

1. CYANANTHUS Wallich ex Bentham in Royle, Ill. Bot. Himal. Mts. 1: 309. 1836,
nom. cons., not Rafinesque (1815).

蓝钟花属 lan zhong hua shu

Hong Deyuan (洪德元); Thomas G. Lammers, Laura L. Klein

Herbs, annual or perennial, caudices of latter thick, lignified, covered with numerous scales, usually branched, stems thus caespitose. Leaves alternate, but sometimes 4 or 5 leaves aggregated below pedicel, appearing whorl-like. Flowers solitary, terminal on main stems and branches, rarely in a dichasium and dichasia aggregated on top of stem and branches, pedicellate. Calyx tubular or tubular-campanulate, 5- or rarely 4-lobed. Corolla tubular-campanulate, (3–)5-lobed. Stamens 5, often aggregated and surrounding ovary at upper part. Ovary superior, conical, mostly 5-locular, less frequently 4- or 3-locular. Fruit a capsule, loculicidal. Seeds numerous, brown-red or brown-black.

Eighteen species: Himalaya and the Hengduan Mountains; 17 species (nine endemic) in China.

- 1a. Plant annual, lacking a caudex (3. *C.* sect. *Annui*).
 - 2a. Plants dwarf, less than 20 cm tall; flowers almost sessile, typically 4-merous; corolla usually less than 10 mm, rarely up to 15 mm 17. *C. hookeri*
 - 2b. Plants taller; flowers pedicellate, typically 5-merous; corolla usually more than 15 mm.
 - 3a. Calyx covered with red-brown setae, base of setae swollen, black verrucose; calyx lobes obovate-oblong, broadest at middle or above middle; corolla pale yellow or white 14. *C. lichiangensis*
 - 3b. Calyx villous; calyx lobes sublinear or triangular, broadest below middle; corolla blue or blue-purple.
 - 4a. Leaves glabrous or sparsely puberulent; flowers in dichasia, fascicled at top of stem; calyx lobes linear 15. *C. fasciculatus*
 - 4b. Leaves hairy; flowers solitary, terminal on top of stem and branches, rarely 3–5-fascicled; calyx lobes triangular 16. *C. inflatus*
- 1b. Plant perennial with a robust caudex densely clothed in persistent and straw-colored scales.
 - 5a. Calyx with brown-black setae, sometimes mixed with other hairs; corolla lobes suborbicular, broadly ovate, or oblong, as long as or slightly longer than broad (2. *C.* sect. *Cyananthus*).
 - 6a. Calyx covered with brown-black and white setae; stems sparsely arachnoid.
 - 7a. Leaf blade cordate to triangular-ovate, base cordate or rounded, margin obviously crenulate 12. *C. cordifolius*
 - 7b. Leaf blade linear-elliptic, base cuneate, margin entire or sinuous 13. *C. sherriffii*
 - 6b. Calyx covered with only brown-black setae; stems villous, scaberulose, or sericeous.
 - 8a. Leaves less than 11 mm 11. *C. microphyllus*
 - 8b. Leaves more than 10 mm.
 - 9a. Leaf blade usually oblanceolate, spatulate, or obovate, margin with 3–9 obtuse lobes above middle 8. *C. lobatus*
 - 9b. Leaf blade elliptic or ovate-lanceolate, margin entire or sinuous-crenulate above middle.
 - 10a. Leaves hispidulous on both surfaces; pedicels 12–32 mm; no leaves aggregated below pedicels 9. *C. pedunculatus*
 - 10b. Leaves adaxially glabrous, abaxially densely sericeous; pedicels 5–12 mm; several leaves aggregated below pedicels, whorl-like 10. *C. sericeus*
 - 5b. Calyx glabrous or covered with hairs other than brown-black setae; corolla lobes usually oblong, longer than broad (1. *C.* sect. *Stenolobi*).
 - 11a. Flowers several on a stem in racemelike inflorescence; leaves ovate-lanceolate, abaxially densely sericeous; margin strongly recurved 7. *C. longiflorus*
 - 11b. Flowers solitary and terminal on a stem; leaves rhombic, flabellate, spatulate, or ovate, rarely lanceolate, rarely sericeous, margin spreading or slightly recurved.
 - 12a. Leaves usually rhombic, flabellate, or spatulate, (2–)2.5–4.8(–5.5) mm, base usually truncate or broadly cuneate, obviously petiolate.
 - 13a. Flowers 1.6–2.4 cm; leaves rhombic, base broadly cuneate 1. *C. delavayi*
 - 13b. Flowers 2.5–4.8 cm; leaves spatulate to rhombic, margins serrate to sinuous-crenulate, rarely entire 2. *C. formosus*
 - 12b. Leaves usually spatulate, elliptic, ovate, or obovate-lanceolate, (3–)4.5–16 mm, base cuneate or rounded, attenuate into shortly petiolate, or leaves sessile.
 - 14a. Plants densely covered with long yellow-brown appressed hairs except corolla; scales on caudexes 10–15 × ca. 3 mm; corolla 3–4 cm, lobed to 1/3 4. *C. wardii*
 - 14b. Plants glabrous or covered with other types of hairs than above, leaves adaxially white hirsute or white hispidulous; scales on caudexes much smaller; corolla 2–2.5(–3.8) cm,

