

12. GMELINA Linnaeus, Sp. Pl. 2: 626. 1753.

石梓属 shi zi shu

Trees, tall shrubs, or rarely subshrubs, often climbing when young. Branchlets tomentose, often spiny. Leaves opposite, simple, sometimes lobed, usually with large gland patches near base, often abaxially gray mealy. Inflorescences usually terminal cymes or panicles, sometimes 1-flowered in leaf axils; cymules axillary, decussate, few flowered, short; bracts leaflike. Calyx persistent, campanulate, enlarged in fruit, truncate, 4- or 5-dentate or lobed, often somewhat unequal or oblique, usually with large glands. Corolla zygomorphic, ventricose funnelform, tube narrow at base, throat wide; limb oblique, ca. 2-lipped, upper lip 2-lobed or entire, lower lip 3-lobed with middle lobe larger. Stamens 4, distinctly didynamous, inserted on basal part of corolla tube, usually included, sometimes slightly exerted; anthers divaricate, opening by longitudinal slits. Ovary (2–)4-locular; ovules pendulous or laterally attached, often with a central cavity. Style slender, usually unequally 2-lobed or stigma awl-shaped. Fruit a succulent drupe, endocarp bony, mesocarp fleshy. Seeds 4 or by abortion 2 or 3.

About 35 species: Asia, Australia, and New Guinea; seven species in China.

- 1a. Bracts rounded to broadly ovate, persistent ..... 1. *G. szechwanensis*
- 1b. Bracts linear, lanceolate, to ovate, deciduous before anthesis.
  - 2a. Calyx distinctly dentate or lobed.
    - 3a. Subshrubs or shrubs; branchlets slender; leaf blade 1.5–2.5(–5) cm ..... 2. *G. delavayana*
    - 3b. Trees; branchlets robust; leaf blade more than 5 cm.
      - 4a. Calyx 1.5–1.8 cm, teeth ovate-triangular; ovary mealy; fruit shorter than calyx ..... 3. *G. hainanensis*
      - 4b. Calyx 0.3–0.5 cm, teeth sharply triangular; ovary glabrous; fruit much longer than calyx ..... 4. *G. arborea*
  - 2b. Calyx truncate.
    - 5a. Climbing shrubs; branchlets with axillary spines; ovary glabrous ..... 5. *G. asiatica*
    - 5b. Trees; branchlets without spines; ovary pubescent or mealy.
      - 6a. Leaves glabrous; corolla 4-lobed, glabrous ..... 6. *G. chinensis*
      - 6b. Leaves densely puberulent; corolla 5-lobed, puberulent ..... 7. *G. lecomtei*

1. *Gmelina szechwanensis* K. Yao in S. L. Chen & K. Yao, Fl. Reipubl. Popularis Sin. 65(1): 211. 1982.

四川石梓 si chuan shi zi

Trees ca. 12 m tall, deciduous; bark dark brown. Branchlets terete, slender, striate, with elliptic white lenticels, leaf scars prominent, white puberulent when young, glabrescent. Petiole 2–5 cm, puberulent; leaf blade ovate to obovate, 5–9 × 4–6.5 cm, papery, abaxially grayish green, sparsely puberulent, and densely glandular, adaxially glabrous, base cuneate to broadly cuneate and oblique, margin entire, apex obtuse to acuminate, veins 3 or 4 pairs. Inflorescences terminal; peduncle densely grayish puberulent; bracts persistent, with petioles ca. 5 mm, blade rounded to broadly ovate, 1–2 × 1–1.5 cm, outside densely puberulent and glandular, inside sparsely puberulent. Calyx unequally 4- or 5-dentate, outside sparsely puberulent, inside glabrous in fruit. Ovary ovoid, glabrous. Fruit black when dry, obovoid, 1–1.5 cm in diam., shorter than persistent calyx.

• Mixed forests on mountain slopes and along streams; 1200–3000 m. SW Sichuan.

Described from fruiting material. Allied to *Gmelina delavayana* but differs in having bracts and bractlets persistent, broadly ovate to rounded, and densely puberulent and calyces much longer than fruit. *Gmelina hainanensis* can have a similar calyx to *G. szechwanensis*, and these species need further study.

