5 1.2–1.5 mm. Capsule ellipsoid, 5–7 2–3 mm, glabrous. Seeds obliquely ellipsoid, 1.2–1.5 mm, winged at both ends. Fl. Apr–Sep, fr. Aug–Dec.

Thickets; 100–300 m. S Taiwan [Japan].

**6. *Buddleja lindleyana*** Fortune in Lindley, Bot. Reg. 30 (Misc.): 25. 1844.

醉鱼草 zui yu cao

*Adenoplea lindleyana* (Fortune) Small; *Buddleja lindleyana* var. *sinuatodentata* Hemsley.

Shrubs 1–3 m tall; young branchlets, leaves abaxially, petioles, and inflorescences densely rusty pubescent with stellate and/or glandular hairs. Stems brown, branchlets quadrangular to subquadrangular. Stipules absent. Petiole 1–7 mm; leaf blade ovate to elliptic or narrowly so, 3–11 × 1–5 cm,

membranous when dry, adaxially glabrous or sparsely pubescent, base cuneate, margin entire to coarsely sinuate-dentate, apex acuminate; lateral veins 6–8 per side, conspicuous. Inflorescences terminal, spicate cymes, 4–20 × 2–4 cm; lower bracts leafy, often linear, 1–10 mm. Calyx campanulate to urceolate, 2–4 mm; lobes broadly triangular, 0.2–1 × 0.5–1 mm, outside densely pubescent with glandular and often also with some stellate hairs. Corolla purple, 1.3–2 cm; tube 1.1–1.7 cm, curved below middle, apically 2.5–4 mm in diam., basally 1–1.5 mm wide, outside pubescent with glandular and often also with some stellate hairs; lobes suborbicular, 2–3.5 × 2–3 mm. Stamens inserted at or near base of corolla tube; anthers oblong to ovate. Pistil glabrous. Ovary ovoid, 1.5–2.2 mm. Stigma clavate. Capsule ellipsoid, 4–6 × 1.5–2 mm, glandular-pubescent or less often glabrous. Seeds pale brown, obliquely tetrahedral, narrowly winged at edges. Fl. Apr–Oct, fr. Apr of following year.

\* Mountains beside trails, scrub by streams, forest edges; 200–2700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang.

Cultivated, medicinal, poisonous.

**7. *Buddleja crispa*** Bentham, Scroph. Ind. 43. 1835.

皱叶醉鱼草 zhou ye zui yu cao

*Buddleja acosma* C. Marquand; *B. agathosma* Diels; *B. agathosma* var. *glandulifera* C. Marquand; *B. caryopteridifolia* W. W. Smith; *B. caryopteridifolia* var. *eremophila* (W. W. Smith) C. Marquand; *B. caryopteridifolia* var. *fasciculiflora* Z. Y. Zhang; *B. caryopteridifolia* var. *lanuginosa* C. Marquand; *B. crispa* var. *amplexicaulis* Z. Y. Zhang; *B. crispa* var. *dicipiens* Schmidt; *B. crispa* var. *farreri* (I. B. Balfour & W. W. Smith) Handel-Mazzetti; *B. crispa* var. *glandulifera* (C. Marquand) S. Y. Pao; *B. crispa* var. *grandiflora* (C. Marquand) S. Y. Pao; *B. eremophila* W. W. Smith; *B. farreri* I. B. Balfour & W. W. Smith; *B. hastata* Prain ex C. Marquand; *B. incompta* W. W. Smith; *B. praecox* Lingelsheim; *B. sterniana* A. Cotton; *B. tibetica* W. W. Smith; *B. tibetica* var. *farreri* (I. B. Balfour & W. W. Smith) C. Marquand; *B. tibetica* var. *glandulifera* C. Marquand; *B. tibetica* var. *grandiflora* C. Marquand; *B. tibetica* var. *truncatifolia* (H. Léveillé) C. Marquand; *B. truncata* Gagnepain; *B. truncatifolia* H. Léveillé; *B. whitei* Kraenzlin.

Shrubs 0.2–5 m tall. Branchlets subterete to 4-angled, densely stellate tomentose. Stipules suborbicular to cordate, 0.3–3 cm. Leaves petiolate, sessile, or connate-perfoliate, usually amplexicaul on vigorous shoots; petiole often winged, to 4 cm; leaf blade ovate to triangular or narrowly so, 1–20 × 0.5–8 cm, densely tomentose, often glabrescent especially adaxially, base mostly rounded to cordate, margin crenate, serrate, dentate, or shallowly lobed and then lower lobes often large, apex acuminate, acute, or obtuse; lateral veins 3–11 per side. Inflorescences terminal, paniculate or spicate cymes, 1–20 × 1–15 cm; bracteoles several to many, almost linear, 0.4–2.5 cm. Calyx campanulate, 3–9 mm, outside densely stellate tomentose and with some glandular hairs, inside often glabrous; lobes ovate to triangular, 0.8–1.7 mm. Corolla lilac, violet, or purple, with an orange throat, 0.7–1.6 cm, outside densely to sparsely stellate tomentose and with glandular hairs

or glabrous, inside with a pilose belt; tube 6–12 × 1–2 mm; lobes suborbicular, 1.2–4 × 1.2–4 mm. Stamens inserted slightly above or at middle of corolla tube; anthers sessile. Pistil 3–5 mm. Ovary ovoid, 1.2–2 mm, stellate tomentose. Style 1.5–2.5 mm, base stellate tomentose; stigma clavate. Capsule ellipsoid, 5–6 × 2–3 mm, stellate tomentose. Seeds ovate-oblong, ca. 1 mm, not winged. Fl. Feb–Aug.

