

CLETHRACEAE

椴叶树科 qī yè shù kē

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Trees or shrubs, evergreen or deciduous. Buds, branches, leaf blades, inflorescences, and flowers with sparse to dense usually stellate hairs, often mixed with simple hairs. Branches sympodial, usually pubescent at least when young. Stipules absent. Leaves alternate, simple, generally crowded near apex of twigs; leaf blade usually abaxially ± pubescent and adaxially glabrous or glabrescent, margin serrate or occasionally entire. Inflorescences terminal, usually a many-flowered slender raceme, either solitary or umbellate-clustered, sometimes sparsely branched near base and thus appearing paniculate, pubescent, bracteate. Flowers bisexual, actinomorphic. Pedicel articulated at base of sepals. Sepals 5, imbricate, persistent. Petals 5, usually white, free or coherent at base, oblong to obovate, inside often pilose from base to middle, apical margin often fimbriate, apex rounded- to truncate-emarginate. Stamens 10, in 2 whorls, distinct but generally adnate to base of petals; anthers inverted at anthesis, ± V-shaped, introrse, papillose, opening by short apical pores. Ovary superior, 3-locular, globose but apically depressed at style base, pubescent, with axile placentation; ovules 20–40 per locule. Style 1, persistent, apex usually 3-cleft or -lobed. Capsule subglobose to globose, pubescent, 3-locular. Seeds many, ovoid-subtrigonal, thin-walled, surface impressed-reticulate.

One genus and ca. 65 species: America, Asia, N Atlantic Islands (Madeira); seven species (three endemic) in China.

Hu Lingcheng. 1990. Clethraceae. In: Fang Wenpei & Hu Wenkuang, eds., Fl. Reipubl. Popularis Sin. 56: 120–156.

1. CLETHRA Linnaeus, Sp. Pl. 1: 396. 1753.

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Morphological characters and geographic distribution are the same as for the family.

Clethra sleumeriana K. S. Hao (Repert Spec. Nov. Regni Veg. 42: 84. 1937) was placed in the synonymy of *C. fargesii* by Hu (J. Arnold Arbor. 41: 164–190. 1960) but was resurrected by Sleumer (Bot. Jahrb. Syst. 87: 36–116. 1967). The known type material (Hunan: “Tse ching shan, in der Nähe von Sü pu,” 1000 m, fl. 8 Sep 1929, S. S. *Sin* 615, holotype, B) was destroyed during World War II. Hu did not see type material of this species, and Sleumer, who apparently did see it before it was destroyed, states that there are several characters that distinguish *C. sleumeriana* from *C. fargesii*. Based on Sleumer’s description, we agree that the species is likely not *C. fargesii*; we cannot, however, clearly delimit it from a multi-racemed form of *C. delavayi*, a species that, like *C. sleumeriana*, occurs in Hunan Province.

