

13. CRYPTOCORYNE Fischer ex Wydler, Linnaea 5: 428. 1830.

隐棒花属 yin bang hua shu

Li Heng (李恒 Li Hen); Niels Jacobsen

Herbs, amphibious, monoecious. Rhizome creeping, stoloniferous (usually subterranean). Leaves in a rosette, linear to spatulate to oblanceolate to cordate; veins arching from base of blade and connected by transverse veinlets. Peduncle very short, elongating at maturity. Spathe tubular with margins fused for most of length, proximally swollen forming a chamber (kettle) enclosing spadix; limb varying in shape, a collar or collar zone often present, in some species limb spirally twisted. Spadix at first fused at apex to base of spathe flap closing kettle (later breaking loose), much shorter than spathe; basal part with naked, connate gynoecia; intermediate zone naked; male zone apical; appendix conic, short. Female flowers 4–8, each 1-loculed; ovules many, subbasal (adaxial); styles free; stigma globose to elongate. Olfactory bodies immediately above stigmas regular or irregular structures. Male flowers naked; stamens solitary; thecae each dehiscent by an apical pore. Fruit syncarp-like, multiple; each part ultimately splitting at adaxial part and becoming star-shaped, follicle-like; a few species splitting in a septicidal/septifragal-ceratum-like way. Seeds many, ellipsoid, small; endosperm usually copious.

More than 50 species: tropical Asia, from India to Malesia; one variable species in China.

Cryptocoryne cruddasiana Prain (J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69: 174. 1901; *C. retrospiralis* (Roxburgh) Kunth var. *cruddasiana* (Prain) de Wit; *C. burmensis* Rataj) occurs in N Myanmar, where it grows on riverbanks. It has not yet been recorded from China but may be distinguished as follows. Leaves strap-shaped, up to 30×0.5 –1 cm, smooth to somewhat undulate at margin (sometimes also finely denticulate), green to brownish marmorate, apex rather abruptly acute; leaves disappearing during rainy period or becoming small, 2–4 cm, and terete. Spathe 8–12 cm; kettle 2–2.5 cm, with a constriction just below male flowers, proximally whitish, distally purplish and also with alveolae in wall; tube 4–5 cm, grayish outside; limb to 3.5 cm, upright to somewhat bent backward, with irregular, purplish or red-brown, rounded protuberances sometimes \pm transversely oriented, base color of surface dark yellowish to red-brown, throat spotted, collar absent. Spadix: female flowers 5 or 6, with vertical, elliptic stigmas. Olfactory bodies cream-colored, finely spotted, irregularly lobed to subtoothed. Male flowers 80–120. Fruit not seen. Fl. Dec–Feb. $2n = 36$.

- 1a. Limb of spathe \pm spirally twisted, smooth, white or with regular to irregular reddish to purplish to violet markings 1. *C. crispatula*
 1b. Limb of spathe \pm obliquely recurved, rugose from somewhat irregular, rounded, purplish or red-brown protuberances *C. cruddasiana* (see note above)

1. *Cryptocoryne crispatula* Engler, Pflanzenr. 73(IV. 23F): 247. 1920.

旋苞隐棒花 xuan bao yin bang hua

Rhizome sometimes with a metallic blue-gray color, 0.5–1 cm in diam., irregularly thickened. Root system sometimes with many finely branched upright roots. Leaves green to brown, very variable, narrowly linear to lanceolate, 10–70 \times 0.2–4 cm, smooth to undulate to bullate, margin entire to finely, irregularly denticulate; broader leaf blades mostly with conspicuous lateral veins. Generally, two ecological leaf forms occur: 1) plants that grow submerged for most of year, thus developing long flaccid-lax submerged leaves (sometimes also developing shorter, stiffer emergent leaves); 2) plants that develop short terete leaves during rainy season and, when water level decreases, form normal emergent leaves at anthesis. Spathe outside greenish to brownish, 10–40(–60) cm; kettle 1–2.5 cm, inside somewhat constricted below male flowers, inside \pm reddish (especially distally) and with alveolae (depressions in wall) in distal part; flap closing kettle sometimes \pm purple spotted; tube slightly to somewhat twisted, 5–30(–45) cm; limb \pm spirally twisted, yellowish to grayish, with short to long, purple to reddish markings, sometimes markings almost completely covering surface, or few and faint, or absent, (1.5–)3–8(–12) cm; collar not present. Spadix: female flowers 4–6, with horizontal to vertical, round to ovoid stigmas; olfactory bodies \pm irregularly lobed with protruding cells; male flowers 90–130, thecae rough from protruding cells. Fruit splitting in a septicidal/septifragal-ceratum-like way, greenish to purplish, narrowly globose, 1–1.5 cm, smooth. Seeds brownish, 5–8 mm,