Dry river bottoms, slopes with boulders, exposed cliffs, thickets; 1400–4300 m. Gansu, Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, N India, Nepal, Pakistan].

Medicinal.

**8. *Buddleja delavayi*** Gagnepain, Notul. Syst. (Paris) 2: 190. 1912.

腺叶醉鱼草 xian ye zui yu cao

*Buddleja delavayi* var. *tomentosa* H. F. Comber; *B. glabrescens* W. W. Smith; *B. heliophila* W. W. Smith; *B. heliophila* var. *adenophora* Handel-Mazzetti; *B. heliophila* var. *angustifolia* C. Marquand; *B. heliophila* var. *pubescens* C. Marquand.

Shrubs or small trees 1–6 m tall. Branches subterete, glabrous or stellate tomentose, soon glabrescent; nodes slightly inflated. Petiole to 5 mm; leaf blade ovate to very narrowly elliptic, 4–16 × 1.5–6.5 cm, stellate tomentose to almost glabrous, abaxially often with some glandular hairs, base cuneate to decurrent, margin usually entire or repand-dentate, apex acuminate; lateral veins 4–7 per side, abaxially conspicuous. Inflorescences terminal and axillary, paniculate cymes, 4–12 × 3–7 cm; peduncle stellate tomentose. Calyx campanulate, 2.5–5 mm; lobes triangular, 0.5–1.5 mm, outside stellate tomentose or glabrous, apex acuminate. Corolla rose pink to lavender, 1.1–1.6 cm, outside sparsely to densely stellate tomentose and often with some glandular hairs; tube 1–1.4 cm × 1.5–2 mm, inside with a few scattered glandular hairs; lobes suborbicular, 2–4.5 mm, inside glabrous. Stamens inserted slightly above middle of corolla tube, included; anther sessile or subsessile, ovate to triangular, 1.5–2 mm. Ovary ovoid, 1.5–2 mm, glabrous or stellate tomentose. Style short; stigma clavate. Capsule ellipsoid, 4–10 × 2–4 mm, glabrous or partially stellate tomentose. Seeds narrowly elliptic, ca. 2 mm, winged all around. Fl. Jan–Apr.

\* Forests edges, thickets in valleys, along trails in mountains; 2000–3000 m. Xizang, Yunnan.

**9. *Buddleja forrestii*** Diels, Notes Roy. Bot. Gard. Edinburgh 5: 249. 1912.

滇川醉鱼草 dian chuan zui yu cao

*Buddleja cooperi* W. W. Smith; *B. forrestii* var. *gracilis* Lingelsheim; *B. henryi* Rehder & E. H. Wilson; *B. henryi* var. *glabrescens* C. Marquand; *B. latiflora* S. Y. Pao; *B. limitanea* W. W. Smith; *B. longifolia* Gagnepain; *B. pterocaulis* A. B. Jackson; *B. subherbacea* Keenan; *B. taliensis* W. W. Smith.

Shrubs 1–6 m tall; young branchlets, leaves, petioles, and inflorescences glabrous or stellate pubescent or tomentose and with glandular hairs but soon glabrescent. Branchlets nearly

4-angled, often narrowly winged. Petiole 2–15 mm; leaf blade ± narrowly elliptic, 5–35 × 1–8 cm, base cuneate to decurrent, margin crenate-serrate, serrate, less often dentate, or subentire, apex acuminate; lateral veins 8–18 per side. Inflorescences terminal and often also in or above axils of upper leaves, thyrsoid or less often paniculate, lax to almost spikelike and then interrupted or not, 6–25 × 2–8 cm. Calyx campanulate, 3.5–7 mm, outside glabrous or stellate tomentose and with some minute glandular hairs; lobes triangular, 1–2 mm. Corolla orange, pinkish, purple, or mauve, 0.9–1.6 cm; tube 7–11 × (1.2–)2–3.5 mm, inside pilose above middle; lobes suborbicular, 2–6 × 2–5.5 mm, inside glabrous or with some glandular hairs, outside glabrous or stellate tomentose and with some minute glandular hairs. Stamens inserted above or below middle of corolla tube; anthers ovate. Ovary ovoid to subovoid, 2–6 × 1–3 mm, stellate tomentose or glabrous. Capsule ellipsoid to narrowly ovoid, 6–12 × 2–4 mm, with some glandular hairs. Seeds narrowly elliptic, 2–4 mm, winged all around. Fl. Jun–Oct.