2. *Gmelina delavayana* Dop, Bull. Soc. Bot. France 61: 321. 1914.

小叶石梓 xiao ye shi zi

*Gmelina montana* W. Smith.

Subshrubs to shrubs, 0.3–3 m tall. Branchlets terete, slender, striate, with sparse small lenticels, puberulent when young, glabrescent. Petiole 3–8 mm; leaf blade broadly ovate to ovate-rhomboid, 1.5–2.5(–5) cm, abaxially glandular, adaxially glabrous, base cuneate to broadly cuneate and slightly oblique, margin entire or coarsely serrate below

middle, apex acuminate, veins 3 or 4 pairs. Inflorescences lax terminal thyrses, terminal flowers solitary, basal bracts leaflike, bractlets lanceolate. Calyx campanulate, 6–8 mm, 5-dentate, grayish glandular, outside with several disc-shaped black glands. Corolla bluish to reddish purple, base yellow, 3–4 cm, 2-lipped; lower lip 3-lobed, central lobe largest, hooded; upper lip entire or slightly 2-cleft, puberulent. Stamens slightly exerted. Ovary glabrous, sparsely glandular. Style ± as long as stamens, glabrous. Fruit black when dry, obovoid, 1–1.5 cm, longer than persistent calyx. Fl. May–Jul, fr. Jul–Sep.

• Thickets on mountain slopes; 1500–3000 m. SW Sichuan, NW Yunnan.

3. *Gmelina hainanensis* Oliver, Hooker's Icon. Pl. 19: t. 1874. 1889.

苦梓 ku zi

Trees ca. 15 m tall; bark gray. Branchlets yellowish, leaf scars and lenticels very prominent, pubescent when young, glabrescent; buds brownish woolly. Petiole brown, 2–4(–6.5) cm, pubescent; leaf blade ovate to broadly ovate, 5–16 × 4–8 cm, papery, abaxially bluish green mealy, adaxially shiny green and glabrous, base cuneate to truncate, apex short acuminate to acute; veins 3 or 4 pairs, abaxially prominently elevated. Inflorescences terminal, cymose paniculate; peduncle 6–8 cm, yellowish pubescent; bracts sessile, leaflike, ovate-lanceolate to ovate, 0.8–1 × 0.5–2.5 cm, gray pubescent, with circular gland patches. Calyx 1.5–1.8 cm, 2-lipped, outside pubescent and glandular, accrescent and spreading in fruit; teeth 5, ovate-triangular. Corolla pinkish white, red, or rarely yellowish, darker in center, 3.5–4.5 cm, tube ca. 2.5 cm. Stamens sparsely glandular. Ovary pubescent. Fruit ovoid, 2–2.2 × 1.5 cm, as long as fruiting calyx. Fl. May–Jun, fr. Jun–Sep.

Open grassy hillsides, sparse forests; 300–500 m. Guangdong, Guangxi, Hainan, S Jiangxi [Vietnam].

Fine timber.

**4. *Gmelina arborea*** Roxburgh, Pl. Coromandel 3: 41. 1815.

云南石梓 yun nan shi zi

Trees ca. 15 m tall; bark grayish brown; branchlets, petioles, and inflorescences densely yellow-brown tomentose. Branchlets slightly 4-angled when young, becoming terete, lenticellate, leaf scars prominent. Petiole terete, 3.5–10 cm; leaf blade broadly ovate, 8–19 × 4.5–15 cm, thickly papery, base broadly cuneate to subcordate, apex acuminate; veins 3–5 pairs, abaxially prominent. Inflorescences terminal, narrow thyrses; peduncle 15–30 cm. Calyx 3–5 mm, with several black discoid gland patches; teeth 5, sharply triangular. Corolla yellow, 3–4 cm, 2-lipped, sparsely glandular; lower lip 3-lobed, outside yellowish brown puberulent, inside glabrous; upper lip entire or slightly 2-cleft. Ovary glabrous, glandular. Stigma unequally 2-cleft. Drupes yellow when ripe and black when dry, ellipsoid to obovoid-ellipsoid, 1.5–2 cm. Fl. Apr–May, fr. May–Jul.

