

# DAPHNIPHYLLACEAE

交让木科 jiao rang mu ke

Min Tianlu (闵天禄 Ming Tien-lu)<sup>1</sup>; Klaus Kubitzki<sup>2</sup>

Dioecious trees or shrubs; branchlets with leaf scars and lenticels. Leaves alternate, usually conferted at apex of branchlets, simple, entire, long petiolate, exstipulate. Inflorescence racemose, axillary, solitary, bracteate at base. Flowers unisexual, sometimes sterile. Calyx 3–6-parted, persistent or deciduous. Petals absent. Male flowers: stamens 5–12(–18), 1-whorled, radially arranged; filaments shorter than anthers; anthers luniform with lateral-longitudinal dehiscence, connective ± exerted. Female flowers: staminodes absent or 5–10; ovary ovoid or ellipsoidal, 2-locular; ovules 2 per locule, anatropous, pendulous; style very short; style branches 2, recurved or circinate, persistent, adaxially with decurrent stigmas. Drupe ovoid or ellipsoidal, tuberculate or indistinctly tuberculate-rugose on surface, often glaucous; mesocarp fleshy. Stone hard; testa membranous; endosperm fleshy; embryo small; cotyledons semiterete; radicle terete.

One genus and 25–30 species: India and Sri Lanka to Australia, but centered in E and SE Asia; ten species (three endemic) in China.

Ming Tien lu. 1980. Daphniphyllaceae. In: Cheng Mien & Ming Tien lu, eds., Fl. Reipubl. Popularis Sin. 45(1): 1–11.

## 1. DAPHNIPHYLLUM Blume, Bijdr. 13: 1152. 1826–1827.

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Morphological characters and geographical distribution are the same as those of the family.

- 1a. Calyx absent.
  - 2a. Female flower with staminodes around ovary.
    - 3a. Staminodes 10; leaf blade not papillate below, lateral veins slender and dense, visible on both surfaces ..... 1. *D. macropodum*
    - 3b. Staminodes 5; leaf blade finely (or minutely) papillate below, lateral veins laxly arcuate, slightly impressed adaxially, prominent abaxially ..... 2. *D. himalense*
  - 2b. Female flower without staminodes.
    - 4a. Leaf blade narrowly lanceolate, 11.5–15 × 2.5–3 cm; infructescence ca. 2.5 cm; fruit smooth, style branches deciduous ..... 3. *D. angustifolium*
    - 4b. Leaf blade large, oblong-elliptic, 16–26 × 6–9 cm; infructescence 10–16 cm; fruit tuberculate, style branches persistent ..... 4. *D. longeracemosum*
- 1b. Calyx present.
  - 5a. Calyx 0.5–1 mm, deciduous.
    - 6a. Leaf blade lanceolate, obovate-lanceolate, oblong, or oblong-lanceolate, 9–14 × 2.5–4 cm, glaucous and finely papillate below ..... 5. *D. oldhamii*
    - 6b. Leaf blade oblong-elliptic or oblong, 10–15(–21) × 3–6(–7) cm, not glaucous and not papillate below ..... 6. *D. chartaceum*
  - 5b. Calyx persistent.
    - 7a. Calyx 2–3 mm; leaf blade green in dried state, glaucous below.
      - 8a. Leaf blade obovate or obovate-elliptic, 9–16 × 4–9 cm, apex obtuse or rounded; fruit ca. 7 mm, glaucous, densely arranged ..... 7. *D. calycinum*
      - 8b. Leaf blade oblong-elliptic, (16–)20–37 × 7–14 cm, apex acuminate; fruit 10–15 mm, not glaucous, laxly arranged ..... 8. *D. majus*
    - 7b. Calyx less than 1.5 mm; leaf blade dark brown in dried state, not glaucous below.
      - 9a. Leaf blade thinly coriaceous, 9–17 × 3–6 cm, apex falcate-acuminate or shortly acuminate, base broadly cuneate or cuneate, lateral and reticulate veins prominent on both surfaces, petiole 1.5–3.5 cm ..... 9. *D. paxianum*
      - 9b. Leaf blade thickly coriaceous, 6–9 × 2–2.5 cm, apex acute, base rounded or truncate, lateral veins visible on both surfaces, reticulate veins obscure, petiole 5–7 mm ..... 10. *D. subverticillatum*

**1. *Daphniphyllum macropodum*** Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 129. 1867. subsp. *macropodum* (Miquel) T. C. Huang; *D. membranaceum* Hayata.

