

## MASTIXIACEAE

单室茱萸科 dan shi zhu yu ke

Xiang Qiuyun (向秋云 Jenny Xiang)<sup>1</sup>, Xiang Qibai (向其柏 Shang Chih-bei)<sup>2</sup>; David E. Boufford<sup>3</sup>, Porter P. Lowry II<sup>4</sup>

Trees evergreen, resinous. Leaves opposite or alternate, petiolate, estipulate, simple, margin entire or rarely undulate, leathery to thickly papery, often pubescent with unicellular 2-armed trichomes, pinnately veined. Inflorescences paniculate cymes, terminal and axillary. Flowers bisexual, actinomorphic, 4- or 5-merous. Petals distinct, valvate. Anthers dorsifixed, dehiscing via longitudinal slits; pollen 3-aperturate. Ovary inferior, carpel 1, locule 1; ovule 1, pendulous; disk epigynous, fleshy; style 1, stigma punctiform, unlobed, or lobes slight, 2, 4, or 5. Fruit drupes, fleshy, or hard when dry; endocarp grooved; seed 1, endosperm fleshy; cotyledons 2, leafy; embryo small.

Two genera and ca. 27 species: Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Pacific Islands (Solomon Islands); two genera and four species (two endemic) in China.

Recent molecular analyses suggest that *Diplopanax* is the sister of *Mastixia* (Xiang et al., Molec. Phylogen. Evol. 24: 35–57. 2002; Fan & Xiang, Amer. J. Bot. 90: 1357–1372. 2003). The close relationship between the two genera is also supported by some morphological characters (see Eyde & Xiang, Amer. J. Bot. 77: 689–692. 1990). Thus, the genus is best placed in either the Mastixiaceae or the Cornaceae *sensu lato*. Eyde and Xiang (loc. cit.) moved *Diplopanax* to the Cornaceae *sensu lato* (i.e., including Nyssaceae and Mastixiaceae), and Murrell (Syst. Bot. 18: 469–495. 1993) treated it as a subgenus of *Mastixia* in the Cornaceae. We include it here in the Mastixiaceae.

Soong Tzepu. 1990. *Mastixia*. In: Fang Wenpei & Hu Wenkuang, eds., Fl. Reipubl. Popularis Sin. 56: 2–5; Hoo Gin & Tseng Chang-jiang. 1978. *Diplopanax*. In: Hoo Gin & Tseng Chang-jiang, eds., Fl. Reipubl. Popularis Sin. 54: 135–136.

- 1a. Stamens 4–6 or 8; petals 4 or 5; fruit fleshy ..... 1. *Mastixia*  
1b. Stamens 10, 5 sterile; petals 5; fruit hard when dry ..... 2. *Diplopanax*

### 1. MASTIXIA Blume, Bijdr. Fl. Ned. Ind. 13: 654. 1826.

单室茱萸属 dan shi zhu yu shu

Xiang Qiuyun (向秋云 Jenny Xiang); David E. Boufford

Trees evergreen. Branchlets terete or ridged. Leaves oblong-elliptic, ovate, or narrowly obovate, leathery to thickly papery. Flowers pedicellate; bracteoles 2, at base of pedicel. Calyx campanulate, thick; lobes 4 or 5(–7), persistent. Petals 4 or 5(or 6), ovate, leathery, valvate, apex inflexed. Stamens 4, 5, 6, or 8; filaments subulate, short, flattened. Style often persistent, conical, short; disk circular, slightly 4- or 5-lobed. Drupes ovoid, oblong-globose, or narrowly ovoid; stone of fruit woody, with longitudinal grooves; seed coat white, membranous.  $2n = 22, 26$ .

About 25 species: Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Pacific Islands (Solomon Islands); three species (two endemic) in China.

- 1a. Flowers 5-merous; inflorescences slightly pubescent or nearly glabrous ..... 1. *M. pentandra*  
1b. Flowers 4-merous; inflorescences densely pubescent or glabrous.  
2a. Branches and leaves alternate, densely pubescent with gray-brown trichomes; inflorescences densely pubescent with dark brown or yellow brown trichomes; leaf blade broadly elliptic or oblong, 14–20 × 5–7 cm, apex acute ..... 2. *M. trichophylla*  
2b. Branches and leaves opposite, glabrous; inflorescence glabrous; leaf blade elliptic or oblong, smaller, 8–13 × 2.5–6 cm, apex caudate ..... 3. *M. caudatilimba*

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**1. Mastixia pentandra** Blume, Bijdr. Fl. Ned. Ind. 654. 1826.

