Fl. China 19: 141–144. 2011.

29. GARDENIA J. Ellis, Philos. Trans. 51: 935. 1761, nom. cons., not Colden (1756).

栀子属 zhi zi shu

Chen Tao (陈涛); Charlotte M. Taylor

Shrubs or rarely trees, sometimes with short shoots (*Gardenia angkorensis*, *G. sootepensis*), unarmed or with short shoots sometimes spinescent, with buds and young stem apices often resinous. Raphides absent. Leaves opposite or rarely ternate, sometimes clustered at stem apices, often with domatia; stipules persistent or deciduous, united shortly around stem or united completely into a conical cap (i.e., calyptrate), triangular or when united into a cap then splitting along one side. Inflorescences pseudoaxillary and/or terminal, fascicled to cymose and several flowered or reduced to 1 flower, pedunculate to sessile, bracteate. Flowers sessile to pedicellate, bisexual, monomorphic, often showy. Calyx with ovary portion well developed and often longitudinally ridged; limb 5–8-lobed or sometimes fused into a tube or conical cap that splits irregularly as corolla elongates (i.e., spathaceous), often well developed. Corolla white to cream, salverform or funnelform, glabrous or variously pubescent inside; lobes 5–12, convolute in bud. Stamens 5–12, inserted in corolla throat, included or partially exserted; filaments very short or reduced; anthers dorsifixed. Ovary 1-celled, ovules numerous on 2–6 parietal placentas; stigma clavate or 2-lobed, included or exserted. Fruit generally yellow to orange, red-orange, or brown with pulp usually orange, baccate, leathery or fleshy, ellipsoid to subglobose, smooth or with longitudinal ridges, with calyx limb usually persistent or sometimes upper part tardily deciduous; seeds numerous, medium-sized, ellipsoid, compressed, embedded in pulp; testa leathery or membranous; endosperm usually corneous; embryo small or medium-sized; cotyledons broad, leaflike.

About 60–200 or 250 species: tropical and subtropical regions of Africa, Asia, Madagascar, and Pacific islands; five species (one endemic) in China.

The persistent calyx lobes apparently enlarge markedly as the fruit develop in many species; this may be confusing when the enlarged fruiting calyx lobes are compared with descriptions of flowering calyx lobes. The flowers are often nocturnal and are usually strongly sweetly fragrant with an odor of, well, gardenia. Several species from Asia and the Pacific are occasionally cultivated, but *Gardenia jasminoides*—native to our region—is very popular worldwide for its flowers.

1a. Leaf blade puberulent or pilosulous to glabrous adaxially, densely tomentose abaxially; stipules and calyx limb each fused into a conical cap then splitting along one side; fruit with spathaceous upper portion of calyx limb deciduous ..... 4. *G. sootepensis*
1b. Leaf blade glabrous to puberulent or pilosulous; stipules united in basal portion with apical portions free or fused into a conical cap, calyx regularly lobed; fruit with calyx lobes persistent.
2a. Leaf blade 1.5–4 × 1–2.5 cm, obovate or spatulate, obtuse to rounded at apex; calyx lobes 4–5 mm in flower, 5–8 mm in fruit ..... 1. *G. angkorensis*
2b. Leaf blade 3–25 × 0.4–8 cm, acute, acuminate, or obtuse at apex; calyx lobes 4–30 mm in flower, to 40 mm in fruit.
3a. Leaves ternate or sometimes opposite on a few nodes, with blade narrowly lanceolate or linear-lanceolate, 0.4–2.3 cm wide, without domatia; fruit ellipsoid-oblong to ellipsoid, 1.5–2.5 × 1–1.3 cm, smooth or with 5–8 weak to developed longitudinal ridges ..... 5. *G. stenophylla*
3b. Leaves opposite or sometimes ternate on a few nodes, with blade oblanceolate, obovate-oblong, elliptic-oblong, lanceolate-oblong, obovate, or elliptic, 1.5–8 cm wide, without or usually with domatia; fruit ovoid-ellipsoid, subglobose, or ellipsoid, 1.5–7 × 1.2–2 cm, smooth or with 5–9 weak to well-developed longitudinal ridges.
4a. Trees; calyx lobes 4–7 mm in flower; corolla tube ca. 15 mm, shorter than lobes; fruit with 5 weak to well-developed longitudinal ridges ..... 2. *G. hainanensis*
4b. Shrubs; calyx lobes 10–30 mm in flower; corolla tube 30–50 mm, ± equal to or usually longer than lobes; fruit with 5–9 well-developed longitudinal ridges ..... 3. *G. jasminoides*

