

## 12. CASEARIA Jacquin, Enum. Syst. Pl. 4, 21. 1760.

脚骨脆属 jiao gu cui shu

*Antigona* Vellozo; *Athenaea* Schreber (1789), not Adanson (1763); *Vareca* Gaertner.

Shrubs or small trees. Leaves alternate, usually petiolate; stipules usually small, caducous, rarely larger and/or persistent; leaf blade usually pinnate-veined, sometimes 3-veined from base, often with pellucid glandular dots and lines throughout (view at 10 × against light), margin entire or toothed. Flowers perigynous, bisexual, small, usually clustered in axillary, few- to many flowered, sessile or shortly pedunculate fascicles, rarely solitary or in small cymes; bracts papery or scalelike, generally ovate, small, congested at fascicle base to form a persistent cushion; pedicels usually present, articulate, rarely flowers practically sessile. Sepals 4 or 5, imbricate, joined in basal part to form a shallow or deeper cup, free above, cup never adnate to ovary. Petals absent. Disk cuplike, adnate to inside of calyx tube, free from ovary, rim lobed; lobes triangular, oblong, or clavate, usually hairy, either in same row as and alternating with stamens, or in an intrastaminal row. Stamens (6–)8–10(–12); filaments inserted on rim of disk cup. Ovary superior, 1-loculed; placentas 2–4, each with several ovules; style 1, entire or distally 3-branched, sometimes very short; stigma capitate, 3-lobed when style is entire. Capsule fleshy to leathery, globose, ellipsoid or 3-angled when fresh, mostly 6-ribbed when dry, (2 or)3(or 4)-valvate, dehiscent valves often naviculate; sepals, stamen filaments, disk, and disk lobes generally persistent at capsule base, style remnant often persistent at apex. Seeds several, ovoid or obovoid, arillate, aril completely covering seed, membranous or fleshy, often brightly colored, soft, partly fimbriate.

About 180 species: tropical and subtropical regions of Africa, Asia, Australia, North and South America, and the Pacific islands; seven species in China.

In Chinese species: flowers in axillary glomerules; disk lobes in same row as stamens; style entire; capsule fleshy.

More gatherings are needed for the genus from China, Myanmar, India, Laos, Thailand, and Vietnam, from which more accurate, detailed, and standardized descriptions and keys can be drawn. Chinese material of *Casearia kurzii*, *C. tardieuae*, and *C. velutina* seems particularly scarce. Between some species, the flowers and fruit offer few diagnostic characters. The following key is tentative.

- 1a. Stipules narrowly lanceolate or linear-lanceolate, 1.5–10 mm.
  - 2a. Stipules narrowly lanceolate, 5–10 mm, early caducous, on young growth leaving a large conspicuous pale brown scar; leaves with 10–14 pairs of lateral veins; in dried material pellucid dots and streaks throughout leaf blade usually clearly visible at × 10 mag. without holding leaf up to light, reddish brown, contrasting sharply against color of leaf; leaves glabrous or glabrescent below ..... 5. *C. graveolens*
  - 2b. Stipules linear-lanceolate, 1.5–3 mm, persistent for some time; leaves with 5–8 pairs of lateral veins; in dried material pellucid dots and streaks throughout leaf blade not clearly visible at × 10 mag. without holding leaf up to light, nor reddish brown, nor contrasting sharply against color of leaf; leaves usually pubescent beneath, less often glabrous ..... 1. *C. flexuosa*
- 1b. Stipules broadly triangular or broadly ovate, minute, 1–2 mm.
  - 3a. Abaxial surfaces of mature leaves pubescent, at least along midvein and lateral veins.
    - 4a. Pedicels 2–4 mm in flower, 5–6 mm in fruit ..... 2. *C. velutina*
    - 4b. Pedicels 5–8 mm in flower, ca. 10 mm in fruit ..... 3. *C. kurzii*
  - 3b. Abaxial surfaces of mature leaves glabrous.
    - 5a. Leaves leathery ..... 4. *C. tardieuae*
    - 5b. Leaves papery to membranous.
      - 6a. Terminal bud, pedicel, and calyx hairy, stamen filaments usually hairy (rarely nearly glabrous); capsule slightly to not at all ridged, pericarp veined, vesicled, vesicles black and shiny in cross-section (subglabrous *C. kurzii* var. *gracilis* might also key out here) ..... 6. *C. glomerata*
      - 6b. Terminal bud hairy or glabrous, pedicel, calyx, and stamen filaments usually glabrous (rarely puberulous); capsule usually strongly ridged, pericarp veined but not conspicuously vesicled ..... 7. *C. membranacea*

1. *Casearia flexuosa* Craib, Bull. Misc. Inform. Kew 1911: 54. 1911.

