

SOLANACEAE

茄科 qie ke

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Herbs, shrubs, small trees, or climbers. Stems sometimes prickly, rarely thorny; hairs simple, branched, or stellate, sometimes glandular. Leaves alternate, solitary or paired, simple or pinnately compound, without stipules; leaf blade entire, dentate, lobed, or divided. Inflorescences terminal, overtopped by continuing axes, appearing axillary, extra-axillary, or leaf opposed, often apparently umbellate, racemose, paniculate, clustered, or solitary flowers, rarely true cymes, sometimes bracteate. Flowers mostly bisexual, usually regular, 5-merous, rarely 4- or 6–9-merous. Calyx mostly lobed. Petals united. Stamens as many as corolla lobes and alternate with them, inserted within corolla, all alike or 1 or more reduced; anthers dehiscent longitudinally or by apical pores. Ovary 2–5-locular; placentation mostly axile; ovules usually numerous. Style 1. Fruiting calyx often becoming enlarged, mostly persistent. Fruit a berry or capsule. Seeds with copious endosperm; embryo mostly curved.

About 95 genera with 2300 species: best represented in western tropical America, widespread in temperate and tropical regions; 20 genera (ten introduced) and 101 species in China.

Some species of *Solanaceae* are known in China only by plants cultivated in ornamental or specialty gardens: *Atropa belladonna* Linnaeus, *Cyphomandra betacea* (Cavanilles) Sendtner, *Brugmansia suaveolens* (Willdenow) Berchtold & Presl, *Nicotiana glauca* Link & Otto, and *Solanum jasminoides* Paxton.

Kuang Ko-zen & Lu An-ming, eds. 1978. Solanaceae. Fl. Reipubl. Popularis Sin. 67(1): 1–175.

- 1a. Flowers in several- to many-flowered inflorescences; peduncle mostly present and evident.
 - 2a. Fruit enclosed in fruiting calyx.
 - 3a. Plants copiously spiny; leaves much divided or lobed 13. *Solanum*
 - 3b. Plants unarmed; leaves entire.
 - 4a. Flowers in congested axillary clusters; disc conspicuous, red-orange; fruit a berry 10. *Withania*
 - 4b. Flowers in racemes, spikes, or panicles, sometimes umbellate; disc not evident; fruit a capsule.
 - 5a. Corolla zygomorphic, 2-lipped; fruiting calyx lobes mucronate, with strong marginal veins 6. *Hyoscyamus*
 - 5b. Corolla actinomorphic; fruiting calyx lobes lacking mucros and strong marginal veins 7. *Physochlaina*
 - 2b. Fruit exposed, exceeding fruiting calyx.
 - 6a. Corolla tube much longer than lobes and limb; seeds not compressed, usually ovoid to ellipsoid; calyx not or hardly becoming enlarged.
 - 7a. Fruit a few-seeded berry; flowers regular; plants puberulent or glabrescent; calyx less than 6 mm, shallowly lobed 18. *Cestrum*
 - 7b. Fruit a many-seeded capsule; flowers somewhat zygomorphic; plants mostly viscid glandular pubescent; calyx more than 6 mm, deeply lobed 19. *Nicotiana*
 - 6b. Corolla tube much shorter than lobes and limb; seeds mostly compressed, discoid, reniform, or lenticular; calyx often becoming enlarged.
 - 8a. Corolla yellow; anthers dehiscent longitudinally, with a slender, sterile apex; seeds pilose; flowers 5–9-merous 15. *Lycopersicon*
 - 8b. Corolla usually white, blue, or violet (if yellow then zygomorphic); anthers dehiscent by terminal pores, lacking a terminal appendage; seeds glabrous; flowers 4- or 5-merous 13. *Solanum*
- 1b. Flowers 1–3 per axil; peduncle absent or obsolete.
 - 9a. Fruit enclosed in fruiting calyx, sometimes fused with it; herbs.
 - 10a. Fruit a dry dehiscent capsule; flowering calyx more than 1.5 cm, lobed or divided halfway; corolla more than 2.5 cm.
 - 11a. Stems mostly underground; normal leaves forming a rosette at stem apex, scaly leaves distributed along new stems; flowers mostly included within rosette 5. *Przewalskia*
 - 11b. Stems aboveground; normal leaves borne along stems, scaly leaves absent; flowers arising along stem or apically in leaf axils.
 - 12a. Leaves mostly sessile, petiole if present winged; pedicel less than 5 mm; calyx lobes sharp pointed, with noticeable marginal veins 6. *Hyoscyamus*
 - 12b. Leaves petiolate, petiole wingless; pedicel more than 5 mm; calyx lobes blunt, lacking marginal veins.
 - 13a. Corolla zygomorphic, funnelform; stamens unequal; calyx lobes alike; fruiting pedicel not thickened 4. *Atropanthe*
 - 13b. Corolla regular, campanulate; stamens subequal; calyx lobes differing in size and/or shape; fruiting pedicel thickened 3. *Anisodus*
 - 10b. Fruit a juicy or dry indehiscent berry; flowering calyx mostly less than 1.5 cm (if more than 1.5 cm then corolla more than 2 cm), deeply parted; corolla less than 2 cm.
 - 14a. Corolla blue and white; fruiting calyx lobes free more than halfway down, each with 2 basal auricles; fruit a dry brown berry 1. *Nicandra*
 - 14b. Corolla yellow or white; fruiting calyx lobes united to near apex, lacking basal auricles; fruit a juicy, green, yellow, or orange berry.

- 15a. Fruiting calyx with thickened angles (ribs), bristly soft emergences that appear deltate on drying, or with both 8. *Physalistrum*
- 15b. Fruiting calyx lacking enations on ribs or walls, angles sometimes prominent but not thickened 9. *Physalis*
- 9b. Fruit fully or mostly exposed, free from calyx; herbs, shrubs, or trees.
- 16a. Fruit a dry capsule; leaves entire, dentate, or lobed.
- 17a. Calyx 5-lobed, circumscissile; fruit prickly or papillate, 4-valved or irregularly dehiscent; plants erect, mostly more than 60 cm tall; seeds discoid; corolla lobes pointed 17. *Datura*
- 17b. Calyx 5-parted, persistent; fruit unarmed, lacking papillae, 2-valved, dehiscent; plants sprawling, if erect then less than 50 cm tall; seeds ovoid or oblong; corolla mostly with rounded lobes 20. *Petunia*
- 16b. Fruit a berry, often juicy; leaves entire.
- 18a. Corolla funnelform; stamens mostly exerted; shrubs, often thorny; leaves usually fasciculate on short shoots 2. *Lycium*
- 18b. Corolla campanulate, rotate, or stellate; stamens included; unarmed herbs or shrubs; leaves arising along stem or forming a basal rosette.
- 19a. Calyx with 5 well-developed apical lobes; fruit yellow to orange or black.
- 20a. Calyx becoming enlarged, wide flaring in fruit; leaves subsessile, usually forming a basal rosette; anthers dehiscing longitudinally 16. *Mandragora*
- 20b. Calyx not enlarged; leaves petiolate, arising along stem; anthers dehiscing by apical pores 13. *Solanum*
- 19b. Calyx subtruncate, sometimes with 10 subapical teeth or umbos arising near base of apical rim; fruit red, sometimes yellow, purple, or pink in cultivation.
- 21a. Anthers dehiscing by apical pores; corolla rotate; plants sometimes pubescent with simple or branched hairs; calyx often with 10 subapical teeth 14. *Lycianthes*
- 21b. Anthers dehiscing longitudinally; corolla campanulate; plants glabrescent with sparse simple hairs; calyx 5-toothed or toothless.
- 22a. Corolla bright yellow; fruit a juicy globose berry; anther yellowish 12. *Tubocapsicum*
- 22b. Corolla white, rarely blue or violet; fruit a dry variously shaped berry; anthers purplish 11. *Capsicum*

1. NICANDRA Adanson, Fam. Pl. 2: 219. 1763.

假酸浆属 jia suan jiang shu

Herbs, with simple and glandular hairs. Leaves petiolate; leaf blade simple. Flowers solitary, axillary or in branch forks, pedicellate, actinomorphic. Calyx campanulate, deeply 5-parted. Corolla campanulate, shallowly lobed; lobes ovate. Stamens included, inserted on corolla tube; filaments slender; anthers elliptic, dehiscing longitudinally. Ovary 3–5-locular; ovules numerous. Style filiform; stigma subcapitate, 3–5-lobed. Fruiting calyx conspicuously enlarged, persistent, enclosing fruit, lobes cordate-sagittate, each with 2 basal auriculate lobes. Berry globose, dry. Seeds reniform-discoid, compressed, pitted; embryo much curved, subperipheral, cotyledons subcylindric.

Monotypic: widely cultivated or naturalized, also in China.

1. *Nicandra physalodes* (Linnaeus) Gaertner, Fruct. Sem. Pl. 2: 237. 1791.

假酸浆 jia suan jiang

Atropa physalodes Linnaeus, Sp. Pl. 1: 181. 1753.

Stems erect, angular, 40–150 cm tall, glabrescent or sparsely pubescent. Petiole 1.5–6 cm; leaf blade ovate or elliptic, 4–20 × 2–13 cm, papery, sparsely pubescent on both surfaces, base cuneate, margin lobed or coarsely sinuate-dentate, apex acute or short acuminate. Pedicel 1.5–4

cm. Calyx 0.8–3 cm, deeply parted; lobes broadly ovate, apex acute, 2.5–4 cm in diam. Corolla pale blue, blue-purple, or bluish with white center, 2.5–4 cm wide. Berry brown or yellow, 1–2 cm in diam. Seeds pale brown, 1–1.2 mm in diam. Fl. summer, fr. autumn.

Near fields, houses, and hills, wastelands; 800–2600 m. Naturalized in Gansu, Guizhou, Hebei, Sichuan, Xinjiang, Xizang, Yunnan [widely distributed; native to Peru].

Whole plant used as a sedative and cough remedy.

2. LYCIUM Linnaeus, Sp. Pl. 1: 191. 1753.

枸杞属 gou qi shu

Shrubs, often armed with thorns, pubescent with simple hairs. Leaves usually fasciculate on short shoots, petiolate or subsessile; leaf blade small, plane or linear-cylindric, entire. Inflorescences solitary or fasciculate axillary flowers; peduncle absent. Flowers pedicellate. Calyx campanulate, 2- or 5-dentate or -lobed. Corolla funnelform or campanulate; tube short, limb usually (4- or) 5-lobed, enlarged at throat. Stamens inserted high in corolla tube, included or exerted; anthers oblong-elliptic, dehiscing

longitudinally. Ovary 2-locular; ovules 1 to many. Style slender. Berry red, orange, yellow, or black, globose, ovoid, or oblong, fleshy or juicy; fruiting calyx slightly enlarged. Seeds numerous or few, compressed, pitted.

About 80 species: South America, S Africa, a few in temperate Europe and Asia; seven species in China.

Lycium cochinchinense Loureiro (Fl. Cochinch. 1: 134. 1790) is excluded from this treatment. According to Merrill (Trans. Amer. Acad. n.s., 24: 401. 1935), "it is clearly not a *Lycium* and is not a solanaceous plant." While this name, with its early publication date, may have priority for some Chinese plant, it is unlikely to affect names in *Lycium*.

- 1a. Berry purple-black, globose; thorns occurring singly at nodes; leaves narrowly linear, fleshy; corolla tube 3–4 × as long as limb and lobes; filaments pubescent 1. *L. ruthenicum*
- 1b. Berry red or orange-yellow, elongated or sometimes globose; thorns usually clustered with leaves and flowers, rarely lacking; leaves broader, linear-lanceolate, lanceolate, or elliptic, fleshy or not; corolla tube ca. 2 × as long as limb and lobes or shorter; filaments glabrous or pubescent.
 - 2a. Corolla lobed about 1/4 way down; filaments sparsely pubescent near base.
 - 3a. Branches slender, flexible; leaves narrow, widest near middle; calyx truncate at apex or unequally divided, lobes not ciliate; apex of young fruit mucronate from a persistent style 2. *L. truncatum*
 - 3b. Branches stout, stiff; leaves usually oblanceolate, sometimes broadly so; calyx lobed halfway down, lobes usually ciliate; apex of young fruit rounded 3. *L. dasystemum*
 - 2b. Corolla lobed 1/3 way down or more; filaments and corolla with a villous ring just above point of insertion.
 - 4a. Corolla less than 7 mm; stamens manifestly exceeding corolla; seeds ca. 1 mm; berry globose, ca. 4 mm 7. *L. yunnanense*
 - 4b. Corolla more than 9 mm; stamens shorter than or slightly exceeding corolla; seeds 2–3 mm; berry oblong or ellipsoid, more than 5 mm.
 - 5a. Calyx usually 2-lobed; corolla lobes marginally glabrescent, tube and limb funnelform, obviously longer than lobes 4. *L. barbarum*
 - 5b. Calyx usually 3-lobed or 4- or 5-dentate; corolla lobes marginally pubescent, tube cylindric or funnelform, about as long as lobes.
 - 6a. Corolla tube cylindric, longer than lobes; leaves lanceolate 5. *L. cylindricum*
 - 6b. Corolla tube funnelform, shorter than or subequaling lobes; leaves mostly broadly or narrowly ovate, rhomboid, or elliptic 6. *L. chinense*

1. *Lycium ruthenicum* Murray, Comm. Gött. 2: 9. 1780.

黑果枸杞 hei guo gou qi

Shrubs 20–50(–100) cm tall, copiously armed. Stems much branched; branches grayish or whitish, erect, ascending, or prostrate; branchlets apically thorny; thorns 3–15 mm, inserted on nodes. Leaves sessile, solitary on young branches, in fascicles of 2–6 on short shoots in older growth; leaf blade grayish, succulent, linear or subcylindric, rarely linear-oblanceolate, 0.5–3 cm × 2–7 mm. Flowers 1 or 2 on short shoots. Pedicel 5–10 mm. Calyx narrowly campanulate, 4–5 mm, irregularly 2–4-lobed, lobes sparsely ciliate. Corolla pale purple, funnelform, ca. 1.2 cm; lobes oblong ovate, 1/3–1/2 as long as corolla tube, not ciliate. Stamens slightly exerted; filaments sparsely villous above base. Fruiting calyx slightly inflated. Berry purple-black, globose, sometimes emarginate, 6–9 mm in diam. Seeds brown, ca. 1.5 × 2 mm. Fl. May–Aug, fr. Aug–Oct.

Saline deserts and sands, roadsides; 400–3000 m. Gansu, Nei Mongol, Ningxia, Qinghai, N Shaanxi, Xinjiang, Xizang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

A fine-leaved, branched, drought-enduring shrub that is used in erosion control.

2. *Lycium truncatum* Y. C. Wang, Contr. Inst. Bot. Natl. Acad. Peiping 2(4): 104. 1934.

截萼枸杞 jie e gou qi

Shrubs 1–1.5 m tall, sparingly armed. Branches flexible. Leaves solitary on long shoots, clustered on short shoots; leaf blade linear-lanceolate or lanceolate, 1.5–2.6 cm × 2–6 mm, base cuneate, decurrent, apex acute, mid vein evident. Inflorescences axillary, 1–3-flowered clusters on short shoots. Pedicel 1–1.5 cm. Calyx campanulate, 3–4 × 3 mm, 2- or 3-lobed or truncate, sometimes circumscissile and only base

persistent. Corolla purple or reddish purple, tube ca. 8 mm; lobes ca. 4 mm, not ciliate. Stamens and style slightly exerted; filaments sparsely villous slightly above base. Berry oblong or oblong-ovoid, 5–8 mm, mucronate. Seeds orange, ca. 2 mm. Fl. May–Aug, fr. Aug–Oct.

Slopes, near roads or fields, disturbed places in dry regions; 800–1500 m. Gansu, Nei Mongol, Ningxia, N Shaanxi, Shanxi, Xinjiang [Mongolia].

3. *Lycium dasystemum* Pojarkova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 13: 268. 1950.

新疆枸杞 xin jiang gou qi

Lycium dasystemum var. *rubricaulium* A. M. Lu.

Shrubs ca. 1.5 m tall. Stems much branched; branches grayish white, yellowish, or rarely brown-red, stout, young branches slender, elongate, older growth with formidable thorns 0.6–6 cm in leaf and flower fascicles. Leaf blade lanceolate, oblanceolate, or broadly lanceolate, 1.5–6 × 0.5–1.5 cm, base cuneate or subdecurrent, apex acute or obtuse. Pedicel 1–1.8 cm. Calyx campanulate, ca. 4 mm, often 2- or 3-divided halfway. Corolla purple, funnelform, 0.9–1.3 cm; tube sparingly villous inside; lobes ovate, half as long as corolla tube, ciliolate. Stamens slightly exerted from spreading corolla lobes; filaments sparsely villous slightly above base. Berry red, ovoid, or oblong 1–1.2 cm × 5–8 mm. Seeds more than 20, 1.5–2 mm. Fl. Jun–Aug, fr. Aug–Sep.

Slopes, sands, oases; 200–3600 m. Gansu, Qinghai, Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan].

Separation of this species from *Lycium turcomanicum* Boiss. (= *L. depressum* Stocks) follows Pojarkova (l.c.), who placed the two species in different series. She indicated that in *L. dasystemum* the filament base and adjacent corolla tube are pubescent and the 10–22 seeds are 1.5–2 mm in diam., while in *L. turcomanicum* the filament base and corolla tube are glabrous and the (2–)5–15 seeds are 2–3 mm in diam. The two taxa occupy a continuous geographic area, and the

differences may be only quantitative in nature. Further work is needed to verify that *L. dasystemum* is really a distinct species.

Specimens with brown-red branches from Qinghai, which were described as *Lycium dasystemum* var. *rubricaulium*, appear to represent a local variant or abnormal suite of specimens rather than a distinct taxon.

4. *Lycium barbarum* Linnaeus, Sp. Pl. 1: 192. 1753.

宁夏枸杞 *ning xia gou qi*

Shrubs (small tree in cultivation) 0.8–2 m tall. Stems and branches glabrous, branches thorny. Leaves solitary or fasciculate, lanceolate or long elliptic, 2–3 cm × 3–6 mm. Inflorescences solitary or clustered flowers. Pedicel 1–2 cm. Calyx campanulate, 4–5 mm, usually 2-lobed, lobes 2- or 3-toothed at apex. Corolla purple, funnellform; tube 8–10 mm, obviously longer than limb and lobes; lobes 5–6 mm, spreading, margin glabrescent. Stamens and style slightly exerted. Berry red or orange-yellow, oblong or ovoid, 0.4–2 cm × 5–10 mm. Seeds usually 4–20, brown-yellow, ca. 2 mm.

- 1a. Leaves broad, membranous or papery; seeds more than 15; berries red 4a. var. *barbarum*
1b. Leaves narrow, fleshy; seeds 4–8; berries orange yellow 4b. var. *auranticarpum*

4a. *Lycium barbarum* var. *barbarum*

宁夏枸杞 *ning xia gou qi*

Lycium halimifolium Miller; *L. lanceolatum* Veillard; *L. turbinatum* Veillard; *L. vulgare* Dunal.

Leaves broad, membranous or papery. Berries red, 6–10 mm in diam. Seeds more than 15. Fl. May–Aug, fr. Aug–Nov.

Slopes, near fields and houses or by ditches. Gansu, N Hebei, Nei Mongol, Ningxia, Qinghai, N Shanxi, Sichuan, Xinjiang [cultivated and naturalized elsewhere in Asia and in Europe].

Widely cultivated for medicine in N and S China, especially in Ningxia and Tianjin Shi. The fruits are used medicinally as a tonic.

4b. *Lycium barbarum* var. *auranticarpum* K. F. Ching, Fl. Reipubl. Popularis Sin. 67(1): 158. 1978.

黄果枸杞 *huang guo gou qi*

Leaf blade narrow, fleshy. Berries orange-yellow, 4–8 mm in diam. Seeds 4–8.

- Ningxia (Yingchuan Shi).

5. *Lycium cylindricum* Kuang & A. M. Lu, Fl. Reipubl. Popularis Sin. 67(1): 158. 1978.

柱筒枸杞 *zhu tong gou qi*

Branches inflexed, with thorns 1–3 cm. Leaves solitary or in clusters of 2 or 3 on short shoots; leaf blade lanceolate, 1.5–3.5 cm × 3–6 mm, base cuneate, apex obtuse. Inflorescences solitary or 2 in a cluster with leaves. Pedicel ca. 1 cm. Calyx campanulate, ca. 3 × 3 mm, usually (2- or) 3-divided to halfway, lobes sometimes with irregular teeth. Corolla tube cylindric, obviously longer than lobes, 5–6 mm, ca. 2.5 mm in diam.; lobes broadly ovate, ca. 4 mm, margin pubescent. Filaments with dense, villous, interwoven hairs slightly above base, forming a hairy circle with those on inner wall of corolla tube. Style ca. 8 mm. Berry ovoid, ca. 5 mm. Seeds few.

- Xinjiang.

6. *Lycium chinense* Miller, Gard. Dict. ed. 8, no. 5. 1768.

枸杞 *gou qi*

Shrubs erect or sprawling, 0.5–1(–2) m tall. Stems much branched; branches pale gray, slender, curved or pendulous, with thorns 0.5–2 cm. Leaves solitary or in clusters of 2–4; leaf blade ovate, rhombic, lanceolate, or linear-lanceolate, 1.5–5 × 0.5–2.5 cm (to 10 × 4 cm in cultivation). Inflorescences solitary or paired flowers on long shoots or fasciculate among leaves on short shoots. Pedicel 1–2 cm. Calyx campanulate, 3–4 mm, 3–5-divided to halfway, lobes densely ciliate. Corolla pale purple, 0.9–1.2 cm; tube funnel-form, shorter than or subequaling lobes, lobes pubescent at margin. Stamens slightly shorter or longer than corolla, with a villous ring slightly above filament base and adjacent corolla tube. Berry red, ovoid or oblong, 0.7–1.5 cm × 5–8 mm (ca. 2.2 × 1 cm in cultivation). Seeds numerous, yellow, 2.5–3 mm.

- 1a. Leaf blade ovate, rhombic, elliptic, or lanceolate; corolla lobes densely ciliate, with distinct basal auricles; stamens slightly shorter than corolla 6a. var. *chinense*
1b. Leaf blade lanceolate to linear-lanceolate; corolla lobes sparsely ciliate, with indistinct basal auricles; stamens slightly longer than corolla 6b. var. *potaninii*

6a. *Lycium chinense* var. *chinense*

枸杞 *gou qi*

Lycium barbarum var. *chinense* (Miller) Aiton; *L. chinense* var. *ovatum* (Poiret) C. K. Schneider; *L. megistocarpum* Dunal var. *ovatum* (Poiret) Dunal; *L. ovatum* Poiret; *L. rhombifolium* Dippel; *L. sinense* Grenier; *L. trewianum* Roemer & Schultes.

Leaves mostly broad. Corolla lobes densely ciliate, with distinct basal auricles. Stamens slightly shorter than corolla. Fl. May–Sep, fr. Aug–Nov.

Slopes, wastelands, saline places, roadsides, near houses. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Nepal, Pakistan; Europe].

Widely cultivated in China as a medicinal plant or vegetable. The fruits are used as a tonic, the root bark is used for relieving cough and reducing fever, the young leaves are eaten as a vegetable, and the seed oil is used as a lubricant and for cooking. The species is also grown for controlling erosion.

6b. *Lycium chinense* var. *potaninii* (Pojarkova) A. M. Lu, Fl. Reipubl. Popularis Sin. 67(1): 16. 1978.

北方枸杞 *bei fang gou qi*

Lycium potaninii Pojarkova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 13: 265. 1950.

Leaves lanceolate or linear-lanceolate. Corolla lobes sparsely ciliate, with indistinct auriculate basal lobes. Stamens slightly longer than corolla. Berry oblong, 2–2.5 × 1 cm. Fl. May–Sep, fr. Aug–Oct.

Sunny slopes, by ditches, occasionally cultivated. W Gansu, N Hebei, Nei Mongol, Ningxia, N Shaanxi, N Shanxi, E Qinghai, Xinjiang [Japan including Ryukyu Islands, S Mongolia, Thailand; SW Asia]. *Lycium flexicaule* Pojarkova, described from Kyrgyzstan, was said to differ from var. *potaninii* in having glabrescent branches, broader calyx lobes, and longer corolla tube. If it is actually different, it may be expected in China.

7. *Lycium yunnanense* Kuang & A. M. Lu, Fl. Reipubl. Popularis Sin. 67(1): 158. 1978.

云南枸杞 yun nan gou qi

Shrubs caespitose, erect, ca. 50 cm tall. Branchlets yellow-brown, thorny at apex. Leaves solitary on long shoots, sometimes on thorns or fasciculate on tubercular short shoots; petiole short; leaf blade narrowly ovate to lanceolate, 8–15 × 2–3 cm, base narrowly cuneate, apex acute.

Inflorescences solitary flowers clustered with leaves. Pedicel 4–6 mm. Calyx campanulate, ca. 2 mm, usually 3-lobed or 3- or 4-dentate, tomentose at apex. Corolla pale blue-purple, purple, or occasionally white, funnelliform, 5–7 mm; tube 3–4 mm; lobes 2–3 mm, glabrescent. Stamens inserted below middle of corolla tube, distinctly longer than corolla; filaments 5–7 mm, exserted, with villous hairs slightly above base, subglabrous on inner wall of corolla tube; anthers ca. 0.8 mm. Style 7–8 mm, exserted. Berry globose, ca. 4 mm in diam., yellow-red when ripe, with an obvious longitudinal furrow on drying. Seeds ca. 20, pale yellow, orbicular, ca. 1 mm in diam., pitted. Fl. Sep–Nov, fr. Oct–Feb.

• Wet places on sands, near rivers, forests, thickets; 700–1500 m. Yunnan.

3. ANISODUS Link in Sprengel, Syst. Veg. 1: 699. 1825.

山萇岩属 shan lang dang shu

Whitleya Sweet.

Subshrubs or perennial herbs, glabrous or pubescent with simple and dendritic hairs. Roots stout, fleshy. Stems erect, obtusely angular, di- or trichotomously branched. Leaves solitary or paired, petiolate, simple, entire or coarsely dentate. Inflorescences solitary flowers in leaf axils. Flowers mostly nodding, somewhat actinomorphic or calyx 2-lipped. Calyx mostly funnelliform, evidently 10-veined, 4- or 5-lobed; lobes unequal, variable in shape and length. Corolla campanulate, lobes quincuncial, included or exserted from calyx. Stamens shorter than corolla, inserted near base of corolla tube; filaments usually glabrous at base; anthers dehiscent longitudinally. Ovary conical, 2-locular, with a dislike nectary. Fruiting pedicel thickened or elongated. Fruiting calyx becoming enlarged, turbinate or campanulate, sometimes elongated beyond fruit, with main veins prominent and pleated. Fruit a globose or ovoid capsule, circumscissile above middle or dehiscent at apex. Seeds numerous, compressed.