Open woodlands, forest edges, scrub, mostly near riverbanks in mountains; 1800–4000 m. Sichuan, SE Xizang, Yunnan [Bhutan, India, N Myanmar].

*Buddleja forrestii* × *B. macrostachya* has been reported from Mengzi Xian in Yunnan (Leeuwenberg, Meded. Landbouwhogeschool 79(6): 149. 1979). This hybrid has the following characteristics: Shrubs. Branchlets 4-angled or nearly so and often narrowly winged, stellate tomentose or pubescent and/or with glandular hairs, glabrescent. Petiole to 1.5 cm; leaf blade elliptic to narrowly elliptic, 10–20 × 3–7 cm, stellate tomentose, margin crenate-serrate to serrate. Inflorescences thyrsoid or paniculate cymes. Calyx campanulate, outside glabrous or stellate tomentose and with some minute glandular hairs. Corolla purple to pinkish; tube ca. 9 mm, outside glabrous or loosely stellate tomentose only on apical half; lobes suborbicular, 2–6 × 2–6 mm. Stamens inserted below corolla mouth. Ovary ovoid, 2–4 × 1.2–1.4 mm, stellate tomentose but basally glabrous. Capsule ellipsoid, 7–10 mm, stellate tomentose.

**10. *Buddleja albiflora*** Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 118. 1889.

巴东醉鱼草 ba dong zui yu cao

*Buddleja albiflora* var. *giraldii* (Diels) Rehder & E. H. Wilson; *B. albiflora* var. *hemsleyana* (Koehne) C. K. Schneider; *B. giraldii* Diels; *B. hemsleyana* Koehne.

Shrubs 1–3 m tall; branchlets, petioles, inflorescences, calyces, and outside of corollas glabrous or less often minutely stellate tomentose and with glandular hairs when young but glabrescent. Branchlets terete or nearly 4-angled. Petiole 2–15 mm; leaf blade ovate to narrowly elliptic, 7–30 × 1.5–10 cm, abaxially minutely stellate tomentose and with some glandular hairs, adaxially glabrous or with scattered stellate and/or glandular hairs, base cuneate to rounded, margin crenate-serrate to sometime subentire, apex acuminate; lateral veins 10–17 per side. Inflorescences terminal, thyrsoid cymes, mostly narrow and almost cylindrical, 7–25 × 2–5 cm. Calyx campanulate, 2–3.5 mm; lobes triangular, 0.5–1.7 mm. Corolla lilac, 5–8 mm; tube 4–6.5 × 1.5–3 mm, outside glabrous or

pubescent above middle; lobes suborbicular, 1.2–1.5 × 1.2–1.5 mm. Stamens inserted just inside corolla mouth; anther sessile. Pistil glabrous. Ovary ovoid, 1.5–1.7 mm. Style 1–1.5 mm; stigma clavate. Capsule ellipsoid, 5–8 × 2–3 mm, glabrous. Seeds brown, fusiform, narrowly winged at ends. Fl. Feb–Sep.

\* Open woodlands, forest edges, stream banks; 500–3000 m. Gansu, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

*Buddleja ×alata* Rehder & E. H. Wilson has been named for what is probably a hybrid between *B. albiflora* and *B. nivea* (Rehder & E. H. Wilson in Sargent, Pl. Wilson. 1: 570. 1913). This hybrid species has been collected in W Sichuan at 1300–3000 m and has the following characteristics: Shrubs 1–3 m tall; young branchlets, petioles, leaves abaxially, calyces, and corollas with scattered stellate and glandular hairs to subglabrous. Branchlets 4-angled and with 4 elevated wings. Petiole 1–1.5 cm; leaf blade narrowly ovate, 15–25 × 4–8 cm, base cuneate, margin serrate, apex acuminate; veins reticulate. Inflorescences terminal and in axils of apical leaves, seemingly racemose or thyrsoid cymes, 10–20 × 1.5–2.5 cm; bracts and bracteoles subulate, ca. 2.5 mm. Calyx campanulate, ca. 3 mm; lobes triangular, ca. 1 mm. Corolla lilac, outside stellate tomentose; tube ca. 5 mm, inside pilose but glabrous at base; lobes suborbicular, 1–1.5 × 1–1.5 mm, inside pilose only at base. Stamens inserted just below corolla mouth. Ovary ca. 1 mm, stellate tomentose. Style ca. 1 mm; stigma clavate, ca. 0.5 mm. Capsule oblong, ca. 5 mm, sparsely stellate tomentose. Seeds winged at both ends. Fl. Apr–Oct.

