

17. PTEROSPERMUM Schreber, Gen. Pl. 2: 461. 1791, nom. cons.

翅子树属 *chi zi shu shu*

Trees or shrubs, stellate velutinous or scurfy and scaly. Leaves simple; stipules linear to palmately fimbriate, sometimes forming nectaries, caducous; petiole short; leaf blade lobed or not, leathery, base often oblique, margin entire or serrate, apex sometimes truncate; juvenile leaves sometimes much larger, petiole long, leaf blade often with peltate base and prominently palmately lobed. Inflorescence axillary, 1-flowered or cymose and 1–5-flowered. Flowers bisexual; epicalyx lobes usually 3, usually distant from calyx, entire, fimbriate, or palmately lobed, rarely absent, caducous. Calyx 5(or 6)-lobed, divided nearly to base, usually spreading to ± reflexed, caducous. Petals 5, white or yellow, often erect. Androgynophore present, very short, glabrous. Stamens 15, in 5 groups of 3 alternating with staminodes; filaments connate into tube, free at top; anthers 2-celled, cells parallel, connective pointed; staminodes 5, filiform, longer and thicker than filaments. Ovary 5-locular; ovules 4–22 per locule; style clavate or filiform; stigma longitudinally 5-grooved. Fruit a schizocarp, cylindrical or ovoid, angular or rounded, usually woody, sometimes leathery, dehiscent into 5 loculicidal mericarps when mature. Seeds 2 to many per locule, with long, oblong, membranous wing; endosperm scanty or absent; cotyledons usually plicate, simple. $2n = 38$.

Between 18 and 40 species: tropical and subtropical Asia; nine species (five endemic) in China.

Sterculia peltata G. Don (Gen. Hist. 1: 517. 1831), based on material from China, has long petiolate 5-lobed peltate leaves that are abaxially puberulent and adaxially glabrous, and has stems and petioles with a white tomentum. The leaf form is much more suggestive of juvenile material of *Pterospermum* than a species of *Sterculia* but the white indumentum is difficult to match with the species known from China.

Key to flowering material (flowers not known for *Pterospermum yunnanense*)

- 1a. Leaf blade 24–34 × 14–29 cm; sepals to 9 cm 1. *P. acerifolium*
- 1b. Leaf blade 4.5–18 × 1.5–11 cm; sepals 1.5–6.5 cm.
 - 2a. Petals obovate, ca. 2.8 cm wide 3. *P. kingtungense*
 - 2b. Petals linear to oblanceolate, 0.4–1.1 cm wide.
 - 3a. Leaf blade of mature trees very variable, usually oblique, lobes very irregular 2. *P. proteus*
 - 3b. Leaf blade of mature trees uniform, usually bilaterally symmetrical, entire or with apex regularly 3–5-lobed.
 - 4a. Leaf blade of mature trees broadest above middle, apex 3–5-lobed 4. *P. truncatolobatum*
 - 4b. Leaf blade of mature trees oblong, elliptic, or broadest at or below middle, apex not lobed.
 - 5a. Epicalyx lobes linear-divided; pedicel 3–5 cm 9. *P. lanceifolium*
 - 5b. Epicalyx lobes entire; pedicel to 1.5 cm.
 - 6a. Leaf blade base obtuse or truncate, rarely shallowly obliquely cordate; sepals 2.5–2.8 × ca. 0.4 cm 8. *P. heterophyllum*
 - 6b. Leaf blade base obliquely cordate or rounded; sepals 3.5–4.5 × 0.25–0.4 cm.
 - 7a. Leaf blade base obliquely cordate; sepals ca. 4.5 × 0.4 cm; androgynophore ca. 2 cm 6. *P. niveum*
 - 7b. Leaf blade base obliquely rounded; sepals ca. 3.5 × 0.25 cm; androgynophore ca. 0.8 cm 7. *P. menglunense*

Key to fruiting material (fruits not known for *Pterospermum kingtungense*)