Four species: China, Bhutan, India (Sikkim), Nepal; all four in China.

- 1a. Calyx pubescent, with wavy veins; plant pubescent overall, especially on abaxial surface of leaf blade 1. *A. luridus*
 1b. Calyx glabrescent, with straight veins; plant usually glabrescent.
 2a. Calyx strongly 2-lipped, upper lip with short, truncate teeth, veins obscure; corolla indistinctly lobed 3. *A. carniolicoides*
 2b. Calyx not 2-lipped, with somewhat unequal lobes, veins prominent; corolla distinctly lobed.
 3a. Leaves ovate or elliptic, mostly entire; calyx lobes narrowly deltate, 2 or 3 of them much longer; fruiting calyx less than 4.5 cm; fruit nodding 2. *A. acutangulus*
 3b. Leaves broadly lanceolate, oblong, or narrowly ovate, ragged-dentate; calyx lobes broadly deltate, 1 or 2 of them longer; fruiting calyx more than 5 cm; fruit erect 4. *A. tanguticus*

1. *Anisodus luridus* Link in Sprengel, Syst. Veg. 1: 699. 1825.

铃铛子 ling dang zi

Anisodus fischerianus Pascher; *A. luridus* var. *fischerianus* (Pascher) C. Y. Wu & C. Chen; *A. mairei* (H. Léveillé) C. Y. Wu & C. Chen; *A. stramonifolius* (Wallich) G. Don; *Nicandra anomala* Link & Otto; *Physalis stramonifolia* Wallich; *Scopolia anomala* (Link & Otto) Airy-Shaw; *S. lurida* (Link) Dunal; *S. mairei* H. Léveillé; *S. stramonifolia* (Wallich) Shrestha; *Whitleya stramonifolia* (Wallich) Sweet. For a discussion of the nomenclature and additional synonymy of this species, see D'Arcy & Zhang, Novon 2: 125. 1992.

Plants 5–120 cm tall, sometimes yellow-brown tomentose. Petiole 2–4 cm; leaf blade ovate or elliptic, 7–15(–22) × 4–8.5(–11) cm, papery, puberulent especially along veins, more so abaxially, base obtuse or slightly decurrent, margin entire or sinuate, apex acute. Flowers nodding. Pedicel 1–5 cm. Calyx campanulate to urceolate, 3–3.5 cm; ribs prominent, wavy, hirsute especially at base, apex sinuate or lobed; lobes short, sometimes unequal. Corolla pale yellow-green, ca. 3.5 cm, slightly exserted from calyx,

pubescent adaxially and proximal to middle of tube abaxially, sometimes spotted adaxially; lobes slightly purplish, rounded. Filaments pubescent; anthers ca. 5 mm. Fruiting pedicel 2–2.5 cm, arching. Fruiting calyx twice as long as and enclosing capsule, ca. 5 cm; lobes indistinct, sometimes glabrescent. Fl. May–Aug, fr. Oct–Nov.

Grassy slopes and by streams in mountains; 3200–4200 m. Sichuan (Muli Xian), SE Xizang, NW Yunnan [Bhutan, India (Sikkim), Nepal].

The roots and seeds are used medicinally for alleviating pain and spasms.

Anisodus fischerianus is placed into synonymy here based on the original description of the species, which does not include diagnostic features. Neither we nor the authors of the FRPS treatment, who recognized it as *A. luridus* var. *fischerianus*, have seen type material.

2. *Anisodus acutangulus* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 15(2): 62. 1977.

三分子 san fen zi

Plants 1–1.5 m tall, glabrous or glabrescent. Roots stout, yellow-brown, pale yellow within. Petiole 0.5–1(–1.5) cm; leaf blade ovate or elliptic, 8–15 × 3–6 cm, papery or submembranous, base cuneate or slightly decurrent, margin entire, sinuate, or sometimes 1–3-toothed, apex acuminate. Pedicel ca. 2 cm. Calyx 3–4.5 cm, with 10 erect veins, glabrous or sparsely pubescent abaxially, irregularly 4- or 5-lobed; lobes narrowly deltate, 2 (or 3) of which are longer and larger, 2–2.5 cm. Corolla pale yellow-green, sometimes purplish; lobes purplish, similar to calyx in shape, barely exceeding calyx to about twice as long, 2.5–3(–4) cm, pubescent, with a purple spot at base of tube abaxially. Stamens included, about half as long as corolla; anthers 5–5.6 mm. Fruiting pedicel to 7 cm, curved. Fruiting calyx 3.5–4.5 cm. Capsule nodding.

- Grassy slopes, waste lands; 2800–3100 m. Sichuan, Yunnan.

- 1a. Calyx lobes and sinuses acute; leaves mostly entire; flowering calyx more than 3 cm, glabrous; corolla lobes pale yellow-green, long exerted, more than 2.5 cm 2a. var. *acutangulus*
- 1b. Calyx lobes short acute; leaves dentate; flowering calyx less than 2 cm, sometimes sparsely pubescent abaxially; corolla lobes purplish, barely exerted, less than 2.5 cm 2b. var. *breviflorus*

2a. *Anisodus acutangulus* var. *acutangulus*

三分子 san fen zi

Leaf blade entire or sinuate. Corolla pale yellow-green, sometimes purplish, similar to calyx in shape, about twice as long. Fruiting pedicel 5–7 cm. Fl. Jun-Aug, fr. Sep-Nov.

- Grassy slopes, wastelands; 2800–3100 m. SW Sichuan, NW Yunnan.

The roots, which are extremely toxic, are used medicinally to ease pain and for stomachache.

2b. *Anisodus acutangulus* var. *breviflorus* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 15(2): 63. 1977.

三分七 san fen qi

Leaf blade with 1(–3) pairs of coarse teeth. Corolla mostly included, usually only barely exceeding calyx, lobes purplish. Fruiting pedicel to 5 cm. Fl. Jun-Jul, fr. Sep-Nov.

- Grassy woods, near edges of forests, wastelands, by stones near fields; 2900–3100 m. SW Sichuan, NW Yunnan.

The roots have similar but weaker medical effects than var. *acutangulus*.

3. *Anisodus carniolicoides* (C. Y. Wu & C. Chen) D'Arcy & Z. Y. Zhang, Novon 2: 126. 1992.

赛茛菪 sai lang dang

Scopolia carniolicoides C. Y. Wu & C. Chen, Acta Phytotax. Sin. 15(2): 59. 1977; *S. carniolicoides* var. *dentata* C. Y. Wu & C. Chen.

Rhizomes yellow. Stems sometimes pale purple, erect. Petiole 1.2–3(–5) cm; leaf blade elliptic to ovate, 6–18(–21) × 3–7.5(–12) cm, papery, glabrous, base cuneate or slightly decurrent, margin entire, sinuate, or irregularly dentate, apex acute or acuminate. Pedicel stout, 1.5–4 cm. Calyx campanulate, 2–3 × 1.5–2.5 cm, short lobed, becoming 1- or 2-parted and irregular during corolla egress. Corolla pale yellow-green, ca. 4.5 cm; lobes purple striate abaxially, indistinct, short mucronate. Anthers 6–7 mm. Disc pale yellow. Fruiting pedicel ca. 4 cm. Fruiting calyx ca. 3 cm, leathery. Fruit subglobose, ca. 1.5 cm in diam. Fl. May-Jul, fr. Sep-Oct.

- Grassy slopes, thickets at forest edges, rock crevices; 3000–4500 m. SE Qinghai, Sichuan, NW Yunnan.

The rhizomes are bitter and poisonous and are used medicinally for treating injury, bleeding wounds, and pain of rheumatism and arthritis.

4. *Anisodus tanguticus* (Maximowicz) Pascher, Repert. Spec. Nov. Regni Veg. 7: 167. 1909.

山茛菪 shan lang dang

Scopolia tangutica Maximowicz, Bull. Acad. Imp. Sci. Saint Pétersbourg 27: 508. 1882; *Anisodus tanguticus* var. *viridulus* C. Y. Wu & C. Chen.

Herbs perennial, 40–80(–100) cm tall. Roots stout. Stems glabrous or pubescent. Petiole 1–3.5 cm; leaf blade lanceolate, oblong, or ovate, 8–20 × 2.5–9 cm, thick papery, glabrous or rarely pubescent, entire or coarsely 1- or 2-toothed. Flowers nodding or erect; pedicel 1.5–8(–11) cm, glabrous or pubescent. Calyx campanulate to nearly funnellform, 2.5–4 cm; lobes broadly deltate, apex acute or obtuse, somewhat unequal, glabrescent. Corolla purple or dark-purple, sometimes pale yellow-green, resembling calyx in shape, 2.5–3.8 cm, only limb exerted; tube pubescent adaxially, especially at base; lobes half rounded. Stamens less than half as long as corolla; filaments ca. 0.8 mm; anthers oblong, 5–6 mm. Style 1.2 cm. Fruiting pedicel 6–8 cm, erect. Fruiting calyx ca. 6–7.5 cm, with prominent ribs and netted veins. Capsule ca. 2 cm in diam. Fl. May-Jun, fr. Jul-Aug.

Sunny grassy slopes; 2000–4400 m. Gansu, Qinghai, NW and SW Sichuan, E Xizang, NW Yunnan [Nepal].

The roots are used medicinally for relieving pain.

4. ATROPANTHE Pascher, Oesterr. Bot. Z. 59: 329. 1909.

天蓬子属 tian peng zi shu

Subshrubs or perennial herbs, glabrous. Rhizomes thick. Stems erect, terete or angled, di- or trichotomously branched. Leaves mostly paired, petiolate, entire. Inflorescences solitary flowers axillary or lateral on stems. Flowers nodding, 5-merous, zygomorphic. Pedicel elongate. Calyx tubular-campanulate or somewhat urceolate, slightly inflated, somewhat bent, 15-veined, with 5 main veins; lobes subequal. Corolla slightly zygomorphic, tubular-campanulate, twice as long as calyx, 15-veined; lobes subequal, quincuncial in bud. Stamens inserted in corolla tube, unequal, shorter than or equaling corolla; filaments pubescent at base; anthers dehiscent longitudinally. Disc ringlike, indistinctly lobed. Ovary 2-locular. Fruiting pedicel hardly thickened. Fruiting calyx inflated at base, contracted below apex but open, abruptly inserted on pedicel and easily detached from it after drying. Fruit a globose capsule. Seeds rectangular, somewhat compressed, netted.

Monotypic: endemic to China.

This genus differs from *Scopolia* and *Anisodus* in its zygomorphic flowers, shape of calyx, and in other features. *Atropanthe mairei* (H. Léveillé) H. Léveillé was identified by Lauener (Notes Roy. Bot. Gard. Edinburgh 37: 147. 1978) as *Cyananthus albiflorus* Chamberlain, *Campanulaceae*.

1. Atropanthe sinensis (Hemsley) Pascher, Oesterr. Bot. Z. 59: 330. 1909.

天蓬子 tian peng zi

Scopolia sinensis Hemsley, J. Linn. Soc., Bot. 26: 176. 1890; *Anisodus sinensis* (Hemsley) Pascher.

Plants 0.8–1.5 m tall. Stems usually dark blue-purple. Petiole 1–4.5 cm; leaf blade elliptic to ovate, 11–22 × 4–12 cm, papery, glabrous, base cuneate, slightly decurrent, apex acuminate. Pedicel 1–2.5 cm, glabrous. Calyx papery, ca. 2 cm, glabrous, lobes deltate or rounded, erose or ciliate, glabrescent. Corolla yellow-green, ca. 3.2 cm, sparsely pubescent abaxially,

pubescent adaxially at point of filament insertion; 1 lobe larger and semirounded, 2 lateral lobes deltate-rounded, remaining lobe rounded. Stamens included; filaments ca. 2 cm; anthers subcordate, 4–4.5 mm. Disc orange-red. Fruiting pedicel 3–3.5 cm. Fruiting calyx conical, ovoid, or oblong, 2.5–3 cm in diam., open at apex. Capsules 1.8–2 cm in diam. Seeds brown, ca. 3 × 2.5 mm, wavy-netted. Fl. Apr-Jul, fr. Aug-Sep.

• Humid places, along ditches, forests; 1400–3000 m. NW Guizhou, W Hubei, SE Sichuan, NE Yunnan.

A source of tropane alkaloids, the roots are used medicinally for relieving muscular spasm and pain.

5. PRZEWALSKIA Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint Pétersbourg 11: 274. 1881.

马尿泡属 ma niao pao shu

Herbs perennial, pubescent with glandular hairs. Roots stout, fleshy. Stems short, stout. Leaves densely aggregated distally on stem; leaf blade entire, basal ones scalelike. Inflorescences clusters of 1–3(–6) axillary flowers, pedunculate or sessile. Flowers actinomorphic, 5-merous. Pedicel short. Calyx tubular-campanulate. Corolla funnellform; lobes overlapping in bud, spreading at anthesis, with inflexed margins. Stamens equal, inserted in corolla throat, included; filaments very short; anthers dehiscing longitudinally. Disc ringlike. Ovary 2-locular. Fruiting calyx much inflated, with prominent netted veins, completely enveloping fruit, slightly open at apex. Capsules globose, much smaller than calyx, circumscissile. Seeds reniform, slightly compressed; embryo curved into a ring, subperipheral.

Monotypic: endemic to China.

1. Przewalskia tangutica Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint Pétersbourg 11: 275. 1881.

马尿泡 ma niao pao

Mandragora shebbearei C. Fischer; *Przewalskia roborowskii* Batalin; *P. shebbearei* (C. Fischer) Grubov.

Plants glandular hairy. Roots cylindric, 1–2.5 cm in diam. Stems 4–30 cm, partly underground. Petiole of upper leaves 2–5.5 cm; leaf blade elliptic, ovate, or spatulate, 10–17 × 1–4.5 cm, glandular hairy, glabrescent, remaining ciliate, base acuminate, margin entire, sinuate, or dentate, apex obtuse. Peduncle axillary, 2–3 mm. Pedicel 5–10 mm. Calyx ca. 15 × 5 mm; lobes deltate, unequal, 1–3 × 1.5–3 mm, glandular

hairy, ciliate. Corolla limb yellow or violet, tube purple, ca. 2.5 cm; lobes ovate, ca. 4 × 3 mm. Filaments ca. 0.5 mm; anthers ca. 1.5 mm. Style exerted. Fruiting calyx elliptic or ovoid, 8–13 × 4–6.5 cm, subleathery. Capsules 1–2 cm in diam. Seeds black-brown, ca. 3 × 2.5 mm. Fl. Jun-Jul, fr. Jul-Sep.

• Sandy lands of alpine or dry grasslands and flood lands; 3200–5000 m. Gansu, Qinghai, Sichuan, Xizang.

The roots are used as a medicine for relieving muscular spasm, pain, and swelling.

Mandragora shebbearei is based on a collection (Xizang, Tinkyela) that was not seen.

6. HYOSCYAMUS Linnaeus, Sp. Pl. 1: 179. 1753.

天仙子属 tian xian zi shu

Herbs annual, biennial, or perennial, erect or sprawling; pubescence of simple glandular hairs. Leaves sometimes forming a rosette, short petiolate or sessile; leaf blade sinuate, coarsely dentate or pinnately lobed, rarely entire. Inflorescences of solitary axillary flowers, sometimes condensed into scorpioid racemes or spikes. Flowers 5-merous, zygomorphic, sessile or short pedicellate. Calyx tubular-campanulate, urceolate, or obconical, becoming enlarged, lobes erect or spreading, needlelike. Corolla campanulate or funnellform, lobes unequal. Stamens inserted in corolla tube, usually slightly exerted; anthers dehiscing longitudinally. Disc sometimes indistinct. Ovary 2-locular; ovules numerous. Fruiting calyx enveloping and longer than capsule, lobes with strong marginal veins produced into mucros. Capsules dehiscent by an operculum slightly distal to middle. Seeds reniform or discoid, minutely pitted; embryo ringlike or coiled.

About 20 species: N Africa, Asia, Europe; two species in China, also cultivated.

- 1a. Fruiting calyx urceolate, lobes mostly erect; flowers 2–3 cm; corolla campanulate, twice as long as calyx 1. *H. niger*
1b. Fruiting calyx tubular-funnelform, lobes spreading; flowers 1–1.5 cm; corolla funnellform, slightly exceeding calyx 2. *H. pusillus*

1. Hyoscyamus niger Linnaeus, Sp. Pl. 1: 179. 1753.

天仙子 tian xian zi

Hyoscyamus agrestis Kitaibel ex Schultes; *H. bohemicus* F. W. Schmidt; *H. niger* var. *annuus* Sims; *H. niger* var. *chinensis* Makino.

Herbs biennial, to 1 m tall, pubescent throughout with sticky glandular hairs. Roots sometimes stout, fleshy, 2–3 cm in diam. Leaves sessile, sometimes forming a rosette; blade of rosette leaves ovate-lanceolate or oblong, ca. 30 × 10 cm, coarsely dentate or pinnately lobed or parted, apex acute; blade of cauline leaves ovate or deltate-ovate, 4–10 × 2–6 cm, pubescent with sticky hairs, nearly clasping or broadly cuneate at base, lobed or entire. Flowers subsessile or on pedicels 3–5 mm. Calyx tubular-campanulate, 1–1.5 cm; lobes deltate, unequal, acute. Corolla pale yellow, usually with purple veins, campanulate, 2–3 cm. Stamens exerted. Fruiting calyx urceolate, 2–2.5 × 1–1.5 cm; lobes mostly erect, tipped with a sharp tooth. Capsules ovoid-rounded, ca. 1.5 × 1.2 cm. Seeds yellow-brown, discoid, ca. 1 mm in diam. Fl. May–Aug, fr. Jul–Oct.

Slopes, near roads, sands by rivers, rich humus soils near villages and houses, occasionally cultivated; 700–3600 m. Gansu, Guizhou, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan [Afghanistan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Nepal, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, N. Africa, Europe].

Alkaloids (hyoscyamine and scopolamine) contained in the roots, leaves, and seeds, are used as an anaesthetic and for relieving muscular spasm and pain. The seed oil can be used for soap making.

2. Hyoscyamus pusillus Linnaeus, Sp. Pl. 1: 180. 1753.

中亚天仙子 zhong ya tian xian zi

Herbs annual, 6–35(–60) cm tall. Roots slender, woody. Stems prostrate or erect, branched or unbranched near base, mostly glandular pubescent, sometimes glabrescent. Leaf blade lanceolate, elliptic, or oblong, 3–10 × 0.5–3 cm, base decurrent, margin entire or dentate, sometimes pinnatifid or pinnatisect, with 2–4 pairs of deltate lobes, apex obtuse or acuminate. Flowers solitary, axillary, subsessile or on pedicels 3–5 mm. Calyx tubular-funnelform, 0.8–1.3 cm; lobes deltate, needlelike. Corolla yellow with a dark purple throat, funnelform, slightly longer than calyx. Stamens included. Fruiting calyx inflated, tubular-funnel form, 2–2.5 cm; lobes spreading. Capsules cylindric, ca. 7 mm. Seeds compressed reniform, ca. 1 mm. Fl. Apr–Jun, fr. Jun–Aug.

Dry gritty hills, edges of sand dunes, clay soils of wastelands, riversides, lake shores. Xinjiang, W Xizang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

7. PHYSOCHLAINA G. Don, Gen. Hist. 4: 470. 1837.

泡囊草属 pao nang cao shu

Belenia Decaisne; *Physochlaena* Miers.

Herbs perennial. Roots stout, fleshy; rhizomes thick, short. Stems erect, much branched. Leaves petiolate; leaf blade membranous, entire and sinuate or with a few deltate teeth. Inflorescences axillary or terminal, usually many flowered, paniculate or umbellate, usually pedunculate, rarely subsessile, mostly bracteate. Flowers actinomorphic, 5-merous. Calyx tubular-campanulate, funnelform, or tubular-urceolate. Corolla campanulate or funnelform, basally contracted cylindric, slightly oblique at limb, lobes overlapping in bud, subequal. Stamens inserted in corolla tube, mostly exerted; anthers ovate, dehiscing longitudinally. Disc fleshy, ringlike, surrounding base of ovary. Ovary 2-locular. Style mostly exerted; stigma indistinctly 2-lobed. Fruiting calyx membranous or subleathery, enveloping capsule, with 10 longitudinal ribs and obvious netted veins, mostly open. Fruit a circumscissile, oblong or globose capsule, dehiscent slightly above middle. Seeds numerous, reniform, minutely pitted; embryo coiled.

About 11 species: Asia, six species in China.

- 1a. Inflorescences open, few flowered, with leaflike bracts or without bracts; capsules mostly more than 1 cm in diam.
 - 2a. Leaves mostly larger than 14 × 8 cm; fruiting calyx membranous, cup-shaped, hardly contracted at apex, inflated at base; corolla dark purple; inflorescences without bracts 3. *P. macrophylla*
 - 2b. Leaves mostly less than 12 × 7 cm; fruiting calyx thick papery, apex tubular, sometimes contracted, base appressed to capsule; corolla yellow with purple veins; inflorescences bracteate.
 - 3a. Leaves entire; calyx ca. 1/3 as long as corolla; fruiting calyx contracted at apex 1. *P. praealta*
 - 3b. Leaves with a few, coarse deltate teeth; calyx half as long as or longer than corolla; fruiting calyx terete, not contracted at apex 2. *P. macrocalyx*
- 1b. Inflorescences dense cymes or umbels, mostly with scalelike bracts; capsules less than 1 cm in diam.
 - 4a. Flowers subsessile; fruiting pedicel less than 3 mm; inflorescences capitate; stamens included 6. *P. capitata*
 - 4b. Flowers obviously pedicellate; fruiting pedicel more than 10 mm; inflorescences umbellate cymes; stamens included or slightly exerted.
 - 5a. Fruiting calyx funnelform, much longer than capsule; calyx teeth spreading; corolla yellow, tube pale purple; leaves subdeltate, with a few coarse deltate teeth 4. *P. infundibularis*
 - 5b. Fruiting calyx broadly ovoid or subglobose, about as long as capsule; calyx teeth slightly inflexed; corolla purple; leaves usually ovate, entire 5. *P. physaloides*

1. *Physochlaina praealta* (Decaisne) Miers, Ann. Mag. Nat. Hist. Ser. 2, 5: 473. 1850.

西藏泡囊草 xi zang pao nang cao

Belenia praealta Decaisne in Jacquemont, Voy. Inde 4: 114. 1844; *Hyoscyamus praealtus* (Decaisne) Walpers; *Physochlaina grandiflora* Hooker; *P. urceolata* Kuang & A. M. Lu; *Scopolia praealta* (Decaisne) Dunal.

Plants 30–50 cm tall. Roots terete, ca. 2 cm in diam. Stems much branched, glandular pubescent. Petiole 1–6 cm; leaf blade ovate, ovate-elliptic, ovate-deltate, or deltate, 4–13 × 3–8 cm, sparsely glandular pubescent, base cuneate, cordate, or sometimes truncate, margin entire and sinuate, apex obtuse or somewhat acute. Inflorescences few flowered, paniculate; bracts leaflike, 0.5–1.5 cm. Pedicel 1–1.5 cm. Calyx short campanulate or tubular-urceolate, glandular pubescent, ca. 6 × 5 mm; lobes deltate, ca. 2 mm. Corolla yellow with purple veins, campanulate or tubular-campanulate, ca. 2–3 cm. Stamens somewhat unequal, exerted; anthers ca. 2 mm. Style exerted. Fruiting calyx thick, tubular to campanulate or urceolate, 2.5–3.5 cm, slightly inflated near base, contracted and tubular upwards, teeth erect, slightly spreading, subequal, ca. 3.5–6 mm. Capsules oblong, 1.2–1.5 cm. Seeds subreniform, somewhat compressed, ca. 3.5 × 2.5 mm. Fl. Jun-Jul, fr. Jul-Aug.

Slopes; 4200–4500 m. W and S Xizang [India (Kashmir), Pakistan].

2. *Physochlaina macrocalyx* Pascher, Repert. Spec. Nov. Regni Veg. 7: 167. 1909.

长萼泡囊草 chang e pao nang cao

Herbs 30–60 cm. Leaf blade base subhastate, subdeltate, sometimes attenuate into channeled petiole, lateral angles sometimes protracted. Calyx larger than 6 × 5 mm, tubular, not urceolate, not at all constricted distally. Corolla yellow, not at all violet, campanulate, gradually narrowed into a tube. Fruit not seen.

- Xizang.

This species is known to us only by Pascher's abbreviated original description.

3. *Physochlaina macrophylla* Bonati, Bull. Soc. Bot. Genève ser. 2, 5: 312. 1914.

大叶泡囊草 da ye pao nang cao

Plants ca. 80 cm tall. Stems glabrescent. Petiole 3–7 cm, glabrous; leaf blade broadly ovate to elliptic, 14–22 × 8–12 cm, glabrescent, base broadly cuneate, margin entire, sinuate, or with a few irregular deltate teeth, apex acute or short acuminate. Inflorescences ebracteate racemose panicles; peduncle 4–6 cm, densely glandular pubescent. Pedicel 1–2 cm. Calyx campanulate, 1.3–1.7 × 1–1.5 cm, divided halfway; lobes deltate-lanceolate, 6–7 mm, ciliate. Corolla purple, campanulate, 2–2.5 × 1.5–2 cm; lobes subdeltate, ciliate. Stamens slightly exerted; anthers ca. 3 mm. Style included. Fruiting calyx inflated, cup-shaped, 2 × 1.7–2 cm, lobes ca. 1 cm. Capsules subglobose, ca. 1 cm in diam. Seeds gray-yellow, ca. 2 mm. Fl. Jun-Jul, fr. Jul-Aug.

- Forests; 1900–2400 m. W Sichuan.

4. *Physochlaina infundibularis* Kuang, Acta Phytotax. Sin. 12: 410. 1974.