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*Daphniphyllum himalense* (Benth) Müller Argoviensis

Trees or shrubs, 3–10(–20) m tall; branchlets stout, dark brown, with orbicular leaf scars. Petiole 3–6 mm, purplish red;

<sup>1</sup> Kunming Institute of Botany, Chinese Academy of Sciences, Heilongtan, Kunming, Yunnan 650204, People's Republic of China.

<sup>2</sup> Biozentrum Klein Flotbek und Botanischer Garten, Department Biologie, Universität Hamburg, Ohnhorststraße 18, D-22609, Hamburg, Germany.

leaf blade oblong or oblanceolate, 14–25 × 3–6.5 cm, leathery, light green and lightly glaucous abaxially, deep green and shining adaxially, base cuneate or broadly cuneate, apex acuminate; lateral veins slender and dense, 12–18 pairs, visible on both surfaces. Male flowers: inflorescence 5–7 cm; pedicel ca. 5 mm; calyx absent; stamens 8–10; filaments very short, ca. 1 mm; anthers ca. 2 mm. Female flowers: inflorescence 4.5–8 cm; pedicel 3–5 mm; calyx absent; staminodes 10 around ovary; ovary ovoid, ca. 2 mm, glaucous; style branches recurved. Drupe ellipsoidal, ca. 10 × 5–6 mm, purplish brown, tuberculate, glaucous; style branches persistent. Fl. Mar–May, fr. Aug–Oct.

Forests; 600–1900 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

The timber is used for building and furniture as well as stationery.

**2. *Daphniphyllum himalense*** (Benth.) Müller Argoviensis in A. Candolle, Prodr. 16(1): 4. 1869 [*“himalayense”*].

西藏虎皮楠 xi zang hu pi nan

*Goughia himalensis* Benth., Hooker's J. Bot. Kew Gard. Misc. 6: 9.1854; *Daphniphyllum himalense* var. *triangulatum* T. C. Huang.

Trees or small trees, 5–12 m tall; branchlets stout, white lenticellate, young branches dark brown. Petiole 2–5 mm; leaf blade oblong-lanceolate, oblong, or oblong-elliptic, 10–21 × 2.5–7 cm, chartaceous or thinly coriaceous, glaucous and finely papillate abaxially, green and shining adaxially in dried state, base cuneate or obtuse, apex acute or acuminate; lateral veins 10–14 pairs, prominent abaxially and slightly impressed adaxially. Male flowers: inflorescence 3–5 cm; pedicel 4–8 mm; calyx absent; stamens 8–12; filaments ca. 1 mm; anthers oblong, ca. 1 mm. Female flowers: inflorescence 4–6 cm; pedicel 7–13 mm; calyx absent; staminodes 5 around ovary; ovary ovoid, glaucous; style branches recurved. Infructescence 7.5–9.5 cm; drupe ellipsoidal, 12–14 × 7–9 mm, ± smooth, glaucous; style branches persistent. Fr. Sep–Nov.

Forests; 1200–2500 m. SE Xizang (Médog), NW Yunnan (Gongshan) [Bhutan, NE India, N Myanmar, E Nepal].

**3. *Daphniphyllum angustifolium*** Hutchinson in Sargent, Pl. Wilson. 2: 521. 1916.

狭叶虎皮楠 xia ye hu pi nan

*Daphniphyllum himalense* (Benth.) Müller Argoviensis subsp. *angustifolium* (Hutchinson) T. C. Huang.