Open forests along roadsides and near farm houses; below 1500 m. S Yunnan [Bangladesh, Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

Allied to *Gmelina asiatica* but differs in having erect inflorescences and larger leaves.

**5. *Gmelina asiatica*** Linnaeus, Sp. Pl. 2: 626. 1753.

亚洲石梓 ya zhou shi zi

Shrubs, climbing, 1–3(–10) m tall, usually with spines and minute yellowish brown hairs on young shoots. Petiole 0.5–4.5 cm; leaf blade ovate to obovate, 3–5(–9) × 2.2–3 (–8.5) cm, papery, abaxially dark brown villous and glandular, adaxially glabrescent, base cuneate, margin entire or ca. 3–5-lobed, apex acuminate, veins 3 or 4 pairs. Inflorescences terminal, usually pendulous, few to many flowered; primary floral branches very short, 1–5-flowered; bracts leaflike, small to large. Flowers pendulous. Calyx 3–6 × 2.5–4 mm, outside densely dark brown pubescent and with 2 to several disc-shaped glands, inside glabrous. Corolla yellow, 2–5 cm, 2-lipped and 4-lobed, lower lip 3-lobed, upper lip entire, outside with scattered appressed hairs, inside with dense glandular hairs. Filaments with dense glandular hairs. Ovary 4-locular, glabrous. Style slender, hardly exerted, apically curved; stigma unequally 2-cleft. Drupes yellow, ovoid to obovoid, glabrous.

Mixed forests; 400–800 m. Guangdong, S Guangxi [Bangladesh, Cambodia, India, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

Differs from other species in its climbing habit, branch spines, small leaves, and long narrow corollas.

**6. *Gmelina chinensis*** Bentham, Fl. Hongk. 272. 1861.

石梓 shi zi

Trees or shrubs, 3–12 m tall; bark gray. Branchlets yellow-brown pubescent when young, glabrescent. Petiole 2–5.5 cm, channeled, pubescent when young, glabrescent; leaf blade ovate-elliptic to ovate, 5–15 × 3–7(–9) cm, papery to thickly papery, abaxially bluish green mealy with gland patches scattered to almost absent, adaxially glabrous, base cuneate, margin entire, apex acuminate, veins 3–5 pairs. Inflorescences terminal thyrses; bracts leaflike, deciduous. Calyx truncate, 5–12 mm, outside densely gray downy and with several disc-shaped glands, inside glabrous and sparsely

glandular. Corolla white or pinkish, 3–3.5 cm, throat ca. 2.5 cm in diam., outside densely glandular, inside sparsely glandular. Ovary apically densely pubescent, basally glabrous. Drupes obovoid, ca. 2.2 × 1.5 cm, apex truncate. Fl. Apr–May, fr. Aug.

• Mixed forests on mountain slopes; 500–1200 m. Fujian, Guangdong, Guangxi, Guizhou.

**7. *Gmelina lecomtei*** Dop, Bull. Soc. Bot. France 61: 322. 1914.

越南石梓 yue nan shi zi

Trees ca. 15 m tall. Branchlets 4-angled and densely yellow pubescent when young, becoming terete and glabrous, sparsely lenticellate. Petiole terete, 6–7 cm, channeled, yellow puberulent; leaf blade ovate-elliptic to ovate, 9–20 × 6–12 cm, abaxially bluish green, yellowish brown puberulent, and gray glandular, adaxially subglabrous except pubescent along veins, base broadly cuneate to subrounded, margin entire, apex acuminate to acute; veins 3 or 4 pairs, abaxially very prominent, reticulate, adaxially pitted. Inflorescences terminal cymose panicles, cymes narrowly divergent, proximal cymes as long as panicle; bracts deciduous, linear to linear-lanceolate, 5–7 mm, densely puberulent, black disc-shaped glandular. Calyx cup-shaped, almost rotate in fruit, 5–8 mm. Corolla yellow, ca. 3 cm; lobes 5, equal, rounded. Stamens slightly exerted. Ovary ovoid, pubescent. Style sparsely glandular. Fruit obovoid, 2.5–4 cm, fleshy. Fl. Jun–Jul, fr. Jul–Sep.

Open forests; 200–1000 m. Yunnan (Hekou Xian and Pingbian Xian) [Laos, Vietnam].