- 1a. Leaf blade thickly papery to subleathery, margin of larger leaves with 0–19(–31 in *C. fabri*) teeth per side; plants evergreen (*C. fabri* apparently deciduous in SE portion of range).
 - 2a. Rachis of racemes and pedicels strigose with simple hairs; racemes 1 per branchlet; filaments hirsute; anthers 2.1–2.8 mm; style 5–7 mm at anthesis 1. *C. bodinieri*
 - 2b. Rachis of racemes and pedicels stellate-hirsute; racemes (1 or)2–7 per branchlet; filaments glabrous; anthers 1.0–1.8 mm; style 1.5–5 mm at anthesis.
 - 3a. Leaf blade abaxially often pubescent along midvein and in axils of secondary veins, otherwise glabrous; sepals suborbicular to ovate, 2.5–3 × 1.5–1.8 mm, midvein abaxially indistinct at anthesis; stamens slightly exerted or ± equal in length to petals 2. *C. fabri*
 - 3b. Leaf blade abaxially densely grayish white appressed stellate-tomentose throughout; sepals ovate-deltoid, 1.5–2.5 × 0.8–1.2 mm, midvein usually abaxially distinct or sepals keeled at anthesis; stamens included ... 3. *C. petelotii*
- 1b. Leaf blade papery, margin of larger leaves with 22–60 or more teeth per side; plants deciduous.
 - 4a. Racemes 1(–4) per branchlet; petal margins neither thickened nor apically distinctly fimbriate; persistent style 7–11 mm; petals (4–)5–12 mm 4. *C. delavayi*
 - 4b. Racemes (1–)3–8(–11) per branchlet; petal margins thickened and apically fimbriate; persistent style 3–6 mm; petals 3–5 mm.
 - 5a. Racemes stellate-hirsute or stellate-subvillous; thickest rachis on each branchlet basally 1.6–2.8 mm in diam. 5. *C. kaipoensis*
 - 5b. Racemes stellate-tomentose but sometimes sparsely so; thickest rachis on each branchlet basally 0.8–1.7(–1.8) mm in diam.
 - 6a. Leaf blade secondary veins (8–)11–14 on each side of midvein; sepals ovate, outside surface (visible through pubescence) usually medially blackened, midvein usually indistinct at anthesis, apex obtuse; filaments glabrous or occasionally sparsely pilose; ovary and capsule apically hirsute with longer hairs 0.7–1.1 mm 6. *C. barbinervis*
 - 6b. Leaf blade secondary veins (11–)15–21 on each side of midvein; sepals ovate-deltoid to rarely ovate, outside surface (when visible) not medially blackened, midvein usually distinct at anthesis, apex

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acuminate-mucronate to rarely obtuse-mucronate; filaments basally pilose or occasionally glabrous;
ovary and capsule apically hirsutulous with longer hairs 0.2–0.7 mm 7. *C. fargesii*

1. *Clethra bodinieri* H. Léveillé, Repert. Spec. Nov. Regni Veg. 10: 475. 1912.

单毛槲叶树 dan mao qi ye shu

Clethra bodinieri var. *coriacea* L. C. Hu; *C. bodinieri* var. *latifolia* S. Y. Hu; *C. bodinieri* var. *parviflora* W. P. Fang & L. C. Hu; *C. bodinieri* var. *parvifolia* S. Y. Hu; *C. glandulosa* W. P. Fang & L. C. Hu.

Shrubs, 0.5–5 m tall, evergreen. Petiole 4–12 mm; leaf blade elliptic to oblanceolate, rarely oblong, 4.2–13 × 1.2–3.2 cm, thickly papery to subleathery, abaxially strigose on midvein, often with cavities surrounded by stellate hairs in vein axils, often glaucous, with densely glandular appearance under high magnification especially basally, and with tawny to cinnamon colored raised reticulations, base cuneate to acute, margin mucronate-denticulate to mucronate-serrate but basal 1/3 to 1/2 apical acumen entire, teeth 2–15 per side and each 3–10 mm apart, apex caudate-acuminate; secondary veins 7–10 on each side of midvein. Racemes 1 per branchlet, 3–14 cm, gray or brown strigose with simple hairs, rachis basally 0.6–1.4 mm in diam.; bracts subulate, 3–7 mm. Pedicel 2–8 mm at anthesis. Sepals ovate, 2.5–4 × 1–2 mm, with a mixture of small stellate hairs and larger appressed simple hairs, midvein indistinct at anthesis, apex abruptly acuminate. Petals white to reddish pink, 4–5(–7) × 2–3 mm, abaxially smooth, adaxially densely barbate, margin slightly thickened and ± entire to apically slightly fimbriate. Stamens 5.5–7 mm, equal in length to petals or slightly exserted; filaments hirsute; anthers 2.1–2.8 mm. Style 5–7 mm at anthesis, glabrous, apex essentially undivided. Fruiting pedicel 0.5–1.7 cm. Ovary and capsule apically hirsute, with longer hairs 1.1–1.4 mm; persistent style 5–12 mm. Fl. Jun–Aug, fr. Jul–Aug(–Dec).