lobed to middle.

15a. Leaves spatulate, petiole short, narrowly winged, (0.5–)1.3–5 mm 3. *C. macrocalyx*

15b. Leaves elliptic, ovate, narrowly ovate, or narrowly obovate, sessile or petiole extremely short, less than 1(–1.7) mm.

16a. Leaves shortly petiolate or sessile, elliptic, narrowly elliptic, or oblanceolate, base cuneate; flowers blue or blue-purple 5. *C. incanus*

16b. Leaves sessile, broadly ovate or obovate-lanceolate, base rounded; flowers yellow or white 6. *C. flavus*

1. *Cyananthus* sect. *Stenolobi* (Franchet) Y. S. Lian in D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 13. 1983.

多年生组 duo nian sheng zu

Cyananthus [unranked] *Stenolobi* Franchet, J. Bot. (Morot) 1: 258. 1887.

Plants perennial. Caudex densely clothed in persistent and straw-colored scales. Leaves alternate. Flowers solitary, terminal on main stems and branches, subtended by a whorl-like aggregation of 3–5 leaves. Calyx glabrous or covered with hairs other than brown-black setae, often ± swollen and saclike after anthesis. Corolla lobes usually oblong, longer than broad.

Seven species: Himalaya and the Hengduan Mountains; seven species (five endemic) in China.

1. *Cyananthus delavayi* Franchet, J. Bot. (Morot) 1: 280. 1887.

细叶蓝钟花 xi ye lan zhong hua

Cyananthus barbatus Franchet (1885), not Edgeworth (1846); *C. microrhombeus* C. Y. Wu; *C. microrhombeus* var. *leiocalyx* C. Y. Wu.

Caudexes branched; scales deltoid-lanceolate, ca. 2 × 1 mm. Stems caespitose, prostrate or ascending, slender, 7–20 cm, branched, white- or yellowish hispid, more densely so toward apex. Leaves alternate; blade suborbicular, ovate, or deltoid, 2–5 × 1–7 mm, abaxially silvery sericeous, adaxially hispidulous, base cuneate, obtuse, rounded, or truncate, margin slightly recurved, entire, sinuous, or crenulate, apex rounded or obtuse; petiole 1–3 mm, white hispid. Flowers solitary, terminal on main stems and some branches, each subtended by a whorl-like aggregation of 3–5 leaves; pedicels 3–9 mm. Calyx brown hirsute or glabrescent; tube cylindrical at anthesis, 4.5–9 × 3.5–7 mm, base rounded or truncate, becoming enlarged in fruit; lobes narrowly triangular, 1.5–4 × 1–3 mm, both sides hirsute. Corolla blue, tubular-campanulate, 1.8–3.4 cm, outside glabrous, inside densely villous at throat; lobes linear-oblong, 6–12 mm. Ovary 5-locular, subequal to calyx in length at anthesis; style extending to corolla throat; stigma 5-fid. Capsules conical, longer than calyx. Seeds brown, oblong or ellipsoid, ca. 1.8 × 0.3 mm. Fl. Sep.

• Grassy calcareous slopes, forests, forest margins; 1900–4000 m. SW Sichuan, N Yunnan.

2. *Cyananthus formosus* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 172. 1912.

美丽蓝钟花 mei li lan zhong hua

Cyananthus chungdienensis C. Y. Wu.