**11. *Buddleja davidii*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 65. 1887.

大叶醉鱼草 da ye zui yu cao

*Buddleja davidii* var. *alba* Rehder & E. H. Wilson; *B. davidii* var. *glabrescens* Gagnepain; *B. davidii* var. *magnifica* (E. H. Wilson) Rehder & E. H. Wilson; *B. davidii* var. *nanhoensis* (Chittenden) Rehder; *B. davidii* var. *superba* (Veitch) Rehder & E. H. Wilson; *B. davidii* var. *veitchiana* (Veitch) Rehder & Bailey; *B. davidii* var. *wilsonii* (E. H. Wilson) Rehder & E. H. Wilson; *B. shaanxiensis* Z. Y. Zhang; *B. shimidzuana* Nakai; *B. striata* Z. Y. Zhang; *B. striata* var. *zhouquensis* Z. Y. Zhang; *B. variabilis* Hemsley; *B. variabilis* var. *magnifica* E. H. Wilson; *B. variabilis* var. *nanhoensis* Chittenden; *B. variabilis* var. *prostrata* C. K. Schneider; *B. variabilis* var. *superba* Veitch; *B. variabilis* var. *veitchiana* Veitch; *B. variabilis* var. *wilsonii* E. H. Wilson.

Shrubs 0.5–5 m tall; young branchlets, leaves abaxially, petioles, and inflorescences white tomentose or pubescent with stellate hairs. Branchlets nearly 4-angled. Stipules often present, suborbicular to ovate, 1–6 mm. Petiole 1–5 mm; leaf blade narrowly ovate, narrowly elliptic, or very narrowly ovate, 4–20 × 0.3–7.5 cm, adaxially dark green and glabrous or subglabrous, base cuneate, margin serrate, apex acuminate; lateral veins 9–14 per side. Inflorescences terminal, seemingly racemose or thyrsoid cymes, 4–30 × 2–5 cm; lower bracts leafy, others small and linear. Calyx campanulate, 2–3.5 mm, outside stellate pubescent to glabrous; lobes narrowly triangular, 0.5–2 mm. Corolla violet to dark purple, sometimes white, with an orange-yellow throat, 0.8–1.4 cm, outside glabrous or stellate pubescent and/or with glandular hairs; tube narrowly cylindrical or

subcylindric, 6–11.5 × 1–1.5 mm, inside pilose except at base; lobes suborbicular, 1.5–3 × 1.5–3 mm, outside glabrous. Stamens inserted at middle to near base of corolla tube; anthers oblong, 0.8–1.2 mm. Ovary ovoid, 1.2–2 × 0.8–1.1 mm, glabrous to minutely pubescent, sometimes with glandular hairs. Style 0.5–1.5 mm; stigma clavate. Capsule brown, narrowly ellipsoid to narrowly ovoid, 5–9 × 1.5–2 mm, glabrous or sparsely stellate pubescent. Seeds ellipsoid, 2–4 × ca. 0.5 mm, long winged at both ends. Fl. May–Oct.

Thickets on mountain slopes, side of draws in mountains; 800–3000 m. Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Japan (most probably introduced)].

Medicinal; ornamental.

*Buddleja davidii* × *B. fallowiana* has been reported from Yunnan (Lieuwenberg, Meded. Landbouwhogeschool 79(6): 149. 1979). This hybrid has the following characteristics: Shrubs. Branchlets terete, densely stellate tomentose. Leaves subsessile to petiole 6 mm; leaf blade ovate to narrowly elliptic, 4–13 × 1–6.5 cm, both surfaces densely stellate tomentose to adaxially glabrescent, base cuneate to decurrent, margin crenate-serrate, apex acuminate, acute, or obtuse, venation inconspicuous. Inflorescences terminal, thyrsoid, 5–15 × 2–3 cm. Calyx campanulate, 3.5–5 mm, inside densely stellate tomentose. Corolla violet to lilac, with an orange-yellow throat, outside densely stellate tomentose and with glandular hairs, tube ca. 9 mm; lobes orbicular, 1–3 × 1–3 mm. Stamens inserted above middle of corolla tube; anthers oblong. Ovary oblong, stellate tomentose. Fl. May–Oct.

**12. *Buddleja asiatica*** Loureiro, Fl. Cochinch. 1: 72. 1790.

白背枫 bai bei feng

*Buddleja acuminatissima* Blume; *B. amentacea* Kraenzlin; *B. arfakensis* Kanehira & Hatusima; *B. asiatica* var. *brevicuspe* Koorders; *B. asiatica* var. *densiflora* (Blume) Koorders & Valetton; *B. asiatica* var. *salicina* (Lamarck) Koorders & Valetton; *B. asiatica* var. *sundaica* (Blume) Koorders & Valetton; *B. densiflora* Blume; *B. neemda* Buchanan-Hamilton ex Roxburgh; *B. neemda* var. *philippensis* Chamisso & Schlechtendal; *B. salicina* Lamarck; *B. serrulata* Roth; *B. subserrata* Buchanan-Hamilton ex D. Don; *B. sundaica* Blume; *B. virgata* Blanco; *Vitex esquirolii* H. Léveillé.

