Flora of China 22: 103–105. 2006.

18. CHIMONOCALAMUS Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 75. 1979.

香竹属 xiang zhu shu

Li Dezhu (李德铢); Chris Stapleton

Sinarundinaria Nakai sect. *Chimonocalamus* (Hsueh & T. P. Yi) C. S. Chao & Renvoize, Kew Bull. 44: 353. 1989.

Shrubby or arborescent bamboos. Rhizomes short necked, pachymorph. Culms unicaespitose, erect; internodes terete, glabrous, cavity not filled with pith; nodes with slightly prominent supra-nodal ridge and a ring of root thorns especially dense at lower nodes. Branch complement 3 at mid-culm nodes, 3–5 at upper culm nodes, promontory absent. Culm sheaths deciduous, usually longer than internodes, sparsely setose; auricles absent or inconspicuous; blade erect or recurved, lanceolate or triangular. Leaves usually small; blade with inconspicuous transverse veins. Inflorescence ebracteate, semelauctant, an open racemose panicle initially terminal to leafy flowering branches. Spikelets robust, 4–12 flowered, followed by a sterile floret, pedicels long. Glumes 2; lemma many veined, mucronate. Palea slightly longer than lemma, 2-keeled, obtuse. Lodicules 3, transparent. Stamens 3; filaments free; anthers yellow. Ovary glabrous, appendage absent; style 1; stigmas 2, plumose. Caryopsis slender, beaked. New shoots Jun–Jul, fl. Mar–May.

Eleven species: E Himalayas, Myanmar, SW China (S Yunnan); nine species (eight endemic) in China.

Most species in this genus produce delicious bamboo shoots and are known as “xiang zhu” (香竹), meaning “fragrant bamboo.” The culms are robust and are widely used in Yunnan for construction and agricultural tools. *Chimonocalamus pallens* and *C. dumosus* are attractive, subtropical ornamentals and have been introduced into gardens.

1a. Nodal sheath scar with a ring of tawny hairs; culm sheath blade 0.3–3 cm, twisted when dry; leaf blade lanceolate, broader than 1.2 cm ..... 1. *C. griffithianus*
1b. Nodes glabrous; sheath blade usually longer than 3 cm, straight; leaf blade linear-lanceolate, mostly narrower than 1.5 cm.
2a. Apex of culm sheath 2–4 cm wide, convex to projected, base of blade 1–2 cm wide, glabrous.
3a. Culms slightly quadrangular, initially purple, scabrous; sheaths densely tawny hairy; leaf blade gray-green; oral setae developed ..... 2. *C. delicatus*
3b. Culms terete, initially gray-green, glabrous; sheaths hairy; leaf blade green; oral setae absent or scarce ..... 3. *C. pallens*
2b. Apex of culm sheath narrower than 1.5 cm, truncate or concave; sheath blade less than 1 cm at base, slender, usually hairy.
4a. Culm sheath ligule conspicuous, 0.8–1.8 cm.
5a. Culm sheath ligule divided; leaf sheath auricles absent ..... 4. *C. longiligulatus*
5b. Culm sheath ligule fimbriate; leaf sheath auricles present ..... 5. *C. fimbriatus*
4b. Culm sheath ligule short, less than 0.5–0.7(–1.2) cm.
6a. Culm sheaths densely hairy, margins ciliate; root thorns short, robust, dense ..... 6. *C. montanus*
6b. Culm sheaths sparsely hairy, margins glabrous; root thorns longer but sparse.
7a. Apex of culm sheaths 11–13 mm wide; ligule 0.5–0.7 cm; culm sheath scars pubescent ..... 7. *C. makuanensis*
7b. Apex of culm sheath ca. 4 mm wide; ligule less than 0.5 cm; culm sheath scars glabrous.
8a. Arborescent bamboo, 4–6 m tall; young culms pubescent at nodes; internodes to 37 cm ... 8. *C. longiusculus*
8b. Shrubby bamboo, 1.5–3 m tall; young culms white powdery, internodes to 16 cm ..... 9. *C. dumosus*

1. Chimonocalamus griffithianus (Munro) Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 83. 1979.

西藏香竹 xi zang xiang zhu

Arundinaria griffithiana Munro, Trans. Linn. Soc. London 26: 20. 1868; *Chimonobambusa griffithiana* (Munro) Nakai; *C. tortuosa* Hsueh & T. P. Yi; *Sinarundinaria griffithiana* (Munro) C. S. Chao & Renvoize.