漏斗泡囊草 lou dou pao nang cao

Plants 20–60 cm tall, glandular pubescent except for leaves. Roots fleshy, terete, 1.5–2 cm in diam. Rhizomes stout, terete. Stems mostly branched. Petiole 2–7(–13) cm; leaf blade deltate or ovate-deltate, sometimes ovate, 4–9 × 4–8 cm, base cordate, truncate or decurrent into petiole, with a few, coarse deltate teeth, apex acute, glabrescent. Inflorescences terminal or axillary, umbellate; bracts scalelike. Pedicel 3–5 mm. Calyx funnelform to campanulate, ca. 6 × 4 mm. Corolla green-yellow, pale purplish at base, funnelform to campanulate, ca. 1 cm; lobes ovate, ca. 1/3 as long as tube. Stamens somewhat unequal, included. Style nearly as long as corolla. Fruiting calyx inflated, funnel-form, 1–1.8 × 1–1.5 cm, membranous, with 10 indistinct longitudinal veins. Capsules subglobose, ca. 5 mm in diam. Seeds pale orange-yellow, reniform, somewhat compressed. Fl. Mar-May, fr. Apr-Jun.

- Valleys, forests; 800–1600 m. S and W Henan, Shaanxi (Qinlin mountains), S Shanxi.

A source of tropane alkaloids.

5. *Physochlaina physaloides* (Linnaeus) G. Don, Gen. Hist. 4: 470. 1837.

泡囊草 pao nang cao

Hyoscyamus physaloides Linnaeus, Sp. Pl. 1: 180. 1753 (as *physalodes*); *Physochlaena dahurica* Miers; *Physochlaena physaloides* (Linnaeus) Miers; *Physochlaina pseudophysaloides* Pascher; *Scopolia physaloides* (Linnaeus) Dunal.

Plants 30–50 cm tall. Stems glandular pubescent, glabrescent. Petiole 1–4 cm; leaf blade ovate, 3–8 × 2.5–5 cm, glandular pubescent, glabrescent, base broadly cuneate, decurrent into petiole, margin entire and sinuate, apex acute. Inflorescences umbellate; bracts scalelike. Pedicel 5–10 mm, glandular pubescent. Calyx narrowly tubular-campanulate, 6–8 × 4 mm; lobes ca. 2 mm, ciliate. Corolla purple, funnelform, more than twice as long as calyx; tube pale purple. Stamens slightly exerted. Style obviously exerted. Fruiting calyx inflated, ovoid or globose, 1.5–2.5 × 1–1.5 cm, mouth contracted, not closed. Capsules ca. 8 mm in diam. Seeds yellow, compressed reniform, ca. 3 × 2.5 mm. Fl. Apr-May, fr. May-Jul.

Grassy slopes, forest edges; 1000 m. Hebei, Heilongjiang, Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia].

Medicinal herb used for relieving muscular spasm and pain. The flowers and stems can be used as a haemostatic.

6. *Physochlaina capitata* A. M. Lu, Fl. Reipubl. Popularis Sin. 67(1): 159. 1978.

伊犁泡囊草 yi li pao nang cao

Plant 50–70 cm tall. Root to 3.5 cm in diam. Rhizomes terete, ca. 4 mm in diam. Stems glandular pubescent, mostly unbranched. Petiole 3–7 cm; leaf blade elliptic or ovate-elliptic, 4–8 × 2–4 cm, puberulent along veins abaxially, base truncate, broadly cuneate, or broadly cordate, margin entire, sinuate, or rarely with 1 or 2 pairs of coarse deltate teeth, apex acute or obtuse. Inflorescences terminal, few-flowered capitata clusters. Flowers subsessile. Calyx funnelform, ca. 6 mm; lobes deltate, half as long as tube, glandular pubescent abaxially, ciliate. Corolla yellow, pale purple on tube, funnelform, ca. 1.3 cm; lobes ovate-deltate, ca. 3 mm. Stamens inserted in middle of corolla tube, slightly exerted; anthers ovoid, ca. 1 mm. Style included. Fruiting pedicel 1–3 mm. Fruiting calyx

campanulate, 1.3–1.6 × 1–1.2 cm, sparsely glandular pubescent, with 10 indistinct longitudinal ribs, persistent; lobes short deltate, equal, ca. 4 mm, spreading. Capsules globose,

5–6 mm in diam. Seeds orange-yellow, reniform, ca. 2.5 × 1.5 mm. Fl. Apr–May, fr. May–Jun.

• Grassy slopes, rock fissures. Xinjiang (Xinyuan Xian and Gongliu Xian).

8. *PHYSALIASTRUM* Makino, Bot. Mag. (Tokyo) 28: 20. 1914.

散血丹属 san xue dan shu

Archiphysalis Kuang.

Shrubs or perennial or perhaps annual herbs; pubescence of simple hairs. Stems dichotomously branched. Leaves simple, petiolate. Inflorescences in branch forks, occasionally axillary, solitary or sometimes 2- or 3-flowered clusters; peduncle short or obsolete. Flowers mostly actinomorphic, 5-merous, long pedicellate, nodding. Calyx short campanulate or conical, lobed to halfway, lobes equal or not. Corolla broadly campanulate to rotate, lobed to halfway; lobes wide spreading, densely villous near base of tube, sometimes spotted. Nectaries sometimes present. Stamens inserted in corolla tube; filaments pubescent or glabrous; anthers dehiscing longitudinally. Disc rudimentary or absent. Ovary 2-locular; ovules numerous. Fruiting calyx becoming enlarged, applied to berry or inflated, mostly open at apex; veins obscure or thickened into angles or ribs, mostly muricate or bristly with soft emergences that appear deltate and scalelike when dry, these sometimes localized on angles. Fruit a juicy or fleshy berry enveloped in calyx. Seeds numerous, reniform-discoïd, minutely pitted; embryo curved, subperipheral.

About nine species: Asia, seven species in China.

The genus *Archiphysalis*, which was recognized in FRPS, was placed into synonymy under *Physaliastrum* by D'Arcy & Zhang, Novon 2: 124–128. 1992. Many species were formerly known as *Chamaesaracha* A. Gray and *Leucophysalis* Rydberg, but these genera now include only New World taxa.

- 1a. Veins of fruiting calyx thickened into ribs or angles, these sometimes with dentate emergences, area between veins smooth.
- 2a. Fruiting calyx with evenly thickened ribs or angles, especially basally, lacking emergences 6. *P. sinense*
- 2b. Fruiting calyx with unevenly thickened, winglike ribs, these with teeth or emergences that dry deltate 7. *P. chamaesarachoides*
- 1b. Veins of fruiting calyx obscure, evenly muricate with bristly emergences that dry deltate and scalelike.
- 3a. Corolla with an evident nectary; fruiting calyx about as long as berry, apex open 5. *P. echinatum*
- 3b. Corolla without a nectary; fruiting calyx longer than berry, apex slightly contracted.
- 4a. Flowering calyx 5-dentate, lobes equal, broadly deltate 1. *P. yunnanense*
- 4b. Flowering calyx 5-divided halfway, lobes unequal, narrowly deltate or oblong.
- 5a. Corolla 1 × 1 cm; stamens more than half as long as corolla, filaments glabrous 4. *P. sinicum*
- 5b. Corolla 1.5–2 × 1.5–2 cm; stamens half as long as corolla, filaments glabrous or pubescent.
- 6a. Calyx lobes subequal; filaments sparsely pubescent 2. *P. heterophyllum*
- 6b. Calyx lobes very unequal, longest 1 as long as corolla; filaments glabrous 3. *P. kweichouense*

1. *Physaliastrum yunnanense* Kuang & A. M. Lu, Acta Phytotax. Sin. 10: 348. 1965.

云南散血丹 yun nan san xue dan

Plants 60–100 cm tall. Roots stout, ca. 2.5 cm in diam. Stems erect, woody at base, mostly unbranched. Petiole 1–3 cm; leaf blade elliptic, 5–15 × 2–8 cm, base obtuse or cuneate, sometimes oblique, apex acute or short acuminate; veins arcuate ascending, sparsely pubescent with minute hairs, glabrescent. Inflorescences solitary or paired flowers. Pedicel 1–2.5 cm. Calyx tubular, short campanulate, 1/4 to 1/3 as long as corolla, ca. 4 × 6 mm, 5-dentate; lobes erect, equal, deltate, densely villous abaxially, ciliate. Corolla white, campanulate, 1–1.7 × 1–1.7 cm; lobes deltate, 5–7 mm, pubescent abaxially. Stamens ca. 6 mm; filaments ca. 4 mm, glabrous; anthers 1.8–2 mm. Ovary conical. Fruiting pedicel 3–5 cm, glabrous. Fruiting calyx ovoid-globose, slightly exceeding berry, closely and entirely enveloping it, sometimes slightly open at apex; lobes very short, persistent. Berry globose, ca. 1.5 × 1.7 cm. Seeds ca. 3 × 2.5 mm. Fl. May–Jun, fr. Jul–Aug.

• Forests; 1800–2600 m. Yunnan (Fengqing Xian, Yangbi Xian).

2. *Physaliastrum heterophyllum* (Hemsley) Migo, J. Shanghai Sci. Inst. Sect. 3, 4: 171. 1939.

江南散血丹 jiang nan san xue dan

Chamaesaracha heterophylla Hemsley, J. Linn. Soc., Bot. 26: 174. 1890; *Leucophysalis heterophylla* (Hemsley) Averett.

Plants 30–60 cm tall. Roots numerous, clustered, fleshy and fibrous often together. Stems erect. Petiole 2–4 cm; leaf blade elliptic, ovate, or lanceolate, 7–19 × 3–9 cm, sparsely pubescent, base oblique, apex short acuminate or acute. Pedicel 1–2.2 cm, glabrescent. Calyx short campanulate, 1/3 as long as corolla, 5–11 × 6–10 mm, divided to halfway or slightly 5-parted; lobes erect, narrowly deltate or lanceolate, acuminate at apex, ± less unequal, pubescent and villous abaxially, ciliate. Corolla white, pale yellow, or yellowish green, broadly campanulate, 1.2–2 × 1.5–2.8 cm; lobes short deltate, pubescent abaxially, ciliate. Nectary absent. Stamens half as long as corolla; filaments 4–5 mm, sparsely pubescent; anthers 2–3 mm. Fruiting pedicel 2–3.5 cm, thickened upwards. Fruiting calyx subglobose, closely enveloping and longer than

berry, 2–2.5 × 3–5 cm, base rounded, apex abruptly contracted, open. Berry 1.5–2 cm. Fl. May–Aug, fr. Jul–Sep.

• Slopes, humid places in forests; 500–1100 m. Anhui, Fujian, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Yunnan, Zhejiang.

3. *Physaliastrum kweichouense* Kuang & A. M. Lu, *Acta Phytotax. Sin.* 10: 351. 1965.

散血丹 san xue dan

Plants ca. 33 cm tall. Roots numerous, fleshy, clustered. Stems slender, pubescent. Petiole 0.5–2.5 cm; leaf blade ovate to elliptic, 6–10 × 3–6 cm, pubescent adaxially and along veins abaxially, base oblique, decurrent, margin entire, apex acute or acuminate. Pedicel 1–1.5 cm, pubescent, nodding. Calyx campanulate, 1–1.3 cm, tube ca. 6 × 7 mm, divided nearly halfway; lobes unequal, 4–9 mm, longest broadly linear, equaling corolla, shortest narrowly deltate, ciliate. Corolla campanulate, ca. 2 × 2 cm; lobes short deltate, ciliate. Stamens 6–7 mm; filaments 5–6 mm, glabrous; anthers ca. 2 mm. Stigma 2-lobed. Fruit unknown. Fl. May–Jul.

• Ditches; 800 m. Guizhou (Kaili Xian), Hubei (Xuanen Xian), Hunan (Sangzhi Xian).

4. *Physaliastrum sinicum* Kuang & A. M. Lu, *Acta Phytotax. Sin.* 10: 352. 1965.

华北散血丹 hua bei san xue dan

Plants 30–50 cm tall. Roots numerous, clustered. Stems pubescent, glabrescent. Petiole 0.5–2.5 cm; leaf blade usually broadly ovate, 5–13 × 4–7 cm, pubescent, base cuneate, apex acute. Inflorescences usually paired flowers in leaf axils, branch forks, or branch axils. Pedicel 1–1.5 cm, densely pubescent, nodding. Calyx short campanulate, half as long as corolla, ca. 7 × 7 mm, divided halfway; lobes erect, unequal, longest oblong, shorter ones narrowly deltate or lanceolate, ciliate. Corolla white, campanulate, ca. 1 × 1 cm; lobes broadly deltate, ciliate. Stamens more than half corolla length; filaments ca. 4 mm, glabrous; anthers ca. 2 mm. Fruiting pedicel 2–2.5 cm. Fruiting calyx ovoid-globose, ca. 2.5 × 1.8 cm, enveloping and longer than berry, open at apex; lobes 0.7–1.4 cm. Berry globose, ca. 1.6 cm in diam. Seeds subdiscoïd. Fl. May–Jun, fr. Jul–Aug.

• Slopes, thickets in valleys; 1200–1400 m. Hebei (Neiqiu Xian), Shanxi (Lingchuan Xian).

5. *Physaliastrum echinatum* (Yatabe) Makino, *Bot. Mag. (Tokyo)* 28: 21. 1914.

日本散血丹 ri ben san xue dan

Chamaesaracha echinata Yatabe, *Bot. Mag. (Tokyo)* 5: 355. 1891.

Plants 50–70 cm tall, sparsely pubescent or villous. Petiole 0.5–2.5 cm; leaf blade ovate to broadly ovate, 4–12 × 3–6 cm, pubescent, ciliate, base cuneate, decurrent, apex acute. Inflorescences usually 2- or 3-flowered clusters in leaf axils or branch forks. Pedicel 2–4 cm, nodding. Calyx short campanulate, 3–5 mm in diam., pubescent and villous with scalelike abaxial emergences; lobes short deltate, equal, 0.5–1.5 mm. Corolla campanulate, ca. 1 cm in diam.; lobes pubescent, ciliate, with 5 pairs of nectaries adaxially near middle part of tube. Stamens included, slightly shorter than corolla tube; filaments pubescent, ca. 6 mm; anthers

1.8–2 mm. Fruiting calyx subglobose, nearly as long as berry, open at apex, thick, muricate. Berry globose, ca. 1 cm in diam., enveloped in fruiting calyx, only apex exposed. Seeds subdiscoïd. Fl. Jun–Aug, fr. Jul–Sep.

Grassy slopes, forests; low elevations. Hebei, Heilongjiang, Jilin, Liaoning, Shandong, Zhejiang [Japan, Korea, Russia].

This species was treated in FRPS as *Physaliastrum japonicum* (Franchet & Savatier) Honda, which is a different species.

6. *Physaliastrum sinense* (Hemsley) D'Arcy & Z. Y. Zhang, *Novon* 2: 127. 1992.

地海椒 di hai jiao

Chamaesaracha sinensis Hemsley, *J. Linn. Soc., Bot.* 26: 174. 1890; *Archiphysalis sinensis* (Hemsley) Kuang; *Physalis sinensis* (Hemsley) Averett.

Herbs perennial, 1–2 m tall, glabrous. Petiole 0.5–2.5 cm; leaf blade ovate or ovate-lanceolate, 3–7 × 2–4 cm, sometimes with scattered pubescence adaxially, glabrous abaxially, sometimes ciliate, base obtuse or acuminate, sometimes oblique, margin entire, sinuate, or with a few teeth, apex acuminate. Flowers in clusters of 2 or 3; pedicel 2–2.5 cm. Calyx ca. 4 × 3 mm; teeth short deltate, apex obtuse, ciliate. Corolla white, with green spots at throat, ca. 1 × 1 cm, divided to halfway; lobes narrowly ovate, densely pubescent adaxially, ciliate. Stamens ca. 8 mm. Ovary ca. 2 mm. Fruiting calyx obovate, 1.5 × 1.8–2 cm, faintly 10-angular, 10-ribbed, contracted and open at apex. Berry yellow-green. Seeds pale yellow. Fl. Jun–Aug, fr. Sep–Oct.

• Forests, slopes; 300–1400 m. Anhui (Qimen Xian), Guizhou (Dejiang, Yongjiang Xians), W Hubei, E and W Sichuan.

7. *Physaliastrum chamaesarachoides* (Makino) Makino, *J. Jap. Bot.* 5: 24. 1928.

广西地海椒 guang xi di hai jiao

Physalis chamaesarachoides Makino, *Bot. Mag. (Tokyo)* 22: 34. 1908; *Archiphysalis chamaesarachoides* (Makino) Kuang; *A. kwangsiensis* Kuang; *P. linnii* Y. C. Liu & C. H. Ou.

Shrubs or herbs, erect, large, perhaps annual, sparsely pubescent, glabrescent. Stems and branches thick, much reflexed. Petiole 1–3 cm; leaf blade ovate or broadly elliptic, 3–14 × 2–6 cm, glabrescent, base rounded or broadly cuneate, decurrent, sometimes oblique, margin with a few coarse teeth, rarely entire, apex short acuminate. Pedicel 5–10 mm. Calyx broadly campanulate, 2–3 mm, basally rounded; lobes deltate, ca. 0.5 mm, ciliate, abaxially spiny. Corolla white, with 5 2-part markings abaxially, campanulate-rotate; lobes ovate, slightly longer than tube, 2–3 mm, spreading, ciliolate. Stamens inserted in tube, erect, included or slightly exerted, 6–7 mm; filaments 5–6 mm; anther ovoid, ca. 1 mm. Ovary ovoid, glabrous. Style erect, as long as stamens. Fruiting pedicel 1.5–1.8 cm, nodding; fruiting calyx much inflated, globose-ovoid, ca. 1.8 × 1.5 cm, with longitudinal winglike ribs and prominent deltate teeth on ribs. Berry globose, much smaller than fruiting calyx, 8–12 × 8–10 mm. Seeds pale yellow, discoid, ca. 1 mm in diam. Fl. Jul–Sep, fr. Aug–Nov.

Forests; 300–1000 m. Anhui (Qimen Xian, Yi Xian), Fujian (Dehua Xian), Guangxi (He Xian), Guizhou (Jiangkou Xian), Jiangxi (Dexing Xian), Taiwan [Japan].

9. *PHYSALIS* Linnaeus, Sp. Pl. 1: 182. 1753.

酸浆属 suan jiang shu

Herbs annual or perennial, glabrous or pubescent with simple hairs. Leaves mostly equal, sometimes paired, simple, petiolate; leaf blade membranous, entire, denticulate or sinuate. Inflorescences solitary flowers in leaf axils or branch forks. Flowers actinomorphic, 5-merous. Calyx campanulate. Corolla yellow or white, often with a contrasting eye, rotate or rotate-campanulate, subentire or lobed. Stamens shorter than corolla, inserted at base of corolla tube; filaments sometimes expanded at base; anthers dehiscent longitudinally. Ovary 2-locular, ovules numerous. Stigma minutely 2-lobed. Fruiting calyx becoming enlarged, inflated, entirely enveloping fruit, membranous or leathery, with 5 or 10 longitudinal ribs, base often invaginated. Fruit a juicy globose berry. Seeds numerous, compressed, discoid or reniform, minutely pitted; embryo coiled, subperipheral.

About 75 species: mostly in the Americas, a few in Asia and Europe; six species in China.

The genus embraces many species from the New World that have green fruiting calyces, and several have been introduced to China. Many Chinese collections with green fruiting calyces could not be determined, and their identity is to be sought among the more than 70 species distributed in various parts of the New World, a task for future workers.

- 1a. Fruiting calyx orange to red, subleathery; rhizomatous perennials; corolla white, mostly with greenish or yellowish spots in throat, margins 5-lobed; anthers yellow 1. *P. alkekengi*
- 1b. Fruiting calyx green or stramineous, papery or membranous; annuals or short-lived perennials; corolla pale yellow or yellow, sometimes with purple or brown blotches in throat, margin entire; anthers purplish, bluish, or yellow.
 - 2a. Plants perennial, softly villous to puberulent throughout; leaf base cordate; anthers 3 mm or more 5. *P. peruviana*
 - 2b. Plants annual, glabrescent to variously pubescent with scattered hairs; leaf base obtuse to truncate or cordate; anthers 3 mm or less.
 - 3a. Fruiting pedicel 3–8 mm.
 - 4a. Corolla less than 7 mm; anthers less than 2 mm; fruiting calyx 2 cm or less, ribs bumpy, sometimes with stout white hairs; berry not filling calyx; stems with long many-celled hairs 2. *P. minima*
 - 4b. Corolla more than 10 mm; anthers more than 2 mm; fruiting calyx 2 cm or more, ribs smooth, glabrous; berry filling calyx; stems with mostly short hairs, glabrescent 4. *P. philadelphica*
 - 3b. Fruiting pedicel 10–25 mm.
 - 5a. Fruiting calyx strongly 5-angled, glabrous; calyx lobes immediately after anthesis linear-lanceolate 6. *P. cordata*
 - 5b. Fruiting calyx weakly 10-angled, often minutely puberulent; calyx lobes immediately after anthesis deltate 3. *P. angulata*

1. *Physalis alkekengi* Linnaeus, Sp. Pl. 1: 183. 1753.

酸浆 suan jiang

Herbs perennial. Stems 40–80 cm tall, slightly woody at base, little branched, nodes sometimes inflated, mostly pubescent. Petiole 1–3 cm; leaf blade narrowly to broadly ovate, 5–15 × 2–8 cm, glabrescent or pubescent, base oblique, cuneate, margin entire or coarsely dentate, sometimes with salient, unequal deltate lobes, apex acuminate. Pedicel 0.6–1.6 cm, glabrescent, puberulent or densely and persistently villous. Calyx broadly campanulate, ca. 6 mm, densely pubescent. Corolla white, mostly with a greenish or yellowish eye, rotate or campanulate, 1.5–2 cm in diam., lobed. Stamens yellow. Fruiting pedicel 2–3 cm; fruiting calyx orange or red, ovate, rounded, 10-ribbed, 2.5–4 × 2–3.5 cm, subleathery, invaginated at base, glabrescent or persistent villous. Berry shiny, orange-red, globose, 1–1.5 cm in diam. Seeds pale yellow, reniform, ca. 2 mm in diam.

Asia, Europe; cultivated and naturalized elsewhere.

The fruits of this species are edible and are used medicinally as a febrifuge.

- 1a. Leaves pubescent; tube of flowering calyx densely pubescent; fruiting calyx puberulent, mostly less than 2 cm across; corolla with indistinct, fused basal marking 1a. var. *alkekengi*
- 1b. Leaves glabrescent, sometimes ciliate; tube of flowering calyx sparsely pubescent; fruiting calyx glabrescent, mostly more than 3 cm across; corolla with distinct basal spots 1b. var. *franchetii*

1a. *Physalis alkekengi* var. *alkekengi*

酸浆 suan jiang

Physalis alkekengi var. *anthoxantha* H. Léveillé; *P. alkekengi* var. *orientalis* Pampanini; *P. ciliata* Siebold & Zuccarini; *P. kansuensis* Pojarkova.

Leaves pubescent. Calyx densely pubescent. Corolla with indistinct spots. Fruiting pedicel pubescent. Fruiting calyx puberulent, mostly less than 2 cm wide. Fl. May-Sep, fr. Jun-Oct.

Slopes, open lands; 1200–2500 m. Gansu, Guizhou, Hebei, Henan, Hubei, Shaanxi, Sichuan, Yunnan [Russia, Tajikistan; SW Asia, Europe].

1b. *Physalis alkekengi* var. *franchetii* (Masters) Makino, Bot. Mag. (Tokyo) 22: 34. 1908.

挂金灯 gua jin deng

Physalis franchetii Masters, Gard. Chron. ser. 3, 16: 434. 1894; *P. alkekengi* var. *glabripes* (Pojarkova) Grubov; *P. franchetii* var. *bunyardii* Makino; *P. glabripes* Pojarkova; *P. praetermissa* Pojarkova; *P. szechuanica* Pojarkova.

Leaves glabrescent, sometimes ciliate. Calyx tube sparingly pubescent; lobes densely pubescent. Corolla with distinct basal spots. Fruiting pedicel pubescent. Fruiting calyx shiny, glabrescent, mostly more than 3 cm wide. Fl. May-Oct, fr. Jun-Nov.

Disturbed sites, forests, also commonly cultivated; 800–2500 m. Throughout China except Xizang [Korea].

2. *Physalis minima* Linnaeus, Sp. Pl. 1: 183. 1753.

小酸浆 xiao suan jiang

Physalis angulata Linnaeus var. *villosa* Bonati;
P. lagascae Roemer & Schultes; *P. parviflora* R. Brown.

Herbs annual. Roots fibrous. Stems prostrate or erect, pubescent with long many-celled hairs. Petiole 1–1.5 cm; leaf blade ovate or ovate-lanceolate, 2–3 × 1–1.5 cm, pubescent along veins, base cuneate, often oblique, margin entire, sinuate, or with a few coarse teeth, apex acuminate. Pedicel ca. 5 mm, pubescent. Calyx campanulate, 2.5–3 mm, pubescent; lobes deltate, short acuminate, densely ciliate. Corolla yellow, ca. 5 mm. Anthers light yellow, 1–1.5 mm. Fruiting pedicel less than 1 cm, pendulous. Fruiting calyx green, subglobose or ovoid, 1–1.5(–2) cm. Berry globose, ca. 6 mm in diam. Fl. summer, fr. autumn.

Slopes; 1000–1800 m. Guangdong, Guangxi, Jiangxi, Sichuan, Yunnan [worldwide].

3. *Physalis angulata* Linnaeus, Sp. Pl. 1: 183. 1753.

苦?? ku zhi

Physalis esquirolii H. Léveillé & Vaniot.

Herbs annual, 30–50 cm tall, sparsely pubescent or glabrescent. Stems much branched. Petiole 1–5 cm; leaf blade ovate to elliptic, 3–6 × 2–4 cm, glabrescent, base cuneate or broadly cuneate, margin entire or dentate, apex acuminate or acute. Pedicel 5–12 mm. Calyx divided about halfway, 4–5 mm; lobes lanceolate, ciliate. Corolla pale yellow or white, spotted in throat, 4–6 × 6–8 mm. Fruiting calyx ovoid, 1.5–2.5 cm in diam. Berry ca. 1.2 cm in diam. Seeds discoid, ca. 2 mm. Fl. May–Jul, fr. Jul–Dec.

Disturbed sites, forests, villages, roadsides; 500–1500 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang [worldwide].

4. *Physalis philadelphica* Lamarck, Encycl. 2: 101. 1786.

毛酸浆 mao suan jiang

Physalis cavalieriei H. Léveillé.

Herbs annual. Stems branched, glabrescent or sparingly pubescent. Petiole 3–8 cm, densely pubescent; leaf blade broadly ovate, 3–8 × 2–6 cm, glabrescent or sparsely pubescent, base cordate, often oblique, margin usually unequal dentate, apex acute. Pedicel 3–8 mm, glabrescent. Calyx campanulate, divided to halfway. Corolla pale yellow, spotted in throat. Anthers bluish to purplish, 2–3 mm. Fruiting calyx green, ovate, 2–3 × 2–2.5 cm, weakly 5-angled, slightly invaginated at base, often completely filled by fruit. Berry green, yellow, or purplish, globose, ca. 1.2 cm in diam. Seeds discoid, ca. 2 mm in diam. Fl. May–Aug, fr. Aug–Nov.