rugose; endosperm present; embryo cone-shaped with an undifferentiated plumule. $2n = 36$, 54.

Rivers, streams; near sea level to 600 m. Guangdong, Guangxi, Guizhou, Yunnan [Bangladesh, Cambodia, Laos, Myanmar, Thailand, Vietnam].

Cryptocoryne crispatula s.l. is here interpreted as one species comprising different ecological races, i.e., leaf forms that are adapted to the water supply and the overall topography of the rivers in which they grow. In rivers with more constant water-bearings, and not too steep a fall, the more aquatic ones occur, viz. the long, narrow-leaved forms with an undulate or bullate leaf blade. In rivers with a seasonal variation in the water-bearings, the more amphibious ones occur, characterized by having shorter, \pm smooth leaves. The variation within *C. crispatula* is very complex, with more than six recognizable forms in mainland Asia, some more readily distinguishable from the next than others. There are transitions between the various forms. The here recognized varieties represent the more distinctive ones, and admittedly specific plants may only with some difficulty be referred unambiguously to a definite variety. The number of varieties accepted is subjective. This is not meant as an excuse for an insufficient treatment but is merely recognition of the complexity of *C. crispatula*.

It is important to note that the leaves can vary in size during the flowering season; therefore, herbarium material should be studied with this in mind.

In the present circumscription, *Cryptocoryne crispatula* is recognized as different from the tetraploid *C. retrospiralis* (Roxburgh) Kunth from India. If *C. crispatula* were not recognized as different from *C. retrospiralis*, the mentioned varieties of *C. crispatula* would then be considered as varieties of *C. retrospiralis*.

In addition to the four varieties here recognized in China, *Cryptocoryne crispata* var. *tonkinensis* (Gagnepain) N. Jacobsen (Aqua Pl. 16: 29. 1991; *C. tonkinensis* Gagnepain, Notul. Syst. (Paris) 9: 133. 1941; *C. retrospiralis* (Roxburgh) Kunth var. *tonkinensis* (Gagnepain) de Wit) occurs in Thailand and Vietnam, where it grows along rivers and streams. It has not yet been recorded from China, but may be distinguished as follows. Leaves usually submerged, green to brownish, flaccid, 20–30 × 0.2–0.4 cm, smooth or slightly undulate. Emergent leaves shorter and broader compared to submerged ones. Spathe mostly with a tube (5–)15–30 cm; limb with a long open spiral with a yellowish base color with irregular, dark reddish lines of varying intensities. Fl. Dec–Apr. $2n = 36$.

- 1a. Plants with short, rather stiff, upright emergent leaves (10–30 × 0.6–2 cm), submerged leaves short, terete, 2–10 cm.
 - 2a. Spathe with a short, thick limb spiral, with distant to dense red spots 1b. var. *yunnanensis*
 - 2b. Spathe usually with a long, thin/narrow limb spiral, with regular to irregular shorter or longer purplish to reddish lines (or limb pure white) 1a. var. *crispata*
- 1b. Plants with long, flaccid-lax submerged leaves (20–70 × 0.2–4 cm).
 - 3a. Leaves 0.2–0.4 cm wide var. *tonkinensis* (see note above)
 - 3b. Leaves 0.5–4 cm wide.
 - 4a. Leaves 0.5–1.2 cm wide, smooth to undulate 1d. var. *flaccidifolia*
 - 4b. Leaves 1.5–4 cm wide, ± bullate 1c. var. *balansae*

1a. *Cryptocoryne crispata* var. *crispata*

旋苞隐棒花(原变种) xuan bao yin bang hua (yuan bian zhong)

Cryptocoryne berteliansenii Rataj; *C. crispata* var. *sinensis* (Merrill) N. Jacobsen; *C. retrospiralis* (Roxburgh) Kunth var. *crispata* (Engler) de Wit; *C. sinensis* Merrill.