Shrubs or small trees, 2–5 m tall; branchlets stout, brown. Petiole 1–1.5 cm; leaf blade narrowly lanceolate, 11.5–15 × 2.5–3 cm, coriaceous, lightly glaucous abaxially, brown adaxially in dried state, base broadly cuneate or obtuse, apex triangular-acute; lateral veins slender, 14–16 pairs, prominent on both surfaces, reticulate veins lightly prominent. Male flowers: inflorescence 2–3 cm; pedicel ca. 2 mm; calyx absent; stamens 8–10; anthers ovoid, ca. 1.5 mm. Female flowers: inflorescence 1–1.5 cm; pedicel ca. 1 mm; calyx absent; ovary ovoid, ca. 1 mm; style branches recurved. Infructescence ca. 2.5 cm; drupe oblong, ca. 8 × 6 mm, ± smooth, glaucous; style branches deciduous. Fl. Apr–May, fr. Aug–Oct.

• Forests; 1500–2300 m. W Hubei, E Sichuan.

**4. *Daphniphyllum longeracemosum*** K. Rosenthal in Engler, Pflanzenr. 68(IV. 147a): 14. 1919.

长序虎皮楠 chang xu hu pi nan

*Daphniphyllum himalense* (Benth.) Müller Argoviensis var. *longeracemosum* (K. Rosenthal) T. C. Huang.

Trees, 12–20 m tall; branchlets stout, lenticellate. Petiole 5–7 cm; leaf blade oblong-elliptic, 16–26 × 6–9 cm, chartaceous, neither glaucous nor papillate abaxially, shining adaxially, base broadly cuneate, apex acute; lateral veins 12–14 pairs, prominent abaxially. Male flowers: inflorescence ca. 4 cm; pedicel ca. 5 mm; calyx absent; stamens 10–16; filaments ca. 1 mm; anthers ovate, ca. 1.2 mm. Female flowers: inflorescence 6–7 cm; pedicel ca. 5 mm; calyx absent; ovary ellipsoidal, ca. 2 mm, glaucous; style branches recurved or circinate. Infructescence 10–16 cm, erect; drupe ellipsoidal, 15–20 × ca. 8 mm, tuberculate, glaucous; style branches persistent. Fl. Apr–May, fr. Aug–Nov.

Dense forests; 100–1800 m. S Guangxi, SE Yunnan [N Vietnam].

**5. *Daphniphyllum oldhamii*** (Hemsley) K. Rosenthal in Engler, Pflanzenr. 68(IV. 147a): 8. 1919.

虎皮楠 hu pi nan

*Daphniphyllum glaucescens* Blume var. *oldhamii* Hemsley, J. Linn. Soc., Bot. 26: 429. 1894; *D. formosanum* K. Rosenthal; *D. kengii* Hurusawa; *D. longistylum* S. S. Chien; *D. marchandii* (H. Léveillé) Croizat & F. P. Metcalf; *D. oblongum* S. S. Chien; *D. oldhamii* var. *oblongolanceolatum* J. X. Wang; *D. pentandrum* Hayata; *D. roxburghii* Baillon; *D. salicifolium* S. S. Chien.

Trees or shrubs, 4–15 m tall; branchlets slender, dark brown. Petiole 2–3.5 cm, slender; leaf blade lanceolate, obovate-lanceolate, oblong, or oblong-lanceolate, 9–14 × 2.5–4 cm, chartaceous, abaxially shining, glaucous, and small papillate, adaxially dark green in dried state, base cuneate or obtuse, margins revolute, apex acute, acuminate, or shortly caudate; lateral veins 8–15 pairs, slender, prominent on both surfaces, reticulate veins prominent adaxially. Male flowers: inflorescence 2–4 cm; pedicel slender, ca. 5 mm; calyx small, irregularly 4–6-parted, lobes triangular-ovate, 0.5–1 mm; stamens 7–10; filaments ca. 0.5 mm; anthers ovate, ca. 2 mm. Female flowers: inflorescence 4–6 cm; pedicel slender, 4–7 mm; calyx lobes lanceolate; ovary long ovate, ca. 1.5 mm, glaucous; style branches recurved or circinate. Drupe ellipsoidal or obovate-globose, ca. 8 × 6 mm, dark brown, tuberculate; calyx absent or rarely persistent; style branches persistent. Fl. Mar–May, fr. Aug–Nov.

Forests; 100–1400 m. Fujian, Guangdong, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Zhejiang [Japan, Korea].

The timber is used for building and furniture as well as stationery.