Shrubs or small trees 1–8 m tall; young branchlets, leaves abaxially, petioles, and inflorescences densely stellate pubescent or woolly with white, gray, or tawny hairs. Branchlets terete or subterete. Leaves opposite, sometimes alternate toward branchlet apex. Petiole 2–15 mm; leaf blade narrowly to very narrowly elliptic, 6–30 × 1–7 cm, adaxially stellate pubescent or glabrous, base cuneate to decurrent, margin subentire or remotely serrate-dentate, apex acuminate; lateral veins 10–14 per side. Inflorescences terminal and/or axillary, 1–3 or more seemingly racemose cymes together, 5–25 × 0.7–2 cm; bracteoles linear. Pedicel to 2 mm. Calyx campanulate, 1.5–4.5 mm; lobes triangular, outside stellate pubescent or tomentose, inside glabrous. Corolla white, rarely pale violet or greenish; tube 2.5–4.8 mm, outside densely to sparsely stellate pubescent; lobes suborbicular, 1–1.7 × 1–1.5



mm, spreading. Stamens inserted above middle of corolla tube to nearly at mouth, included; anthers oblong. Ovary ovoid to narrowly ovoid, 1–1.5 × 0.8–1 mm, glabrous or scaly. Style short; stigma capitate. Capsule ellipsoid, 3–5 × 1.5–3 mm, glabrous or sparsely and minutely scaly. Seeds pale brown, elliptic, 0.8–1 × 0.3–0.4 mm, short winged at both ends. Fl. Jan–Oct; fr. Mar–Dec.

Open places, at edge of open forests, open woodlands; near sea level to 2800 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Shanxi, Sichuan, Taiwan, Xizang, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Thailand, Vietnam].

Medicinal and source of perfume.

**13. *Buddleja myriantha*** Diels, Notes Roy. Bot. Gard. Edinburgh 5: 250. 1912.

酒药花醉鱼草 jiu yao hua zui yu cao

*Buddleja adenantha* Diels; *B. duclouxii* C. Marquand.

Shrubs 1–3 m tall. Branchlets nearly 4-angled, stellate tomentose, glabrescent. Petiole to 6 mm; leaf blade narrowly to very narrowly elliptic, 5–20 × 1–6 cm, abaxially stellate tomentose, adaxially with stellate hairs and some spreading glandular hairs, base cuneate to decurrent, margin serrate, crenate-serrate, or subentire, apex acuminate; lateral veins 7–12 per side. Inflorescences terminal, almost cylindrical, sometimes formed by three slender spicate or thyrsoid cymes, 6–22 × 1–3 cm. Calyx campanulate, 2–4 mm, outside stellate tomentose, inside with minute glandular hairs or glabrous. Corolla purple to violet or white, outside stellate tomentose and often also with glandular hairs, inside pilose but glabrous at base, tube 4–5.8 × 1–1.3 mm; lobes suborbicular, ca. 1–1.2 × 1–1.2 mm, inside glabrous. Stamens inserted just below corolla mouth; anthers sessile, oblong, 0.8–1.2 mm. Ovary ovoid, 1.5–2 mm, glabrous or short stellate tomentose on apical half. Style 1–1.5 mm; stigma clavate. Capsule ellipsoid, 4–6 × 1.5–2 mm, usually glabrous. Seeds fusiform, 2–2.5 mm, narrowly winged at both ends. Fl. Apr–Oct.

Open woodlands, forest edges, thickets, stream banks; 400–3400 m. Fujian, Gansu, Guangdong, Guizhou, Hunan, Sichuan, Xizang, Yunnan [Myanmar].

**14. *Buddleja candida*** Dunn, Bull. Misc. Inform. Kew 1920: 134. 1920.

密香醉鱼草 mi xiang zui yu cao

Shrubs 1–2 m tall; young branchlets, leaves abaxially, petioles, and inflorescences densely stellate tomentose. Branchlets terete or subterete. Petiole 0.5–1.5 cm; leaf blade oblong or narrowly so, 12–24 × 3–6 cm, adaxially stellate tomentose but glabrescent and bullate to rugose with age, base cuneate to decurrent, margin serrate to crenate, apex acuminate; lateral veins 10–12 per side. Inflorescences terminal panicles composed of several interrupted spikelike thyrsi, 8–20 × 3–11 cm. Calyx campanulate, ca. 3 mm, outside densely stellate tomentose and with some glandular hairs, inside glabrous; lobes triangular, ca. 1.7 mm. Corolla violet, ca. 6 mm; tube ca.

4.8 mm, outside stellate tomentose, inside pilose above middle; lobes suborbicular, ca. 1.2 × 1.2 mm, inside glabrous. Stamens inserted at middle of corolla tube; anthers sessile, oblong, ca. 1.2 mm. Ovary ovoid to conical, ca. 2.2 × 1.5 mm, stellate tomentose except for glabrous base; stigma clavate. Capsule ellipsoid, ca. 6 × 2 mm, stellate tomentose and with glandular hairs. Seeds fusiform, winged at both ends. Fl. Apr–Oct.

Forest edges, thickets on mountains, riverbanks; 1000–2500 m. S Sichuan, SE Xizang, Yunnan [NE India].