云南脚骨脆 yun nan jiao gu cui

*Casearia yunnanensis* How & Ko.

Shrubs or small trees, 1–4 m tall; terminal bud, twig tips, and branchlets pubescent or glabrescent, hairs ± spreading. Stipules linear-lanceolate, 1.5–3 mm, papery, with a few appressed to spreading hairs, persistent or caducous; petiole 3–10 mm, pu-

bescent, hairs spreading, short; leaf blade variable in shape and size, narrowly elliptic, oblong-elliptic, or obovate, 3.5–15 × 1–5 cm, thinly membranous, abaxially sparsely puberulous, at least along main veins, rarely glabrous, adaxially glabrous or subglabrous, midvein raised abaxially, lateral veins 5–8 pairs, base acute, obtuse, or slightly rounded, cuneate or not, margin finely serrulate, teeth narrow, extended to a fine point, leaf apex acute, sometimes broadly so, tapering or contracting more abruptly to an acumens ca. 1 cm, extreme tip usually acute, mucronate. Flow-

ers usually few in axillary subsessile glomerules, greenish white. Pedicels ca. 1 mm in flower, ca. 5 mm in fruit, articulate at base; bracts ovate, ca. 2 mm, abaxially glabrous or with a few hairs. Sepals 4 or 5, oblong or obovate-oblong, 2–3 mm, outside usually glabrous, less often sparsely shortly hairy in upper half, inside sparsely pubescent, hairs semispreading, short, margin shortly ciliate. Stamens 8; filaments ca. 1 mm, pubescent; anthers ovoid-oblong, 0.5–0.7 mm, with acute apex and connective sometimes extended, glabrous. Disk lobes nearly as long as stamen filament, narrowly triangular, adaxially glabrous, margin ciliate, hairs long, white when dry. Ovary narrowly ovoid, ca. 1 mm or less, sparsely hairy to nearly glabrous below, hairy above; style short, 0.5–1 mm, hairy; stigma globose, 3-lobed, glabrous. Capsule green or yellow, broadly ellipsoid to globose, ca. 1.5 × 1 cm, 3- or 4-angled, fleshy, dried pericarp thin, usually splitting into 3 broadly elliptic valves, outside pale brown, finely longitudinally ribbed and horizontally wrinkled, reddish brown vesicles often visible below surface, inner surface pale yellowish; valves 3, broadly obovate, slightly naviculate. Seeds 3–8, variously reported as white or red when fresh, pale brown when dry, 6–7 mm, ovoid, surface smooth, completely or partially covered by a thin, fleshy, partly fimbriate, yellowish white aril. Fl. Apr, fr. Apr–May.

Thickets, forests; 100–700 m. Guangxi, Yunnan [Laos, Thailand, Vietnam].

**2. *Casearia velutina*** Blume, Mus. Bot. 1: 253. 1851.

毛叶脚骨脆 mao ye jiao gu cui

*Casearia balansae* Gagnepain; *C. balansae* var. *cuneifolia* Gagnepain; *C. balansae* var. *subglabra* S. Y. Bao; *C. petelotii* Merrill; *C. villilimba* Merrill.