Grasslands, disturbed sites, cultivated and naturalized. Heilongjiang, Jilin [native to Mexico, widely cultivated and naturalized].

The fruits are used in some countries for sauce making.

The report in FRPS of *Physalis pubescens* is actually based on specimens of *P. philadelphica*. Although *Physalis pubescens* is a widely distributed New World weed expected to be found in China, no Chinese material has been seen. Lauener (Notes Roy. Bot. Gard. Edinburgh 37: 148. 1978) placed *P. cavalieriei* and *P. esquirolii* as synonyms of *P. pubescens*. We have not seen the type specimens, and Léveillé's original description of *P. esquirolii* notes dark red fruits, which are unknown in American *Physalis*. Confident assignment of these synonyms awaits further study.

5. *Physalis peruviana* Linnaeus, Sp. Pl. ed. 2: 2: 1670. 1763.

灯笼果 deng long guo

Herbs perennial, 45–90 cm tall. Stems erect, sparingly branched, densely pubescent. Petiole 2–5 cm; leaf blade broadly ovate to cordate, 6–15 × 4–10 cm, densely pubescent, base cordate, margin entire or with a few indistinct teeth, apex short acuminate. Pedicel ca. 1.5 cm. Calyx broadly campanulate, 7–9 mm. Corolla yellow, spotted in throat, 1.2–1.5 × 1.2–2 cm. Filaments and anthers blue-purple; anthers 3–4 mm long. Fruiting calyx green, ovoid, with 5–10 weak angles, 2.5–4 cm, pubescent. Berry yellow, 1–1.5 cm in diam. Seeds yellow, ca. 2 mm in diam. Fl. summer, fr. autumn.

Near roads, river valleys, cultivated and naturalized; 1200–2100 m. Fujian, Guangdong, Jiangsu, Yunnan [native to South America, widely naturalized elsewhere].

The fruits are eaten fresh and are used for jam making.

6. *Physalis cordata* Miller, Gard. Dict. ed. 8, no. 14. 1768.

棱萼酸浆 leng e suan jiang

Herbs annual, to 1 m tall, sparsely pubescent. Petiole 3–6 cm; leaf blade ovate, sometimes broadly so, 3–6 × 2.5–7 cm, membranous, sparsely pubescent along veins, base oblique, margin subentire or sparsely dentate, apex acuminate. Pedicel 4–10 mm. Calyx 4–7 mm; lobes linear-lanceolate, 2.5–3.5 mm, pubescent. Corolla pale yellow, spotted in throat, 6–8 × 4–8 mm in diam., apex pubescent abaxially, subtruncate. Anthers bluish green, 1.8–3 mm. Fruiting pedicel 1–2.5 cm. Fruiting calyx green, strongly 5-angled, turbinate, invaginated at base, glabrescent. Berry 1–1.4 cm in diam. Seeds straw colored, elliptic-discoid, 1.5–2 × 1–1.2 mm. Fl. and fr. Feb–Sep.

Disturbed sites. Hainan [North and South America].

10. WITHANIA Pauquey, Belladone 14. 1825.

睡茄属 shui qie shu

Shrubs or perennial herbs, pubescent with dendritic or perhaps simple hairs. Stems erect, much branched. Leaves solitary or paired, simple, petiolate; leaf blade entire, glabrous or pubescent, often with dendritic hairs. Inflorescences solitary or in congested axillary clusters. Pedicel short. Calyx campanulate, dentate; corolla narrowly campanulate, parted to halfway. Stamens equal, inserted near base of corolla tube; filaments slightly compressed; anthers sometimes connivent. Disc evident, ringlike, surrounding ovary base. Ovary 2-locular; ovules numerous. Style slender. Fruiting calyx becoming enlarged, enveloping berry, closed at apex. Fruit a globose shiny berry. Seeds compressed reniform; embryo coiled, subperipheral.

About six species: N Africa, W Asia, and S Europe; one species adventive in China.

1. *Withania somnifera* (Linnaeus) Dunal in A. de Candolle, Prodr. 13(1): 453. 1852.

睡茄 shui qie

Physalis somnifera Linnaeus, Sp. Pl. 1: 182. 1753;
Withania kansuensis Kuang & A. M. Lu.

Herbs perennial, 30–150 cm tall, pubescent with dendritic hairs. Stems woody proximally, erect or reclining, branched, tomentose. Petiole 1–2 cm; leaf blade ovate, obovate, or oblong, 2.5–12 × 2–7 cm, glabrescent adaxially except along midvein, pubescent abaxially, base cuneate, apex acute. Inflorescences subsessile clusters of 4–6 flowers; peduncle obsolete. Pedicel ca. 5 mm. Calyx campanulate, 3–5 mm, tomentose; lobes deltate, 1–2 mm. Corolla yellowish green,

narrowly campanulate, 5–8 mm, tomentose at throat; lobes ovate, spreading or recurving, 2–2.5 mm. Filaments ca. 1.8 mm; anthers yellow, ovoid, ca. 1 mm, minutely apiculate. Style exerted. Fruiting calyx becoming brown and translucent, globose or ovoid, truncate at base, 1–2.2 cm; lobes short, somewhat urceolate. Berry shiny, scarlet, globose, 5–8 mm. Seeds drying pale brown, reniformdiscoid, 2–2.5 × 2 mm. Fl. and fr. Oct.

Gansu, Yunnan [Afghanistan, India, Pakistan; SW Asia, Europe].

Withania kansuensis, which is known only from the type that cannot be located, was distinguished by a series of characters that are also found in *W. somnifera*, and only the presence of simple hairs seems distinctive.

11. CAPSICUM Linnaeus, Sp. Pl. 1: 188. 1753.

辣椒属 la jiao shu

Shrubs or annual or perennial herbs; pubescence of simple hairs. Stems branched. Leaves solitary or paired, petiolate; leaf blade simple, entire or sinuate. Inflorescences solitary or few-flowered clusters at branch forks or leaf axils; peduncle absent. Flowers nodding or erect, actinomorphic. Pedicel erect or nodding. Calyx broadly campanulate to cup-shaped, denticulate, sometimes slightly enlarged. Corolla white, blue, or violet, campanulate or rotate, divided halfway or more. Stamens inserted near distal end of corolla tube; filaments slender; anthers yellow or purplish, ovoid, dehiscing longitudinally. Ovary 2- (or 3)-locular; ovules numerous. Style slender; stigma small, capitate. Fruit a moist berry, sometimes large, erect, nodding, or reflexed. Seeds yellowish, discoid; embryo coiled, subperipheral.

About 25 species: all in South America, two or three cultivated and naturalized worldwide; one species in China.

1. *Capsicum annuum* Linnaeus, Sp. Pl. 1: 188. 1753.

辣椒 la jiao

Capsicum annuum var. *conoide* (Miller) Irish; *C. annuum* var. *fasciculatum* (Sturtevant) Irish; *C. annuum* var. *grossum* (Linnaeus) Sendtner; *C. conoide* Miller; *C. fasciculatum* Sturtevant; *C. frutescens* Linnaeus; *C. frutescens* var. *fasciculatum* L. Bailey; *C. frutescens* var. *longum* L. Bailey; *C. frutescens* var. *grossum* L. Bailey; *C. grossum* Linnaeus; *C. longum* de Candolle.

Shrubs or annual or perennial herbs, 20–80 cm tall. Stems glabrescent. Leaves solitary or paired; petiole 4–7 cm; leaf blade oblong-ovate, ovate, or ovate-lanceolate, 4–13 × 1.5–4 cm, glabrescent, base narrowed, margin entire, apex short acuminate or acute. Inflorescences solitary flowers or few-flowered clusters. Pedicel bent at apex, 1–2 cm. Calyx cup-shaped, undulate, 2–3 × 3 mm. Corolla white, ca. 1 cm.

Anthers purplish, 1.8–2 mm. Berry mostly red (orange, yellow, or purple in cultivation), variously shaped, up to 15 cm. Seeds pale yellow, discoid or reniform, 3–5 mm. Fl. May-Aug, fr. Jul-Nov.

Widely cultivated in China [native to Mexico and South America, widely cultivated and naturalized throughout the world].

The species includes forms with sweet or pungent fruits. The fruits are an important vegetable and flavoring, and the seed oil is edible. Fruits are used medicinally for inducing sweat. Plants are sometimes cultivated as ornamentals. During its long cultivation, many cultivars have been selected with very different fruit appearance.

The practice of referring woody plants of this species to *Capsicum frutescens* Linnaeus has little merit since herbaceous plants often become woody with age, and other characters supposed to distinguish the two species occur in various populations in both herbaceous and woody plants.

12. TUBOCAPSICUM (Wettstein) Makino, Bot. Mag. (Tokyo) 22: 18. 1908.

龙珠属 long zhu shu

Capsicum sect. *Tubocapsicum* Wettstein in Engler & Prantl, Nat. Pflanzenfam. 4(3b): 21. 1895.

Herbs perennial; pubescence of minute simple hairs, glabrescent. Leaves solitary or subequal paired on distal branches, simple, petiolate; leaf blade subentire. Inflorescences solitary flowers or few- to several-flowered clusters in branch forks, sometimes appearing axillary; peduncle absent. Flowers actinomorphic, 5-merous. Pedicel slender. Calyx short cup-shaped, apex subtruncate. Corolla yellow, broadly campanulate, lobed. Stamens inserted in distal end of corolla tube; filaments adnate to base of limb, subulate, base broadened with ascending projections; anthers ovate, dorsifixed, cordate, dehiscing longitudinally. Disc inconspicuous. Ovary 2-locular; ovules numerous. Stigma capitate. Fruiting pedicel pendulous. Fruit a red, juicy globose berry. Seeds discoid; embryo coiled and subperipheral.

One species: China, Indonesia, Japan, Korea, Phillipines, Thailand.

- 12b. Leaves entire, lanceolate or narrowly oblong; corolla less than 8 mm 21. *S. luzoniense*
- 9b. Inflorescences unbranched; plants mostly less than 1 m.
- 13a. Fruit more than 1.4 cm across; flowers mostly andromonoecious.
- 14a. Fruit red, often longitudinally furrowed; corolla white or slightly purplish 29. *S. aethiopicum*
- 14b. Fruit mostly yellow or black, not red, not furrowed; corolla blue or violet.
- 15a. Fruit mostly much more than 4 cm across, variously shaped, seldom globose, green, white, black, pink, or brown, only yellow at extreme maturity 40. *S. melongena*
- 15b. Fruit mostly less than 4 cm across, globose, green or yellow 39. *S. undatum*
- 13b. Fruit less than 1.4 cm across; flowers mostly bisexual.
- 16a. Leaves soon glabrescent, deeply pinnately lobed; stems with copious, compressed, bright yellow, nearly straight prickles often more than 7 mm; anthers more than 7 mm; fruit yellow 41. *S. virginianum*
- 16b. Leaves with persistent indumentum, entire, dentate, or shallowly lobed; stems unarmed or with recurved spines less than 5 mm; anthers mostly less than 7 mm; fruit red or orange.
- 17a. Leaves entire; plants unarmed or sparingly armed; inflorescences elongated 23. *S. nienkui*
- 17b. At least some leaves lobed or sinuate; plants armed, sometimes copiously so; inflorescences condensed.
- 18a. Leaves mostly less than 4 cm, sinuate; petiole less than 1.5 cm; inflorescences mostly terminal on leafy shoots 24. *S. procumbens*
- 18b. Leaves mostly more than 5 cm, often saliently lobed; petiole mostly more than 1.5 cm; inflorescences mostly extra-axillary or axillary.
- 19a. Flowers usually purple; plants evidently armed; fruiting pedicels usually erect, more than 1 cm 27. *S. violaceum*
- 19b. Flowers usually white; plants sparingly armed, occasionally with prickles less than 1 mm; fruiting pedicels strongly recurved, less than 1 cm 28. *S. deflexicarpum*
- 1b. Plants glabrous or with predominantly simple or rarely dendritic hairs, stellate hairs usually absent, if present on leaves, then mixed with simple hairs; prickles mostly absent.
- 20a. Anthers lanceolate, tapering to a slender subulate apex; plants with coarse, straight simple hairs, armed with needlelike prickles.
- 21a. Fruit orange-red; seeds yellowish, compressed discoid with a conspicuous orbicular wing, 4–6 mm in diam. (including wings) 32. *S. capsicoides*
- 21b. Fruit light yellow; seeds brown, lenticular, unwinged, less than 4 mm in diam.
- 22a. Plants villous with mixed stellate and simple, partly glandular hairs; pericarp more than 1 cm thick.
- 23a. Stems pilose with some hairs 2 mm; leaf lobes sharp pointed; ovary glabrous; corolla purple 33. *S. mammosum*
- 23b. Stems densely tomentose with hairs less than 1 mm long; leaf lobes blunt tipped; ovary and young fruit pubescent; corolla white or green 31. *S. viarum*
- 22b. Plants minutely tomentose with simple, many-celled, mostly glandular hairs, only leaves sparsely stellate abaxially; pericarp less than 1 cm thick 30. *S. aculeatissimum*
- 20b. Anthers oblong or ovoid, not tapering; plants glabrescent or with simple or branched hairs, unarmed.
- 24a. Leaves pinnately compound, at least in part.
- 25a. Leaves interruptedly odd-pinnate compound, usually with interstitial leaflets, viscid pubescent; pedicel articulated well above middle; foliage strongly odorous when crushed; calyx divided nearly halfway; underground tubers present 19. *S. tuberosum*
- 25b. Leaves with 1 or 2 pairs of basal leaflets, mostly not glandular, sometimes glabrous; pedicel base articulate or not at all; foliage hardly odorous; calyx lobes short or absent; underground tubers absent.
- 26a. Plants glabrous; leaves usually 5–9-parted; calyx subtruncate; anthers free 17. *S. seaforthianum*
- 26b. Plants pubescent; leaves entire or 3–5-parted; calyx with short distinct lobes; anthers connate 11. *S. dulcamara*
- 24b. Leaves entire or variously parted, but not compound.
- 27a. Shrubs; leaves large, often lobed to near midvein, lobes narrow; corolla lobes notched at apex; fruit nodding, orange-yellow, ellipsoid 1. *S. laciniatum*
- 27b. Herbs or vines, if shrubs then leaves unlobed or lobes broad; corolla lobes entire; fruit various.
- 28a. Inflorescences solitary or paired flowers, or unbranched, often umbellate racemes (branched in *S. merrillianum*); mostly shrubs or herbs.
- 29a. Shrubs; leaves borne on woody stems, all entire, mostly unequal paired; style and filaments glabrous.
- 30a. Peduncle and rachis short or obsolete, 1(–3)-flowered; pubescence of branched hairs; fruit bright orange-red 10. *S. pseudocapsicum*
- 30b. Peduncle evident, rachis elongate, several to many flowered; pubescence of simple hairs; fruit pale, dull orange or yellow.
- 31a. Berry often less than 1 cm in diam.; corolla less than 1 cm; anthers less than 2.5 mm; pedicel less than 1 cm; leaves glabrous, minor ones rounded at apex 3. *S. diphyllum*
- 31b. Berry more than 1.1 cm in diam.; corolla more than 1 cm; anthers more than 2.5 mm;

- pedicel more than 1 cm; leaves with tufts of hairs in axils of main veins abaxially, minor ones acute at apex 4. *S. spirale*
- 29b. Herbs or woody vines; leaves borne on herbaceous shoots, often dentate or sinuate, all alike; style and filaments pubescent.
- 32a. Woody vines; peduncle often branched; anthers 1.5–1.7 mm 6. *S. merrillianum*
- 32b. Herbs; peduncle unbranched; anthers various in length.
- 33a. Fruit yellow, orange, or reddish, broadly ellipsoid; plants villous 9. *S. villosum*
- 33b. Fruit black or rarely green, globose; plants glabrescent or puberulent.
- 34a. Anthers less than 1.5 mm; fruiting calyx strongly reflexed; fruit less than 8 mm in diam., shiny; corolla less than 5 mm 5. *S. americanum*
- 34b. Anthers more than 2 mm; fruiting calyx reflexed or not; fruit mostly more than 8 mm in diam., somewhat shiny or dull; corolla more than 5 mm.
- 35a. Fruiting calyx applied to berry; berry dull black; plants copiously and evidently pubescent with erect and spreading hairs; leaves dentate or subentire, ovate to lanceolate 7. *S. nigrum*
- 35b. Fruiting calyx reflexed from berry; berry slightly shiny, black or purple; plants with inconspicuous appressed hairs; leaves mostly subentire, ovate, rhomboid, or rounded 8. *S. scabrum*
- 28b. Inflorescences paniculate, mostly many flowered, peduncle branched; often climbers.
- 36a. Style pubescent; filaments laterally ciliate; fruit black; leaves sinuate, dentate, or entire, not lobed 6. *S. merrillianum*
- 36b. Style and filaments glabrous; fruit red, orange, or yellow; leaves entire or lobed.
- 37a. Leaves pinnately 5–9-parted.
- 38a. Plants glabrous; calyx truncate with minute lobes; corolla purple or white; fruit 1–2 cm 17. *S. seaforthianum*
- 38b. Plants pubescent; calyx with evident lobes, sinuses deltate; corolla greenish purple; fruit less than 1 cm 18. *S. septemlobum*
- 37b. Leaves all entire or with 1(–3) pairs of basal lobes.
- 39a. Stems and inflorescences villous with erect, many-celled hairs more than 2 mm 15. *S. lyratum*
- 39b. Stems and inflorescences glabrous or pubescent with ± appressed hairs less than 2 mm.
- 40a. Anthers connate; leaf base truncate or cordate.
- 41a. Herbs; leaves mostly with 1 (or 2) pairs of basal lobes; seeds less than 2.5 mm; calyx lobes deltate 11. *S. dulcamara*
- 41b. Subshrubs; leaves entire; seeds more than 2.5 mm; calyx truncate or sinuate, lobes minute, pointed 14. *S. kitagawae*
- 40b. Anthers free; leaf base rounded or cuneate.
- 42a. Leaves undulate-dentate or lobed; emergent growth with long simple hairs 13. *S. japonense*
- 42b. Leaves all entire; emergent growth often glabrous.
- 43a. Leaves puberulent; anthers less than 2 mm; fruit mostly less than 8 mm in diam.; seeds less than 2 mm in diam. 12. *S. hidetaroii*
- 43b. Leaves glabrescent; anthers more than 2 mm; fruit mostly more than 8 mm in diam.; seeds more than 2 mm in diam. 16. *S. pitosporifolium*

1. *Solanum laciniatum* Aiton, Hort. Kew. 1: 247. 1789.

澳洲茄 ao zhou qie

Shrubs to 3 m tall; pubescence of simple hairs, soon glabrescent. Stems glabrous except for minute pubescence on young tips and buds. Leaves unequal paired, lobed and entire often on same plant; petiole of lobed leaf ca. 1–1.5 cm, that of entire leaf 0.5–1 cm; blade of lobed leaf broadly ovate, deeply pinnately 3–5-parted, 12–17 × 6–13 cm; blade of entire leaf lanceolate, 10–20 × 1.5–3 cm. Inflorescences terminal, axillary, or extra-axillary, scorpioid-racemose, ca. 8 cm; peduncle short or obsolete. Pedicel 1.5–3 cm. Calyx 5–7 mm; lobes deltate, 2–3 mm, leathery, apex mucronulate. Corolla blue-purple, rotate, 2–2.5 cm; lobes semirounded, notched. Filaments subulate; anthers oblong, 3–4 mm. Style ca. 8 mm. Berry orange-yellow, ovoid or ellipsoid, ca. 3 × 2.5 cm, pendulous. Seeds subovate, ca. 3 × 2 mm, compressed. Fl. Apr–Jun, fr. Jul–Sep.

Cultivated. Hebei, Hubei, Jiangsu, Sichuan, Yunnan [native of Oceania].

This species is grown as a major source of the medicinal alkaloids solasodine, solasonine, and solamargin that are contained in the leaves and fruits.

Solanum laciniatum is similar to *S. aviculare* Forster under which name it was introduced from Australia and known in FRPS and other works. It differs in having yellow-orange rather than scarlet fruit, notched corolla lobes, and in details of the seeds.

2. *Solanum erianthum* D. Don, Prodr. Fl. Nepal. 96. 1825.

假烟叶树 jia yan ye shu

Shrubs or small trees 1.5–10 m tall, unarmed, stellate tomentose overall. Petiole stout, 1.5–5.5 cm; leaf blade ovate-oblong or elliptic, 10–29 × 4–12 cm, base cuneate or obtuse, entire or sinuate, apex short acuminate. Inflorescences erect, appearing terminal, flat-topped or rounded panicles; peduncle 3–10 cm. Pedicel 3–5 mm. Calyx campanulate, ca. 1

cm in diam.; lobes ovate, ca. 3 mm. Corolla white; lobes oblong, 6–7 × 3–4 mm. Filaments ca. 1 mm; anthers ca. 2 mm. Style glabrous, 4–6 mm. Berry yellow-brown, globose, ca. 1.2 cm in diam. Seeds compressed, 1–2 mm in diam. Fl. and fr. nearly throughout the year.

Waste places, thickets; 300–2100 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Xizang, Yunnan, [native of South America, widespread in tropical Asia and Oceania].

The root bark is sweet, poisonous, and can be used medicinally as an antiphlogistic and for arthritis.

This species was long known as *Solanum verbascifolium* Linnaeus, which has been shown to be a different plant now known as *S. donianum* Walpers.

3. *Solanum diphylum* Linnaeus, Sp. Pl. 1: 184. 1753.

黄果龙葵 huang guo long kui

Shrubs glabrous. Stems erect, 0.5–2 m tall, young stems angled proximal to nodes from decurrent leaf bases, otherwise terete. Leaves unequal paired; petiole of major leaf 1–1.5 cm, winged by leaf bases; blade of major leaf elliptic to oblong, sometimes broad, 4–9 × 2–3.5 cm, base attenuate and decurrent on petiole and stem, margin entire, apex rounded; minor leaves subsessile, blade rounded, 1.5–3 × 1.2–2.2 cm, entire. Inflorescences leaf opposed, short scorpioid racemes, often subumbellate; peduncle unbranched, 3–12 mm, later bearing conspicuous pedicel scars. Pedicel 5–12 mm, erect at anthesis. Calyx constricted at base and just proximal to lobes, 2–2.5 mm; lobes deltate, ca. 1 mm, minutely ciliate. Corolla white, 3.5–4.5 mm, lobed ca. 3/4 way to base. Filaments short; anthers 1–1.5 mm. Ovary glabrous. Style 3–4 mm. Fruiting pedicel erect, 0.8–1.4 cm. Berry orange, globose, slightly 2-lobed, 7–12 mm in diam. Seeds yellow or tan, reniform-discoïd, ca. 3 × 2 mm, margins thickened. Fl. May–Jul, fr. Jun–Sep.

Cultivated in Taiwan [native of Mexico and Central America].

4. *Solanum spirale* Roxburgh, Fl. Ind. 2: 247. 1824.

旋花茄 xuan hua qie

Solanum spirale var. *tetrasepalum* H. Chu.

Shrubs glabrescent. Stems erect, 0.5–3 m tall, drying grooved angled. Leaves unequal paired; petiole 5–10 mm; blade of major leaf narrowly elliptic to elliptic, 9–22 × 4–11 cm, glabrous adaxially, with tufts of hairs in axils of main veins abaxially, base attenuate, margin entire, apex acuminate; blade of minor leaf resembling that of major leaf, 5–7 × 1.6–3 cm. Inflorescences leaf opposed or extra-axillary, short, simple scorpioid racemes; peduncle 3–12 mm, later bearing conspicuous pedicel scars. Pedicel 1.5–2.5 cm, deflexed at anthesis. Calyx 2–3 mm, (4- or) 5-lobed; lobes deltate, 0.5–1 mm. Corolla white, 8–10 mm, lobed ca. 3/4 way to base. Filaments ca. 1 mm; anthers 3–3.5 mm. Ovary glabrous. Style ca. 7 mm. Fruiting pedicel deflexed. Berry dull yellow-orange, globose, 1.1–1.6 cm in diam. Seeds yellow or tan, reniform-discoïd, 3–3.5 × 2.5–3 mm. Fl. May–Jul, fr. Jun–Dec.

Thickets, streamsides, wastelands; 500–1900 m. Guangxi, Guizhou, Hunan, Xizang, Yunnan [India, Myanmar, Thailand, Vietnam, Australia].

The young leaves are locally eaten in Yunnan and India as a vegetable, and the roots are used as an anaesthetic and diuretic.

Variety *tetrasepalum* was established mainly on the basis of having 4-merous flowers. These occasionally occur in many species of *Solanum*, including *S. spirale*.

5. *Solanum americanum* Miller, Gard. Dict. ed. 8, no. 5. 1768.

少花龙葵 shao hua long kui

Solanum ganchouenense H. Léveillé; *S. nigrum* Linnaeus var. *pauciflorum* Liou; *S. photeinocarpum* Nakamura & Odashima.

Herbs annual or short-lived perennial, glabrescent or puberulent with simple hairs. Stems green or purple, mostly erect, 25–100 cm tall. Petiole 1–2 cm; leaf blade ovate, 4–8 × 2–4 cm, membranous, glabrescent or sparsely pubescent, base truncate to cuneate, margin entire or sparingly dentate, apex acute. Inflorescences extra-axillary, subumbellate, 3–6 (–10)-flowered; peduncle 1–2.5 cm. Pedicel 5–10 mm. Calyx cup-shaped, 1.5–2 mm in diam., lobed nearly halfway; lobes ovate, pubescent abaxially, ciliate. Corolla white, rarely bluish or purplish, sometimes with a yellow eye, 3–5 mm, lobed halfway or more; lobes ovate-oblong, 3–4 mm, pubescent abaxially, ciliate. Filaments short, ca. 0.5 mm, puberulent; anthers 1–1.5 mm. Fruiting pedicel erect or nodding; fruiting calyx strongly reflexed. Berry shiny black, occasionally ripening green, globose, 5–8 mm in diam. Seeds discoïd, 1.5–2 mm in diam. Fl. Jun–Oct, Fr. Jul–Jan.

Waste places, roadsides, fields; 100–2000 m. Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [widespread in all tropical and temperate regions].

The leaves are used as a vegetable, yielding a heat-clearing effect. Whole plant can be used for treating inflammation, dissipating blood stasis, and promoting the subsidence of swelling, also clearing away heat and detoxifying.