*Buddleja ×griffithii* (C. B. Clarke) C. Marquand has been named for what is probably a hybrid between *B. candida* and *B. macrostachya* (Marquand, Bull. Misc. Inform. Kew 1930: 194. 1930). This hybrid species has been collected in Qinghai, Xizang, E Bangladesh, and Bhutan at altitudes of 700–800 m and has the following characteristics: Shrubs or small trees, to 6 m tall. Branchlets terete, stellate tomentose. Leaves sessile; leaf blade narrowly to very narrowly elliptic, 4–27 × 1–12 cm wide, both surfaces stellate tomentose or adaxially sometime glabrescent, margin serrate. Inflorescences terminal and axillary, spicate cymes, to 20 × 1–1.5 cm, densely stellate tomentose. Corolla lead blue, with an orange throat; tube 4–5 × ca. 1 mm, rarely smaller; lobes suborbicular, 1–2 mm. Stamens inserted below corolla mouth. Ovary ovoid, stellate tomentose and with glandular hairs. Capsule ellipsoid, 4–5 mm, stellate tomentose. Seeds winged at both ends.

**15. *Buddleja nivea*** Duthie, Gard. Chron., ser. 3, 38: 275. 1905.

金沙江醉鱼草 jin sha jiang zui yu cao

*Buddleja macrostachya* Wallich ex Benth var. *yunnanensis* Dop; *B. nivea* var. *yunnanensis* (Dop) Rehder & E. H. Wilson; *B. stenostachya* Rehder & E. H. Wilson.

Shrubs 1–3 m tall; branchlets, leaves abaxially, petioles, and inflorescences densely stellate tomentose. Branchlets terete or 4-angled. Petiole 0.5–1.5 cm; leaf blade narrowly ovate to elliptic, 5–26 × 1.5–11 cm, adaxially glabrous or with spreading hairs and/or stellate tomentose on midrib, base cuneate, rounded, or subcordate, margin serrate to crenate, apex acuminate; lateral veins 12–16 per side. Inflorescences terminal and often also in axils of upper leaves, spicate or thyrsoid cymes, mostly narrow and almost cylindrical, 10–30 × 2–5 cm. Calyx campanulate, 3–4 mm, outside densely stellate tomentose, inside glabrous. Corolla purple, 6–8 mm, outside densely stellate tomentose; tube 5–6 × 1.8–3 mm, inside pilose on apical half; lobes suborbicular, 1.2–2 × 1.2–2 mm, inside pilose. Stamens inserted near corolla mouth; anthers narrowly ovate, 1.3–1.5 mm, apex reaching corolla mouth. Ovary ovoid, ca. 2 × 1–1.5 mm, stellate tomentose. Style 1–1.5 mm, glabrous or basally stellate tomentose; stigma capitate. Capsule ellipsoid, 5–8 × 2–3 mm, stellate tomentose. Seeds fusiform to oblong-ellipsoid, 2–3.5 mm, winged at both ends. Fl. Jun–Sep.

\* Open woodlands and border of forests, thickets on mountains; 700–3600 m. Sichuan, Xizang, Yunnan.

**16. *Buddleja macrostachya*** Wallich ex Benth, Scroph. Ind. 42. 1835.

大序醉鱼草 da xu zui yu cao

*Buddleja cylindrostachya* Kraenzlin; *B. hancockii* Kraenzlin; *B. henryi* Rehder & E. H. Wilson var. *hancockii*

(Kraenzlin) C. Marquand; *B. hookeri* C. Marquand, *B. hosseusiana* Kraenzlin; *B. martii* Schmidt.

Shrubs or small trees 1–6 m tall. Branchlets 4-angled to 4-winged, stellate tomentose when young, glabrescent. Leaves sessile or subsessile; interpetiolar stipules leaflike, sometimes deciduous; leaf blade narrowly to very narrowly elliptic, 4–45 × 1–15 cm, abaxially densely stellate tomentose, adaxially stellate tomentose but glabrescent, base cuneate to decurrent into very short petiole or into leaf base, margin crenate-serrate, apex acuminate; lateral veins 16–26 per side. Inflorescences terminal, spicate, dense or less often interrupted, 5–20 × 2.5–4 cm. Calyx campanulate, 3–6 mm, outside stellate tomentose and often with a few glandular hairs, inside glabrous; lobes triangular, 1.2–2.5 × 1–1.8 mm. Corolla mauve, purple, pinkish, or lilac, with an orange to red throat, 0.9–1.5 cm; tube cylindrical, 8–11 × 2–3.2 mm, outside stellate tomentose and often with a few glandular hairs, inside villous but basally glabrous; lobes suborbicular, 2–4 × 2–4 mm, inside glabrous. Stamens inserted slightly below corolla mouth; anthers oblong to narrowly triangular, 2–2.5 mm. Ovary ovoid, 2–4 × 1.5–2.5 mm, stellate tomentose and often with glandular hairs. Style 0.5–3 mm, basally stellate tomentose and with glandular hairs like ovary; stigma clavate. Capsule ellipsoid to narrowly ovoid, 7–10 × 3–4 mm, stellate tomentose, glabrescent. Seeds pale brown, 3–3.5 mm, long winged at both ends. Fl. Mar–Sep.

Scrub on mountain slopes, river banks in forests; 900–3200 m. Guizhou, Sichuan, Xizang, Yunnan [Bangladesh, Bhutan, India, Myanmar, Sikkim, Thailand, Vietnam].