Trees or shrubs, to 10 m tall; terminal bud densely pubescent, twig tips and branchlets densely to sparsely pubescent, hairs spreading, yellowish brown. Stipules broadly triangular-ovate, minute, ca. 1 mm, densely appressed pubescent, caducous early or later; petiole 5–15 mm, densely to sparsely pubescent, hairs spreading; leaf blade often drying blackish green or blackish brown, variable in shape and size, elliptic to oblong, rarely ovate, 7–20 × 4–8 cm, thickly papery, initially pubescent on both sides, very densely so beneath, both sides becoming more sparsely hairy or glabrous except for midvein and main veins, hairs semispreading to appressed, yellowish, long (0.5–1 mm); leaf lateral veins 8–12 pairs, base acute to rounded, sides convex to concave, often oblique, margin serrulate, apex acute to obtuse, contracting to an acumen of ca. 1 cm or less. Flowers (1 to) few to many in axillary sessile or subsessile glomerules. Pedicels 2–4 mm, extending to 5–6 mm in fruit, articulate, sparsely pubescent, hairs semiappressed; bracts ovate, ca. 1 mm or less, outside pubescent. Sepals 5, ovate, hooded, 2–3 mm, outside pubescent, hairs as for pedicels, apex acute or obtuse. Stamens 8, rarely 5–7; filament ca. 1.5 mm, puberulous throughout; anthers ovoid, ca. 0.4 mm. Disk lobes narrowly oblong, ca. 2/3 as long as filament, glabrous adaxially except at tip, abaxially pubescent at tip and margin. Ovary conic, very sparsely puberulous, hairs semiappressed; style short, 0.5–1 mm, gla-

brous; stigma globose, 3-lobed. Capsule broadly ellipsoid, to ca. 1.2 cm, fleshy, when dry pericarp blackish, with dense shallow warts, with fine longitudinal ridges marking valve margins, black shiny vesicles absent. Seeds ca. 8, when dry pale yellowish brown, ca. 5 mm, smooth, enveloped in a thin, fleshy, pale yellow partly fimbriate aril. Fl. Feb–Dec, fr. Apr–Jun.

Evergreen broad-leaved forests; 100–1800 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Indonesia (Java, Sumatra), Laos, Malaysia, Thailand, Vietnam].

*Casearia velutina* is treated here as a polymorphic species particularly variable in leaf shape, size, and indumentum. Lescot (Fl. Cambodia Laos Vietnam 11: 51. 1970) and Lai (FRPS 52(1): 71. 1999) recognized *C. balansae* as a separate species, with *C. petelotii* and *C. villimba* in synonymy. Sleumer (Blumea 30: 217–250. 1985) treated *C. balansae* as a synonym of *C. velutina*. The group requires further gatherings and a distribution-wide study.

**3. *Casearia kurzii*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 594. 1879.

印度脚骨脆 yin du jiao gu cui

Trees, small, 5–12 m tall; terminal buds densely appressed hairy (except stipules), twig tips, branchlets sparsely pubescent, hairs spreading. Stipules broadly triangular-ovate, minute, ca. 1 mm, papery, sparsely to densely appressed pubescent, ciliate, very early caducous, stipule scar sometimes increasing in size with age and becoming conspicuous; petiole 5–15 mm, pubescent, often sparsely so, hairs spreading, yellowish; leaf blade lanceolate or oblong-lanceolate, rarely oblong-elliptic, 9–21 × 4–8 cm, papery, abaxially pubescent throughout or sparsely pubescent only along midvein and lateral veins with spreading, yellowish or pale brown hairs, rarely subglabrous, adaxially glabrous or with a few hairs toward base, lateral veins 8–11 pairs, base rounded to cordate, often inequilateral, margin shallowly serrate, crenate, or subentire, apex acute or contracting rather gradually to an acumen to ca. 1.5 cm. Flowers few in axillary sessile glomerules, whitish, small. Pedicels 5–8 mm in flower, ca. 1 cm in fruit, articulate at base, pubescent, hairs spreading, yellowish; bracts ovate, 0.5–0.7 mm, papery, pubescent, ciliate. Sepals 5, ovate, 2–3 mm, outside pubescent except toward margin, hairs appressed to spreading and yellowish, inside glabrous or with few hairs, margin nearly glabrous. Disk lobes narrowly oblong, 1/2–3/4 as long as filament, densely hairy at apex, hairs drying white, long. Stamens 7 or 8; filaments pubescent, ca. 0.7 mm; anthers ovoid, ca. 0.5 mm, apex obtuse to apiculate, connective hairy. Ovary ovoid, 1–2 mm, practically glabrous; style short; ca. 0.5 mm, glabrous, stigma discoid, enlarged. Capsule 1–1.5 cm, obovoid to ellipsoid, fleshy, when dry outer surface blackish brown, densely and shallowly warty, at least in young fruit, pericarp with many ellipsoid inclusions, in dried material these black, shiny, conspicuous in pericarp cross-section. Seeds several, drying pale brown, ovoid, ca. 5 mm, surface smooth, enveloped by a thin, fleshy, partly fimbriate, pale yellowish aril. Fl. Jul–Aug, fr. Oct–Mar of next year.