1. Gardenia angkorensis Pitard in Lecomte, Fl. Indo-Chine 3: 252. 1923.

匙叶栀子 chi ye zhi zi

Shrubs, 1–3 m tall, with short shoots; branches terete, glabrous, becoming grayish white. Leaves opposite, usually crowded at ends of short shoots; petiole 1–4 mm, puberulent to glabrous; blade drying stiffly papery, obovate or spatulate, 1.5–4 × 1–2.5 cm, adaxially glabrous and shiny, abaxially sparsely puberulent to glabrous, base cuneate to acute, apex obtuse to rounded; secondary veins 6–8 pairs, in abaxial axils with pubescent foveolate domatia; stipules united shortly around stem, broadly triangular to ligulate, 2–3 mm, glabrous, obtuse to rounded. Flowers solitary, terminal on short shoots, sessile or subsessile. Calyx puberulent to glabrescent; ovary portion obconical, weakly ridged, 7–8 mm; limb lobed nearly to base; lobes 6, narrowly spatulate, 4–5 mm, obtuse. Corolla outside glabrous; tube 13–15 mm, somewhat funnelform; lobes 6, spatulate, ca. 15 mm, obtuse. Fruiting pedicels to 3 mm. Berry ellipsoid to subglobose, 15–18 × 10–15 mm, smooth to weakly ridged, with persistent calyx lobes 7–8 mm; seeds ca. 5 × 3–4 mm. Fr. Aug–Dec.

Forests or thickets at streamsides in valleys or on mountain slopes. Hainan [Cambodia].

2. Gardenia hainanensis Merrill, Lingnan Sci. J. 9: 43. 1930.

海南栀子 hai nan zhi zi

Trees, 3–12 m tall; branches with internodes congested to developed, compressed to terete, densely puberulent to glabrous, resinous at apices with usually distalmost several internodes coated with dried resin, becoming straw-brown. Leaves opposite; petiole 0.2–1 cm, puberulent to glabrous; blade drying thinly leathery, bright to dull or yellowed green adaxially, similar but darker or paler abaxially, obovate-oblong, elliptic-oblong, or oblanceolate, 5–19.5 × 2–8 cm, adaxially shiny and glabrous, abaxially glabrous to puberulent, base cuneate to acute, apex acute or shortly acuminate with tip often ultimately obtuse; secondary veins 10–15 pairs, in abaxial axils with pilosulous domatia; stipules calyptrate, conical, 4–10 mm, splitting for 1/2–3/4 their length, puberulent to usually glabrous. Flowers solitary, terminal or pseudoaxillary; peduncle 0.4–0.8 cm, densely puberulent. Calyx puberulent, usually covered with resin; ovary portion broadly obconical to ellipsoid, 5-ridged, 5–6 mm; limb with tubular portion 3–4 mm; lobes 5, oblong-lanceolate to linear or spatulate, 4–7 mm, 1–1.6 mm wide at base, strongly keeled, narrowed then ultimately rounded at apex. Corolla outside apparently glabrous, often covered with resin; tube ca. 15 mm, somewhat funnelform; lobes 5, obovate-oblong to elliptic, 23–30 × 8–10 mm, acute to obtuse and apiculate. Fruiting peduncles to 2 cm. Berry yellow, subglobose or ovoid-ellipsoid to ellipsoid, 1.6–3.3 × 1.5–1.6 cm, with 5 weak to developed longitudinal ridges, with persistent calyx limb. Fl. Apr, fr. May–Oct.

● Forests at streamsides in valleys or on mountain slopes; below 100–1200 m. Guangxi (Shangsi), Hainan.