**17. *Buddleja fallowiana*** I. B. Balfour & W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 15. 1917.

紫花醉鱼草 *zi hua zui yu cao*

*Buddleja fallowiana* var. *alba* Sabourin.

Shrubs 1–5 m tall; branchlets, leaves abaxially, petioles, inflorescences, bracts, and calyces and corollas outside densely stellate tomentose and with glandular hairs. Branchlets terete. Petiole 5–10 mm; leaf blade ovate to narrowly elliptic, 5–14 2–6.5 cm, adaxially densely stellate tomentose when young, glabrescent, base cuneate to decurrent, margin serrate, apex usually acuminate to acute; lateral veins 8–10 per side, inconspicuous. Inflorescences terminal, thyrsoïd, 5–15 2–3 cm. Calyx campanulate, 3.5–5 mm; lobes triangular, 1.5–2.5 mm, apex acuminate. Corolla white or lavender, with an orange throat, 9–14 mm; tube cylindrical, 7–10 1–1.5 mm, outside stellate tomentose, inside pilose but basally glabrous; lobes elliptic to subelliptic, 2–4 1.5–3 mm, margin crenate-serrate. Stamens inserted near corolla mouth; anthers oblong, 1–1.5 mm. Pistil stellate tomentose except for glabrous apex of style. Ovary ovoid, 1.2–2 1–1.4 mm; stigma large, clavate. Capsule ellipsoid, 4–7 2–4 mm, stellate tomentose. Seeds oblong, winged all around. Fl. May–Oct.

\* Open woodlands and thickets in mountains; 1200–3800 m. Sichuan, Xizang, Yunnan.

Medicinal.

**18. *Buddleja paniculata*** Wallich in Roxburgh, Fl. Ind. 1: 412. 1820.

喉药醉鱼草 *hou yao zui yu cao*

*Buddleja acutifolia* C. H. Wright; *B. gynandra* C. Marquand; *B. lavandulacea* Kraenzlin; *B. mairei* H. Léveillé.

Shrubs or small trees 1–6 m tall. Branchlets terete or nearly 4-angled, stellate tomentose. Stipules present, sometimes leafy. Petiole 0.2–2 cm; leaf blade narrowly elliptic, narrowly ovate, or less often ovate or elliptic, 2–25 0.7–9 cm, abaxially stellate tomentose, adaxially slightly bullate, stellate tomentulose, and often with glandular hairs but glabrescent, base decurrent, margin entire or less often serrate, apex acuminate to rarely acute or obtuse; lateral veins 8–13 per side. Inflorescences terminal and in axils of apical leaves, paniculate or thyrsoïd cymes, 3–25 2–12 cm. Calyx campanulate, 2.5–4 mm, outside stellate tomentose and mostly with glandular hairs, inside usually glabrous; lobes triangular to broadly triangular, 0.3–1.2 mm. Corolla white, pink, or lavender, with an orange throat, 7–12 mm, outside stellate tomentose and with some glandular hairs; tube 6–10 1.2–1.6(–2) mm, inside pilose above base; lobes suborbicular, 2–2.5 1.8–2.2 mm. Stamens inserted just below corolla mouth, included; anthers oblong, 1–1.2 mm. Ovary ovoid, 1.2–2 0.8–1.2 mm, stellate pubescent and with glandular hairs except for glabrous base. Stigma clavate, 1–1.5 mm. Capsule ellipsoid, 4–7 2–3 mm, stellate pubescent, glabrescent. Seeds oblong, 1–1.2 mm, winged at both ends. Fl. Mar–Jun. *2n* = 38.

Forest edges in mountains, open woodlands, thickets; 500–3000 m. Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan [Bhutan, N India, Myanmar, Nepal, Vietnam].

**19. *Buddleja madagascariensis*** Lamarck, Tabl. Encycl. 1: 291. 1792.

浆果醉鱼草 *jiang guo zui yu cao*

*Adenoplea madagascariensis* (Lamarck) Eastwood; *Nicodemia madagascariensis* (Lamarck) R. Parker.

Shrubs or climbers 2–10 m; branchlets, leaf blades abaxially, petioles, and inflorescences densely grayish white stellate tomentose, drying rusty. Branchlets terete. Petiole 0.5–2 cm; leaf blade narrowly ovate to elliptic, 2–14 1.5–7 cm, adaxially glabrous or subglabrous, base rounded, acute, cuneate, or rarely subcordate, margin entire, apex acuminate; lateral veins 6–12 per side. Inflorescences terminal, paniculate or thyrsoïd, 5–25 2–15 cm. Calyx campanulate to urceolate, 2–3.5 cm; lobes broadly triangular, 0.4–1 0.5–1 mm. Corolla dark yellow, orange, or salmon; tube 7–10 mm, outside stellate tomentose, inside with a pilose belt; lobes ovate to suborbicular, 2–4 2–3 mm. Stamens inserted just below corolla mouth; anthers oblong, 1–1.4 mm. Ovary subglobose, 1–1.5 mm, apex stellate tomentose,

4-locular. Style base stellate tomentose; stigma clavate, 1.2–1.7 mm. Berry white at first, purple–blue when ripe, globose, 2.5–5 mm in diam., glandular pubescent or glabrous, often stellate tomentose at apex. Seeds ellipsoid to obliquely ovoid, ca. 1–0.5 mm, not winged. Fl. Apr–Jun, fr. Aug–Nov.  $2n = 38$ .