• Dense or open forests on slopes or in valleys, hillside scrub; 200–1700 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Yunnan.

2. *Clethra fabri* Hance, J. Bot. 21: 130. 1883.

华南槲叶树 hua nan qi ye shu

Clethra annamensis Dop; *C. fabri* var. *brevipes* L. C. Hu; *C. fabri* var. *laxiflora* W. P. Fang & L. C. Hu; *C. liangii* H. L. Li; *C. smithiana* W. P. Fang; *C. smithiana* var. *latifolia* C. Y. Wu; *C. tonkinensis* Dop.

Trees or shrubs, 2–7 m tall, evergreen but apparently deciduous in SE portion of range. Petiole 3–15 mm; leaf blade oblanceolate or occasionally elliptic to obovate-elliptic, 5.1–12.4 × 1.5–4.2 cm, thickly papery to subleathery, abaxially often pubescent along midvein and in axils of secondary veins but otherwise glabrous and with usually slightly raised tawny reticulations, base acute to cuneate, margin shortly serrate but basal 1/4–1/2 and apical acumen entire, teeth 5–19(–31) per side on larger leaves and 1–18 mm apart, apex acuminate; secondary veins 7–13 on each side of midvein. Racemes (1–)2–7 per branchlet, 6–20 cm, densely grayish brown stellate-hirsute, thickest rachis on each twig basally 0.8–1.7 mm in diam.; bracts linear-lanceolate, 2–6 mm. Pedicel 1–4 mm at anthesis. Sepals suborbicular to ovate, 2.5–3 × 1.5–1.8 mm, densely stellate-pubescent, midvein abaxially indistinct at anthesis, apex obtuse and glandular-mucronate. Petals white or cream-white, 2.8–4.5 × 1.5–2.4 mm, abaxially smooth, adaxially villous from base to middle, margin thickened and apically distinctly fimbriate. Stamens 2.8–6.0 mm, slightly exserted or ± equal in length to petals; filaments glabrous; anthers 1.0–1.8 mm. Style 2.5–5 mm at anthesis, glabrous, apex subcapitate, 3-lobed, or shallowly 3-cleft. Fruiting pedicel 1–7 mm. Ovary and capsule apically hirsutulous, with longer hairs 0.4–0.8 mm; persistent style 3–5 mm. Fl. Jul–Aug, fr. Aug–Oct.

Dense shaded forests, open grassy slopes; 300–2000 m. Guangdong, Guangxi, Guizhou, Hainan, Hunan, Yunnan [Vietnam].

3. *Clethra petelotii* Dop & Trochain–Marquès, Bull. Mus. Natl. Hist. Nat., sér. 2, 4: 718. 1932.

白背槲叶树 bai bei qi ye shu

Trees or shrubs, 2–10 m tall, evergreen. Petiole 0.7–2.6 cm; leaf blade elliptic, 7–19 × 1.8–6.5 cm, thickly papery, abaxially densely grayish white appressed stellate-tomentose, base cuneate, margin serrate-denticulate but basal 1/2 and apical acumen entire or occasionally entire throughout, teeth 0–16 per side on larger leaves and 1–15 mm or more apart, apex acuminate; secondary veins 8–15 on each side of midvein. Racemes or raceme branchlets 3–5 per twig, 10–15 cm, densely grayish brown stellate-hirsute, thickest rachis on each twig basally ca. 1.2 mm in diam.; bracts linear-lanceolate to subulate, 2–4 mm. Pedicel 1–2 mm at anthesis. Sepals ovate-deltoid, 1.5–2.5 × 0.8–1.2 mm, densely appressed stellate pubescent, midvein usually abaxially distinct or sepals keeled at anthesis, apex acute to occasionally abruptly acuminate or obtuse. Petals white, 3.5–4.5 × 1.5–2 mm, abaxially smooth, adaxially glabrous or pilose near middle, margin slightly thickened and apically ± entire to fimbriate. Stamens 2.0–3.5 mm, included; filaments glabrous; anthers 1.1–1.3 mm. Ovary hirsutulous, with longer hairs 0.2–0.4 mm. Style 1.5–3 mm at anthesis, glabrous or basally sparsely strigose, apex shallowly 3-lobed to nearly undivided. Fruit unknown. Fl. Aug.