Culms 6–10 m, 1–3.5(–5) cm in diam.; internodes yellow-green, 18–22(–28) cm, distally pilose, hollow; wall 5–6 mm thick; nodes prominent, with a basal ring of tawny hairs. Culm sheaths longer than internode, 12–16 cm wide at base, gradually attenuate upward, papery, striate, base with a thick belt of soft tawny hairs, margins ciliate, apex 3–5 mm wide; auricles tiny; oral setae few; ligule short, sparsely ciliate; blade triangular, 0.3–3 cm, twisted when dry. Leaves 3–7 per ultimate branch; sheaths purple, glabrous; ligule truncate, ca. 1 mm; auricles absent; oral setae scarce; blade lanceolate, 12–20 × 1.2–2.4 cm. Inflorescence a terminal panicle, subtended by several sheathing bracts. Spikelets in verticillate clusters on thin, wavy, scabrous, hairy pedicels, 2.5–3.8 cm; florets 4–6. Glumes 2; rachilla internodes flattened, 5–7.5 mm; lemma lanceolate, 1.2–1.4 cm, papery, long mucronate; palea slightly shorter than lemma; lodicules obovate, one shorter and narrower. Anthers emarginate. Style short; stigmas 2. Caryopsis unknown. New shoots Jul–Aug.

Evergreen broad-leaved forests; 1700–2200 m. Xizang, Yunnan [NE India].

The inflorescence is unknown in China; its description is taken from NE Indian specimens.

2. Chimonocalamus delicatus Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 77. 1979.

香竹 xiang zhu

Culms 6–8 m, 4(–8) cm in diam.; internodes initially

purple-brown, yellow when old, slightly 4-angled, 20–30 cm, initially scabrous, glabrous when old; nodes prominent, glabrous. Culm sheaths distally attenuate and triangular, longer than internode, leathery, with thick, glossy, tawny hairs, apex 2–4 cm wide, centrally strongly convex or projected, slightly projected on 2 sides; auricles tiny; oral setae several, long; ligule 3–4 mm; blade lanceolate, 5–17 × 1.3–2.5 cm. Leaves 4–8 per ultimate branch; sheaths glabrous; auricles absent or tiny; oral setae ca. 8 mm; ligule truncate, ca. 1 mm; blade linear-lanceolate, 10–16 × 0.6–1.3 cm. Inflorescence a panicle, terminal to leafy shoot. Spikelets 2.7–4.5 cm; florets 5–8, plus a terminal, sterile floret. Glumes 2; rachilla internodes flattened, 4–6 mm, densely pubescent; lemma lanceolate, 0.7–1 cm, papery; palea equal to or slightly longer than lemma; lodicules obovate, one shorter and narrower. Anthers ca. 6 mm. Style short; stigmas 2. Caryopsis unknown. New shoots Jun–Jul, fl. Mar–Apr.

● Evergreen broad-leaved forests; 1400–2000 m. S Yunnan (Jinping).

The shoots are eaten, and the culms are used for construction.

3. Chimonocalamus pallens Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 78. 1979.

灰香竹 hui xiang zhu

Chimoncalamus bicorniculatus S. F. Li & Z. P. Wang, Acta Phytotax. Sin. 33: 614. 1995.

Culms 5–8 m, 2–5 cm in diam.; internodes terete, 12–29 cm, initially white powdery, later gray-green, glabrous; nodes prominent, slightly pubescent. Culm sheaths longer than internode, thinly leathery, striate, sparsely, glossy-tawny hairy, distally attenuate and triangular, apex centrally strongly convex or projected, slightly projected on 2 sides, apex 2–4 cm wide; auricles tiny; oral setae several, long; ligule 3–13 mm; blade lanceolate, 4–16 × 1–1.5 cm. Leaves 5 or 6 per ultimate branch; sheaths glabrous; auricles absent or tiny; oral setae 1 or 2; ligule truncate, ca. 1.5 mm; blade linear-lanceolate, 10–13 × 0.8–1.5 cm. Inflorescence and caryopsis unknown. New shoots Jun–Jul.

● Evergreen broad-leaved forests; 1400–2000 m. S Yunnan (Jinping).

The culms are used for construction.