- 1a. Capsule 3–6 cm.
 - 2a. Capsule apex 3–5 mm, beaked 2. *P. proteus*
 - 2b. Capsule apex obtuse.
 - 3a. Small trees, to 5 m tall; branchlets gray puberulent when young 5. *P. yunnanense*
 - 3b. Large trees, 20–25 m tall; branchlets yellow-brown pilose or velutinous.
 - 4a. Petiole 1–2 cm, leaf blade 7–15 × 3–10 cm; capsule stipe robust, 1–1.5 cm 8. *P. heterophyllum*
 - 4b. Petiole ca. 0.5 cm, leaf blade 5–9 × 2–3 cm; capsule stipe slender, 3–5 cm 9. *P. lanceifolium*
- 1b. Capsule 8–15 cm.
 - 5a. Leaf blade 24–34 × 14–29 cm, base not oblique 1. *P. acerifolium*
 - 5b. Leaf blade 4.5–18 × 1.5–11 cm, base oblique.
 - 6a. Leaf blade apex truncate and 3–5-lobed; capsule prominently 5-angled, ca. 12 × 7 cm 4. *P. truncatolobatum*
 - 6b. Leaf blade apex acuminate or caudate; capsule rounded, 8–10 × ca. 3 cm.
 - 7a. Branchlets yellow stellate tomentose when young; capsule glabrous, apex beaked 6. *P. niveum*
 - 7b. Branchlets shortly gray-white woolly when young; capsule hairy, apex acute 7. *P. menglunense*

1. *Pterospermum acerifolium* Willdenow, Sp. Pl. 3: 729. 翅子树 *chi zi shu* 1800.

Big trees; bark smooth. Branchlets densely velutinous

when young. Stipules linear; petiole robust, striate; leaf blade nearly orbicular or oblong, sometimes \pm lobed, $24\text{--}34 \times 14\text{--}29$ cm, leathery, abaxially densely yellowish and gray stellate velutinous, adaxially sparsely hairy or glabrous, base cordate, margin entire or crenate, apex truncate, nearly rounded, or pointed; juvenile leaves palmately lobed, peltate. Flowers solitary, fragrant; epicalyx lobes fimbriate or palmately divided. Sepals linear-oblong, ca. 9×0.7 cm, abaxially densely yellow-brown stellate velutinous, adaxially white villous. Petals white, linear-oblong, slightly cuneate, slightly shorter than sepals, glabrous. Stamines clavate, hairy. Ovary oblong, 5-angular; ovules many per locule. Capsule woody, cylindrical, stipitate, obscurely 5-grooved, $10\text{--}15 \times 5\text{--}5.5$ cm, reddish brown velutinous, glabrescent, base tapering, apex rounded. Seeds many per locule, obliquely ovate, flat, wing large and thin, brown, smooth.

Forested slopes; 1200–1700 m. S Yunnan [Bangladesh, Bhutan, India, Laos, Malaysia, Myanmar, Nepal, Thailand].

Pterospermum acerifolium is grown as an ornamental.

2. *Pterospermum proteus* Burkill, Bull. Misc. Inform. Kew 1901: 138. 1901.

变叶翅子树 bian ye chi zi shu

Small trees or shrubs, to 6 m tall. Branchlets densely white and yellowish brown puberulent. Leaf blade variously shaped, nearly orbicular, or broadly oblong in outline, usually oblique, sometimes irregularly lobed, $5\text{--}11 \times 2\text{--}5.5$ cm, abaxially densely red-brown puberulent, adaxially red-brown puberulent and glabrescent, base shallowly obliquely cordate or peltate, margin entire or irregularly lobed, lobes obtuse or crenate, apex acuminate, obtuse, or truncate; juvenile leaves palmately 7-lobed, peltate. Flowers 1–4-fascicled; epicalyx lobes filiform, ca. 2 mm. Sepals linear, ca. 1.5×0.15 cm, abaxially densely reddish brown puberulent. Petals linear, 1–1.2 cm, veins 7 or 8. Stamens slightly shorter than petals, almost free; staminodes ca. 0.6 cm, hairy on upper part. Ovary ovoid, ca. 4 mm, densely hairy. Capsule ovoid or ovoid-cylindrical, 5-angular or slightly foveolate, 3–4 cm, densely red-brown stellate tomentose, apex with 3–5 mm beak. Seeds ca. 3 cm including wing.