Sparse evergreen forests; 400–1200 m. SE Yunnan [N Vietnam].

4. *Clethra delavayi* Franchet, J. Bot. (Morot) 9: 370. 1895.云南栲叶树 *yun nan qi ye shu*

Clethra cavaleriei H. Léveillé; *C. cavaleriei* var. *leptophylla* L. C. Hu; *C. cavaleriei* var. *subintegrifolia* Ching ex L. C. Hu; *C. delavayi* var. *glabra* S. Y. Hu; *C. delavayi* var. *lanata* S. Y. Hu; *C. delavayi* var. *yuana* (S. Y. Hu) C. Y. Wu & L. C. Hu; *C. esquirolii* H. Léveillé; *C. euosmoda* Dop; *C. lancilimba* C. Y. Wu; *C. lineata* H. Léveillé; *C. longebracteata* Sleumer; *C. minutistellata* C. Y. Wu; *C. monostachya* Rehder & E. H. Wilson; *C. monostachya* var. *cuprescens* W. P. Fang & L. C. Hu; *C. monostachya* var. *lancilimba* (C. Y. Wu) C. Y. Wu & L. C. Hu; *C. monostachya* var. *minutistellata* (C. Y. Wu) C. Y. Wu & L. C. Hu; *C. monostachya* var. *trichopetala* W. P. Fang & L. C. Hu; *C. nanchuanensis* W. P. Fang & L. C. Hu; *C. nanchuanensis* var. *albescens* L. C. Hu; *C. purpurea* W. P. Fang & L. C. Hu; *C. purpurea* var. *microcarpa* W. P. Fang & L. C. Hu; *C. sinica* K. S. Hao; *C. yuana* S. Y. Hu.

Trees or shrubs, 1–8 m tall, deciduous. Petiole 0.5–3 cm; leaf blade elliptic, ovate-elliptic, ovate, lanceolate, or oblanceolate, 4.2–15(–24) × 1.4–6(–10.5) cm, papery, abaxially nearly glabrous to densely pubescent, often with stellate-tufted hairs in axils of secondary veins, reticulations not or only slightly raised and usually dark brown, base cuneate to rounded, margin serrate nearly throughout or basal 1/4 entire, teeth 22–50 or more per side on larger leaves, 1–5 mm apart; apex acute to acuminate; secondary veins 7–24 on each side of midvein. Racemes 1(–4) per branchlet, 7–21 cm, densely stellate pubescent, thickest rachis on each twig basally 1.1–2.3 mm wide; bracts acerose, 7–10 mm. Pedicel 3.5–15 mm at anthesis. Sepals lance-ovate to lanceolate, 3.5–6 × 1.4–3.1 mm, densely stellate pubescent, midvein usually distinct at anthesis, apex abruptly mucronate-acuminate. Petals white or reddish pink to dark purple, (4–)5–12 × 2.4–6 mm, abaxially smooth or papillose, adaxially glabrous or basally pilose, margin neither thickened nor apically distinctly fimbriate. Stamens 5–9 mm, included, equal to petal lengths, or exserted; filaments pilose, villous, or occasionally glabrous; anthers 1.0–3.5 mm. Style 4–10 mm at anthesis, glabrous to strigose, apically 3-parted. Fruiting pedicel 0.6–1.7 cm. Ovary and capsule distally hispid, with longer hairs 0.5–1.5 mm; persistent style 7–11 mm. Fl. Jun–Sep, fr. Sep–Oct.

Mixed or coniferous forest margins, ± open thickets, slopes to alpine regions; 300–4000 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, SE Xizang (Mêdog), Yunnan, Zhejiang [Bhutan, NE India, N Myanmar, Vietnam].