4. Chimonocalamus longiligulatus Hsueh & T. P. Yi, Acta Phytotax. Sin. 23: 236. 1985.

长舌香竹 chang she xiang zhu

Culms 2.5–3.5 m, 1–1.8 cm in diam.; internodes green, terete, (6–)18–22(–32) cm, shallowly grooved above branches, sparsely gray-white setose, hollow; wall 2–4.5 mm thick; nodes prominent, dark brown, slightly pubescent; root thorns spreading or slightly reflexed, 2–4 mm. Branches 3(–10) per node. Culm sheaths deciduous, striate, concave or truncate, longer than internode, leathery, sparsely appressed tawny setose, attenuate, apex 0.8–1 cm wide; auricles absent; oral setae absent to 2; ligule conspicuous, often split, 8–18 mm, apex serrate; blade reflexed, triangular or lanceolate, 7–25(–90) × 2.5–3.5 mm. Leaves 3–6 per ultimate branch; sheaths glabrous; ligule truncate, ca. 1 mm, ciliate; auricles absent or inconspicuous; oral setae 5–8, 2.5–8 mm; blade linear-lanceolate, 4.5–14 × (0.4–)0.7–1.1 cm, secondary veins (2 or)3- or 4-paired, transverse veins distinct, one margin minutely serrulate-scabrid. Inflorescence and caryopsis unknown. New shoots Jun–Jul.

● Evergreen broad-leaved forests; 1800–2000 m. S Yunnan (Lüchun).

The culms are used for construction.

5. Chimonocalamus fimbriatus Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 78. 1979.

流苏香竹 liu su xiang zhu

Culms 5–8 m, 2–5 cm in diam.; internodes dark green or purple, 20–36 cm, minutely white setose and pubescent; nodes slightly prominent, slightly pubescent or glabrous; root thorns more than 30, dense, 7–14 mm. Culm sheaths deciduous, striate, gradually attenuate upward, longer than internodes, thickly leathery, sparsely appressed tawny setose, apex 1–1.5 cm wide, concave or truncate; auricles inconspicuous; oral setae few, deciduous; ligule conspicuous, 1–1.3 cm, fimbriate; blade erect or curved upward, lanceolate, 6–16 × 0.4–0.6 cm. Leaves 3–6 per ultimate branch; sheaths glabrous, ciliate; auricles inconspicuous; oral setae 5–11 mm; ligule truncate, ca. 1 mm, scabrous; blade linear-lanceolate, 5–15 × 0.5–1.1 cm, apex finely pointed, tip to 1 cm. Inflorescence unknown. New shoots Sep.

● Evergreen broad-leaved forests; 1500–1800 m. SW Yunnan.

6. Chimonocalamus montanus Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 79. 1979.

山香竹 shan xiang zhu

Culms ca. 5 m, to 1.5 cm in diam.; internodes terete, ca. 33 cm, glabrous; nodes slightly prominent, glabrous; root thorns dense, robust. Culm sheaths deciduous, striate, acuminate, longer than internodes, leathery, initially densely appressed tawny setose (setae ca. 1 mm), margin ciliate, apex truncate, ca. 8 mm wide; auricles absent; oral setae deciduous, to 2 cm; ligule truncate, ca. 2 mm, with fimbriae 2–5 mm; blade recurved, linear-lanceolate, 7–10 × ca. 0.35 cm. Leaves 2–4 per ultimate branch; sheaths ciliate; auricles absent or inconspicuous; oral setae several, ca. 1 cm; ligule truncate, pubescent; blade narrowly lanceolate, ca. 14 × 1 cm, apex finely pointed, tip to 8 mm. Inflorescence unknown. New shoots Jun–Jul.

● Evergreen broad-leaved forests; ca. 1700 m. NW Yunnan (Gaoligong Shan).

7. Chimonocalamus makuanensis Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 80. 1979.

马关香竹 ma guan xiang zhu

Culms 5–6 m, 1.5–2.5 cm in diam.; internodes pale green, 10–27 cm, initially brown setose, later glabrous; nodes strongly prominent, pubescent; root thorns dense, basally swollen. Culm sheaths deciduous, initially yellow striped, oblong-elliptical, distally broad, longer than internode, leathery, striate, sparsely appressed tawny setose; setae deciduous, ca. 1 mm; apex triangular, 1.1–1.3 cm wide, truncate; auricles absent; ligule trun-

cate or slightly convex, 5–7(–12) mm, apex membranous, fimbriate; blade erect, lanceolate, 5–7 × 0.5–0.7 cm. Leaves 3 or 4 per ultimate branch; sheaths glabrous, margins ciliate; auricles absent or inconspicuous; oral setae several, 4–7 mm; ligule convex, ca. 1.5 mm, pubescent; blade narrowly lanceolate, 9–13 × 0.9–1.3 cm, apex finely pointed, tip to 8 mm. Inflorescence unknown. New shoots Jun–Sep.