• Open forests on limestone; 900–1700 m. S Yunnan.

3. *Pterospermum kingtungense* C. Y. Wu ex H. H. Hsue, Acta Phytotax. Sin. 15(1): 81. 1977.

景东翅子树 jing dong chi zi shu

Trees, to 12 m tall; bark brown. Branchlets dark brown puberulent. Stipules ovate, scalelike, entire, ca. 4 mm; petiole ca. 1 cm, densely brownish tomentose; leaf blade oblong-obovate in outline, usually irregularly lobed, $8\text{--}13.5 \times 4.5\text{--}6$ cm, leathery, abaxially densely yellowish white stellate tomentose, adaxially glabrous, base rounded, truncate, or shallowly cordate, apex irregularly 3–5-lobed, bluntly acuminate. Flowers solitary, ca. 7 cm in diam., nearly sessile; epicalyx lobes ovate, entire, hairy. Sepals linear to narrowly lanceolate, ca. 4.5×1.1 cm, abaxially densely dark brown tomentose, adaxially densely yellow-brown tomentose. Petals white, obliquely obovate, ca.

4.8×2.8 cm, stellate puberulent, especially at base, base clawed, apex rounded. Androgynophore ca. 6 mm; filaments glabrous, apex of connective pointed and caudate; staminodes linear-clavate, ca. 3.5 cm, glabrous, upper part densely verrucose. Ovary ovoid, densely yellowish brown tomentose; style hairy; stigmas free but twisted together. Capsule not seen.

• Forested valleys on limestone; 1400–1500 m. SW Yunnan (Jingdong).

Pterospermum kingtungense is easily distinguished from other species by its much broader, obliquely obovate petals, ca. 2.8 cm wide, with a rounded apex. It is classified as “Critically endangered” in the IUCN Red List because its very small population is in an unprotected area subject to regular cutting.

4. *Pterospermum truncatolobatum* Gagnepain, Notul. Syst. (Paris) 1: 84. 1909.

截裂翅子树 jie lie chi zi shu

Trees, to 16 m tall; bark black, striate. Branchlets densely yellow-brown stellate tomentose when young, becoming gray-white or yellowish gray stellate tomentose or nearly glabrous. Stipules palmately 3–5-fimbriate, densely hairy, caducous; petiole robust, 4–12 mm; leaf blade oblong-obovate in outline, usually irregularly lobed, $8\text{--}16 \times 3.5\text{--}11$ cm, leathery, abaxially densely gray-white or yellow-brown stellate tomentose, adaxially glabrous or minutely hairy along midrib, base cordate or obliquely cordate, apex truncate and 3–5-lobed, central lobe acute or acuminate, 1–2 cm. Flowers solitary, nearly sessile; epicalyx lobes fimbriate. Sepals linear, relatively thick, $4.5\text{--}6.5 \times$ ca. 0.4 cm, abaxially densely brown tomentose, adaxially silvery white villous. Petals linear-falcate, $3\text{--}6 \times 0.4\text{--}0.5$ cm, base tapering. Stamens ca. 3.5 cm; staminodes filiform, ca. 5 cm, glabrous. Ovary ovoid, hairy. Fruiting pedicel to 8 mm; capsule woody, ovoid or ovoid-cylindrical, prominently 5-angular and 5-grooved, ca. 12×7 cm, densely brown stellate tomentose, verrucose or not, base narrowed into $2\text{--}3 \times$ ca. 1 cm stipe. Seeds 6–10 per locule, in 2 rows, 4–5.5 cm including wing, wing linear, up to 4.4 cm, apex obtuse or truncate. Fl. Jul.