Rain forests in moist valleys, evergreen broad-leaved forests; 500–1500 m. Yunnan [Bangladesh, India, N Myanmar].

- 1a. Leaf blade abaxially densely puberulous ..... 3a. var. *kurzii*  
1b. Leaf blade abaxially subglabrous, or sparsely  
puberulous only along midvein and lateral  
veins ..... 3b. var. *gracilis*

**3a. *Casearia kurzii* var. *kurzii***

印度脚骨脆(原变种) yin du jiao gu cui (yuan bian zhong)

Leaf blade abaxially densely puberulous.

Rain forests in moist valleys; 500–1200 m. Yunnan [India, N Myanmar].

**3b. *Casearia kurzii* var. *gracilis*** S. Y. Bao, Acta Bot. Yunnan. 5: 376. 1983.

细柄脚骨脆 xi bing jiao gu cui

Leaf blade abaxially subglabrous, or sparsely puberulous only along midvein and lateral veins. Fl. Mar–Apr, fr. Aug–Sep.

- Evergreen broad-leaved forests; 1300–1500 m. Yunnan.

**4. *Casearia tardieuae*** Lescot & Sleumer, Adansonia, sér. 2, 10: 293. 1970

石生脚骨脆 shi sheng jiao gu cui

*Casearia calciphila* C. Y. Wu & Y. C. Huang ex S. Y. Bao.

Trees, to 12 m tall; branches with bark brown to greenish gray, young branches wrinkled, older ones flaky, branchlets glabrous. Stipules triangular, ca. 2 mm, glabrous except for ciliate margin, apex acute, early caducous; petiole 8–13 mm, robust, completely glabrous; leaf blade pale green, elliptic, ovate-oblong, or oblong, 8–13 × 3.5–6 cm, leathery to thickly leathery, both surfaces completely glabrous, midvein prominent below, lateral veins 6–8 pairs, arching upward, finely marked on both surfaces, base acutely attenuate, asymmetric, margin undulate to repand-dentate, apex shortly acute-acuminate. Flowers few in sessile axillary glomerules, small. Pedicels ca. 3 mm, glabrous; bracts ovate, ca. 0.8 mm, abaxially glabrescent, adaxially glabrous. Sepals 5, ovate, 3.5–4.5 mm, leathery, glabrous except for sparsely ciliate margin. Stamens 8; filaments sparsely pubescent, glabrescent or glabrous, ca. 2 mm; anthers oblong-ellipsoid. Disk lobes oblong, hairy at apex. Ovary conic, 2–3 mm, hairy toward apex; style very short to nearly absent, ca. 0.5 mm, glabrous; stigma capitate. Capsule ellipsoid, 2.5–3.5 mm, fleshy, verrucose. Seeds many, whitish, ovoid, completely enveloped in partly fimbriate aril. Fl. Dec–Mar of next year, fr. Mar–Nov.

Mixed forests; 1000–1600 m. Yunnan [Vietnam].

Material of *Casearia tardieuae* was not seen by present authors.

**5. *Casearia graveolens*** Dalzell, Hooker's J. Bot. Kew Gard. Misc. 4: 107. 1852.

香味脚骨脆 xiang wei jiao gu cui

*Casearia graveolens* var. *lintsangensis* S. Y. Bao.