This species was reported in FRPS as *Solanum nigrum* and *S. photeinocarpum*. However, *S. nigrum* is actually a different species, treated below. A variant of *S. americanum* was reported for China by Wessely (Feddes Repert. 63: 293. 1960) as *S. nigrum* L. var. *violaceum* Chen and in FRPS as *S. photeinocarpum* var. *violaceum* (Chen) C. Y. Wu & S. C. Huang, but we were unable to locate the original description of this variety or material of it.

Solanum ganchouenense was based on a specimen from Guizhou, which was not seen for this treatment. The original description separates the species from *S. nigrum* in having narrower leaves, larger umbellate inflorescences with more flowers, and revolute anthers that dry green. The anther description more resembles *Capsicum* than *Solanum*.

Some material of this species was recorded in FRPS as *Solanum suffruticosum* Schousboe. The type of the latter (B-W 4363), with its slender, slightly elongated inflorescences and sparingly dentate leaves, resembles *S. americanum*, but from the microfiche copy available, this determination is not certain.

Solanum opacum A. Braun & Bouché, which resembles *S. americanum* except for its yellowish green fruit, may also occur in Yunnan.

6. *Solanum merrillianum* Liou, Contr. Inst. Bot. Nat. Acad. Peiping 3: 455. 1935.

光枝木龙葵 guang zhi mu long kui

Solanum suffruticosum, *S. chousboe* var. *merrillianum* (Liou) C. Y. Wu. & S. C. Huang.

Herbs or shrubs 0.5–1.5 m tall. Stems woody, rooting at nodes, with herbaceous shoots; twigs slender, angled, sparingly puberulent with short, ascending simple hairs. Petiole slender, 0.5–2 cm; leaf blade ovate, 2–8 × 1.5–4.5 cm, puberulent with scattered, arched simple hairs, glabrescent,

base cuneate, decurrent, margin subentire, shallowly sinuate-dentate, apex acute or obtuse. Inflorescences cymose panicles 2–3 cm across, sometimes reduced to simple racemes; peduncle 2–3 cm, mostly several times dichotomously branched, slender. Pedicel 7–9(–12) mm, slender, pubescent, sometimes articulate just above base. Calyx cup-shaped, sparingly pubescent; lobes ovate-rounded, slightly unequal, 0.4–0.6 mm, ciliate. Corolla white, 4–6 × 5 mm, lobed halfway; lobes 2–3 mm, acute, ciliate, pubescent abaxially. Filaments equal, 0.5 mm, pubescent; anthers oblong, 1.5–1.7 mm. Style ca. 4 mm, tomentose at base. Fruiting pedicel 0.8–1.2 cm; fruiting calyx not enlarged. Berry black or black-blue, globose, 4–5 mm across. Seeds numerous, discoid or ovate, ca. 1.5 mm across. Fl. and fr. throughout the year.

• Slopes, near roadsides; low elevations. Anhui (Maanshan Shi), Guangdong, Hainan, Taiwan.

7. *Solanum nigrum* Linnaeus, Sp. Pl. 1: 186. 1753.

龙葵 long kui

Solanum nigrum var. *atriplicifolium* G. Meyer.

Herbs annual, erect, 25–100 cm, pubescent with simple hairs, unarmed. Stems often angular, sparsely pubescent. Petiole 2–5 cm; leaf blade ovate, 4–10 × 3–7 cm, pubescent or glabrescent, base cuneate, decurrent, entire or coarsely dentate, apex obtuse. Inflorescences extra-axillary umbels; peduncle 2–4 cm. Pedicel 0.8–1.2 cm. Calyx cup-shaped, 2–3 × 2–3 mm; lobes subdeltate, 0.5–1 × 1–1.5 mm, pubescent abaxially, ciliate. Corolla white, 8–10 mm; lobes ovate-oblong, 4–5 × 3–3.5 mm, pubescent abaxially, ciliate, spreading. Filaments 1–1.5 mm; anthers oblong, 2.5–3.5 mm. Style 5–6 mm. Fruiting pedicel strongly deflexed; fruiting calyx applied to berry. Berry dull black, globose, 8–10 mm in diam. Seeds discoid, ca. 2 mm in diam. Fr. May–Aug, fr. Jul–Nov.

600–3000 m. Fujian, Guangxi, Guizhou, Hunan, Jiangsu, Sichuan, Taiwan, Xizang, Yunnan [India, Japan; SW Asia, Europe].

The name *Solanum nigrum* has been commonly used to include many distinct but similar species, and more than one taxon may be represented in the material treated here under this name.

8. *Solanum scabrum* Miller, Gard. Dict. ed. 8, no. 6. 1768.

木龙葵 mu long kui

Herbs annual or short-lived perennial, glabrescent or sparingly pubescent. Stems erect, often angular; branchlets pubescent, glabrescent. Petiole 4–7 mm; leaf blade broadly ovate, rhomboid, or rounded, often broad, 2–10(–12) × 2–6 (–7) cm, glabrescent or pubescent, base cuneate, decurrent, margin entire, sinuate, or sparingly dentate, apex acute. Inflorescences extra-axillary, subumbellate; peduncle unbranched, 1–2.5 cm. Pedicel 5–10 mm, pubescent. Calyx cup-shaped, ca. 2 mm in diam., puberulent abaxially; lobes deltate-ovate, ca. 0.5 mm, ciliate. Corolla white, ca. 1 cm in diam.; lobes ovate, 2.5–5 mm, pubescent abaxially. Filaments short; anthers oblong, 2–4 mm. Style ca. 3 mm, pilose. Fruiting pedicel deflexed; fruiting calyx reflexed. Berry purplish black, somewhat shiny, globose, 5–10 mm in diam. Seeds discoid, 0.8–1 mm in diam. Fl. and fr. throughout the year.

Near roads, humid places in ravines and valleys; 200–2700 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, cultivated in Zhejiang (Hangzhou Shi) [Africa].

This species was treated in FRPS as *Solanum nigrum*.

9. *Solanum villosum* Miller, Gard. Dict. ed. 8, no. 2. 1768.

红果龙葵 hong guo long kui

Solanum alatum Moench; *S. humile* Bernhardt ex Willdenow; *S. miniatum* Bernhardt ex Willdenow; *S. nigrum* var. *humile* (Bernhardt ex Willdenow) C. Y. Wu & S. C. Huang.

Herbs erect, 40–60 cm tall, much branched; pubescence of simple, sometimes glandular hairs. Stems pubescent, often angular. Petiole 5–10 mm, winged; leaf blade ovate to elliptic, 3–7 × 2–4 cm, sparsely pubescent, base cuneate, decurrent, margin entire, sinuate, or coarsely dentate, apex acute. Inflorescences extra-axillary, umbellate; peduncle 1 cm, unbranched. Pedicel 4–6 mm. Calyx 2 × 1–1.5 mm, puberulent; lobes obtuse, less than 1 mm, ciliate, sinuses rounded. Corolla white or purplish, sometimes drying yellowish, 5–7 × 8–10 mm; lobes ovate-lanceolate, ca. 3 mm, ciliate, strongly spreading and reflexed. Filaments 1.5–1.8 mm, pubescent; anthers ca. 2 mm. Style 3–4.5 mm, pilose at base. Fruiting pedicel 1–1.5 cm, pubescent. Berry red, orange, or yellow, often bright, globose, 6–8 mm in diam. Seeds discoid, ca. 1 mm. Fr. Jul–Sep, fr. Sep–Nov.

Slopes, valleys, near roads, shady places; 100–1300 m. Gansu, Qinghai, Shanxi, Xinjiang; occasionally cultivated in Hebei [Afghanistan, India, Nepal; SW Asia, Europe].

10. *Solanum pseudocapsicum* Linnaeus, Sp. Pl. 1: 184. 1753.

珊瑚樱 shan hu yin

Shrubs erect, branched, unarmed; pubescence of simple and branched hairs. Petiole 2–5 mm; leaf blade narrowly oblong to lanceolate, 1–6 × 0.5–1.5 cm, pubescent or glabrous, base cuneate, decurrent, margin entire or sinuate, apex acute or obtuse. Inflorescences leaf opposed or extra-axillary, solitary or rarely paired flowers or short racemes; peduncle short or obsolete. Pedicel 3–4 mm. Calyx green, ca. 4 mm in diam., prominently lobed; lobes ca. 1.5 mm. Corolla white or mauve, 0.8–1.5 cm in diam., lobed about half way. Filaments less than 1 mm, glabrous; anthers ca. 2 mm. Style ca. 2 mm. Fruiting pedicel ca. 1 cm, expanded at apex. Berry orange-red, fleshy, 1.2–1.5(–2) cm in diam. Seeds discoid, 2–3 mm in diam.

Native of South America, cultivated and naturalized elsewhere.

- 1a. Plants glabrescent; anthers more than 2 mm 10a. var. *pseudocapsicum*
- 1b. Plants conspicuously puberulent with dendritic hairs; anthers ca. 2 mm 10b. var. *diflorum*

10a. *Solanum pseudocapsicum* var. *pseudocapsicum*

珊瑚樱 shan hu yin

Stems, leaves, and inflorescences glabrescent. Fl. early summer, fr. late autumn.

Cultivated for ornament. Anhui, Guangdong, Guangxi, Hubei, Jiangxi [native to South America; widely cultivated].

10b. *Solanum pseudocapsicum* var. *diflorum* (Vellozo) Bitter, Bot. Jahrb. Syst. 54: 498. 1917.

珊瑚豆 shan hu dou

Solanum diflorum Vellozo, Fl. Flumin. 2: t. 102. 1827; *S. capsicastrum* Link ex Schauer; *S. dunnianum* H. Léveillé.

Stems, leaves, and inflorescences minutely tomentose with branched hairs, often glabrescent. Fr. Apr–Jul, fr. Aug–Oct.

11. *Solanum dulcamara* Linnaeus, Sp. Pl. 1: 185. 1753.

欧白英 ou bai ying

Vines perennial, herbaceous, unarmed, glabrous or sparsely pubescent. Leaves unequal paired, sometimes compound with 1 or 2 pairs of leaflets proximal to main leaflet; petiole 1–2 cm; leaf blade elliptic or ovate-hastate, 4–11 × 2–8 cm, sparsely pubescent, base hastate or with 1 or rarely 2 lobes, margin entire, apex acuminate. Inflorescences extra-axillary, lax, open, many-flowered panicles; peduncle 1–3 cm, branched. Pedicel 5–12 mm, sparsely pubescent. Calyx 1.5–2 × 2–3 mm; lobes deltate, sparsely pubescent. Corolla purple, usually with a yellow eye, 5–8 mm; lobes elliptic-lanceolate, ca. 5 mm. Filaments ca. 0.5 mm; anthers connate, 2–3.5 mm. Style slender, ca. 5.5 mm. Berry red, globose or ovoid, 6–8 mm in diam. Seeds discoid, 1.5–2 mm in diam. Fl. summer, fr. autumn.

Slopes at forest edges; 500–3500. Henan, SW Sichuan, Xinjiang, SE Xizang, NW Yunnan [Russia; SW Asia, Europe].

The solanine contained in the berries can be used for treating rheumatism, arthritis, and skin disease, and as a pesticide.

12. *Solanum hidetaroii* Masamune, Trans. Nat. Hist. Soc. Taiwan 29: 84. 1939.

台白英 tai bai ying

Herbs climbing, suberect, glabrous, unarmed. Stems hollow, angular, glabrescent or puberulent. Petiole 1–1.5 cm; leaf blade ovate or ovate-lanceolate, 3–5 × 1.5–2.5 cm, puberulent adaxially, glabrescent abaxially; upper leaves 1.5–1.8 × 0.6 cm, base rounded, slightly oblique, margin entire or praemorse, apex acuminate. Inflorescences extra-axillary, lax, open, many-flowered panicles; peduncle ca. 2 cm, puberulent. Pedicel 5–12 mm, glabrous. Calyx ca. 2.5 mm in diam.; lobes ovate-rounded, ca. 0.5 mm, mucronate, puberulent abaxially. Corolla dark blue with basal spots adaxially; tube ca. 0.8 mm, limb ca. 4 mm; lobes lanceolate, 3–4 × 1.3 mm, pubescent at apex, ciliate. Filaments ca. 0.5 mm; anthers free, 1.8–2 mm. Ovary glabrous. Style ca. 4 mm. Fruiting pedicel 12–15 cm. Fruiting calyx spreading. Berry shiny red, globose, 5–8 mm in diam. Seeds discoid, ca. 1.5 mm in diam.

- C and N Taiwan.

No material was seen of this species, and the above description is taken from the original publication and from the Flora of Taiwan. To judge from the description, this taxon may not be distinct from *Solanum dulcamara*.

13. *Solanum japonense* Nakai, Fl. Sylv. Kor. 14: 58. 1923.

野海茄 ye hai jie

Solanum dulcamara Linnaeus var. *heterophyllum* Makino; *S. nipponense* Makino.

Vines 50–120 cm tall, glabrescent. Stems sparsely pubescent. Petiole 0.5–2.5 cm; blade of basal leaves deltate, broadly lanceolate or ovate-lanceolate, often with 2 basal lobes, 3–10 × 2–5 cm, glabrous or sparsely pubescent, base rounded or cuneate, margin entire or 3(–5)-lobed, apex acuminate; blade of distal leaves ovate-lanceolate, 2–4 cm. Inflorescences terminal or extra-axillary, open, many-flowered panicles; peduncle 2–3.5 cm, glabrescent. Pedicel 6–10 mm, glabrescent. Calyx 1.5–2 × 2.5 mm; lobes deltate, 0.5 mm. Corolla purple with a green eye, 5–8 × 1 cm; lobes lanceolate, ca. 4 mm. Filaments ca. 0.5 mm; anthers oblong, free, 2.5–3.5 mm. Style

slender, ca. 5 mm. Berry red, subglobose, ca. 1 cm in diam. Seeds reniform-discoid, ca. 2 mm in diam. Fl. Jun-Sep, fr. Sep-Nov.

Wastelands, slopes in valleys, near roads, by waters, open forests; 300–2900 m. Anhui, Guangdong, Guangxi, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Qinghai, Shaanxi, Sichuan, Xinjiang (Urumqi Shi), Yunnan, Zhejiang [Japan, Korea].

This taxon is doubtfully distinct from *Solanum dulcamara*.

14. *Solanum kitagawae* Schönbeck-Temesy, Fl. Iranica 100: 15. 1972.

光白英 guang bai ying

Solanum borealisinense C. Y. Wu & S. C. Huang; *S. depilatum* Kitagawa, not Bitter.

Subshrubs climbing, woody at base, slightly branched, 30–70 cm, puberulent with simple hairs, unarmed. Stems striate with scattered lenticels. Petiole 2–3 cm; leaf blade ovate to broadly ovate, ca. 9 × 6 cm, puberulent along veins and margins adaxially, glabrous abaxially, base broadly cordate to rounded, abruptly decurrent, margin entire, apex acuminate. Inflorescences extra-axillary, many-flowered panicles; peduncle 3–7 cm, branched. Pedicel 5–10 mm, puberulent. Calyx truncate at apex or sinuate, minutely pointed, puberulent adaxially; lobes subdeltate, mucronate, ca. 1 mm. Corolla purple, 1–1.5 cm; lobes elliptic or lanceolate, 6–8 mm. Filaments free, ca. 1 mm; anthers united into a tube, ca. 4.5 mm. Style ca. 6 mm. Berry red, 5–8 mm in diam. Seeds ovate, ca. 3 × 2.3 mm. Fl. Jun-Aug, fr. Aug-Oct.

Moist places by water; 100–1500 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai (Xinhai Xian), Xinjiang [Afghanistan, Japan, Mongolia, Russia; SW Asia].

This taxon is doubtfully distinct from *Solanum dulcamara*.

15. *Solanum lyratum* Thunberg in Murray, Syst. Veg. ed. 14. 224. 1784.

白英 bai ying

Solanum cathayanum C. Y. Wu & S. C. Huang; *S. dulcamara* var. *chinense* Dunal; *S. dulcamara* var. *pubescens* Blume; *S. dulcamara* var. *lyratum* (Thunberg) Bonati.

Vines herbaceous, much branched, 0.5–3 m tall, villous overall with elongate, many-celled hairs more than 2 mm. Petiole 1–3 cm; leaf blade elliptic or lyrate, 3–11 × 2–6 cm, base cordate or hastate, margin entire or 3–5-parted, apex acuminate. Inflorescences axillary, extra-axillary, or appearing terminal, few- to many-flowered panicles; peduncle 2–4 cm, villous. Pedicel 0.8–1.5 cm, villous. Calyx 1.5–2.5 × 3–4 mm in diam., sparsely pubescent; lobes rounded. Corolla blue-purple or white, 5–8 × 10 mm; lobes elliptic-lanceolate, ca. 4 × 2 mm, usually reflexed, puberulent at apex. Filaments ca. 0.8–1 mm; anthers free, oblong, 2.8–3.2 mm. Style glabrous, 6–8 mm. Fruiting pedicel sparsely pubescent, usually curved. Berry red or red-black, globose, 7–9 mm in diam. Seeds discoid, ca. 1.5 mm in diam., reticulate. Fl. Jun-Oct, fr. Oct-Nov.

Grasslands in valleys, near roads and fields; 100–2900 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan,

Xizang, Yunnan, Zhejiang [Cambodia, Japan including Ryukyu Islands, Korea, Laos, Myanmar, Thailand, Vietnam].

Stems can be used as a medicine for treating convulsions in infants, and branches and leaves for clearing away heat and cooling the blood.

16. *Solanum pittosporifolium* Hemsley, J. Linn. Soc., Bot. 26: 171. 1890.

海桐叶白英 hai tong ye bai ying

Solanum pittosporifolium var. *pilosum* C. Y. Wu & S. C. Huang.

Shrubs to 2 m tall, glabrous or sparsely pubescent with simple hairs, unarmed. Stems sometimes angular, mostly glabrous. Petiole 0.7–2 cm; leaf blade lanceolate to ovate-lanceolate, 4–13 × 2–6.5 cm, usually glabrous, base rounded or cuneate, sometimes oblique, margin entire, apex acuminate. Inflorescences extra-axillary, paniculate; peduncle 1–5.5 cm. Pedicel 0.5–2 cm. Calyx ca. 3 mm in diam.; lobes short deltate, ca. 1 × 2 mm, ciliate. Corolla usually white, rarely purple, with greenish spots at throat; lobes oblong-lanceolate, 4–5 × 1.5 mm, ciliate, reflexed. Filaments ca. 1 mm; anthers oblong, free, 2.5–2.8 mm. Style ca. 7 mm. Berry red, globose, 0.8–1.2 cm in diam. Seeds discoid, 2–2.8 mm in diam. Fl. Jun-Aug, fr. Sep-Dec.

Open or dense forests; 500–2500 m. Anhui, Guangdong, Guangxi, Guizhou, Hebei, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [N Vietnam].

Doubtfully distinct from *Solanum dulcamara*.

17. *Solanum seaforthianum* Andrews, Bot. Repos. 8: tab. 504. 1808.

南青杞 nan qing qi

Solanum kerrii Bonati.

Vines slender, woody, 1–5 m, glabrescent; pubescence of simple hairs. Leaves simple or pinnately compound; petiole 2–5 cm; leaf blade 4–10 × 4–7 cm, puberulent along veins, base acute, obtuse, truncate, or cordate, usually pinnately (5–)7(–9)-parted; lobes ovate to oblong or lanceolate, unequal, 1.5–5 × 0.5–2.5 cm, acute or acuminate. Inflorescences leaf opposed or appearing terminal, showy, many-flowered open panicles; peduncle to 4 cm, branched. Pedicel 5–10 mm, abscissing nearly at base. Calyx cup-shaped, 1–1.5 × 2–3 mm, truncate or with minute, short deltate lobes, glabrous. Corolla usually purple, rarely white, 0.9–1.3 cm; lobes ovate-oblong, 5–8 × 2.5–4.5 mm, glabrous. Filaments 2–3 mm; anthers free, 3–4 mm. Style ca. 1 cm. Fruit (not seen in Chinese plants) red, juicy, globose, 1–2 cm. Seeds discoid, 2–3.5 mm in diam.

Near roads; 600–1300 m. Yunnan (Mengzi Xian), cultivated in gardens [perhaps native of Caribbean area, widely cultivated and naturalized in many countries].

18. *Solanum septemlobum* Bunge, Enum. Pl. China Bor. 48. 1833.

青杞 qing qi

Solanum septemlobum var. *ovoideocarpum* C. Y. Wu & S. C. Huang; *S. septemlobum* var. *subintegrifolium* C. Y. Wu & S. C. Huang.

Herbs or shrubs, erect, unarmed; pubescence of curved simple, often glandular hairs. Stems angular, usually white pubescent, sometimes glabrescent. Petiole 1–2.5 cm; leaf blade ovate, 3–9 × 2–6 cm, base cuneate, usually 3–7-parted, sometimes upper leaves subentire, apex obtuse; lobes ovate-oblong to lanceolate, sparsely pubescent, entire or dentate. Inflorescences extra-axillary or appearing terminal, open panicles; peduncle 2–5 cm, puberulent or glabrous. Pedicel 5–10 mm, usually basally articulated. Calyx ca. 2 mm in diam., sparsely pubescent abaxially; lobes deltate, 0.5–1 mm. Corolla greenish purple, 8–10 × 8–10 mm, 5-parted; lobes oblong-ovate, 4–6 mm, pubescent, ciliate, reflexed. Filaments ca. 1 mm; anthers oblong, 2.5–3.5 mm. Style ca. 7 mm. Berry red, subglobose or ovoid, ca. 8 mm in diam. Seeds discoid, 2–3 mm in diam. Fl. Jun-Oct, fr. Oct-Dec.

Sunny slopes; 300–2500 m. Anhui, Gansu, Hebei, Henan, Jiangsu, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, E Xizang, Zhejiang [Russia].

Solanum septemlobum var. *indutum* Handel-Mazzetti (Oesterr. Bot. Z. 83: 234. 1934) was distinguished by being densely covered overall with capitate glandular hairs of varying length, but this condition sometimes occurs in more or less typical material of *S. septemlobum*. Without seeing the type material, which was collected in S Shaanxi, the identity of this variety remains uncertain.

19. *Solanum tuberosum* Linnaeus, Sp. Pl. 1: 185. 1753.

阳芋 yang yu

Herbs erect or sprawling, 30–80 cm tall, glabrous or sparsely pubescent with simple and glandular hairs. Stolons bearing underground tubers; tubers white, red, or purplish, globose, oblate, or elliptic, 3–10 cm in diam., fleshy. Leaves interruptedly odd-pinnate, with 6–8 pairs of leaflets and smaller, unequal interstitial leaflets; petiole 2.5–5 cm; leaflet blade ovate or oblong, mostly sparingly pilose. Inflorescences appearing terminal, leaf opposed, or axillary, many-flowered, sparingly branched panicles. Pedicel articulate near middle, 1–2 cm. Calyx sparsely pubescent; lobes lanceolate. Corolla white, pink, or blue-purple, sometimes all on 1 plant, rotate, 2.5–3 cm in diam.; lobes deltate, ca. 5 mm. Filaments ca. 1 mm; anthers 5–6 mm. Ovary glabrous. Style ca. 8 mm. Berry green or yellowish green, often striped, globose, smooth, ca. 1.5 cm in diam. Fl. and fr. summer and autumn.

Native to South America; widely cultivated throughout China for its edible tubers, also in other temperate regions of the world.

20. *Solanum chrysostrichum* Schlechtendal, Linnaea 19: 304. 1847.

多裂水茄 duo lie shui jie

Solanum torvum Swartz var. *pleiotomum* C. Y. Wu & S. C. Huang.

Shrubs 1–1.5 m tall, sparingly armed, densely pubescent overall with rust-colored, short- or long-stalked stellate hairs. Stems angular, with short prickles 2–3 × 1–1.5 mm. Petiole stout, 1–3 cm, sometimes armed; leaf blade broadly ovate or elliptic, 8–20 × 4–14 cm, base obtuse or cordate, often asymmetric, 3–5-lobed to parted; lobes deltate or long deltate, unequal, irregularly sinuate, densely pubescent with rust-colored, stalked stellate hairs, denser abaxially, acute or subobtuse at apex. Inflorescences extra-axillary, many-flowered racemose panicles; peduncle mostly 2- or 3-branched, 5–12 mm, pubescent as on stems.

Pedicle stout, 5–10 mm. Calyx cup-shaped, 5–8 mm; lobes deltate-lanceolate, 4–6 mm, acuminate at apex, pubescent as on peduncle. Corolla white, 1.5–1.8 cm; lobes ovate-oblong, 0.8–1.2 cm, acute. Filaments 1–2 mm; anthers oblong, 6–8 mm. Style 8–10 mm. Berry yellow-orange, globose, 8–10 mm in diam. Seeds discoid, 1.5–2 mm in diam. Fl. and fr. throughout the year.

Dry lands. Fujian, Taiwan [Central America; introduced elsewhere].

21. *Solanum luzoniense* Merrill, Philipp. J. Sci. 13: 58. 1918.

呂宋茄 lǚ song qié

Shrubs or subshrubs 50–100 cm tall, densely stellate-tomentose, armed with short, straight prickles 2–3.5 mm. Stems and branches terete, stellate tomentose, sparsely prickly. Petiole 1–3 cm, pubescent as on stems; leaf blade lanceolate to narrowly oblong, 4–15 × 1.5–5 cm, sparsely stellate tomentose or glabrate adaxially, tomentose abaxially, base cuneate, margin entire or obscurely sinuate, apex acute. Inflorescences extra-axillary or terminal, racemose panicles to 3 cm; peduncle 1–1.8 cm, stellate tomentose. Pedicel ca. 5 mm. Calyx campanulate, ca. 3 mm; lobes oblong-ovate, ca. 1.5 mm, acute or obtuse, stellate tomentose. Corolla violet, 6–8 mm, 5-lobed; lobes oblong-ovate or ovate-lanceolate, 5–6 mm, adaxially pubescent as on calyx. Filaments short; anthers lanceolate, narrowed upward, ca. 4 mm. Fruiting pedicel 1–2.5 cm, stellate tomentose. Fruiting calyx stellate hairy. Berry red, globose, 6–10 mm in diam., glabrous. Seeds reniform, discoid, ca. 3 mm in diam. Fl. Apr–Aug, fl. Jul–Oct.

Hillsides. Taiwan (Botel Tobago, Taidong) [Philippines].

No material from China was seen, and the description is based on specimens from the Philippines and on the account in Flora of Taiwan (4: 542. 1978).