**6. *Daphniphyllum chartaceum*** K. Rosenthal in Engler, Pflanzenr. 68(IV. 147a): 11. 1919.

纸叶虎皮楠 zhi ye hu pi nan

*Daphniphyllum bengalense* K. Rosenthal; *D. divaricatum*

(T. C. Huang) J. X. Wang; *D. himalense* (Bentham) Müller Argoviensis var. *chartaceum* (K. Rosenthal) T. C. Huang; *D. himalense* var. *divaricatum* T. C. Huang.

Trees or small trees, 5–12(–20) m tall; branchlets stout, purplish brown, white lenticellate. Petiole 2–5 cm, purplish red; leaf blade oblong-elliptic to oblong, 10–15(–21) × 3–6(–7) cm, chartaceous, light green abaxially, deep green adaxially, base broadly cuneate, apex acuminate; lateral veins 11–13 pairs and reticulate veins prominent abaxially, slightly impressed adaxially. Inflorescence erect. Male flowers: pedicel 4–6 mm; calyx absent; stamens 10; filaments ca. 1 mm; anthers ovate, ca. 1 mm, connective exerted. Female flowers: pedicel ca. 2 mm; calyx lobes lanceolate, 1–1.5 mm, caducous; staminodes absent; style branches recurved. Infructescence 6–9 cm, erect; drupe ellipsoidal, 11–13 × 7–8 mm, tuberculate; calyx and style branches persistent. Seeds oblong, 9–10 × ca. 4 mm. Fl. Aug–Sep, fr. Dec.

Forests; (1200–)1500–2100 m. SE Xizang (Médog), NW and SE Yunnan [Bhutan, India, N Myanmar, Nepal, Pakistan, N Vietnam].

**7. *Daphniphyllum calycinum*** Bentham, Fl. Hongk. 316. 1861.

牛耳枫 niu er feng

Shrubs, 1.5–4 m tall; branchlets grayish brown, sparsely lenticellate. Petiole 4–8 cm; leaf blade obovate or obovate-elliptic, 12–16 × 4–9 cm, chartaceous, glaucous and inconspicuously papillate abaxially, green and shining adaxially, base broadly cuneate, margin slightly reflexed, apex obtuse or rounded, mucronate; lateral veins 8–11 pairs, visible adaxially, prominent abaxially. Male flowers: pedicel 8–10 mm; calyx discoid, 3- or 4-lobed, lobes broadly triangular; stamens 9 or 10, ca. 3 mm; filaments very short; anthers oblong, laterally compressed, connective exerted. Female flowers: pedicel 5–6 mm; calyx lobes broadly triangular, ca. 1.5 mm; ovary ellipsoidal, 1.5–2 mm; style very short; stigmas 2, recurved. Infructescence 4–5 cm, densely arranged; drupe ovoid-ellipsoidal, ca. 7 × 4 mm, tuberculate, glaucous; calyx and style branches persistent. Fl. Apr–Jun, fr. Aug–Nov.

Forests, thickets; (below 100–)200–700 m. Fujian, Guangdong, Guangxi, S Hunan, S Jiangxi [Japan, Vietnam].

The seeds are rich in oil, which is used for lubrication and refined soap. The roots and leaves are used in Chinese medicine.

**8. *Daphniphyllum majus*** Müller Argoviensis, Linnaea 34: 76. 1865.

大叶虎皮楠 da ye hu pi nan

*Daphniphyllum candelabrum* Croizat & F. P. Metcalf; *D. latifolium* K. Rosenthal; *D. longipes* Craib; *D. yunnanense* C. C. Huang ex T. L. Ming.