Trees, 10–15 m tall; terminal buds, twig tips, and branch-

lets glabrous. Stipules narrowly lanceolate, 5–10 mm, papery, glabrous, early caducous, on young growth leaving a large conspicuous pale brown scar; petiole 1–1.2 cm, glabrous; leaf blade broadly elliptic to elliptic-oblong, 6–15 × 4–8 cm, papery, abaxially glabrous or glabrescent, adaxially glabrous, densely set with irregularly shaped, reddish brown pellucid dots and streaks, in dried material these clearly visible at × 10 mag. without holding leaf up to light, lateral veins 10–14 pairs, arching upward, base rounded or broadly obtuse, margin shallowly serrate, crenate, very rarely repand, apex variable, broadly acute, obtuse or rounded, often contacting gradually or abruptly to a short acumen to ca. 1 cm. Flowers in few- to many flowered axillary glomerules, greenish, fetid. Pedicels 3–6 mm, articulate near base, pubescent with short semispreading hairs, more densely so below articulation; bracts ovate, ca. 2 mm, outermost bracts densely appressed hairy, striate. Sepals 5, ovate to ovate-oblong, ca. 4 mm, outside pubescent, more densely so toward base, or glabrescent, hairs semispreading and short, inside sparsely hairy, margin practically glabrous, not ciliate. Stamens 8; filaments sparsely pubescent, ca. 1.5 mm; anthers oblong, ca. 0.5 mm, connective glabrous. Disk lobes oblong, ca. 1/2 as long as stamen filaments, pubescent throughout, hairs white when dry, long. Ovary ovoid, ca. 1.5 mm, pubescent in upper half, hairs spreading; style short, hairy in lower part, stigma capitate. Capsule orange-yellow when ripe, dark reddish or blackish brown and strongly longitudinally ribbed when dried, ellipsoid-oblong, ca. 2 cm, fleshy, pericarp densely and shallowly warty, veined, cross-section and inner surface without shiny black vesicles, valves narrowly naviculate in dried state. Seeds several, when dry pale yellowish brown, ovoid, ca. 4 mm, surface smooth, enclosed in a thin, fleshy, partly fimbriate pale yellowish brown aril. Fl. Mar–Apr, fr. Sep–Nov.

Forests; 500–1800 m. Yunnan [Bangladesh, Bhutan, Cambodia, India, Laos, Myanmar, Nepal, Pakistan, Thailand, Vietnam].

**6. *Casearia glomerata*** Roxburgh, Fl. Ind., ed. 1832, 2: 419. 1832.

球花脚骨脆 qiu hua jiao gu cui

*Casearia glomerata* f. *pubinervis* How & Ko; *C. merrillii* Hayata.

Trees or shrubs, 4–10 m tall; terminal buds densely pubescent, hairs semiappressed, twig tips and young branches puberulous, hairs spreading, older branches glabrous. Stipules ovate, small, ca. 1 mm, adaxially sparsely appressed hairy, ciliate, apex acute, early caducous; petiole 8–12 mm, sparsely puberulous to practically glabrous; leaf blade variable in shape, elliptic, lanceolate, or oblong, less often ovate, 7–12(–17) × 3–5(–6.5) cm, thickly papery, sparsely puberulous when young, soon glabrous on both surfaces, lateral veins 7 or 8 pairs, arching upward, conspicuous on both surfaces, base obtuse or rounded, more rarely acute, often asymmetric, margin serrulate or crenulate to nearly entire, apex acute to obtuse, less often rounded, often contracting gradually or more abruptly to a short acumen to 1 cm. Pedicels 4–5 mm in flower, 7–10 mm in mature fruit, articulate near base, pubescent, hairs semiappressed; bracts broadly ovate or triangular, ca. 1 mm, abaxially semiappressed hairy, or

at least with a hairy median band. Flowers 10–15 or more in axillary glomerules, yellowish, small. Sepals 5, broadly elliptic, obovate, or oblong-obovate, 2–3 mm, outside sparsely pubescent except toward margin, hairs semiappressed, inside glabrous or rarely sparsely hairy, margin minutely ciliate to nearly glabrous. Stamens 8–10; filaments 1–2 mm, pubescent; anthers suborbicular, ca. 0.3 mm. Disk lobes oblong, ca. 1/2 as long as anthers, adaxially glabrous, apex densely hairy, hairs white, rather long. Ovary ovoid, glabrous or sparsely hairy; style short, glabrous; stigma capitate. Capsule ca. 1.5 cm, reported as ovoid-subglobose when fresh, bright yellow when ripe, ellipsoid, oblong-ellipsoid, or obovoid when dried, leathery, usually not or only scarcely ridged, 2- or 3-valved, dark reddish or blackish brown, in dried material pericarp conspicuously veined, densely and shallowly warty with few to many ellipsoid inclusions, the latter blackish and shiny in pericarp cross-section. Seeds several, pale brown when dry, ovoid, ca. 5 mm, enveloped by a thin, fleshy, partly fimbriate, pale yellowish aril. Fl. Apr–Dec, fr. Jan–Dec.