Clethra delavayi is treated here as a single, highly variable species. All characters that have been used to delimit more narrowly defined species in other treatments of Chinese *Clethra* exhibit a strongly continuous pattern of variation from west to east across the range of the species in China (i.e., leaf size and shape, the number of secondary veins on each side of the midvein, anther size and shape); they also exhibit geographically correlated or seemingly random patterns, but without correlated gaps in character states among any two or more characters (i.e., style pubescence, corolla abaxial surface, stamen exsertion).

5. *Clethra kaipoensis* H. Léveillé, Repert. Spec. Nov. Regni Veg. 10: 475. 1912.贵州栲叶树 *gui zhou qi ye shu*

Clethra brammeriana Handel-Mazzetti; *C. kaipoensis* var. *paucinervis* L. C. Hu; *Clethra kaipoensis* var. *polyneura* (H. L. Li) W. P. Fang & L. C. Hu; *C. kwangsiensis* S. Y. Hu; *C. pinfaensis* H. Léveillé; *C. polyneura* H. L. Li.

Trees or shrubs, 1–18 m tall, deciduous. Petiole 0.8–3.8 cm; leaf blade elliptic, oblanceolate, oblong-oblanceolate, or sometimes ovate to lanceolate-ovate, basal 1/2 often ± straight-sided, 8.4–22.6 × 3.0–9.1 cm, papery, abaxially nearly glabrous to densely stellate-pilose or strigose especially along major veins with stellate and/or simple hairs, adaxially often pubescence on major veins and denser in secondary vein axils but glabrous elsewhere, and reticulations cinnamon brown but not raised, base broadly attenuate, obtuse, or rounded, margin serrate nearly throughout or basal 1/4 entire, teeth 30–60 or more per side on major leaves and 1–6 mm apart, apex acuminate; secondary veins (14–)16–25 on each side of midvein. Racemes or raceme branches (1–)4–8(–11) per branchlet, (10–)14–22 cm, densely rusty golden stellate-hirsute or -subvillous, thickest rachis on each twig basally 1.6–2.8 mm in diam.; bracts 3.5–11 mm, linear-subulate. Pedicel 0.6–4.5 mm at anthesis. Sepals ovate to deltoid-ovate, 3–3.8 × 1.4–1.8 mm, outside densely stellate-tomentose, midvein indistinct at anthesis, apex rounded to subacute. Petals white, 3–4.5 × 2.2–2.8 mm, outside smooth, inside glabrous, margin thickened and apically fimbriate. Stamens 3.4–5.5 mm, slightly exserted or occasionally ± equal to petal lengths; filaments glabrous or basally pilose; anthers 1.0–1.5 mm. Style 2.5–5.5 mm at anthesis, glabrous to finely and densely pilose, apex shallowly 3-lobed. Fruiting pedicel 1–10 mm. Ovary and capsule distally hirsutulous with longer hairs 0.3–0.5 mm; persistent style 4–6 mm. Fl. Jul–Aug, fr. Sep–Oct.

- Dense forests on hilly slopes, along streams; (200–)1000–2100 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi.

6. *Clethra barbinervis* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 128. 1846.髭脉栲叶树 *zi mai qi ye shu*

Clethra barbinervis var. *kawadana* (Yanagita) H. Hara; *C. kawadana* Yanagita; *C. wuyishanica* Ching ex L. C. Hu; *C. wuyishanica* var. *erosa* L. C. Hu.