22. *Solanum macaonense* Dunal in A. de Candolle, Prodr. 13(1): 264. 1852.

山茄 shan qié

Solanum lasiostylum (Y. C. Liu & C. H. Ou) Tawada; *S. torvum* Swartz var. *lasiostylum* Y. C. Liu & C. H. Ou.

Shrubs 1–1.5 m tall, mostly armed, pubescent overall with stalked stellate hairs. Stems with dark or yellowish, stout, broad-based, recurved or reflexed prickles 2.5–10 × 2–10 mm. Leaves solitary or in somewhat unequal pairs; petiole 2–4 cm; leaf blade ovate-elliptic, 10–18 × 3–12 cm, drying of different colors, abaxially glabrescent or with sparse, sessile, stellate hairs, adaxially softly tomentose with dense, whitish, short-stalked hairs, base obtuse, rounded, or cuneate, margin subentire or 6- or 7-sinuate lobed, apex acute. Inflorescences extra-axillary, many-flowered cymes; peduncle mostly 1–3-branched, 1–2.3 cm, stellate pubescent with stalked hairs. Pedicel 4–8 mm, tomentose. Calyx 3–5 mm, pubescent; lobes ovate or broadly deltate, 2.5–3 mm. Corolla blue or purple, rotate, 0.8–1.2 × 1.5–1.8 cm; lobes ovate-lanceolate, 6–7 × 2–3 mm, pubescent abaxially, spreading, sometimes reflexed. Filaments ca. 0.5 mm; anthers 5–5.5 mm. Style 7–8 mm, base puberulent with stellate and simple hairs. Fruiting pedicel erect, 1–1.3 cm, stellate pubescent. Fruiting calyx not enlarged. Berry red, 5–8 mm in diam. Seeds discoid, ca. 1.5 mm in diam. Fl. and fr. throughout the year.

Wastelands, thickets. Fujian, Guangdong, Guangxi, Hainan, Taiwan [Philippines].

The type of *Solanum macaonense* was not seen, and the name is used here with hesitation. Some features of the original description (stellate and simple hairs on the pedicels) suggest that it may be synonymous with *S. torvum*.

23. *Solanum nienkui* Merrill & Chun, Sunyatsenia 2: 318. 1935.

疏刺茄 shu ci qié

Shrubs erect, 50–100 cm tall, often armed; pubescence of stellate hairs. Stems usually stellate pubescent, glabrescent, unarmed or with stout-based straight prickles ca. 1 mm. Petiole 1–4.5 cm; leaf blade narrowly ovate or oblong-ovate, 3–10 × 1.5–5 cm, with branched, short, stellate hairs adaxially and dense, long-stalked, 7–9-rayed stellate hairs abaxially, base cuneate, margin entire or subentire, apex obtuse. Inflorescences extra-axillary, rarely appearing terminal, scorpioid-racemose, 3–6 cm. Pedicel 5–10 mm. Calyx campanulate, 4–6 × 5–6 mm, tomentose with many-rayed stellate hairs; lobes deltate, unequal, 1–2 mm. Corolla blue-purple, 0.8–1.2 × 1–1.3 cm, stellate hairy abaxially; lobes ovate-deltate, unequal, 4–6 mm. Filaments 0.5–1 mm; anthers 4–6 mm. Style ca. 7 mm. Berry globose, ca. 1 cm in diam., glabrous. Seeds reniform-discoid, 1.5–2 mm in diam., reticulate. Fl. and fr. throughout the year.

• Forests, thickets; 100–300 m. Hainan.

24. *Solanum procumbens* Loureiro, Fl. Cochinch. 1: 132. 1790.

海南茄 hai nan qié

Solanum hainanense Hance.

Shrubs erect or prostrate, 1–2 m tall, much branched, armed, pubescent overall with stellate hairs. Stems and branches terete, with copious recurved prickles 2–4 × 1.5–4 mm. Petiole 0.5–1.5 cm; leaf blade ovate-oblong, 1.5–6.5 × 1–3.5 cm, adaxially with sparse stellate tomentum, densely tomentose abaxially, prickly on both surfaces, base cuneate or rounded, margin usually 5-sinuate lobed, rarely entire, apex obtuse. Inflorescences terminal, rarely appearing extra-axillary, several-flowered scorpioid racemes; peduncle ca. cm. Flowers 4-merous; pedicel 4–12 mm. Calyx cup-shaped, 3–4 mm; lobes deltate, unequal, 1–2 mm, stellate tomentose abaxially. Corolla white, pale reddish, or pale purple, ca. 1 cm; lobes lanceolate, 4–7 mm, with stellate hairs abaxially. Filaments ca. 1 mm; anthers ca. 6 mm. Style ca. 7 mm. Fruiting pedicel 1–2 cm. Berry shiny red, globose, 7–9 mm in diam. Seeds pale yellow, reniform-discoid, ca. 3 × 2 mm. Fl. Apr–Sep, fr. Sep–Dec.

Forests, thickets; 300–1200 m. Guangdong, Guangxi (Hepu Xian), Hainan [Laos, Vietnam].

25. *Solanum torvum* Swartz, Prodr. 47. 1788.

水茄 shui qié

Shrubs 1–2(–3) m tall, sparingly armed, densely pubescent overall with many-rayed, grayish stellate hairs. Stems with stout, recurved, reddish or pale-yellow prickles 2.5–10 × 2–10 mm and sometimes bearing basal stellate hairs. Leaves solitary or paired; petiole 2–4 cm; leaf blade ovate to elliptic, 6–16(–19) × 4–11(–13) cm, with yellow, many-branched stellate hairs, armed or unarmed, base cordate

or cuneate, margin sinuate or usually 5–7-lobed, apex acute. Inflorescences extra-axillary, many-flowered racemose panicles; peduncle mostly 1- or 2-branched, 1–1.8 cm, stellate pubescent. Flowers andromonoecious. Pedicel dark, slender, 5–12 mm, bearing simple glandular hairs and stalked stellate hairs. Calyx cup-shaped, 4–5 mm, pubescence as on pedicel; lobes ovate-lanceolate, 2–3 mm. Corolla white, rotate, 1–1.3 × 1–1.5 cm; lobes ovate-lanceolate, 8–10 mm, stellate pubescent abaxially. Filaments ca. 1 mm; anthers 4–7 mm. Style 6–8 mm. Fruiting pedicel 1–2 cm, thickened upwards, with sparse stellate and simple glandular hairs. Fruiting calyx ca. 1.5 cm. Berry yellow, smooth, glabrous, 1–1.5 cm in diam. Seeds discoid, 1.5–2 mm in diam. Fl. and fr. throughout the year.

Roadsides, wastelands, ravines, valleys, thickets, wet places near villages; 200–2000 m. Fujian (Xiamen Shi), Guangdong, Guangxi, Guizhou, Hainan, Taiwan, S Xizang, Yunnan [native of the Caribbean, widely naturalized in tropical regions].

The young fruits are edible after cooking and are used medicinally for improving eyesight; the leaves are used for treating skin diseases.

26. *Solanum wrightii* Bentham, Fl. Hongk. 243. 1861.

大花茄 da hua qie

Trees to 12 m tall, sometimes armed with straight prickles, pubescent with stalked stellate hairs. Petiole 5–10 cm; leaf blade broadly ovate, 30 × 15–20 cm, scabrid with dispersed simple or stellate hairs adaxially, with sparse to dense, stalked stellate hairs and prickles abaxially, often with straight yellow or green prickles, base oblique, margin entire or sinuate-lobed, apex obtuse or acute. Inflorescences axillary or extra-axillary many-flowered racemes; peduncle mostly unbranched. Flowers showy, andromonoecious. Pedicel 0.6–1.5 cm, often leaving a conspicuous scar, with dense, bristlelike, long-stalked hairs. Calyx 1–1.5 cm, deeply lobed; lobes lanceolate, hispid with mostly simple hairs. Corolla opening deep purple, fading through blue to white over several days, 6–9 cm in diam., lobed ca. 1/3 way down, stellate hairy abaxially. Filaments 2–3 mm, glabrous; anthers oblong, apex narrowed, beaklike, 1.2–1.5 cm. Style dimorphic. Berry red, sometimes remaining green, globose, 3–4 cm in diam. Seeds lenticular, 2–3 mm in diam.

Hong Kong [widely cultivated for ornament and coffee shade in tropical and subtropical regions; native of Bolivia and Brazil].

As no material from China was seen, the description was based on American plants. The species was originally described from a plant cultivated in Hong Kong.

27. *Solanum violaceum* Ortega, Nov. Pl. Desc. Dec. 56. 1798.

刺天茄 ci tian qie

Solanum chinense Dunal; *S. indicum* Linnaeus var. *recurvatum* C. Y. Wu & S. C. Huang; *S. nivalomontanum* C. Y. Wu & S. C. Huang.

Shrubs 0.5–1.5(–2) m tall, much branched, pubescent overall with dense, stalked, 5–11-rayed stellate hairs. Stems and branches with pale yellow, recurved prickles 4–10 × 1.5–7 mm, gray stellate tomentose. Leaves unequal paired; petiole 1.5–4 cm; leaf blade ovate, 5–8(–11) × 2–7(–8.5) cm, tomentose with short-stalked, 5–9(–11)-rayed stellate hairs adaxially, with long-stalked hairs abaxially, with straight needlelike prickles, base cordate or truncate,

margin 5–7-sinuate lobed, apex obtuse or acute. Inflorescences extra-axillary, scorpioid racemes, 2–6 cm, sparingly branched; peduncle ca. 1.5 cm, prickly or not. Pedicel 4–15 mm. Calyx 4–7 mm; lobes lanceolate, 3–5 mm, unequal, pubescent and prickly as on pedicel. Corolla blue-purple, sometimes white, rotate, 1–1.2 1–2 cm; lobes ovate or ovate-lanceolate, 5–8 × 2–5 mm, obtuse. Filaments ca. 1 mm; anthers oblong, 5–6 mm. Style 8–10 mm, stellate pubescent. Fruiting pedicel 1–2 cm, stellate pubescent, prickly, erect or sometimes recurved. Fruiting calyx reflexed, stellate pubescent, prickly. Berry shiny orange, globose, 0.8–1.3 cm in diam. Seeds subdiscoid, ca. 2 mm in diam. Fl. and fr. throughout the year.

Forests, dry thickets, wastelands, roadsides; 100–2700 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan [widespread in tropical Asia].

Fruits are used medicinally for relieving cough, alleviating toothache, and externally for skin disease.

28. *Solanum deflexicarpum* C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 16(2): 73. 1978.

苦刺 ku ci

Shrubs ca. 1 m tall, erect, pubescent overall with dense, stalked or sessile, (3–)5–9-rayed stellate hairs. Stems and branches occasionally armed with 1 or 2 prickles less than 1 mm. Leaves unequal paired; petiole 1.5–2.5 cm; leaf blade ovate, 5.5–10.5 × 4–8.5 cm, green and sparsely tomentose with 5–9-rayed stellate hairs adaxially, yellow-green with denser hairs abaxially, unarmed, base truncate to broadly cuneate, margin 5–7-sinuate, apex acute. Inflorescences extra-axillary, 10- or 11-flowered scorpioid cymes to 2 cm; peduncle 1.5–1.8 cm. Pedicel 4–5 mm, strongly recurved, ca. 1 cm in fruit, stellate tomentose. Calyx ca. 4 mm; lobes ovate, 1.5 mm, acute, stellate tomentose. Corolla white, campanulate, ca. 1 cm; lobes ovate-lanceolate, ca. 5 mm. Filaments less than 1 mm; anthers oblong, ca. 4 mm. Style ca. 7 mm, stellate-pubescent. Berry globose, ca. 1 cm in diam. Seeds discoid, ca. 2 mm in diam. Fl. and fr. autumn.

• Roadsides; 1400–1500 m. Yunnan.

29. *Solanum aethiopicum* Linnaeus, Cent. Pl. 2: 10. 1756.

红茄 hong qie

Solanum integrifolium Poir.

Herbs annual, ca. 70 cm tall, pubescent with stalked or sessile, 5–9-rayed stellate hairs. Stem and branches prickly; prickles 2–5 mm, 1–2 mm broad at base, straight or slightly curved. Upper leaves often unequal paired; petiole 2–7 cm; leaf blade ovate to oblong-ovate, 10–20 × 6–14 cm, with mixed simple and many-rayed hairs abaxially, stellate tomentose along veins and often with subulate prickles 3–7 mm, irregularly sinuate-parted, apex acuminate or obtuse. Inflorescences extra-axillary, few flowered, racemose; peduncle 1–1.5 cm. Flowers 5-merous, (6–9-merous in cultivation). Pedicel 5–12 mm, with prickles 0.2–2 mm. Calyx campanulate; lobes slightly unequal, ovate to ovate-lanceolate, 5–7 × 3–4 mm. Corolla white or slightly purplish, stellate or stellate-rotate, 1.5–2.5 cm in diam.; limb ca. 6.5 mm. Filaments 0.5–1 mm, glabrous; anthers lanceolate-elliptic, 4–5 × 0.7–1 mm, emarginate at apex and base. Ovary 4–8-locular. Style 5.7–7.5 mm. Berry orange

or red, 1.5–3(–5) cm in diam., often longitudinally 4–6-grooved. Seeds reniform, 2–3.5 mm in diam.

400–1800 m. Cultivated in Henan (Song Xian) and Yunnan (Kunming Shi and Xishuangbanna) [Africa].

The fruits are used medicinally and for food in some countries.

30. *Solanum aculeatissimum* Jacquin, *Collectanea* 1: 100. 1787.

喀西茄 ka xi qie

Solanum cavaleriei H. Léveillé & Vaniot; *S. khasianum* C. B. Clarke.

Herbs to subshrubs, erect, 1–2(–3) m tall, copiously armed, minutely tomentose with simple, many-celled, mostly glandular hairs, often with a pinkish cast. Stems and branches terete, erect, loosely pilose with many-celled, simple and stellate hairs to 2 mm, armed with recurved flat prickles 1–5 × 2–10 mm and sometimes straight spines. Leaves sometimes unequal paired; petiole, stout, 3–7 cm, copiously prickly; leaf blade broadly ovate, 6–15 × 4–15 cm, with coarse, many-celled simple hairs and straight prickles on both surfaces, mixed with sparse, stellate hairs abaxially, base truncate to subhastate, margin 5–7-lobed or -parted, with angular or dentate sharp lobes, apex acute or obtuse. Inflorescences extra-axillary, short, 1–4-flowered scorpioid racemes; peduncle obsolete or to 1 cm. Pedicel 5–10 mm, pilose. Calyx campanulate, ca. 5.5 cm; lobes oblong-lanceolate, 5 × 1.5 mm, hairy and sometimes prickly abaxially. Corolla white; lobes lanceolate, ca. 4 × 14 mm, pubescent as on calyx. Filaments 1–2 mm; anthers lanceolate, acuminate, 6–7 mm. Ovary glabrous or minutely stipitate glandular. Style 6–7 mm. Berry pale yellow, globose, 2–3 cm in diam. Seeds light brown, lenticular, 2–2.8 mm in diam. Fl. Mar-Aug, fr. Nov-Dec.

Along ditches and roads, wastelands, grasslands, thickets, open forests; 600–2300 m. Fujian (Xiamen Shi), Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang (Pingyang Xian) [probably native to Brazil; widespread in tropical Asia and Africa].

31. *Solanum viarum* Dunal in A. de Candolle, *Prodr.* 13(1): 240. 1852.

毛果茄 mao guo qie

Solanum khasianum C. B. Clarke var. *chatterjeeanum* Sen Gupta.

Herbs or subshrubs, erect, 0.5–1(–2) m tall, armed, minutely tomentose with many-celled, simple, mostly glandular hairs. Stems and branches terete, densely and evenly pubescent with many-celled, simple hairs to 1 mm, armed with recurved prickles 2–5 × 1–5(–8) mm and sometimes with needlelike prickles 1–4 mm. Leaves unequal paired; petiole stout 3–7 cm, armed with erect, flat straight prickles 0.3–1.8 cm; leaf blade broadly ovate, 6–13 × 6–12 cm, with prickles and coarse, many-celled, glandular simple hairs on both surfaces, these mixed with sparse, sessile, stellate hairs abaxially, base truncate to short hastate, margin 3–5-lobed or -parted; lobes blunt at apex. Inflorescences extra-axillary, subfasciculate, 1–5-flowered racemes; peduncle obsolete or short. Flowers andromonoecious, only basal ones fertile. Pedicel 4–6 mm. Calyx campanulate, ca. 10 × 7 mm, lobes oblong-lanceolate, 0.6–1.2 mm, hairy and sometimes prickly abaxially. Corolla white or green; lobes lanceolate, ca. 2.5 × 10 mm, pubescent as on calyx. Filaments 1–1.5 mm; anthers lanceolate, acuminate, 6–7 mm. Ovary puberulent. Style ca. 8 mm, glabrous. Berry pale yellow, globose, 2–3 cm

in diam. Seeds brown, lenticular, 2–2.8 mm in diam. Fl. Jun-Aug, fr. Jun-Oct.

Wastelands, grasslands, thickets, open forests, along ditches, roadsides; 1400–2200 m. E Xizang (Zaya Xian), Yunnan [widespread in tropical Asia and Africa].

32. *Solanum capsicoides* Allioni, *Mélanges Philos. Math. Soc. Roy. Turin* 5: 64. 1773.

牛茄子 niu qie zi

Solanum bodinieri H. Léveillé & Vaniot; *S. ciliatum* Lamarck.

Herbs or subshrubs, erect or sprawling, 30–60(–100) cm tall, copiously armed with pale yellow, needlelike prickles, pubescent with coarse, many-celled simple hairs. Stems conspicuously white lenticellate, glabrescent to pilose; prickles straight to slightly recurved, 0.5–1.8 cm. Leaves paired; petiole stout, 2–7 cm; leaf blade broadly ovate, 5–13 × 4–12 cm, with many-celled simple hairs adaxially, glabrous or hairy only along veins abaxially, prickly along veins on both surfaces, base cordate, margin 5–7-lobed to halfway, apex acute or acuminate. Inflorescences extra-axillary, racemose, 1–4-flowered; peduncle unbranched. Pedicel 5–12 mm. Calyx cup-shaped, ca. 5 × 8 mm; lobes ovate, pubescent as on stems. Corolla white, greenish at base; lobes lanceolate, ca. 12 × 4 mm. Filaments 2.5 mm; anthers lanceolate, ca. 6 mm. Ovary minutely stipitate glandular. Style 7–8 mm. Fruiting pedicel 2–2.5 cm. Fruiting calyx copiously armed, somewhat enlarged, not covering fruit. Berry orange-red, subglobose, 3.5–6 cm in diam., mesocarp white, spongy. Seeds yellowish, discoid, with a conspicuous, thin orbicular wing, 4–6 mm in diam. Fl. Jun-Aug, fr. Aug-Oct.

Wastelands, near roadsides, open forests, thickets; 200–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang, also cultivated in Henan and Liaoning [native to Brazil; now a widespread weed of warm regions].

Sometimes cultivated for its bright, ornamental fruits that are poisonous.

33. *Solanum mammosum* Linnaeus, *Sp. Pl.* 1: 187. 1753.

乳茄 ru qie

Herbs or shrubs, erect, ca. 1 m tall, copiously armed, villous throughout with mixed stellate and simple, partly glandular hairs. Stems pilose with glandular simple hairs, armed with needlelike, sometimes slightly curved yellowish prickles 4–12 × 3–5 mm. Leaves mostly paired; petiole 2.5–8 cm; leaf blade broadly ovate or suborbicular, 5–12 × 5–10 cm, (3–)5(–7)-lobed, villous, armed on major veins with needlelike prickles 0.8–2 cm, base cordate, apex acute or obtuse. Inflorescences extra-axillary, scorpioid-racemose, 3- or 4-flowered; peduncle obsolete. Pedicel 5–10 mm. Calyx pubescent as on stems, sometimes armed; lobes ovate-lanceolate, 5–6 mm. Corolla purple, 2.5–3.2 cm in diam.; lobes oblong-lanceolate, 2–2.2 × 0.4 cm, villous abaxially. Stamens subequal; filaments ca. 1 mm; anthers narrow, lanceolate, 1–1.2 cm. Style ca. 3 mm. Berry yellow, darkening with age, pyriform, 4.5–7 × 3–4 cm, with 1–5 papillate protuberances at base; mesocarp white, spongy. Seeds dark brown, somewhat compressed, 3–4 mm in diam. Fl. summer, fr. autumn.

200–1300 m. Guangdong, Guangxi, Yunnan [native to South America].

34. *Solanum lasiocarpum* Dunal, Hist. Nat. Solanum. 222. 1813.

毛茄 mao qie

Solanum immane Hance ex Walpers; *S. lasiocarpum* var. *velutinum* Dunal.

Herbs or subshrubs, erect or spreading, 1–1.5 m tall, armed, densely pubescent throughout with pale yellow, many-celled stellate hairs. Stems and branches stout, with flat, erect or slightly recurved prickles 1–8 mm. Petiole 3–8 cm, often with stalked, stellate hairs and erect prickles; leaf blade ovate, 10–20 × 8–18 cm, pubescent as on stems, denser abaxially, prickly along veins on both surfaces, base truncate or subhastate, margin 5–11-sinuate lobed, apex acute. Inflorescences extra-axillary, several flowered, scorpioid-racemose, 1.2–2 cm; peduncle ca. 3 mm. Flowers andromonoecious. Pedicel ca. 1 cm. Calyx lobes ovate, 8–10 mm. Corolla white, subrotate, 1–1.2 × 2 cm. Filaments very short; anthers lanceolate, acuminate, 7–8 mm. Style ca. 9 mm, glabrous. Fruiting pedicel erect, 1–1.5 cm. Fruiting calyx somewhat enlarged, reflexed. Berry orange, globose, ca. 2 cm in diam., densely stellate hirsute, tomentum persistent. Seeds brown, ca. 2 mm in diam. Fl. Jun–Oct, fr. Nov–Dec.

Wet places in ravines and valleys, thickets, open forests, near roads, humid places, dense forests; 200–1000 m. Guangdong, Guangxi, Taiwan, S and SE Yunnan [Cambodia, India, Indonesia, Laos, Philippines, Sri Lanka, Thailand, Vietnam].

35. *Solanum barbisetum* Nees, Trans. Linn. Soc. London 17: 51. 1837.

刺苞茄 ci bao qie

Herbs or subshrubs, erect, ca. 1 m tall, armed with straight prickles, pubescent with stellate hairs. Stems and branches shaggy-tomentose with stalked, 5–9-rayed stellate hairs and erect, broad-based prickles 2–5 × 1–1.5 mm. Leaves paired; petiole 4.5–6 cm; leaf blade ovate-elliptic to elliptic, 16–24 × 12–19 cm, tomentose with 4–9-rayed hairs, sparsely prickly, base cuneate, margin 10–14-dentate, apex acute. Inflorescences extra-axillary, elongated, many-flowered scorpioid racemes, 5–10 cm; peduncle ca. 2 cm. Pedicel 5–10 mm. Calyx campanulate, 1–1.2 cm; lobes oblong-lanceolate, 8–9 × 3 mm, densely pubescent with pale yellow, stellate hairs. Corolla blue or purple, 1–1.2 × 1.5 cm; lobes lanceolate, ca. 7 × 3 mm, pubescent as on calyx. Filaments less than 1 mm; anthers lanceolate, ca. 7 mm. Ovary glabrous. Style ca. 9 mm. Fruiting calyx with stellate hairs and dense erect prickles, enveloping most of berry. Berry (immature?) globose, glabrous, ca. 1.2 cm in diam. Seeds brownish, discoid, ca. 2.5 mm in diam. Fl. summer.

Waste places, by waters, wet places, valleys, thickets; 500–1300 m. S Yunnan [Bangladesh, India, Laos, Thailand].

We have not seen the type or reliable material of this species, and the record, which follows FRPS, remains uncertain. It is different from any other species known from China, and it resembles *S. dasyanthum* Thonning of West Africa in many features.

36. *Solanum griffithii* (Prain) C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 16(2): 75. 1978.

膜萼茄 mo e qie

Solanum barbisetum Nees var. *griffithii* Prain, J. Asiat. Soc. Bengal 62: 541. 1896.

Herbs or subshrubs 50–100 cm tall, puberulent with stalked stellate hairs. Stems sparingly lanate with weak, long-stalked, 7–9-rayed hairs, glabrescent, sparingly armed with erect, stout prickles 2–3(–5) × 1–1.5(–2.5) mm. Leaves equal paired; petiole 2–5 cm; leaf blade ovate to obovate-elliptic, 6–16(–19) × 4–10(–16) cm, pubescent as on stems, sparsely prickly along main veins, base obtuse or cuneate, margin 6–18-dentate, apex acute. Inflorescences extra-axillary scorpioid racemes ca. 3.5 cm; peduncle 4–5 mm. Pedicel ca. 1 cm, with short prickles. Calyx subcampanulate, ca. 7 mm; lobes lanceolate, ca. 4 × 1 mm, pubescent, prickly. Corolla white, broadly campanulate, 1.2–1.5 × 1.5 cm; lobes lanceolate, ca. 6 × 1.5 mm, stellate hairy. Filaments ca. 1.5 mm; anthers ovate-lanceolate, ca. 6 mm. Ovary glabrous. Style ca. 9 mm, glabrous. Fruiting pedicel 0.9–1.1 cm. Fruiting calyx with dense stellate hairs, closely enveloping most of berry, with numerous short yellowish prickles. Berry globose, ca. 1.2 cm in diam., glabrous. Seeds orbicular, ca. 2.5 mm in diam. Fl. Apr–Aug, fr. Aug–Oct.

Near roads, limestone mountains, thickets, forests; 300–900 m. Guangxi (Pinguo Xian), Guizhou, Yunnan [India, Myanmar].

37. *Solanum sisymbriifolium* Lamarck, Tabl. Encycl. 2: 25. 1794.

蒜芥茄 suan jie qie

Herbs annual, copiously armed, pubescent with glandular, many-celled, simple and stellate hairs. Stems erect, with yellow or orange-yellow, subulate prickles 2–10 × 1.5 mm. Leaves simple or sometimes pinnate; petiole 1.5–4 cm; leaf blade oblong or ovate, 4.5–10(–14) × 2.5–5(–8) cm, stellate pubescent, sometimes shaggy, often armed along main veins on both surfaces, pinnately lobed or parted; lobes pinnately lobed or dentate, apex acute. Inflorescences axillary or extra-axillary scorpioid racemes; peduncle branched or not. Pedicel 5–10 mm. Calyx cup-shaped, ca. 1 cm; lobes ovate-lanceolate, ca. 5 × 2 mm, pubescent and prickly as on stems. Corolla purplish or white, stellate, 1.6–3.5 cm; lobes ovate, 10 × 4–8 mm, sparsely hairy. Filaments ca. 1 mm, glabrous; anthers lanceolate, ca. 9 mm. Ovary puberulent. Style 1–1.2 cm. Fruiting pedicel 1–1.5 cm, stout. Fruiting calyx enlarged, longer than fruit, densely prickly and enveloping most berry, ultimately flaring wide and exposing it. Berry bright red, subglobose, 1–2 cm in diam. Seeds reniform, ca. 2.5 × 2 mm. Fl. and fr. warm months of the year.