Sparse forests in mountains; low elevations. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Xizang, Yunnan [Bhutan, India, Nepal, Vietnam].

“*Casearia membranacea* f. *nigrescens*” (S. S. Lai, Bull. Bot. Res., Harbin 14: 229. 1994) belongs here but was not validly published under Art. 37.2 of the *Vienna Code* because two gatherings were indicated as types (S. Q. Chen [S. H. Chun] 11697 and S. Q. Chen [S. H. Chun] 13372).

For Indian and Chinese material of *Casearia glomerata*, the combination of hairy terminal bud, pedicel, calyx, and stamen filament, and obovoid fruit with veined, vesicled, unridged pericarp seems to hold, although rarely the stamens are nearly glabrous and the fruit slightly ridged. The species can be difficult to differentiate from *C. membranacea*, in which the terminal bud is hairy or glabrous, the pedicel, calyx and stamen filaments usually glabrous but sometimes hairy, and the capsule usually strongly ridged and veined but not conspicuously vesicled. Sleumer in *The Flacourtiaceae of Thailand* (Blumea 30: 217–250. 1985) refers to a widespread “*Casearia glomerata* Roxburgh complex” that includes *C. aequilateralis*, *C. annamensis* (Gagnepain) Lescot & Sleumer, *C. membranacea*, and *C. pseudoglomerata* Sleumer. *Casearia merrilli*, described from Taiwan, is here a new synonym of *C. glomerata*.

**7. *Casearia membranacea* Hance, J. Bot. 6: 113. 1868.**

膜叶脚骨脆 mo ye jiao gu cui

*Casearia aequilateralis* Merrill.

Trees or shrubs, 4–18 m tall; terminal buds glabrous or hairy, twig tips and branchlets usually glabrous. Stipules ovate, small, ca. 1 mm, abaxially sparsely appressed hairy, ciliate,

apex acute, early caducous; petiole 6–12 mm, pubescent at first, soon glabrous or subglabrous; leaf blade variable in size, shape, and texture, often elliptic or oblong, sometimes ovate-oblong or obovate, 5–12(–14) × 2.5–5(–6) cm, papery, sometimes thinly so, or slightly leathery, both surfaces glabrous, lateral veins 5–7(–10) pairs, arching upward, base mostly acute to obtuse, sometimes cuneate, attenuate, nearly rounded or asymmetric, margin serrulate, crenulate or nearly entire, apex broadly acute to rounded, contracting gradually or more usually abruptly to a short acumen to 1 cm. Pedicels 5–6 mm in flower, to ca. 9 mm in fruit, articulate at base, usually glabrous, rarely sparsely puberulous; bracts broadly ovate or triangular, ca. 2 mm, abaxially hairy, at least along median line. Flowers few to many in axillary glomerules, small. Sepals 5, broadly elliptic, obovate, or obovate-oblong, ca. 2.5 mm, both sides usually glabrous, outside rarely sparsely puberulous. Stamens 8–10; filaments usually glabrous, rarely puberulous, 1–2 mm; anthers ovoid-ellipsoid. Disk lobes oblong or triangular, ca. 1/2 as long as anthers, adaxially glabrous, apex densely hairy, hairs white or reddish, long. Ovary conic, glabrous, rarely puberulous; style short; stigma capitate. Capsule 1–1.5(–4) cm, ellipsoid to oblong, leathery, in dried material usually strongly angled or ridged, pericarp sometimes veined but not vesicular-warty; seeds several, pale brown when dry, 4–5 mm, enveloped by a thin, fleshy, partly fimbriate, pale yellowish aril. Fl. Apr–Jan, fr. following May–Jan.

Forests in mountains; low elevations. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Vietnam].

In FRPS (52(1): 78. 1999), the name *Casearia virescens* Pierre ex Gagnepain was misapplied to this species.

*Casearia membranacea* is easily confused with *C. glomerata*; see notes under that species.

*Wang* 39266, collected from Pingnan, Guangxi, has unusually large leaves (10–14 × 5–6 cm) and capsules (3–4 cm).