Dense forests on limestone; 300–500 m. SE Guangxi (Ningming, Longzhou), SE Yunnan (Jinping) [N Vietnam].

5. *Pterospermum yunnanense* H. H. Hsue, Acta Phytotax. Sin. 15(1): 81. 1977.

云南翅子树 yun nan chi zi shu

Small trees, to 5 m tall. Branchlets gray puberulent when young. Leaf blades dimorphic: those of young trees and coppiced branches with petiole up to 24 cm, blade palmately 5-divided, lobes nearly linear, ca. 16×11 cm, base peltate, apex acuminate; those of mature trees with petiole 1–1.5 cm, blade oblong-obovate in outline, usually irregularly lobed, 6.5–8.5 cm, leathery, abaxially densely yellowish brown stellate puberulent, adaxially glabrous, base cordate or obliquely cordate, apex truncate with obtuse acumen; lateral veins 5–6 per side of midrib. Flowers unknown. Capsule ovoid-ellipsoid, obscurely 5-angular and with 5 nearly flat foveolate spots, ca. 4 cm, densely brown puberulent, base narrowed into ca. 6 mm stipe,

apex obtuse. Seeds ca. 2.8 cm including wing, wing brown, apex obtuse.

• Forests on limestone cliffs and summit ridges; 1400–1600 m. S Yunnan.

Pterospermum yunnanense is classified as “Critically endangered” in the IUCN Red List because there are few mature individuals and regeneration is poor.

6. *Pterospermum niveum* S. Vidal, Revis. Pl. Vasc. Filip. 67. 1886.

台湾翅子树 tai wan chi zi shu

Pterospermum formosanum Matsumura.

Trees, to 20 m tall. Branchlets yellow stellate tomentose when young and glabrescent. Stipules lanceolate, ca. 8 mm; petiole 0.5–1 cm, gray-yellow velutinous; leaf blade oblong or oblong-lanceolate, 12–18 × 3.5–7 cm, abaxially densely gray-yellow velutinous, adaxially yellow velutinous near base of petiole, basal veins 5, impressed adaxially and prominently raised abaxially, base obliquely cordate, margin entire, apex acuminate or caudate. Flowers solitary, 5–7 cm in diam. Sepals linear-lanceolate, ca. 4.5 × 0.4 cm, abaxially yellow-brown velutinous, adaxially villous. Petals white, obovate, ca. 3.5 × 1.1 cm, apex obtuse. Stamines filiform. Ovary ovoid, densely tomentose; style glabrous; stigma 5-lobed. Capsule cylindrical, or cylindrical-ellipsoid, 8–10 × ca. 3 cm, glabrous, apex acute and beaked. Seeds 3–4 cm including wing, apex obtuse.

Lowland forests. S Taiwan [Philippines].

Pterospermum niveum is possibly conspecific with *P. celebicum* Miquel. The type of *P. formosanum* has not been seen but the type locality and protologue description strongly suggest that it belongs here.

The timber is valued commercially.

7. *Pterospermum menglunense* H. H. Hsue, Acta Phytotax. Sin. 15(1): 81. 1977.