Shrubs or trees, 2–10 m tall; branchlets stout, grayish brown, densely lenticellate. Petiole 6.5–12 cm; leaf blade oblong-elliptic or obovate-oblong, (16–)20–37 × 7–14 cm, chartaceous, glaucous abaxially, green adaxially, base cuneate or broadly cuneate, apex acuminate or acute; midrib elevated abaxially, lateral veins 15–18 pairs and reticulate veins prominent on both surfaces. Male flowers: inflorescence 2–6 cm; pedicel ca. 2 mm; calyx 4-lobed, lobes ovate, ca. 2.5 mm; stamens 9–12; filaments very short; anthers recurved, 1.5–2

mm. Female flowers: inflorescence 3.5–5 cm; calyx 4-lobed, lobes ovate, 2–3 mm; ovary globose, ca. 2 mm. Infructescence ca. 4 cm; drupe obovoid-ellipsoidal, 10–15 × 6–7 mm, tuberculate; calyx persistent, lobes ovate-lanceolate, ca. 3 mm; style branches persistent. Fl. Mar–Apr, fr. Oct–Dec.

Forests; 1100–1500 m. S Yunnan (Jinghong, Maguan, Malipo, Menghai, Pingbian, Simao) [NE India, N Myanmar, N Thailand, N Vietnam].

**9. *Daphniphyllum paxianum*** K. Rosenthal in Engler, Pflanzenr. 68(IV. 147a): 13. 1919.

显脉虎皮楠 xian mai hu pi nan

*Daphniphyllum atrobadium* Croizat & F. P. Metcalf; *D. beddomei* Craib; *D. glaucescens* Blume subsp. *atrobadium* (Croizat & F. P. Metcalf) T. C. Huang; *D. glaucescens* subsp. *paxianum* (K. Rosenthal) T. C. Huang.

Shrubs or small trees, 3–8 m tall; branchlets dark brown, sparsely white lenticellate. Petiole 1.5–3.5 cm, purplish brown; leaf blade oblong or oblong-lanceolate, 9–17 × 3–6 cm, thinly coriaceous or chartaceous, brown in dried state, neither glaucous nor papillose abaxially, shining adaxially, base cuneate or broadly cuneate, margin entire and crisped, apex falcate-acuminate or shortly acuminate; lateral veins 11–13 pairs and reticulate veins prominent on both surfaces. Male flowers: inflorescence 2–3 cm; pedicel 5–7 mm; bracts ovate, 1.5–2 mm; calyx disciform, 4- or 5-lobed, lobes ca. 0.5 mm; stamens 8–10; filaments ca. 1.5 mm; anthers oblong, ca. 2 mm, apex rounded or retuse. Female flowers: inflorescence 3–5 cm; pedicel 5–8 mm; calyx 4- or 5-lobed, lobes ovate, 0.5–1.5 mm, persistent; ovary ellipsoidal, ca. 1.5 mm; style branches recurved. Drupe ellipsoidal, 8–10 × 5–6 mm, slightly tuberculate, not glaucous; calyx persistent; style branches persistent. Fl. Mar–May, fr. Aug–Nov.

• Forests on mountain slopes or in valleys; 400–2300 m. S Guangxi, S Guizhou, Hainan, Sichuan (Emei Shan), S Yunnan.

The timber is used for building and furniture as well as paper-making.

**10. *Daphniphyllum subverticillatum*** Merrill, Lingnan Sci. J. 13: 34. 1934.

假轮叶虎皮楠 jia lun ye hu pi nan

*Daphniphyllum glaucescens* Blume subsp. *subverticillatum* (Merrill) T. C. Huang.

Shrubs, 1.5–3 m tall; branchlets dark brown, lenticellate. Leaves subverticillate on top of branchlet; petiole 5–7 mm; leaf blade thickly oblong or oblong-lanceolate, 6–9(–17) × 2–3 cm, coriaceous, dark brown in dried state, neither glaucous nor papillate abaxially, shining adaxially, base rounded or obtuse, apex acute or acuminate; lateral veins 8–10 pairs, visible on both surfaces. Inflorescence 3–6 cm. Male flower: pedicel ca. 1 mm; calyx 4- or 5-lobed; stamens 7 or 8; anthers elliptic, connective slightly exerted. Female flower: pedicel ca. 2 mm; calyx 4- or 5-lobed, lobes deltoid, ca. 1 mm. Drupe ovoid, ca. 7 × 5 mm, dark brown, rugose, not glaucous; calyx and style branches persistent. Fl. Apr–May, fr. Oct.

• Forests; 400–700 m. Guangdong (Conghua, Fengshun, Longmen, Raoping, Yangchun).