Cultivated in Guangdong and Yunnan (Kunming), naturalized in Kunming [native to South America; naturalized in Africa, Australia].

38. *Solanum angustifolium* Miller, Gard. Dict. ed. 8, no. 15. 1768.

狭叶茄 xia ye qie

Solanum cornutum Lamarck; *S. heudesii* H. Léveillé.

Herbs annual, 30–150 cm tall, copiously prickly, stellate pubescent. Stems of young plants glaucescent, pubescent with short, simple, often glandular hairs to 0.2 mm; older stems with scattered stellate hairs; prickles yellow, straight, 1–1.8 cm. Petiole 3–8 cm, armed; leaf blade broadly ovate, 10–20 × 3–8 cm, stellate pubescent, prickly along veins, 2- or 3-pinnatifid, pinnatisect near base; lobes irregularly ovate, dentate or sinuate, apex acute or obtuse. Inflorescences extra-axillary, 7–11-flowered scorpioid racemes, 4–12 cm; peduncle 5–10 mm. Pedicel ca. 5 mm. Calyx campanulate,

divided nearly to base; lobes lanceolate, 5–10 mm, pubescent and prickly as on stems. Corolla yellow, often with an abaxial reddish band on lobes drying purplish, stellate, 1.5–2 × 2.5–3.5 cm; lobes lanceolate, stellate hairy. Filaments ca. 1 mm; anthers narrowly lanceolate, attenuate, 1.2–1.7 cm. Style 1.5–1.7 cm. Fruiting pedicel 1–1.5 cm. Fruiting calyx enlarged, enveloping most of berry, sparsely stellate-hairy, densely prickly, 1–2 cm. Berry globose, 1–1.2 cm in diam. Seeds dark brown, discoid, 2.2–2.8 mm in diam., minutely pitted, reticulately ridged. Fr. Jul-Sep, fr. Aug-Oct.

Adventive in Jiangsu [tropical Mexico south into Honduras].

Inclusion of this species is based on the original description of *Solanum heudesii*, the type of which we have not seen. Because no material from China was seen of this species, the above description is taken from a range of Mexican material.

39. *Solanum undatum* Lamarck, Tab. Encycl. 2: 22. 1793.

野茄 ye qie

Solanum cumingii Dunal.

Herbs or subshrubs, erect, 0.5(–2) m tall, pubescent with stellate hairs, usually armed. Stems and branches shaggy tomentose with stalked many-rayed hairs, glabrescent, sparingly armed with mostly straight needlelike prickles. Leaves unequal paired; petiole 1–4 cm; leaf blade ovate or elliptic, 5–12(–14.5) × 4–7 cm, tomentose with stalked and sessile, many-rayed hairs, with short stout prickles on veins, base obtuse or truncate, oblique, margin 5(–7)-sinuate lobed, apex acute or obtuse. Inflorescences extra-axillary, few-flowered scorpioid racemes, ca. 2.5 cm; peduncle very short. Flowers andromonoecious. Pedicel 0.5–2 cm. Calyx campanulate, 6–9 × 1–1.5 cm; lobes deltate-lanceolate, ca. 5 × 2 mm, densely stellate hairy. Corolla purple-blue or white, stellate-rotate, 1.5–2 × 1.5–3 cm; lobes broadly deltate or ovate, ca. 10 × 5 mm, with stellate hairs abaxially. Filaments 1.5–1.8 mm, glabrous; anthers elliptic, 5–8 mm. Style 5–6 mm, glabrous. Fruiting pedicel 2.5–5 cm, deflexed, sparsely stellate hairy, prickly; fruiting calyx persistent, slightly enlarged, hairy, prickly. Berry yellow, globose, 2–3 cm in diam., glabrous. Seeds lenticular, 2–3 mm in diam. Fl. Mar-Jul, fr. May-Dec.

Thickets, slopes; 200–1100 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Yunnan [Afghanistan, NW India, Indonesia, Malaysia, Pakistan, Thailand, Vietnam; Africa, SW Asia].

Material of this species was identified in FRPS as *Solanum coagulans* Forsskål, a species from eastern Africa and Arabia which has unequal anthers. The name *S. incanum* Linnaeus has commonly been used for this species, but recent neotypification of that name calls for applying it to a species from northeast Africa and the Arabian Peninsula that has more pubescent leaves with narrower apices and smaller fruits. The application of *S. undatum* or *S. cumingii* to this species is uncertain.

40. *Solanum melongena* Linnaeus, Sp. Pl. 1: 186. 1753.

茄 qie

Solanum esculentum Dunal; *S. melongena* var. *esculentum* (Dunal) Nees; *S. melongena* var. *serpentinum* Linnaeus; *S. melongena* var. *depressum* Linnaeus.

Herbs or subshrubs to 60 cm tall, sparingly armed, pubescent with stellate hairs. Stems and branches minutely tomentose, sometimes with stout recurved prickles. Petiole 2–4.5 cm; leaf blade ovate to oblong-ovate, 6–18 × 5–11 cm, stellate-tomentose or sometimes with a few fine prickles on both surfaces, denser abaxially, base oblique, margin sinuate-lobed, apex obtuse. Inflorescences mostly solitary flowers, rarely reduced racemes; peduncle obsolete. Flowers andromonoecious. Pedicel 1–1.8 cm. Calyx stellate tomentose, often with ca. 3 mm prickles abaxially; lobes lanceolate. Corolla purplish or violet, rotate, 3(–5) cm; lobes deltate, ca. 1 cm. Filaments ca. 2.5 mm; anthers ca. 7.5 mm. Style 4–7 mm. Berry black, purple, pink, brown, or yellow, yellowish when completely mature, greatly variable in form and size, mostly more than 6 cm in diam., with a thick, spongy, whitish mesocarp and septal region. Seeds lenticular, yellowish, 2.8–3.9 × 2.5–3.5 mm.

Widely cultivated in China and other countries for its edible fruits.

41. *Solanum virginianum* Linnaeus, Sp. Pl. 1: 187. 1753.

毛果茄 mao guo qie

Solanum mairei H. Léveillé; *S. surattense* N. L. Burman; *S. xanthocarpum* Schrader & Wendland.

Herbs erect or creeping, sometimes woody at base, 50–70 cm tall, copiously armed with sturdy, needlelike, broad-based prickles 0.5–2 cm × 0.5–1.5 mm, pubescent with 7–9-rayed stellate hairs, overall glabrescent. Leaves unequal paired; petiole 2–3.5 cm, prickly, with sessile stellate hairs; leaf blade ovate-oblong, 4–9 × 2–4.5 cm, pubescent and prickly along veins, glabrescent, base subcordate or unequal, margin usually 5–9-lobed or pinnately parted, lobes unequal, sinuate, apex acute. Inflorescences elongate racemes 4–7 cm; peduncle unbranched, copiously armed. Pedicel ca. 1 cm. Calyx campanulate, ca. 1 cm in diam.; lobes oblong, pubescent, prickly. Corolla blue-purple, rotate, 1.4–1.6 × 2.5 cm; lobes ovate-deltate, 6–8 mm, densely pubescent with stellate hairs. Filaments ca. 1 mm; anthers ca. 8 mm. Style ca. 1 cm. Fruiting pedicel 2–3.6 cm, with prickles and sparse stellate hairs. Fruiting calyx prickly, sparsely pubescent. Berry pale yellow, 1.3–2.2 cm in diam. Seeds subreniform, ca. 1.5 mm in diam. Fl. Nov-May, fr. Jun-Sep.

Sandy river beaches; 100–1300 m. Hainan, Hubei, Sichuan, Taiwan, Yunnan [Afghanistan, India, S Japan, Malaysia, Nepal, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Pacific Islands].

Solasodine can be extracted from the fruits, a source of raw material for hormone synthesis.

14. LYCIANTHES (Dunal) Hassler, *Annuaire Conserv. Jard. Bot. Genève* 20: 180. 1917.

红丝线属 hong si xian shu

Solanum subgenus *Lycianthes* Dunal in A. de Candolle, *Prodr.* 13(1): 161. 1852.

Shrubs, subshrubs, or rarely herbs or creeping herbs, unarmed; pubescence of many-celled, simple or 2- to many-branched hairs. Leaves solitary, paired, or sometimes unequal paired; leaf blade entire. Inflorescences 1–10-flowered fascicles in leaf axils; peduncle obsolete or absent. Flowers actinomorphic, 5- or rarely 4-merous, pedicellate. Calyx cup-shaped, truncate, often with 5–10 subapical teeth; teeth linear-subulate or umbonate, equal or not. Corolla white or purple-blue, rotate or stellate, shallowly or

deeply divided. Stamens inserted at apex of corolla tube; filaments short, equal; anthers elliptic dehiscent by oblique apical pores. Ovary 2-locular; ovules numerous. Style glabrous. Fruit a red or red-purple berry, globose. Seeds small, numerous, deltate, deltate-reniform, or lenticular, finely reticulate.

About 180 species: most in Central and South America, ten species in China.

- 1a. Herbs perennial; stems creeping, often rooting at nodes; flowers solitary, rarely 2 9. *L. lysimachioides*
- 1b. Shrubs or herbs; stems erect, not rooting at nodes; flowers mostly in fascicles, rarely solitary.
 - 2a. Calyx usually lacking teeth, sometimes 1-toothed; plants puberulent or glabrous 7. *L. leavis*
 - 2b. Calyx 5–10-toothed; plants pubescent with many-celled or branched hairs.
 - 3a. Calyx teeth longer than tube; corolla white 4. *L. macrodon*
 - 3b. Calyx teeth mostly shorter than tube; corolla white or pale purple to purple-blue.
 - 4a. Branchlets, petiole, pedicel, and calyx with dense, yellow simple hairs and 2- to many-celled hairs; corolla white to pale purple.
 - 5a. Inflorescences mostly more than 1-flowered; blades of major leaves more than 4 cm 1. *L. biflora*
 - 5b. Flowers solitary; blades of major leaves less than 3.5 cm 10. *L. solitaria*
 - 4b. Branchlets, petiole, pedicel, and calyx with only simple hairs; corolla purple to purple-blue.
 - 6a. Teeth of fruiting calyx 0.5–1 mm.
 - 7a. Teeth of fruiting calyx 10 8. *L. neesiana*
 - 7b. Teeth of fruiting calyx 5 6. *L. marlipoensis*
 - 6b. Teeth of fruiting calyx mostly more than 1.5 mm.
 - 8a. Plant soon glabrous; pedicel usually less than 1 cm 5. *L. shunningensis*
 - 8b. Plant sparingly villous with many-celled hairs; pedicel 1–1.5 cm.
 - 9a. Leaf blade glabrescent except on veins; pedicel and calyx sparingly strigose with ascending hairs 3. *L. yunnanensis*
 - 9b. Leaf blade persistently downy-puberulent; pedicel and calyx densely puberulent with mostly short, weak hairs 2. *L. hupehensis*

1. *Lycianthes biflora* (Loureiro) Bitter, Abh. Naturwiss. Vereine Bremen 24: 461. 1920.

红丝线 hong si xian

Shrubs or subshrubs 0.5–1.5 m tall; pubescence yellowish, of simple, often moniliform hairs mixed with many-celled ones. Petiole 0.5–4 cm; leaf blade dimorphic; blade of major leaf elliptic-ovate, 9–15 × 3.5–7 cm, sparsely pubescent adaxially, denser abaxially, base cuneate, apex acute or acuminate; blade of minor leaf broadly ovate, 2.5–4 × 2–3 cm, base broadly rounded and decurrent, apex acute. Inflorescences several-flowered fascicles in leaf axils. Pedicel 0.5–2 cm. Calyx cup-shaped, 3–6 × 3–3.5 mm, 10-dentate; teeth linear-subulate, 2–3 mm. Corolla pale purple or white, often drying dark, stellate, 8–12 × 8–10 mm; lobes lanceolate, 6 × 1.8 mm. Filaments ca. 1 mm; anthers ca. 3 mm, sometimes pubescent adaxially. Style 8–9 mm. Fruiting pedicel 1–2 cm. Fruiting calyx densely pubescent with simple and branched hairs; teeth elongate, 3–3.5 mm. Berry red, globose, 6–9 mm in diam. Seeds numerous, pale yellow, ovate to subdeltate, ca. 2 × 1.5 mm, reticulate.

China, India, Indonesia, Japan, Malaysia, New Guinea, Philippines, Thailand.

- 1a. Leaves variously pubescent, not brownish pubescent abaxially, blade often more than 9 × 3.5 cm; calyx 5–6 mm 1a. var. *biflora*
- 1b. Leaves densely brownish pubescent abaxially, blade mostly less than 7.5 × 3.7 cm; calyx 3–4 mm 1b. var. *subtusochracea*

1a. *Lycianthes biflora* var. *biflora*

红丝线 hong si xian

Solanum biflorum Loureiro, Fl. Cochinch. 1: 129. 1790; *S. biflorum* var. *kotoensis* Y. C. Liu & C. H. Ou; *S. calleryanum* Dunal; *S. decemdentatum* Roxburgh; *S. decemfidum* Nees; *S. osbeckii* Dunal; *S. osbeckii* var. *stauntonii* Dunal.

Leaves variously pubescent, mostly greenish; blade often more than 9 × 3.5 cm. Pedicel 0.5–2 cm. Calyx 5–6 mm. Corolla pale purple or white. Anthers sometimes pubescent. Fl. May-Aug, fr. Jul-Nov.

Wet places of wastelands, forests, roadsides, by waters, valleys; 100–2300 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, S Sichuan, Taiwan, Yunnan [India (Sikkim), Indonesia, Japan, Malaysia, New Guinea, Philippines].

Because no material of the Taiwanese endemic var. *kotoensis* has been examined, the taxon is placed in the synonymy above with some hesitation.

1b. *Lycianthes biflora* var. *subtusochracea* Bitter, Abh. Naturwiss. Vereine Bremen 24: 466. 1920.

密毛红丝线 mi mao hong si xian

Plants green, with dense branched tomentum. Leaves less than 7.5 × 3.7 cm. Pedicel 8–10 mm. Calyx 3–4 mm at anthesis. Corolla white. Anthers usually glabrescent. Fl. Jun-Sep, fr. Sep-Nov.

Roadsides, forests; 500–2000 m. Guizhou, Yunnan [Thailand].

2. *Lycianthes hupehensis* (Bitter) C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 16(2): 77. 1978.

鄂红丝线 e hong si xian

Lycianthes biflora subsp. *hupehensis* Bitter, Abh. Naturwiss. Vereine Bremen 24: 466. 1920.

Shrubs or subshrubs 1–2 m tall, pubescent throughout with short simple hairs. Leaves unequal paired; petiole 5–10 mm; blade of major leaf elliptic-lanceolate, 7–10 × 3–5 cm, sparsely pubescent adaxially, more densely so abaxially, surfaces of different colors, base cuneate, apex acute; blade of minor leaf ovate, 3–4 × 1.5–2.5 cm, base rounded, decurrent, apex obtuse. Inflorescences 2–4-flowered fascicles in leaf axils. Pedicel 1–1.5 cm. Calyx cup-shaped,

4–5.5 × 4–6 mm; teeth 10, linear-subulate, 1.5–2 mm, pubescent. Corolla purple-blue, 8–9 mm; lobes lanceolate, ca. 6 × 2.5 mm. Filaments ca. 0.5 mm; anthers oblong-ovate, ca. 3 mm, sometimes puberulent. Ovary glabrous. Style 8–10 mm, puberulent. Fruiting pedicel 1.2–1.6 cm. Berry red, 6–8 mm in diam., mucronate. Seeds pale yellow, subdeltate, 2–1.5 × 0.5–1 mm. Fl. May–Aug, fr. Sep–Nov.

• Roadsides, forests; 400–1400 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan (Yongshun Xian), Sichuan, Yunnan.

3. *Lycianthes yunnanensis* (Bitter) C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 16(2): 77. 1978.

滇红丝线 dian hong si xian

Lycianthes biflora subsp. *yunnanensis* Bitter, Repert. Spec. Nov. Regni Veg. 18: 319. 1922.

Shrubs ca. 1 m tall, whole plant with dense, pale yellow, many-celled villous hairs. Leaves unequal paired; petiole 1–1.5 cm; blade of major leaf long elliptic, 8–20 × 3–7 cm, pubescent with many-celled hairs, sometimes glabrescent adaxially, base cuneate, decurrent on petiole, apex acute or acuminate; blade of minor leaf ovate, 3–7 × 1.5–3 cm. Inflorescences 4–6-flowered fascicles in leaf axils. Pedicel 1–1.5 cm. Calyx cup-shaped, ca. 5 × 4 mm; teeth 10, linear-subulate, 2–3 mm. Corolla purple, stellate, ca. 1 cm, 5-parted; lobes broadly lanceolate, 6–7 mm. Filaments ca. 0.5 mm; anthers oblong, ca. 3 mm, glabrous. Style ca. 6–8 mm, glabrous. Fruiting pedicel 1.8–2 cm, sparsely long villous. Berry purple-red, 0.8–1.2 cm in diam. Seeds deltate-reniform, ca. 2 × 1.5 mm. Fl. Oct–Nov, fr. Nov–Dec.

• Open slopes, forests, forest edges; 1000–1700 m. Yunnan.

4. *Lycianthes macrodon* (Wallich ex Nees) Bitter, Abh. Naturwiss. Vereine Bremen 24: 468. 1920.

大齿红丝线 da chi hong si xian

Solanum macrodon Wallich ex Nees, Trans. Linn. Soc. London 17: 43. 1837.

Shrubs to subshrubs ca. 1 m tall; young branchlets with erect, simple hairs, mostly glabrescent, sometimes with persistent, scattered branched hairs. Leaves unequal paired; petiole 0.5–2 cm; blade of major leaf lanceolate to elliptic-lanceolate, 5–9 × 3–4 cm, with sparse many-celled hairs adaxially, base decurrent, apex acute or acuminate; blade of minor leaf ovate, 2–4 × 1–1.5 cm. Inflorescences 1–3-flowered fascicles in leaf axils. Pedicel 1–1.5 cm. Calyx cup-shaped to campanulate, 6–7 mm; teeth 10, subulate, slightly unequal, 4–4.5 mm. Corolla white, stellate, ca. 1 cm; lobes lanceolate, 8–11 × 2–3 mm, with green basal spots, ciliate. Filaments ca. 0.3 mm; anthers oblong, 3–3.5 mm. Style 8–10 mm. Fruiting pedicel 5–12 mm, pubescent with many-celled hairs. Fruiting calyx teeth 5–5.5 mm. Berry red, subglobose, 0.8–1 cm in diam. Seeds deltate-reniform, ca. 1.2 mm. Fl. Jun–Sep, fr. Sep–Dec.

Near ditches, wet places at edges of forests; 1500–2300 m. Taiwan, Yunnan [Bangladesh, Bhutan, India, Nepal, Thailand].

This species was recorded in FRPS on the basis of two collections that were assigned with hesitation. The record here is based on a collection from Yunnan, *Henry 12273*, which agrees with the type collection, *Wallich 2621*, as seen on microfiche. Three varieties described by Bitter from India were recorded in FRPS, but it was said that the Chinese material was not a good match for any of them, and we have not seen authenticated material.

5. *Lycianthes shunningensis* C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 16(2): 77. 1978.

顺宁红丝线 shun ning hong si xian

Shrubs 1.5–2.5 m tall. Branchlets sparsely pubescent, glabrescent. Leaves unequal paired; petiole of major leaf 0.5–2 cm, that of minor leaf 0.2–1 cm; blade of major leaf oblong, 6–17 × 2.8–7.4 cm, ciliate, with sparse many-celled hairs adaxially, sparsely pubescent abaxially along veins; blade of minor leaf ovate, 2–7.5 × 1.5–5.5 cm. Inflorescences 4–6-flowered fascicles in leaf axils. Pedicel 5–10 mm, sparsely pubescent, glabrescent. Calyx cup-shaped; teeth 10, slightly unequal, 2–3 mm, often spreading, glabrescent. Corolla purple-blue, ca. 1.5 cm in diam., 5-parted; lobes lanceolate, 7 × 1.5–2 mm. Filaments ca. 0.4 mm; anthers oblong, 3–3.5 mm, sparsely white pubescent. Fruit not seen. Fl. Jul.

• Thickets; 2200 m. Yunnan (Shunning Xian).

6. *Lycianthes marlipoensis* C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 16(2): 78. 1978.

麻栗坡红丝线 ma su po hong si xian

Subshrubs 1–2 m tall, glabrous throughout. Leaves unequal paired; petiole of major leaf 1–1.5 cm, that of minor leaf 0.5–1.2 cm; blade of major leaf long elliptic, 10–14 × 4–6.5 cm, base cuneate, apex caudate-acuminate; blade of minor leaf ovate-lanceolate, 3.8–8.5 × 1.7–3.5 cm. Flowers not seen. Infructescences usually 2–4(–8)-fruited fascicles in leaf axils. Fruiting pedicel usually 2–3 cm. Fruiting calyx cup-shaped, 3–3.5 × 5–7 mm; teeth 5, slightly unequal, 0.5–1 mm. Berry globose, 6–7 mm in diam. Seeds brown-yellow, subdeltate, discoid, 1.5–2 × 1–1.2 mm. Fr. winter.

• Forests, calcareous slopes; 1100–1400 m. SE Yunnan.

7. *Lycianthes laevis* (Dunal) Bitter, Abh. Naturwiss. Vereine Bremen 24: 484. 1920.

缺齿红丝线 que chi hong si xian

Solanum laeve Dunal in Poiret, Encycl. suppl. 3: 751. 1813.

Shrubs 1–2 m tall, glabrescent or pubescent with simple hairs. Stem puberulent. Leaves unequal paired; petiole of major leaf 5–10 mm, that of minor leaf 3–5 mm; blade of major leaf elliptic, 10–20 × 4–8 cm, membranous, sparsely pubescent or glabrescent adaxially, glabrous abaxially, puberulent along veins, base cuneate, margin entire, apex acuminate; blade of minor leaf resembling that of major leaf, 3–8 × 1.5–3.5 cm. Inflorescences 2–7-flowered axillary fascicles. Pedicel 5–10 mm, puberulent. Calyx cup-shaped, 2–3 × 2–3 mm, apex entire, sometimes with 1 tooth ca. 0.5 mm. Corolla purple or white with purple apex, stellate, ca. 8 mm; lobes lanceolate-elliptic, ca. 5 × 1.2 mm, glabrescent. Filaments ca. 0.5 mm; anthers oblong, ca. 2.5 mm. Style slender, 7–8 mm. Berry globose, 5–6 mm in diam., glabrous. Seeds ovate, discoid, ca. 1.5 × 1 mm. Fl. Aug–Oct, fr. Oct–Dec.

Forests, streamsides, wet places; 700–1000 m. Guangxi, Hainan, Yunnan [Indonesia].

The application of this specific epithet is tentative, and the record is based on material at the Natural History Museum, London.

8. *Lycianthes neesiana* (Wallich ex Nees) D'Arcy & Z. Y. Zhang, *Novon* 2: 126. 1992.

截齿红丝线 jie chi hong si xian

Solanum neesianum Wallich ex Nees, *Trans. Linn. Soc. London* 17: 42. 1837; *Lycianthes subtruncata* (Wallich ex Dunal) Bitter; *L. subtruncata* var. *paucicarpa* C. Y. Wu & S. C. Huang; *L. subtruncata* var. *remotidens* Bitter; *S. subtruncatum* Wallich ex Dunal.

Shrubs 1–2 m tall, pubescent with simple ascending hairs, glabrescent. Branchlets simple or dichotomously branched. Leaves unequal paired; petiole of major leaf 2–15 mm, that of minor leaf 1–5 mm; blade of major leaf lanceolate or elliptic, 4–18 × 3–5 cm, sparsely puberulent adaxially, glabrous or puberulent abaxially, base cuneate, apex acute; blade of minor leaf 1–8.5 × 2–5 cm. Inflorescences solitary or 2–9-flowered fascicles in leaf axils. Pedicel 8–10 mm, densely pubescent or glabrescent. Calyx cup-shaped, ca. 2.5 × 3 mm; teeth 1–10, 0.5–1 mm. Corolla blue, white, or purplish, campanulate-stellate; lobes broadly lanceolate, 4–5 × 1.5–2 mm. Filaments ca. 1 mm, glabrous; anthers ca. 3 × 1 mm. Style ca. 8 mm. Fruiting pedicel 0.8–2.5 cm. Fruiting calyx cup-shaped, 3–3.5 mm in diam.; teeth 10, subulate, unequal, 0.5–1 mm. Berry red or orange, globose, 5–6(–8) mm in diam. Seeds pale yellow, deltate-reniform or discoid, ca. 1.2 mm in diam., finely reticulate. Fr. winter.

Near roads or rivers, dense forests in valleys; 200–1600 m. Fujian, Guangdong, Guangxi, Hunan, Yunnan [India, Indonesia, Thailand].

9. *Lycianthes lysimachioides* (Wallich) bitter, *Abh. Naturwiss. Vereine Bremen* 24: 491. 1920.

单花红丝线 dan hua hong si xian

Herbs perennial, to 1.5 m, trailing, prostrate, or perhaps climbing, rooting at nodes; pubescence of many-celled straight hairs. Leaves unequal paired; petiole of major leaf 0.8–3 cm, that of minor leaf 2–3 mm, sometimes pubescent; blade of major leaf ovate, elliptic to ovate-lanceolate, 3–7 × 2.5–7.5 cm, pubescent on both surfaces or glabrescent abaxially, ciliate, base cuneate, rounded, or cordate, apex acuminate or acute; blade of minor leaf 2–4.5 × 1.2–2.8 cm. Inflorescences 1- (or 2)-flowered fascicles; peduncle absent. Pedicel 8–10 mm. Calyx cup-shaped to campanulate, ca. 5 × 7 mm, 10-veined. Corolla white, pink, or pale purple, stellate, 1.8 cm in diam.; lobes lanceolate, 10 × 3–4 mm, often reflexed at apex, puberulent abaxially. Filaments 1 mm, glabrous; anthers 3–3.5 × 1.2 mm. Ovary glabrous. Style slender, ca. 8 mm. Fruiting pedicel 0.5–1.5 cm. Berry red, globose, ca. 8 mm in diam. Seed ovate-deltate, 1.5–2 mm in diam., finely reticulate.

