

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

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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 dehiscing 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.

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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*

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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.

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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.

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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 cavaleriei 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. cavaleriei* 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].