3. Gardenia jasminoides J. Ellis, Philos. Trans. 51: 935. 1761.

栀子 zhi zi

Shrubs, 0.3–3 m tall; branches terete to flattened, with internodes developed to shortened, glabrescent or usually densely puberulent to pilosulous, becoming gray to grayish white, with buds resinous and distalmost internodes often covered with resin. Leaves opposite or rarely ternate, subsessile to petiolate; petiole to 0.5(–1) cm, densely puberulent or shortly pilosulous to glabrous; blade drying thinly leathery to stiffly papery, oblong-lanceolate, obovate-oblong, obovate, oblanceolate, or elliptic, 3–25 × 1.5–8 cm, adaxially shiny and glabrous or sometimes puberulent on principal veins, abaxially puberulent or pilosulous to glabrous, base cuneate to acute, apex acute to acuminate or obtuse then abruptly long acuminate; secondary veins 8–15 pairs, in abaxial axils often with pilosulous domatia; stipules calyptrate, cylindrical, 4–13 mm, splitting for ca. 3/4 their length, densely puberulent to glabrous. Flower solitary, terminal; peduncle 1–10 mm, puberulent or pilosulous to glabrous. Calyx puberulent or pilosulous to glabrous; ovary portion obconic or obovoid, 5–8 mm, with (5 or)6(–8) weak to developed longitudinal ridges; limb with basal tubular portion 3–5 mm; lobes (5 or)6(–8), lanceolate or linear-lanceolate to spatulate, 10–30 × 1–4 mm, often strongly keeled, acute. Corolla white to pale yellow, simple or in cultivation sometimes doubled, outside glabrous; tube 30–50 × 4–6 mm, cylindrical, in throat pilose; lobes (5 or)6(–8) or numerous when doubled, obovate or obovate-oblong, 15–40 × 6–28 mm, obtuse to rounded. Fruiting peduncles apparently not much elongating. Berry yellow or orange-yellow, ovoid, subglobose, or ellipsoid, 1.5–7 × 1.2–2 cm, with 5–9 longitudinal ridges, with persistent calyx lobes to 40 × 6 mm; seeds suborbicular, weakly angled, ca. 3.5 × 3 mm. Fl. Mar–Jul, fr. May–Feb.

Thickets and forests at streamsides, on mountain slopes or hills, or in valleys or fields; near sea level to 1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang; cultivated in Gansu, Hebei, Shanxi [Bhutan, Cambodia, India, Japan, N Korea, Laos, Nepal, Pakistan, Thailand, Vietnam; cultivated in Africa, Asia, Australia, Europe, North and South America, and Pacific islands].

This is one of the most commonly collected species of Rubiaceae in China. It is quite variable morphologically especially in leaf size, calyx lobe size, and corolla size. Several varieties have been recognized for Chinese plants (e.g., Qiu & Zhong, Fl. Zhejiang 6: 105. 1986) but are not clearly separated or widely accepted outside this region. The varieties recognized by W. C. Chen (in FRPS 71(1): 332–335. 1999) are outlined below for reference.

1a. Corolla doubled; flowers sterile, plants not setting fruit; cultivated plants ..... 3a. var. *fortuneana*

1b. Corolla simple; flowers fertile, plants setting fruit; wild and occasionally cultivated plants ..... 3b. var. *jasminoides*

3a. Gardenia jasminoides var. **fortuneana** (Lindley) H. Hara, Enum. Sperm. Jap. 2: 15. 1952 [*"fortuniana"*].

白蟾 bai chan

Gardenia florida Linnaeus var. *fortuneana* Lindley, Edwards's Bot. Reg. 32: t. 43. 1846 [*"fortuniana"*].

Flowers with doubled corolla, sterile. Fl. throughout year.

Cultivated in gardens and green belts as an ornamental in provinces of S China (including Nanhai Zhudao) [cultivated worldwide, outdoors in tropical regions and indoors in temperate regions].

3b. Gardenia jasminoides var. **jasminoides**

栀子(原变种) zhi zi (yuan bian zhong)

Gardenia florida Linnaeus, nom. illeg. superfl.; *G. florida* f. *oblanceolata* Nakai; *G. florida* var. *ovalifolia* Sims; *G. florida* f. *simpliciflora* Makino; *G. grandiflora* Loureiro; *G. jasminoides* f. *grandiflora* (Loureiro) Makino; *G. jasminoides* var. *grandiflora* (Loureiro) Nakai; *G. jasminoides* var. *longisepala* (Masamune) F. P. Metcalf; *G. jasminoides* f. *maruba* (Siebold ex Blume) Nakai ex Ishii; *G. jasminoides* var. *maruba* (Siebold ex Blume) Nakai; *G. jasminoides* f. *oblanceolata* (Nakai) Nakai; *G. jasminoides* f. *ovalifolia* (Sims) H. Hara; *G. jasminoides* var. *ovalifolia* (Sims) Nakai; *G. jasminoides* var. *radicans* (Thunberg) Makino; *G. jasminoides* f. *simpliciflora* (Makino) Makino; *G. jasminoides* f. *variegata* (Carrière) Nakai; *G. jasminoides* var. *variegata* (Carrière) Makino; *G. maruba* Siebold ex Blume; *G. radicans* Thunberg; *G. radicans* var. *variegata* Carrière; *G.*

schlechteri H. Léveillé (1911), not Bonati & Petitmengin (1907).

Flowers with simple corolla, fertile. Fl. Mar–Jul, fr. May–Feb.