China [India, Indonesia, Nepal].

Lycianthes lysimachioides is a highly variable species, and the varieties recognized here are weak taxonomically and might well be placed in synonymy under the type variety. A series of infraspecific taxa recognized in FRPS (*L. lysimachioides* var. *purpuriflora* C. Y. Wu & S. C. Huang, *L. lysimachioides* var. *formosana* Bitter, *L. lysimachioides* var. *rotundifolia* C. Y. Wu, *L. lysimachioides* var. *cordifolia* C. Y. Wu), none of which compete in priority with the names used here, may have taxonomic validity, but this cannot be perceived at this time.

1a. Plants densely pubescent with many-celled hairs
..... 9b. var. *caulorrhiza*

1b. Plants sparingly pubescent or glabrescent.

2a. Leaf blade sparingly pubescent abaxially, mostly less than 7 cm 9a. var. *lysimachioides*

2b. Leaf blade glabrous abaxially except sometimes on veins, mostly more than 7 cm

..... 9c. var. *sinensis*

9a. *Lycianthes lysimachioides* var. *lysimachioides*

单花红丝线 dan hua hong si xian

Solanum lysimachioides Wallich in Roxburgh, *Fl. Ind.* 2: 257. 1824; *Lycianthes biflora* (Loureiro) Bitter subsp. *lysimachioides* (Wallich) Deb; *S. macrodon* Wallich ex Nees var. *lysimachioides* (Wallich) C. B. Clarke.

Herbs sparingly pubescent or glabrescent. Petiole of major leaf 0.8–3 cm, that of minor leaf 0.5–2 cm; blade of major leaf ovate, elliptic, to ovate-lanceolate, 4.5–7 × 2.5–3.5 cm, sparsely pubescent on veins, ciliate, base cuneate, rounded, or cordate, apex acuminate; blade of minor leaf 2–4.5 × 1.2–2.8 cm. Inflorescences 1- (or 2)-flowered fascicles. Corolla white or pale purple.

Roadsides, forests, 1500–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [India, Indonesia, Nepal].

9b. *Lycianthes lysimachioides* var. *caulorrhiza* (Dunal) Bitter, *Abh. Naturwiss. Vereine Bremen* 24: 493. 1920.

茎根红丝线 jing gen hong si xian

Solanum caulorrhizum Dunal in A. de Candolle, *Prodr.* 13(1): 181. 1852; *S. debilissimum* Merrill.

Plants densely covered with many-celled hairs. Petiole of major leaf 5–7 mm, that of minor leaf 2–3 cm, hairy; blade of major leaf ovate, 3–5 × 2–3.5 cm, hairy, base rounded or cuneate, apex acuminate or acute; blade of minor leaf 1.2–2 × 1–1.5 cm. Corolla white to pink.

Forests, near streams; 1700–2100 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Indonesia].

9c. *Lycianthes lysimachioides* var. *sinensis* Bitter, *Abh. Naturwiss. Vereine Bremen* 24: 493. 1920.

中华红丝线 zhong hua hong si xian

Lycianthes lysimachioides var. *formosana* Bitter.

Stems, leaves, petiole, and calyx with scattered hairs. Petiole 1–4.5 cm; leaf blade 6–13 × 4–7.5 cm; glabrescent abaxially. Flowers white.

• Forests, streamsides; 600–2500 m. Guangdong, Hubei, Hunan, Jiangxi, Sichuan, Yunnan.

10. *Lycianthes solitaria* C. Y. Wu & A. M. Lu, *Acta Phytotax. Sin.* 16(2): 76. 1978.

单果红丝线 dan guo hong si xian

Herbs or subshrubs; pubescence of villous simple hairs mixed with 2-branched hairs. Branchlets, petiole, and fruiting pedicel villous. Leaves unequal paired; petiole 2.5–5 mm; blade of major leaf ovate, 1.5–3.5 × 1–2.5 cm, sparsely

pubescent adaxially, densely pubescent abaxially, base rounded or cuneate, apex acute; blade of minor leaf 0.8–2 × 0.8–1.5 cm. Flowers not seen. Berry solitary in leaf axils, red, 7–8(–10) mm in diam. Fruiting calyx teeth 10,

linear-subulate, 1–1.5 mm. Seeds pale yellow, deltate-reniform, 2 × 1.2 mm. Fl. Jul, fr. Sep–Nov.

• Near ditches in evergreen forests; 1700 m. Xizang (Zayü Xian).

This species is known only from the type.

15. LYCOPERSICON Miller, Gard. Dict. Abr. ed. 4. 1754.

蕃茄属 fan qie shu

Herbs annual or perennial, unarmed; pubescence of simple or glandular hairs. Leaves petiolate, mostly compound with interstitial leaflets. Inflorescences appearing axillary or lateral, racemose; peduncle sometimes forked. Flowers pedicellate, 5–9-merous. Calyx campanulate, slightly enlarged or not. Corolla yellow, rotate, deeply lobed. Stamens inserted in corolla tube; filaments short; anthers slender, coherent, attenuate and long apiculate at apex, dehiscent longitudinally. Ovary 2–5-loculed. Style filiform; stigma minute, capitate. Fruiting calyx hardly enlarged. Berry red, orange, yellow, or green, mostly globose, rarely grooved, sometimes pubescent. Seeds numerous, discoid, sometimes pubescent; embryo strongly curved.

Nine species: South and North America, one species widely cultivated in China.

1. *Lycopersicon esculentum* Miller, Gard. Dict. ed. 8, no. 2. 1768.

蕃茄 fan qie

Lycopersicon lycopersicum (Linnaeus) Karsten;
Solanum lycopersicum Linnaeus.

Herbs annual, sprawling, 0.6–2 m tall, viscid pubescent, odorous. Petiole 2–5 cm; leaf blade mostly pinnately compound or divided, sometimes entire, 10–40 cm, base oblique, cuneate, apex obtuse; leaflets mostly 5–9, sessile or petiolulate, unequal, ovate or oblong, 5–7 cm, entire or irregularly dentate, sparingly glandular pilose. Peduncle

2–5 cm, little or not branched, often 3–7-flowered. Pedicel 1–1.5 cm. Calyx rotate-campanulate, lobes lanceolate. Corolla 2–2.5 cm in diam.; lobes narrowly oblong, 8–10 mm, often reflexed. Filaments ca. 1 mm; anthers 6–10 mm. Style ca. 1.2 cm. Berry red or orange-yellow, subglobose, fleshy, juicy, shiny. Seeds straw colored, 2–4 mm, pilose. Fl. May–Sep, fr. Sep–Nov.

Widely cultivated in China [native to Mexico and South America].

Fruits are used as a vegetable.

16. MANDRAGORA Linnaeus, Sp. Pl. 1: 181. 1753.

茄参属 qie shen shu

Mairella H. Léveillé.

Herbs perennial, scapose; pubescence of simple hairs. Roots stout, vertical. Stems short, sometimes branched; axis sometimes elongated into a scape. Leaves often subsessile and forming a basal rosette; leaf blade entire, sinuate, or dentate, often undulate, sometimes reduced. Flowers in leaf or bract axils; peduncle absent; bracts membranous. Flowers actinomorphic, 5-merous. Pedicel sometimes elongated. Calyx rotate-campanulate, deeply lobed. Corolla campanulate, lobed. Stamens inserted in distal part of corolla tube, included; filaments slender, pubescent, at least basally; anthers oblong, dehiscent longitudinally. Disc evident, lobed. Ovary 2-locular; ovules numerous. Stigma slightly expanded. Fruiting calyx somewhat enlarged. Fruit yellow or orange, globose or ovoid juicy berry, becoming unilocular. Seeds compressed, reticulate; embryo curved, peripheral.

About four species: SW Asia, Europe; one species in China.

1. *Mandragora caulescens* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 242. 1883.

茄参 qie shen

Anisodus caulescens (C. B. Clarke) Diels; *A. mariae* Pascher; *Mairella yunnanensis* H. Léveillé; *Mandragora chinghaiensis* Kuang & A. M. Lu; *Mandragora tibetica* Grubov.

Herbs perennial, mostly scapose, 20–60 cm tall, pubescent with simple or glandular hairs. Rhizome sturdy, fleshy, elongated or not, 5–22 cm. Stems sometimes present, 10–40 cm, occasionally branched. Leaves mostly basal,

sometimes on ascending stems; leaf blade obovate-oblong to oblanceolate, 3–20 cm × 1.5–5 cm, pubescent, densely ciliate, base narrow, decurrent, apex obtuse. Peduncle 1–17 cm; bracts sessile, decurrent, membranous, apex obtuse. Flowers solitary, axillary, sometimes nodding; pedicel stout, 6–20 cm. Calyx campanulate, divided to halfway; lobes ovate to deltate. Corolla dark purple or yellow, divided halfway; lobes broadly ovate to deltate. Filaments ca. 7 mm; anthers 1.5–5 mm. Style ca. 4 mm; stigma slightly 2-lobed. Fruiting calyx becoming enlarged, campanulate, sometimes exceeding berry. Berry globose, 2–2.5 cm in diam. Seeds yellow, compressed-reniform, ca. 2 mm. Fl. May–Jul, fr. Jul–Sep.

Grassy slopes; 2200–4200 m. SE Qinghai, W Sichuan, E Xizang, NW Yunnan [Bhutan, India (Sikkim), Nepal].

The roots contain hyoscyne and anisodamine, which are used medicinally.

There is considerable variability in flower color, stature, shapes, and dimension of parts, including anther length. Grierson & Long (Notes. Roy. Bot. Gard. Edinburgh 36:139–144. 1978)

17. DATURA Linnaeus, Sp. Pl. 1: 179. 1753.

曼陀罗属 man tuo luo shu

Shrubs or annual or perennial herbs; pubescence of simple sometimes glandular hairs. Leaves petiolate; leaf blade simple, entire or sinuate-dentate. Inflorescences solitary flowers in leaf axils or in branch forks; peduncle, bracts, and bracteoles absent. Flowers actinomorphic, large. Pedicel often stout. Calyx long tubular or cylindric, often circumscissile near base. Corolla elongated, funnellform; lobes sometimes cuspidate. Anthers mostly elongated, dehiscing longitudinally, included. Ovary 2–4-locular. Fruit a dry capsule, 4-valved or irregularly dehiscent, prickly or unarmed, often subtended by remnants of persistent calyx. Seeds numerous, laterally compressed; embryo curved.

About 11 species: North and South America, three species in China.

- 1a. Fruit erect, regularly 4-valved; calyx tube 5-angular; corolla less than 11 cm; seeds black; anthers less than 5 mm 1. *D. stramonium*
- 1b. Fruit horizontal or pendulous, irregularly 4-valved; calyx tube cylindric; corolla more than 11 cm; seeds brown; anthers more than 7 mm.
 - 2a. Plants glandular pubescent; capsules densely gray-white pubescent with slender prickles 2. *D. inoxia*
 - 2b. Plants glabrescent; capsules tuberculate or with stout-based prickles 3. *D. metel*

1. *Datura stramonium* Linnaeus, Sp. Pl. 1: 179. 1753.

曼陀罗 man tuo luo

Datura stramonium var. *tatula* (Linnaeus) Torrey; *D. tatula* Linnaeus.

Herbs or subshrubs, sometimes robust, 0.5–1.5 m tall, glabrescent. Petiole 3–5.5 cm; leaf blade broadly ovate, 8–17 × 4–14 cm, membranous, glabrescent, base asymmetric, cuneate, irregularly sinuous or dentate-lobed, apex acuminate, veins 3–5 pairs. Flowers erect. Pedicel 5–12 mm. Calyx tubular, 5-angular, 3–5 cm. Corolla white or pale purple, greenish at base, sometimes purple distally, funnellform; limb 3–5 cm in diam.; lobes 6–10 cm, mucronate at apex. Filaments ca. 3 cm; anthers 3–4 mm. Capsules erect, globose or ovoid, 3–4.5 × 2–4 cm, with copious prickles, rarely smooth, dehiscent by 4 equal valves, subtended by remnants of persistent calyx. Seeds black, ovate or discoid, ca. 4 mm in diam. Fl. Jun–Oct, fr. Jul–Nov.

Near houses, roadsides, grasslands; 600–1600 m. Throughout China [native of Mexico, now worldwide].

Cultivated in gardens as a medicinal and decorative plant.

The whole plant is toxic and is used medicinally as anaesthetic and for sedating and relieving muscular spasm. Seed oil can be used for soap making.

2. *Datura inoxia* Miller, Gard. Dict. ed. 8, no. 5. 1768.

毛曼陀罗 mao man tuo luo

Herbs erect, 1–2 m tall, densely pubescent and glandular. Petiole 3–5 cm; leaf blade broadly ovate, 10–18 × 4–15 cm, membranous or felty, minutely tomentose, base rounded or obtuse, asymmetric, margin subentire, sinuate, or irregularly dentate, apex acute; veins 7–10 pairs. Flowers erect. Pedicel 1–5 cm. Calyx cylindric, 8–10 × 2–3 cm; lobes narrowly deltate, 1–2 cm, sometimes unequal. Corolla greenish proximally, white at apex, 15–18 cm; limb 7–10 cm in diam.;

recognized four subspecies of *Mandragora caulescens* that overlap geographically, and their analysis did not cover *M. tibetica* and *M. chinghaiensis* that were described from western China. Further study may lead to separation of independent taxa from the single species recognized here. Authentic material of *M. tibetica* was not seen.

lobes mucronate at apex. Filaments ca. 5.5 cm; anthers 1–1.7 cm. Capsules deflexed, globose or ovoid, 3–4 cm in diam., densely armed with slender, subequal prickles, pubescent with white hairs, irregularly dehiscent at apex, subtended by remnants of persistent calyx. Seeds numerous, brown, discoid-reniform, 3–5 mm in diam. Fl. and fr. Jun–Sep.

Near villages, roadsides, also cultivated; 300–600 m. Hebei, Henan, Hubei, Jiangsu, Shandong, Xinjiang [native to Americas].

The leaves and flowers are used medicinally as in *Datura stramonium*.

3. *Datura metel* Linnaeus, Sp. Pl. 1: 179. 1753.

洋金花 yang jin hua

Datura alba Nees; *D. fastuosa* Linnaeus; *D. fastuosa* var. *alba* (Nees) C. B. Clarke.

Herbs annual, 0.5–1.5 m tall, glabrescent. Stems often dark violet. Petiole 2–6 cm; leaf blade ovate or broadly ovate, 5–20 × 4–15 cm, membranous, glabrescent, base truncate or cuneate, asymmetrical, margin irregularly sinuate-dentate, lobed, or entire, apex acuminate; veins 4–6 pairs. Flowers erect. Pedicel ca. 1 cm. Calyx tubular, 4–9 cm. Corolla white, yellowish, or pale purple, funnellform, sometimes doubled or tripled, 14–20 cm; limb 6–10 cm in diam.; lobes elongate. Anthers 1–1.2 cm. Capsules deflexed, subglobose, ca. 3 cm in diam., tuberculate, irregularly 4-valved, subtended by remnants of persistent calyx. Seeds pale brown, reniform-discoid, ca. 3 mm in diam. Fl. and fr. Mar–Dec.

Grassy and sunny slopes, near houses, also commonly cultivated in many cities; 1200–2100 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Yunnan [native of the Americas, long introduced and naturalized in Asia].

Whole plant, especially seeds, toxic. The flowers are used as an anaesthetic.

18. CESTRUM Linnaeus, Sp. Pl. 1: 191. 1753.

夜香树属 ye xiang shu shu

Shrubs or trees, glabrous or pubescent with simple or branched hairs. Leaves solitary, simple, petiolate, entire. Inflorescences terminal or axillary, racemose or paniculate, sometimes clustered in leaf axils, often bracteate or bracteolate. Flowers 5-merous. Calyx campanulate or tubular. Corolla long tubular; tube sometimes expanded or contracted around anthers, sometimes pubescent abaxially; limb lobed, usually spreading. Stamens inserted at various levels in corolla tube; filaments sometimes pubescent or appendaged at or below point of insertion; anthers dehiscing longitudinally; disc mostly evident. Ovary 2-locular; ovules few to several, rarely to 20. Style slender; stigma entire or 2-lobed, rarely exerted. Fruit a berry, mostly white or blackish, globose, ovoid, or oblong, often juicy. Seeds 1 or several, oblong; embryo straight or slightly curved; cotyledons ovate, oblong and much wider than radicle, or cylindrical.

About 175 species: North America, South America; three cultivated for ornament in China.

- 1a. Corolla red, violet, or pink, conspicuously narrowed at throat; stem copiously pubescent 1. *C. elegans*
 1b. Corolla white, green, yellow, or orange, not or scarcely narrowed at throat; stems glabrescent.
 2a. Corolla pale yellowish or greenish white, subcylindric except near anthers; calyx less than 4 mm, ca. 4 mm in fruit 2. *C. nocturnum*
 2b. Corolla yellow-orange, conspicuously expanded at apex; calyx more than 5 mm, ca. 6 mm in fruit 3. *C. aurantiacum*

1. *Cestrum elegans* (Brongniart) Schlechtendal, Linnaea 19: 261. 1847.

毛茎夜香树 mao jing ye xiang shu

Habrothamnus elegans Brongniart in Neumann, Ann. Fl. Pomone 118. 1844.

Shrubs. Stem copiously pubescent. Petiole 6–12 mm; leaf blade ovate or elliptic, ca. 8 × 3 cm. Inflorescences erect, terminal or axillary, congested racemose panicles; bracts ovate, minutely tomentose, 4–5 mm. Flowers odorless. Pedicel ca. 1 mm. Calyx narrowly campanulate, 6–8 mm, glabrous, unribbed; teeth ca. 3 mm, ciliate. Corolla red, pink, or violet, ca. 2 cm, expanded upward, abruptly contracted at throat, glabrous; lobes deltoid, ca. 2 mm. Filaments glabrous, unappendaged, slightly bent at point of insertion. Fruiting calyx not splitting. Berry dark pink, globose, 0.8–1.3 cm. Seeds ca. 8.

Yunnan [native to Mexico]. Cultivated for ornament.

2. *Cestrum nocturnum* Linnaeus, Sp. Pl. 1: 191. 1753.

夜香树 ye xiang shu

Shrubs erect or sprawling, 1–3 m tall; young growth puberulent, glabrescent. Branches slender. Petiole 0.8–2 cm; leaf blade oblong-ovate or oblong-lanceolate, 6–15 × 2–4.5 cm, entire. Inflorescences drooping, many-flowered, axillary or terminal racemose panicles, 7–10 cm. Flowers strongly

night scented. Pedicel 1–5 mm. Calyx campanulate, 2–3 × 1–1.5 mm; lobes deltoid, 0.5–0.8 mm. Corolla greenish or whitish yellow, 1.5–2.5 cm, tube slightly contracted at throat, lobes 3–4 mm. Filaments with dentate appendages, usually puberulent at point of insertion. Ovary ca. 1 mm. Berry white, juicy, oblong or globose, 6–10 × 4–10 mm. Seeds 1–5, ellipsoid, 3.5–4.5 mm.

Fujian, Guangdong, Guangxi, Yunnan [native to America, widely cultivated for ornament in tropical regions].

3. *Cestrum aurantiacum* Lindley, Bot. Reg. 30: Misc. 71. 1844.

黄花夜香树 huang hua ye xiang shu

Shrubs, pubescent on young growth, glabrescent. Petiole 1–1.4 cm; leaf blade ovate or elliptic, 4–7 × 2–4 cm. Inflorescences erect, terminal or axillary racemose panicles; bracts deciduous, leaflike, to 7 mm. Pedicel ca. 1 mm. Calyx campanulate, ca. 6 mm, sometimes with 5 prominent longitudinal ribs; teeth ca. 1 mm, often somewhat unequal. Corolla golden yellow, 1.4–2 cm, gradually expanded upwards, glabrous, lobes 3–4 mm. Filaments denticulate, pubescent at point of insertion. Berry white, ovoid, 7–11 mm; persistent calyx often splitting. Seeds ca. 4.

Guangdong [native to Central America].

19. NICOTIANA Linnaeus, Sp. Pl. 1: 180. 1753.

烟草属 yan cao shu

Herbs, shrubs, or small trees; pubescence of simple and glandular hairs. Leaves petiolate or sessile, entire or subentire. Inflorescences paniculate, racemose, or reduced to solitary flowers; peduncle mostly erect; bracts mostly present. Flowers sometimes showy, mostly fragrant, zygomorphic, 4- or 5-merous, pedicellate. Calyx regular or irregular, tubular or tubular-campanulate, lobed. Corolla tubular, funnelform, or salverform; tube lobed to subentire. Stamens inserted below middle of corolla tube; filaments slender; anthers dehiscing longitudinally. Disc ringlike, nectariferous. Ovary 2-locular. Stigma 2-lobed. Fruiting calyx persistent, slightly inflated, partially or completely enveloping fruit. Fruit a dry capsule dehiscing by apical valves. Seeds numerous, minute; embryo erect or slightly bent; cotyledons linear.

About 95 species: Africa, Americas, Australia, and Oceania; three species are cultivated in China as drug plants or as ornamentals, at least one is naturalized.

1a. Shrubs glabrescent; leaves glaucous, subleathery, slender petiolate; corolla glabrous; filaments glabrous, subequal 1. *N. glauca*
1b. Herbs glandular hairy; leaves membranous, often winging stem; corolla puberulent adaxially; filaments pubescent at base, 1 shorter than others.

2a. Petiole not winged; corolla tubular, greenish yellow, less than 2.5 cm; stamens included 2. *N. rustica*

2b. Petiole winged or leaves sessile; corolla funnelform, pink or pale green, more than 3 cm; stamens exerted

.....3. *N. tabacum*

1. *Nicotiana glauca* Graham, Edinburgh New Philos. J. 5: 175. 1828.

光烟草 guang yan cao

Nicotiana glauca var. *angustifolia* Comes; *N. glauca* var. *grandiflora* Comes.

Shrubs or small trees 2–6 m tall, glabrescent. Petiole slender, 3–12 cm; leaf blade ovate, 5–25 cm, leathery, base obtuse to cordate, entire, apex obtuse or acute, glaucous, subleathery. Inflorescences many-flowered, lax panicles. Pedicel 3–12 mm. Calyx tubular, 1–1.5 cm; lobes deltate, acute, equal. Corolla yellow to red, tubular, 2.5–4.5 cm; lobes short. Stamens subequal, included. Capsules ellipsoid, 0.7–1.5 cm. Seeds brown, ca. 0.5 mm.

Cultivated in China [native of Argentina].

2. *Nicotiana rustica* Linnaeus, Sp. Pl. 1: 180. 1753.

黄花烟草 huang hua yan cao

Herbs annual, 40–60(–120) cm tall, with viscid, glandular hairs. Petiole 5–15 cm; leaf blade ovate, oblong, or lanceolate, 10–30 cm, membranous, glandular hairy, base cordate or rounded. Inflorescences many-flowered, compact to lax panicles. Pedicel 3–7 mm. Calyx cup-shaped, 7–12 mm; lobes deltate, unequal. Corolla greenish yellow, tubular; tube 1.2–2 cm; limb ca. 4 mm in diam.; lobes short, obtuse, apiculate.

Stamens unequal. Capsules subglobose, 1–1.6 cm. Seeds brown, oblong, ca. 1 mm. Fl. Jul–Aug.

Cultivated in Gansu, Guangdong, Guizhou, Qinghai, Shanxi, Sichuan, Xinjiang, Yunnan [native to South America].

Used for tobacco and as an insecticide.

3. *Nicotiana tabacum* Linnaeus, Sp. Pl. 1: 180. 1753.

烟草 yan cao

Nicotiana chinensis Fischer ex Lehmann.

Herbs viscid, annual or short-lived perennial, 0.7–2 m tall, glandular hairy overall. Leaves decurrent, winging stems; leaf blade ovate to elliptic or lanceolate, 30(–70) × 8–15(–30) cm, membranous, glandular hairy, base narrowed, nearly half clasping, apex acuminate. Inflorescences many-flowered, much-branched panicles. Pedicel 0.5–2 cm. Calyx tubular or tubular-campanulate, 2–2.5 cm; lobes deltate, acuminate, unequal. Corolla yellowish at base, yellowish, greenish, red, or pink distally, funnelform, 3.5–5 cm; limb 1–1.5 cm in diam., with acute unequal lobes. Stamens unequal, sometimes partly exerted. Capsules ellipsoid or ovoid. Seeds brown, rounded, ca. 0.5 mm in diam. Fl. summer, fr. autumn.

Widely cultivated throughout China [native to South America].

Used for tobacco and as an insecticide, also medicinally for anaesthetic, inducing sweat, or vomiting.

20. PETUNIA Jussieu, Ann. Mus. Natl. Hist. Nat. 2: 214. 1803.

碧冬茄属 bi dong qie shu

Herbs, usually glandular hairy. Stems erect or reclining, branched. Leaves petiolate, simple, entire. Flowers solitary, axillary, somewhat actinomorphic. Calyx tubular-campanulate, deeply 5-parted. Corolla funnelform or salverform, tube gradually inflated upwards; lobes short, rounded or short pointed. Stamens inserted in corolla tube, included; filaments slender; anthers dehiscing longitudinally; disc glandular, entire or lobed. Ovary 2-locular; stigma indistinctly 2-lobed; ovules numerous. Fruit a dry, 2-valved capsule. Seeds minute, subglobose or ovoid, reticulate-pitted; embryo slightly curved or erect.

About three species: South America, one cultivated in China.

1. *Petunia hybrida* (J. D. Hooker) Vilmorin, Fl. Pleine Terre ed. 1. 615. 1863.

碧冬茄 bi dong qie

Petunia violacea var. *hybrida* J. D. Hooker, Bot. Mag. 64: t. 3556. 1837.

Herbs annual, 30–60 cm tall, glandular hairy. Leaves short petiolate or sessile; leaf blade ovate, 3–8 × 1.5–4.5

cm, base cuneate, margin entire, apex acute. Pedicel 3–5 cm. Calyx deeply parted, 1–1.8 cm × 3.5 mm; lobes linear, 1–1.5 cm × 3.5 mm, obtuse. Corolla white, red, yellow, or purple, sometimes fragrant, funnelform, 5–7 cm, limb spreading. Style slightly exceeding stamens. Capsules conical, ca. 1 cm. Seeds subglobose, ca. 0.5 mm in diam.

Ornamental plant of hybrid origin, cultivated worldwide.