Roots carrotlike, up to 10 mm wide. Caudexes robust, often branched; scales persistent, linear-lanceolate, 3.5–5 mm. Stems caespitose, prostrate to ascending, pale purple, slender, 5–25 cm, simple or with short branches. Leaves alternate, lowermost leaves scalelike; blade ovate or rhombic, 3–9 × 2–6 mm, abaxially densely white hirsute, adaxially sparsely white hirsute

or glabrous, base obtuse or subtruncate, margin revolute, crenulately 3–5-lobed or -parted, rarely entire, apex truncate; petiole 2–7 mm. Flowers large, solitary and terminal on main stems and branches, subtended by a whorl-like aggregation of 4 or 5 leaves; pedicels 3–5 mm. Calyx densely hirsute with long pale brown stiff hairs; tube cylindrical, 7–12 mm; lobes triangular or narrowly triangular, 4–6 × 2–3.5 mm, both sides hirsute, margins ciliate. Corolla dark blue or purple-blue, 2.5–4.8 cm, outside glabrous, inside densely villous at throat; lobes narrowly obovate or oblong, 1/3–1/2 as long as tube, apex with a tuft of hairs outside. Ovary 5-locular, nearly as long as calyx tube; style extended up to corolla throat; stigma 5-fid. Fl. Aug–Sep.

• Grassy slopes, forest glades, forest margins, scree; 2800–4600 m. SW Sichuan (Muli), NW Yunnan (Heqing, Lijiang, Zhongdian).

3. *Cyananthus macrocalyx* Franchet, J. Bot. (Morot) 1: 279. 1887.

大萼蓝钟花 da e lan zhong hua

Caudexes robust, lignified, branched, covered toward apex with persistent ovate-lanceolate scales; scales 2–6 mm. Stems caespitose, ascending, 5–20 cm, simple, sparsely white villous or glabrous. Leaves alternate, increasing in size toward apex; blade suborbicular, rhombic, or spatulate, 5–10 × 1–6 mm, abaxially densely white hirsute, adaxially sparsely hispidulous, base attenuate into petiole, margin revolute, entire, or sinuous-serrate, apex obtuse or acute; petiole 1–4 mm. Flowers solitary, terminal, subtended by a whorl-like aggregation of 4 or 5 flowers; pedicels 4–10 mm. Calyx yellow-green or purplish, brown hirsute, glabrescent, or glabrous, conspicuously veined; tube cylindrical at anthesis, 7–13 mm, basally subglobose in fruit; lobes triangular, both sides brown hirsute, or sometimes glabrous outside. Corolla yellow, sometimes purple- or red-veined, less frequently purple basally and yellow apically, tubular-campanulate, 2–3 cm, outside glabrous, inside densely villous at throat; lobes oblanceolate, ca. 2/3 as long as tube. Ovary extended up to throat. Capsules exerted above calyx. Seeds oblong, ca. 1.3 mm, smooth. Fl. Jul–Aug.

Alpine meadows, grassy slopes; 2500–5300 m. SE Gansu, S Qinghai, W Sichuan, SE Xizang, Yunnan [Bhutan, NE India (Assam,

Sikkim), Myanmar, E Nepal].

- 1a. Leaf blade ovate to suborbicular,
margin entire; calyx more than
11 mm 3a. subsp. *macrocalyx*
- 1b. Leaf blade obovate-spatulate,
margin crenulate; calyx less
than 11 mm 3b. subsp. *spathulifolius*

3a. *Cyananthus macrocalyx* subsp. *macrocalyx*

大萼蓝钟花(原亚种) da e lan zhong hua (yuan ya zhong)

Cyananthus incanus J. D. Hooker & Thomson var. *leio-calyx* Franchet; *C. leio-calyx* (Franchet) Cowan; *C. leio-calyx* subsp. *lucidus* K. K. Shrestha; *C. macrocalyx* var. *flavopurpureus* C. Marquand; *C. macrocalyx* var. *pilosus* C. Marquand; *C. neurocalyx* C. Y. Wu; *C. pilosus* (C. Marquand) K. K. Shrestha.

Leaf blade ovate, broadly elliptic, or rhombic, margin entire or sparsely crenulate. Pedicel typically less than 5 mm. Calyx tube more than 11 mm.

• Alpine meadows, grassy slopes; 2500–5000 m. SE Gansu (Zhugqu), S Qinghai (Nangqên), W Sichuan, Yunnan.

3b. *Cyananthus macrocalyx* subsp. *spathulifolius* (Nannfeldt) K. K. Shrestha, Acta Phytotax. Sin. 35: 412. 1997.

匙叶蓝钟花 chi ye lan zhong hua

Cyananthus spathulifolius Nannfeldt, Acta Horti Gothob. 5: 30. 1930.

Leaf blade obovate, spatulate, elliptic, or narrowly elliptic, margin slightly crenulate or subentire. Pedicel 5–10 mm. Calyx tube usually less than 12 mm, rarely up to 16 mm.