五蕊单室茱萸 wu rui dan shi zhu yu

Trees, evergreen, to 30 m tall. Branches cylindrical or ridged, slender or stout, subglabrous or puberulous. Leaves alternate; petiole 1.5–2.5 cm; leaf blade elliptic or oblong-obovate, 6–15(–20) × 2.5–8 cm, leathery or subleathery, abaxially subglabrous, veins 3–8(or 9) per side, shortly ascending along margin, base cuneate to broadly cuneate, apex acute or acuminate. Inflorescences terminal, 4–9 cm, puberulous; branches subtended by small, triangular or lanceolate bracteoles. Flowers 5-merous; sepals 5; petals 5, oblong, thick, apex inflexed. Stamens 5, alternate petals; anther locules 2; disk slightly 5-lobed. Style 1.5–2 mm; stigma small. Drupes ovoid to oblong, 1.5–2.5 × 1–1.7 cm, apex with persistent style and sepals. Fl. May–Jun, fr. Sep–Oct.

Dense forests, mixed woods; 300–1400 m. Hainan, S Yunnan [Cambodia, NE India, Malaysia, Myanmar, Thailand, Vietnam].

1a. Leaves elliptic or obovate oblong,

6–11 × 3–4 cm; fruit 1.5–1.7 cm ... 1a. subsp. *cambodiana*

1b. Leaves oblong or long-obovate,

15–20 × 4–8 cm; fruit ca. 2.5 cm ..... 1b. subsp. *chinensis*

**1a. Mastixia pentandra** subsp. *cambodiana* (Pierre) K. M. Matthew, Blumea 23(1): 85. 1976.

单室茱萸 dan shi zhu yu

*Mastixia cambodiana* Pierre, Fl. For. Cochinch. Fasc. 17. 1892; *M. alternifolia* Merrill & Chun.

Trees 7–15 m tall; branches terete. Leaves with petiole 1.5–2 cm; leaf blade elliptic or obovate-oblong, 6–11 × 2.5–5 cm, leathery, veins 3–5, arched inward, base cuneate, apex shortly acuminate. Inflorescences 4–5 cm, puberulous; bracteoles lanceolate to triangular, 1–1.5 mm. Drupes 1.5–1.7 cm. Fl. May–Jun, fr. Oct.

Dense forests; 300–900 m. Hainan [Cambodia, Vietnam].

**1b. Mastixia pentandra** subsp. *chinensis* (Merrill) K. M. Matthew, Blumea 23(1): 83. 1976.

云南单室茱萸 yun nan dan shi zhu yu

*Mastixia chinensis* Merrill, Sunyatsenia 3: 256. 1937.

Trees 7(–30) m tall; branches ridged. Leaves with petiole 2–2.5 cm; leaf blade oblong, obovate-oblong, or narrowly obovate, 15–20 × 4–8 cm, leathery or subleathery, veins 6–8, base broadly cuneate, apex shortly acuminate. Inflorescences 7–9 cm, slightly pubescent; bracteoles lanceolate to triangular, less than 3 mm. Drupes 2–2.5 cm. Fl. May, fr. Sep.

Dense forests, mixed woods; 1300–1400 m. S Yunnan [NE India, Malaysia, Myanmar, Thailand, Vietnam].

**2. Mastixia trichophylla** W. P. Fang, J. Sichuan Univ., Nat. Sci. Ed. 1982(1): 65. 1982.

毛叶单室茱萸 mao ye dan shi zhu yu

Trees, evergreen, ca. 7 m tall. Branches alternate, dark

brown, terete, sometimes slightly ridged, densely pubescent, with dark gray or brown short trichomes; young branches slender, ridged; old branches also densely puberulous. Leaves alternate, petiolate; leaf blade elliptic or oblong, 14–20 × 5–7 cm, thickly papery, abaxially light green, densely pubescent, with gray-brown trichomes, veins 6 or 7, ascending along margin toward apex, base broadly cuneate, margin slightly revolute when dry, apex acute. Inflorescences loose, terminal and axillary, pubescent, with brown to yellow-brown short trichomes; terminal panicles 9–10 cm, with 30 or more flowers, axillary panicles 4–7 cm, with 5–15 flowers; bracteoles lanceolate, 3–5 mm. Flowers 4-merous; calyx slightly lobed, lobes 4 or 5, abaxially puberulous. Petals 4, whitish, ovate, ca. 4 × 2–2.5 mm, apex inflexed. Stamens 4; filaments ca. 3 mm, slender; anthers ovoid, locules 2. Disk 4-lobed. Style ca. 2 mm; stigma small. Fruit not observed. Fl. Jun–Jul, fr. unknown.