勐仑翅子树 meng lun chi zi shu

Trees, to 12 m tall. Branchlets shortly gray-white woolly when young. Petiole 0.3–0.5 cm; leaf blade lanceolate or elliptic-lanceolate, 4.5–12.5 × 1.5–4.8 cm, thickly papery, abaxially densely yellowish brown stellate velutinous, adaxially glabrous or minutely sparsely puberulent, base obliquely rounded, apex long acuminate or caudate-acuminate. Flowers solitary, subterminal; pedicel ca. 0.5 cm; epicalyx lobes long-pointed, entire, ca. 6 mm. Sepals linear, 3.5–3.8 × ca. 0.25 cm, abaxially densely yellow-brown stellate tomentose, adaxially glabrous. Petals white, obovate, ca. 3 × 0.8 cm, glabrous, base tapering into narrow stalk, apex obtuse with acumen. Androgynophore ca. 8 mm, glabrous. Stamens slightly shorter than stamines; stamines ca. 1 cm, glabrous. Ovary ovoid, ca. 4 mm, densely yellowish brown tomentose. Capsule narrowly ellipsoid, ca. 8 cm, base tapering into 1–2 cm stipe, apex acute. Seeds ca. 3.5 cm including wing. Fl. Apr.

• Monsoon forests on limestone hills. S Yunnan (Xishuangbanna).

Pterospermum menglunense, though found within a protected area, is still treated as “Critically endangered” in the IUCN Red List because of the very small, fragmented population.

8. *Pterospermum heterophyllum* Hance, J. Bot. 6: 112. 1868.

翻白叶树 fan bai ye shu

Pterospermum levinei Merrill.

Trees, to 20 m tall; bark gray or gray-brown. Branchlets yellow-brown pilose. Petiole 1–2 cm, hairy; leaf blade oblong-ovate to oblong, 7–15 × 3–10 cm, abaxially densely yellow-brown stellate pubescent, adaxially nearly glabrous; base obtuse, truncate or obliquely cordate, apex acute or acuminate; juvenile and coppice leaves: petiole ca. 12 cm, leaf blade palmately 3–5-lobed, ca. 15 cm in diam., base conspicuously peltate, truncate or slightly rounded. Flowers solitary or in cymes of 2–4; pedicel 0.5–1.5 cm; epicalyx lobes closely adnate to calyx, scalelike. Sepals linear, up to 2.8 × 0.4 cm, both surfaces puberulent. Petals greenish white, oblanceolate, as long as sepals. Androgynophore ca. 2.5 mm; stamines filiform, slightly longer than stamens. Ovary ovoid, villous; style glabrous. Capsule woody, cylindrical-ovoid, ca. 6 × 2–2.5 cm, yellow tomentose, base tapering into robust, 1–1.5 cm stipe, apex obtuse. Fl. autumn.

• Fujian, Guangdong, Guangxi, Hainan.

The roots of *Pterospermum heterophyllum* are of medicinal use. The epithet refers to the great contrast in form between juvenile and mature leaves but this is not unique to this species.

9. *Pterospermum lanceifolium* Roxburgh, Fl. Ind., ed. 1832, 3: 163. 1832 [“*lanceaefolium*”].

窄叶半枫荷 zhai ye ban feng he

Trees, to 25 m tall; bark yellow-brown or gray, striate. Branchlets yellow-brown velutinous when young. Stipules 2–3-fimbriate, velutinous, longer than petiole; petiole ca. 0.5 cm; leaf blade lanceolate or oblong-lanceolate, 5–9 × 2–3 cm, abaxially densely yellow-brown or yellow-white velutinous, adaxially glabrous, base oblique or obtuse, margins entire or with several teeth near apex, apex acuminate or acute. Flowers solitary; pedicels 3–5 cm, articulate, velutinous; epicalyx lobes at middle of pedicel, 4- or 5-fimbriate or linear, 7–8 mm. Sepals linear, ca. 2 × 0.3 cm, both surfaces puberulent. Petals white, lanceolate, as long as sepals or slightly shorter, apex obtuse. Stamines filiform, longer than stamens, basally villous. Ovary puberulent. Capsule woody, cylindrical-ovoid, ca. 5 × 2 cm, yellow-brown tomentose, base tapering into slender, 3–5 cm stipe, apex obtuse. Seeds 2–4 per locule, 2–2.5 cm including wing. Fl. spring and summer.

Dense or open forests, slopes, valleys; 800–900 m. Guangdong, SW Guangxi, S Yunnan [India, Malaysia, Myanmar, Vietnam].

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