Alpine meadows; 3000–5300 m. SE Xizang [Bhutan, NE India (Assam, Sikkim), Myanmar, E Nepal].

4. *Cyananthus wardii* C. Marquand, J. Linn. Soc., Bot. 48: 196. 1929.

棕毛蓝钟花 zong mao lan zhong hua

Roots ca. 5 mm in diam. Caudexes with 2 or 3 grades of branching, densely covered with persistent straw-colored scales; scales elliptic or spatulate, 10–15 × 2–4 mm. Stems several from each branch of caudex, caespitose, 10–18 cm, lower half with small, straw-colored, elliptic scales, sparsely yellow arachnoid. Leaves alternate, sessile or nearly so, increasing in size toward apex; blade elliptic or spatulate, 5–11 × 3–5 mm, both surfaces densely covered with brown-yellow arachnoid hairs, base cuneate, margin entire, apex rounded, acute, or obtuse. Flowers solitary and terminal, subtended by a whorl-like aggregation of 4 or 5 leaves; pedicels 2–4 mm, covered with brown-yellow arachnoid hairs. Calyx densely covered with brown-yellow arachnoid hairs; tube cylindrical, 10–12 × 6–8 mm; lobes ovate or triangular, 1/3–1/2 as long as tube, apex acute or obtuse. Corolla tubular, 3–4 cm, outside glabrous but inside densely villous; lobes obovate, ca. 1/2 as long as tube, outside with a yellow villous tuft at apex. Stamens ca. 1/2 as long as corolla tube. Style slightly exceeding corolla tube, glabrous.

• 3400–5000 m. SE Xizang.

5. *Cyananthus incanus* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 20. 1857.

灰毛蓝钟花 hui mao lan zhong hua

Cyananthus dolichosceles C. Marquand; *C. incanus* var. *decumbens* Y. S. Lian; *C. incanus* subsp. *orientalis* K. K. Shrestha; *C. incanus* var. *parvus* C. Marquand; *C. incanus* subsp. *petiolatus* (Franchet) D. Y. Hong & L. M. Ma; *C. neglectus* C. Marquand; *C. petiolatus* Franchet; *C. petiolatus* var. *pilifolius* (C. Y. Wu) Y. S. Lian; *C. pilifolius* C. Y. Wu; *C. pilifolius* f. *leio-calyx* C. Y. Wu; *C. pilifolius* var. *minor* C. Y. Wu; *C. pilifolius* var. *pallidocoeruleus* C. Y. Wu.

Caudexes robust, branched, with persistent scales toward apex; scales ovate or lanceolate, ca. 4 mm. Stems caespitose, simple or branched below, white villous. Leaves alternate, gradually increasing in size toward apex, shortly petiolate; blade elliptic, narrowly elliptic, or oblanceolate, 4–12 × 1.5–4 mm, both surfaces white hirsute, base cuneate or attenuate, margin revolute, subentire, or sinuous, apex obtuse or acute. Flowers solitary, terminal on main stems and branches, subtended by a whorl-like aggregation of 4 or 5 leaves; pedicels 4–13 mm, hirsute. Calyx densely or sparsely hirsute with yellow-brown stiff hairs, rarely glabrous; tube narrowly ellipsoid, 5–10 mm; lobes triangular, 2–4 mm, inside densely white hirsute, margin long ciliate. Corolla dark blue or blue-purple, 25–38 mm, outside glabrous, inside densely villous at throat; lobes narrowly obovate or oblong, ca. 2/3 as long as tube. Ovary subequal to calyx tube in length at anthesis; style extended up to corolla throat. Capsule exerted beyond calyx, 5-loculicidal, 10–13 mm. Seeds pale brown, oblong. Fl. Jul–Sep, fr. Sep–Oct.

Grassy slopes, forest glades, grassy places at forest and thicket margins, alpine meadows; 2700–5300 m. S Qinghai, W Sichuan, E Xizang, NW Yunnan (Dêqên, Zhongdian) [Bhutan, NE India (Sikkim), Nepal].

6. *Cyananthus flavus* C. Marquand, Bull. Misc. Inform. Kew 1924: 247. 1924.