• Evergreen forests; ca. 700 m. S Guangxi.

**3. Mastixia caudatilimba** C. Y. Wu ex T. P. Soong, J. Sichuan Univ., Nat. Sci. Ed. 1982(1): 66. 1982.

长尾单室茱萸 chang wei dan shi zhu yu

Trees, evergreen, to 23 m tall. Branches opposite, dark brown, terete, glabrous or subglabrous; young branches slender, ridged. Leaves opposite; leaf blade elliptic, broadly elliptic, or oblong, 8–13 × 2.5–6 cm, leathery, abaxially glabrous, veins 6 or 7, ascending shortly, ending at margin, base somewhat rounded or broadly cuneate, slightly decurrent and oblique, margin entire or slightly undulate, slightly revolute, apex caudate. Inflorescences panicles, terminal, 5–6 cm, loosely flowered, densely pubescent; bracteoles narrowly triangular. Flowers not observed (floral characters taken from fruit), 4-merous. Calyx lobes 4. Disk circular, slightly 4-lobed, with scars of 4 stamens. Style ca. 2 mm. Fruit dark brown after drying, oblong, ca. 2 cm, ca. 9 mm in diam., calyx and style persistent. Fl. buds Mar, fr. Oct–Dec.

• Subtropical forests, sparse wet forests in valleys; 1400–1600 m. S Yunnan (Xishuangbanna: Nannuo Shan).

**2. DIPLOPANAX** Handel-Mazzetti, *Sinensia* 3: 197. 1933.

马蹄参属 ma ti shen shu

Xiang Qibai (向其柏 Shang Chih-bei), Xiang Qiuyun (向秋云 Jenny Xiang); David E. Boufford, Porter P. Lowry II

Trees unarmed, glabrous. Leaves simple, estipulate. Flowers in single, terminal, paniculate (spikelike) inflorescences, upper ones solitary, lower ones umbellate, sessile or pedunculate; bracts caducous; flowers articulate below calyx tube. Calyx margin 5-dentate. Petals 5, hooked, valvate. Stamens 10, 5 often sterile. Style solitary. Fruit drupaceous, 1-seeded, oblong-ovoid, very hard when dry, mesocarp thick and woody. Seed laterally compressed and curved, horseshoe-shaped in cross section; endosperm uniform.

Two species: one in S China and N Vietnam, one in S Vietnam.

## MASTIXIACEAE

### 1. *Diplopanax stachyantus* Handel-Mazzetti, Sinensia 3: 198. 1933.

马蹄参 ma ti shen

Trees evergreen, to 25 m; bark gray-brown; branches stout, with white oblong lenticels. Leaves with petiole 2–6 cm; leaf blade obovate-elliptic or obovate-lanceolate, 9–16 × 3.5–7 cm, leathery, abaxially pale green and pubescent with sparse 1-celled, 2-armed hairs along midvein, adaxially dark green and shiny, lateral veins 6–11 pairs, distinct on both surfaces, tertiary veins inconspicuous adaxially, base narrowly cuneate, margin entire, apex acute. Inflorescence terminal, paniculate (spikelike), to 30 cm, upper part spikelike with solitary flowers and sessile, lower flowers umbellate, umbels 3–5-flowered, peduncles 0.2–1.5 cm, pedicels absent, flowers articulate below calyx tube. Calyx tube 3–4 mm, densely pubescent, margin 5-dentate. Petals 5, ca. 3 mm, fleshy, pubescent outside. Stamens 10, 5 often sterile; filaments shorter than petals. Style conical. Fruit oblong-ovoid to oblong-ellipsoid, slightly compressed laterally, 2–3 × 4.5–5.5 cm, hard when dry, with subconspicuous linear veins and very thick mesocarp, 1-seeded, seed laterally compressed and curved, horseshoe-shaped in cross section.

## MASTIXIACEAE

Evergreen broad-leaved forests on slopes or in valleys; 1300–1900 m. Guangdong (Yangchun, Yangjiang, Yuyuan), Guangxi, S Guizhou, S Hunan (Mang Shan), SE Yunnan (Pingbian, Xichou) [N Vietnam].

This species is used for timber and as an ornamental.