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Trees or shrubs, 1–9 m tall, deciduous. Petiole 0.6–2.4 cm; leaf blade ovate, lanceolate-ovate, elliptic, oblanceolate, or obovate, 5.2–11 × 2.8–4.8 cm, papery, abaxially appressed pilose or glabrous on major veins and often stellate-tufted in secondary vein axils, glabrous elsewhere, and reticulations dark brown but not raised, base attenuate to cuneate or occasionally obtuse to subrounded, margin sharply serrate nearly throughout or basal 1/4–1/3 entire, teeth 22–39 per side on larger leaves and 1–4 mm apart, apex acuminate; secondary veins (8–)11–14 on each side of midvein. Racemes or raceme branches (1–)3–8 per twig, 5–17 cm, grayish brown or brown stellate-tomentose but sometimes sparsely so, thickest rachis on each twig basally 0.8–1.7 mm in diam.; bracts linear-subulate, 3–6 mm. Pedicel 1.5–5.5 mm at anthesis. Sepals ovate, 2–3(–3.8) × 1.2–1.6 mm, outside densely white stellate-tomentose and surface (visible through pubescence) usually medially blackened, midvein usually indistinct at anthesis, apex obtuse. Petals white, 3–4 × 2–2.9 cm, outside smooth, inside glabrous, margin thickened and apically fimbriate. Stamens 4–5.3 mm, exerted; filaments glabrous or occasionally sparsely pilose; anthers 1.3–2 mm. Style 1.5–3.5 mm at anthesis, glabrous, apex 3-lobed to shallowly 3-cleft. Fruiting pedicel 4–9 mm. Ovary and capsule apically hirsute with longer hairs 0.7–1.1 mm; persistent style 3–5 mm. Fl. Jun–Aug, fr. Sep–Nov. $2n = 32$.

Open deciduous montane forests, ± dry places; 800–1800 m. Anhui, Fujian, Hubei, Hunan, Jiangxi, Shandong (Lao Shan), Zhejiang [Japan, Korea].

7. *Clethra fargesii* Franchet, J. Bot. (Morot) 9: 369. 1895.

城口栲叶树 cheng kou qi ye shu

Clethra brachypoda L. C. Hu; *C. brachystachya* W. P. Fang & L. C. Hu; *C. magnifica* W. P. Fang & L. C. Hu; *C. magnifica* var. *trichocarpa* L. C. Hu.

Trees or shrubs 1–15 m tall, deciduous. Petiole 0.4–2.6 cm; leaf blade narrowly oblong-elliptic, narrowly elliptic, oblanceolate-elliptic, lanceolate-elliptic, or elliptic, 5.7–15.6 × 1.5–6.0 cm, papery, abaxially stellate pubescent or appressed pilose on major veins and stellate-tufted in secondary vein axils but glabrous elsewhere or occasionally sparsely stellate pubescent, and reticulations cinnamon, tawny, or dark brown and not or only slightly raised, base cuneate to rounded, margin serrate nearly throughout or basal 1/4 entire, teeth 22–41 per side on larger leaves and 1–7 mm apart, apex acuminate to long-acuminate; secondary veins (11–)15–21 on each side of midvein. Racemes (1–)3–7 per twig, 5.5–24 cm, tawny brown to light brown or rust colored stellate-tomentose, thickest rachis on

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each twig basally 1–1.6(–1.8) mm in diam.; bracts subulate, 5–10 mm. Pedicel 1–12 mm at anthesis. Sepals ovate-deltoid to rarely ovate, 2.0–4.0 × 1.0–1.5 mm, outside densely tawny- to grayish white stellate tomentose and surface (when visible) not blackened medially, midvein usually distinct at anthesis, apex acuminate-mucronate to rarely obtuse-mucronate. Petals white, 3–5 × 2–2.5 mm, outside smooth, inside glabrous or basally sparsely barbate, margin thickened and apically fimbriate. Stamens 3–7 mm, exerted or occasionally nearly equal to petal lengths; filaments basally pilose or occasionally glabrous; anthers 1.0–2.0 mm. Style 2–3.5 mm at anthesis, glabrous, apex 3-lobed to shallowly 3-cleft. Fruiting pedicel 3–11 mm. Ovary and capsule apically hirsutulous with longer hairs 0.2–0.7 mm; persistent style 3–6 mm. Fl. Jul–Aug, fr. Sep–Oct.

- Montane broadleaved forests and scrub, open woodlands and thickets; 700–2100 m. Guizhou, Hubei, Hunan, Jiangxi, Sichuan.