Leaves upright to flat on soil surface, rather stiff (in shaded habitats more lax), mostly green but often brownish (to brown) with markings in sun-exposed habitats, lanceolate to strap-shaped, 10–30 × 0.5–1.5(–2.5) cm, smooth to somewhat finely undulate to crenulate along margin, entire or distinctly irregularly serrulate. During times of high water, leaves become small and terete, and when becoming emergent, leaves and spathes develop. Spathe with a tube 10–20 cm; limb with a rather long, somewhat tight to open spiral, usually grayish, mostly with shorter or longer purplish markings of varying intensities, but also a completely white limb has been found. Fl. Nov–Apr. $2n = 36, 54$.

Stream and river banks and beds. Guangdong, Guangxi, Guizhou [Bangladesh, Cambodia, Laos, Myanmar, Thailand, Vietnam].

1b. *Cryptocoryne crispata* var. *yunnanensis* (H. Li) H. Li & N. Jacobsen, *comb. et stat. nov.*

八仙过海 ba xian guo hai

Basionym: *Cryptocoryne yunnanensis* H. Li, Acta Phytotax. Sin. 15(2): 108. 1977.

Leaves upright to flat on soil surface, rather stiff, mostly green but sometimes brownish, 5–30 × 0.5–1.5 cm, smooth to slightly undulate. During times of high water, leaves become small and terete, and when becoming emergent, new larger leaves and spathes develop. Spathe with a rather short tube 8–12 cm; limb rather thick in texture and with a rather short spiral, with a yellowish base color and somewhat distant to very dense dark reddish spots that sometimes become longer irregular lines into throat. Fl. Nov–Apr. $2n = 36$.

Riverbanks, riverbeds; near sea level to 600 m. Yunnan [Laos, Thailand, Vietnam].

The plants are used medicinally for treating traumatic injuries, rheumatic arthralgia, and stomach aches.

1c. *Cryptocoryne crispata* var. *balansae* (Gagnepain) N. Jacobsen, Aqua Pl. 16: 29. 1991.

广西隐棒花 guang xi yin bang hua

Cryptocoryne balansae Gagnepain, Notul. Syst. (Paris) 9: 131. 1941; *C. kwangsiensis* H. Li; *C. longispatha* Merrill.

Leaves usually submerged, green to brownish to dark brown, rather flaccid, 15–70 × 1–4 cm, slightly to strongly bullate; midrib conspicuous, lateral veins less so. Emergent leaves shorter and often not as bullate as submerged ones. Spathe with a long tube 10–30(–40) cm; limb with a rather long and rather open to somewhat tight spiral, usually grayish or yellowish, mostly with shorter or longer purplish markings of varying intensities. Fl. Dec–Apr. $2n = 36$.

Rivers, streams. Guangxi [Laos, Thailand, Vietnam].

1d. *Cryptocoryne crispata* var. *flaccidifolia* N. Jacobsen, Aqua Pl. 16: 26. 1991.

柔叶隐棒花 rou ye yin bang hua

Leaves usually submerged, green to reddish brown, flaccid, 20–50 × 0.5–1.2 cm, somewhat undulate to almost smooth. Emergent leaves shorter and rather smooth compared to submerged ones. Spathe with a long tube (15–)20–30 cm; limb with a rather long, open spiral, usually grayish, mostly with

Fl. China 23: 20–22. 2010.

shorter or longer purplish markings of varying intensities. Fl.
Dec–Apr. $2n = 36$.

Rivers, streams. Guangxi [Thailand, Vietnam].

Fl. China 23: 20–22. 2010.