● Evergreen broad-leaved forests; 1700–1900 m. SE Yunnan (Maguan).

8. Chimonocalamus longiusculus Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 80. 1979.

长节香竹 chang jie xiang zhu

Culms 4–6 m, 1–2 cm in diam.; internodes terete, flattened above branches, to 37 cm, basally nearly solid, hollow further up culm; wall thick; nodes very prominent, minutely white hairy below nodes; root thorns few, short, conical. Culm sheaths gradually deciduous, oblong, thickly papery, proximally glossy-tawny hairy, distally pubescent, attenuate into slightly convex apex ca. 4 mm wide; auricles deciduous, tiny; ligule 1–1.5 mm, ciliate; blade linear, 3–5 × ca. 0.2 cm, both surfaces pubescent. Leaves 3–5 per ultimate branch; sheaths glabrous; auricles absent or tiny; ligule slightly convex, ca. 1 mm; blade linear, 5–14 × 0.5–0.9 cm. Inflorescence a panicle terminal to leafy branch. Spikelets 2.5–4 cm; florets 3–7. Glumes 2; rachilla internodes flattened, 4–5 mm, densely pubescent; lemma lanceolate, 0.9–1 cm, papery, pubescent; palea slightly longer than lemma; lodicules obovate, one shorter and narrower. Anthers unknown. Style short; stigmas 2. Caryopsis unknown. New shoots Apr–May, fl. May.

● Evergreen broad-leaved forests; 1600–1700 m. SE Yunnan (Xichou).

The shoots are eaten, and the culms are used for construction.

9. Chimonocalamus dumosus Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 81. 1979.

小香竹 xiao xiang zhu

Culms 1.5–3 m, 0.5–1.5 cm in diam.; internodes terete, 10–16 cm, sometimes nearly solid at culm base, hollow further up; wall thin or thick; nodes very prominent, glabrous; root thorns sharp and sparse, or blunt and dense. Culm sheaths deciduous, oblong, papery, tawny strigose, attenuate into slightly convex apex ca. 6 mm wide; auricles absent; ligule ca. 1.5 mm, irregularly serrate; blade linear, 4–11 × 0.4–0.5 cm, both surfaces pubescent. Leaves 3–7 per ultimate branch; sheaths glabrous, margins ciliate; ligule slightly convex, ca. 1 mm, puberulent; auricles absent or tiny; oral setae 0.5–1 cm; blade linear-lanceolate, 3–16 × 0.3–1.2 cm. Inflorescence a panicle, terminal to leafy, pubescent branches. Spikelets 0.8–1 cm; florets 2 or 3. Glumes 2; rachilla flattened, 4–5 mm, densely pubescent; lemma lanceolate, 0.8–1 cm, papery, pubescent; palea about as long as or slightly longer than lemma; lodicules ovate, one shorter and narrower. Anthers unknown. Style short; stigmas 2. Caryopsis brown, 3.5–8.5 mm, glabrous, with a persistent style. New shoots Sep–Oct.

● Montane, evergreen, broad-leaved forests. S Yunnan.

The young shoots are harvested, and the culms are used for construction.

1a. Culm walls thick, basally nearly solid; root thorns sharp, sparsely arranged; leaves 3–16 cm ..... 9a. var. *dumosus*

1b. Culm walls thin, basally hollow; root thorns obtuse, densely arranged on nodes; leaves 5–11 cm ..... 9b. var. *pygmaeus*

9a. Chimonocalamus dumosus var. **dumosus**

小香竹(原变种) xiao xiang zhu (yuan bian zhong)

Slightly larger in size. Culms subsolid or solid at base; root thorns acute and sparsely arranged; leaves only on basal nodes. Leaves relatively larger, 3–16 × 0.3–1.2 cm.

● Montane evergreen forests. SE Yunnan (Xichou).

9b. Chimonocalamus dumosus var. **pygmaeus** Hsueh & T. P. Yi, Acta Bot. Yunnan. 1(2): 82. 1979.

耿马小香竹 geng ma xiao xiang zhu

Slightly smaller in size. Culms basally hollow; root thorns obtuse and densely arranged on basal nodes. Leaves relatively smaller, 5–11 × 0.5–0.9 cm.

● Montane evergreen forests. SW Yunnan (Gengma).

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