100–300 m. Cultivated in Fujian, Guangdong, and Guangxi [introduced from Madagascar, cultivated throughout tropical and subtropical Asia].

Medicinal.

**20. *Buddleja officinalis*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 496. 1880.

密蒙花 mi meng hua

*Buddleja officinalis* var. *macrantha* Lingelsheim.

Shrubs 1–4 m tall; branchlets, leaves abaxially, petioles, and inflorescences densely stellate tomentose. Branchlets terete or slightly 4-angled. Petiole 0.2–3 cm; leaf blade ovate to elliptic or narrowly so, 4–19 × 2–8 cm, adaxially glabrescent, base cuneate to decurrent, margin entire, sinuate, or

repand-dentate, apex acuminate, acute, or obtuse; lateral veins 8–14 per side. Inflorescences terminal, paniculate or thyrsoid, 5–15(–30) × 2–10 cm. Calyx campanulate, 2.5–4.5 mm, outside densely stellate tomentose and with some glandular hairs; lobes triangular to broadly triangular, 0.6–1.2 × 1–1.2 mm. Corolla pinkish, lilac, or pale purple, with an orange throat, 1–1.3 cm, outside densely stellate tomentose and with some glandular hairs; tube 8–10 × (1.6–)2–2.2 mm, inside densely pilose; lobes suborbicular, 2–3 × 1.8–2.8 mm, inside glabrous. Stamens included, inserted just above middle of corolla tube; anthers oblong, 0.8–1.3 mm. Ovary ovoid, 1.5–2.2 × 1.2–1.8 mm, stellate tomentose and with some glandular hairs but glabrous below middle. Style 1–1.5 mm, basal hairs like those of ovary; stigma clavate. Capsule ellipsoid, 4–8 × 2–3 mm, stellate tomentose, glabrescent. Seeds narrowly elliptic, 1–1.2 × 0.3–0.5 mm, winged all around. Fl. Mar–Apr.

Forest edges in mountains, thickets on riverbanks; 200–2800 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan [Myanmar, Vietnam].

Source of dye, food, medicine, and perfume.

## 8. FAGRAEA Thunberg, Kongl. Vetensk. Acad. Nya Handl. 3: 132. 1782.

灰莉属 hui li shu

Trees or shrubs, sometimes scandent, epiphytes or semi-epiphytes. Leaves petiolate or sometimes sessile; stipules connate into an ocrea usually split early into 2 axillary scales; leaf blade margin entire or rarely crenulate; veins often inconspicuous. Flowers terminal or axillary, solitary or in cymes forming racemes, corymbs, or panicles, 5-merous, large. Calyx deeply divided; lobes broad, thick, imbricate, base inside with colleters. Corolla funnelform to salverform, with a long tube; lobes shorter than tube, contorted, overlapping to right in bud. Stamens inserted at or near corolla mouth, often exserted; filaments filiform; anthers introrse. Ovary 1-locular with parietal placentation or 2-locular with axile placentation; ovules many per locule. Style filiform to thick; stigma capitate, obconical, peltate, or 2-cleft. Berry globose to ellipsoid, 1- or 2-locular, many seeded. Endosperm horny.

About 35 species: SE Asia, Australia, Pacific Islands; one species in China.

**1. *Fagraea ceilanica*** Thunberg, Kongl. Vetensk. Acad. Nya Handl. 3: 132. 1782.

灰莉 hui li

*Fagraea chinensis* Merrill; *F. khasiana* Bentham; *F. obovata* Wallich; *F. sasakii* Hayata.

Shrubs, scandent epiphytes, or trees to 15 m tall. Branchlets stout, with prominent leaf scars. Stipules scalelike, ca. 1 × 4 mm. Petiole 1–5 cm; leaf blade elliptic, ovate, obovate, or narrowly obovate, 5–25 × 2–10 cm, fleshy to leathery, glabrous, margin entire; lateral veins 4–10 per side, inconspicuous. Flowers terminal, solitary or in dichasial cymes.

Calyx broadly campanulate; lobes ovate to rounded, ca. 1 cm. Corolla white, funnelform, tube 3–3.5 cm; lobes obovate, 2.5–3 × ca. 2 cm. Stamens included; anthers oblong to narrowly ovate, 5–7 mm. Ovary ellipsoid to ovoid, glabrous, 2-locular. Style filiform; stigma obconical, slightly cupular to peltate. Berry ovoid, ellipsoid, or subglobose, 3–5 × 2–4 cm, apex slightly to strongly beaked. Fl. Apr–Aug.

Dense forests, woodlands on limestone; 500–1800 m. Guangdong, S Guangxi, Hainan, Taiwan, S Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

Ornamental.