Thickets and forests at streamsides, on mountain slopes or hills, or in valleys or fields; near sea level to 1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang; cultivated in Gansu, Hebei, Shanxi [Cambodia, India, Japan, N Korea, Laos, Nepal, Pakistan, Vietnam; cultivated in Europe, North America, Pacific islands].

4. Gardenia sootepensis Hutchinson, Bull. Misc. Inform. Kew 1911: 392. 1911.

大黄栀子 da huang zhi zi

Trees, 7–10 m tall, often with gelatinous secretions; branches with both developed and shortened internodes, somewhat compressed to angled or subterete, densely puberulent, pilosulous, or tomentulose, becoming glabrescent. Leaves opposite; petiole 0.6–1.2 cm, puberulent or tomentulose; blade drying papery or thinly leathery, obovate, obovate-elliptic, broadly elliptic, or elliptic-oblong, 7–29 × 3–16 cm, adaxially puberulent or pilosulous to glabrous, abaxially densely tomentose, base rounded to obtuse or cuneate, apex shortly acuminate with tip acute or obtuse; secondary veins 12–20 pairs, in abaxial axils often with densely pilosulous domatia; stipules calyptrate, conical, 0.5–1 cm, sericeous outside, densely puberulent or tomentulose inside, apical portion triangular and caducous, basal portion truncate to broadly rounded and usually persisting with leaves and sometimes becoming hardened. Flowers pseudoaxillary usually near branch apices, solitary; peduncle 1–1.5 cm, puberulent. Calyx densely puberulent to pilosulous externally; ovary portion ellipsoid, smooth, 5–6 mm; limb spathaceous, 13–15 mm, splitting along one side for 2/3–3/4 of its length, inside sericeous, often viscid or mucilaginous. Corolla yellow or white, salverform; tube 50–70 × 3–5 mm, cylindrical, outside sparsely puberulent, inside glabrous; lobes 5, broadly obovate, 40–50 × 20–30 mm, glabrous on both surfaces, obtuse to acute. Berry ellipsoid or ellipsoid-oblong, 2.5–5.5 × 1.5–3.5 cm, puberulent, smooth or with 5 or 6 longitudinal lines or very weak ridges, leathery to hard; seeds suborbicular, flattened, 3–4 mm in diam., foveolate. Fl. Apr–Aug, fr. Jun–Apr.

Forests at streamsides, at village margins, or on mountain slopes; 700–1600 m. Yunnan [Laos, Thailand].

W. C. Chen (in FRPS 71(1): 335. 1999) described the flowers as terminal on branchlets, but these are pseudoaxillary on all specimens seen as described here.

5. Gardenia stenophylla Merrill, Philipp. J. Sci. 19: 678. 1922.

狭叶栀子 xia ye zhi zi

Shrubs, 0.5–3 m tall; branches generally slender, angled to subterete, puberulent to glabrescent. Leaves opposite or ternate with arrangement often variable on a branch, subsessile to shortly petiolate; petiole to 5 mm, puberulent to glabrous; blade drying thinly leathery, narrowly lanceolate, narrowly elliptic, elliptic-spatulate, or linear-lanceolate, 3–12 × 0.4–2.3 cm, adaxially glabrous, abaxially puberulent to glabrous, base acute and often decurrent, margin thickened and often thinly revolute, apex acute to obtuse; secondary veins 9–13 pairs, in abaxial axils without domatia; stipules calyptrate, conical, 7–10 mm, splitting along one side for 3/4 or more of length, glabrous. Flowers solitary, pseudoaxillary or terminal; peduncles 5–6 mm, glabrous. Calyx glabrous; ovary portion ellipsoid to cylindrical, 5–6 mm, longitudinally 5–8-ridged; limb with basal tubular portion 4–6 mm; lobes 5–8, linear to narrowly lanceolate, 7–15 mm, keeled, acute. Corolla outside glabrous; tube cylindrical, 35–65 × 3–4 mm; lobes 5–8, oblong-obovate, 25–35 × 10–15 mm, obtuse. Fruiting pedicels to 2 cm. Berry yellow or orange-red, ellipsoid-oblong to ellipsoid, 1.5–2.5 × 1–1.3 cm, with 5–8 weak to developed longitudinal ridges, with persistent calyx lobes to 2 cm; seeds 2–3 mm. Fl. Apr–Aug, fr. May–Jan.

Forests or thickets at streamsides in valleys, fields at riversides; below 100–800 m. Anhui, Guangdong, Guangxi, Hainan, Zhejiang [Vietnam].

Fl. China 19: 141–144. 2011.