黄钟花 huang zhong hua

Roots carrot-shaped, up to 5 mm in diam. Caudexes robust, multibranched, covered with persistent scales toward apex; scales ovate, ca. 3 × 1 mm. Stems caespitose, ascending, 5.5–16 cm, simple or with short branches, densely white villous to subglabrous. Leaves alternate, gradually increasing in size toward apex, sessile or nearly so; blade elliptic, obovate-lanceolate, or broadly ovate, 5–16 × 3–8 mm, both surfaces gray-white hirsute or glabrous, base cuneate, margin entire or sometimes slightly sinuate, slightly recurved, apex acute, obtuse, or rounded. Flowers solitary and terminal, subtended by a whorl-like aggregation of 4 or 5 leaves; pedicel 1–2 cm, usually glabrous, rarely sparsely hirsute. Calyx glabrous, except yellow hirsute inside lobes; tube broadly cylindrical, 8–12 mm, base rounded or truncate, enlarging in fruit; lobes triangular, 3–4 × ca. 3 mm. Corolla white or various shades of yellow, 2.5–3 cm, outside glabrous, inside densely white- or yellow villous at throat; lobes obovate-oblong or obovate-elliptic, 14–16 × 5–7 mm, apex often very sparsely brown villous. Capsule subequal

to calyx in length; style exceeding corolla tube. Fl. Jul–Aug.

- Grassy slopes; 2700–3600 m. SW Sichuan, NE and NW Yunnan.

- 1a. Flowers yellow, pale yellow, or greenish yellow; leaves broadly ovate, apex typically obtuse or rounded 6a. subsp. *flavus*
 1b. Flowers white; leaves elliptic or obovate-lanceolate, apex typically acute 6b. subsp. *montanus*

6a. *Cyananthus flavus* subsp. *flavus*

黄钟花(原亚种) huang zhong hua (yuan ya zhong)

Cyananthus flavus var. *glaber* C. Y. Wu.

Leaves broadly ovate, apex obtuse. Flowers yellow, pale yellow, or greenish yellow.

- Grassy slopes; 3100–3600 m. NW Yunnan (Lijiang, Zhongdian).

6b. *Cyananthus flavus* subsp. *montanus* (C. Y. Wu) D. Y. Hong & L. M. Ma, Acta Phytotax. Sin. 29: 46. 1991.

白钟花 bai zhong hua

Cyananthus montanus C. Y. Wu, Rep. Yunnan Trop. Subtrop. Fl. Res. Rep. 1: 89. 1965, based on *Wahlenbergia mairei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 12: 285. 1913; *Atropanthe mairei* (H. Léveillé) H. Léveillé; *C. albiflorus* D. F. Chamberlain, nom. illeg. superfl.; *C. mairei* (H. Léveillé) Cowan (1938), not H. Léveillé (1916).

Leaves elliptic or obovate-lanceolate, apex acute. Flowers white.

- Grassy slopes; 2700–3400 m. SW Sichuan (Xichang, Zhaojue), NE Yunnan (Huize).

7. *Cyananthus longiflorus* Franchet, J. Bot. (Morot) 1: 280. 1887.

长花蓝钟花 chang hua lan zhong hua

Cyananthus argenteus C. Marquand; *C. obtusilobus* C. Marquand.

Caudexes robust, ± lignified, branched, with some scales toward apex; scales ovate, ca. 2 mm. Stems caespitose, erect, 4–22 cm tall, lignified toward base, densely gray-white lanate; branches very short. Leaves alternate; blade elliptic or ovate, 5–15 × 2–8 mm, abaxially densely silvery sericeous, adaxially sparsely puberulent or glabrescent, base cuneate, margin revolute, entire, apex acute or obtuse; petiole 2–4 mm. Flowers solitary, terminal on main stems and branches, subsessile, subtended by a whorl-like aggregation of 3–5 leaves. Calyx villous; tube cylindrical, 10–15 mm at anthesis; lobes triangular or lanceolate, 3–7 mm, pubescent throughout. Corolla blue-purple, tubular-campanulate, 3.5–5 cm, outside glabrous, inside densely villous at throat; lobes obovate-oblong, ca. 1/2 as long as to equaling tube, with a setose tuft at apex. Style almost extending up to corolla throat. Capsules slightly longer than calyx at maturity. Seeds oblong, ca. 1.3 mm. Fl. Jul–Sep.

- *Pinus* forests, dry slopes, sand dunes; 2800–4300 m. W Yunnan.

2. *Cyananthus* sect. *Cyananthus*

宽瓣组 kuan ban zu

Plants perennial. Caudex densely clothed in persistent and straw-colored scales. Calyx densely covered only with brown-black setae, or mixed with such hairs. Corolla lobes suborbicular, broadly ovate or oblong, as long as or slightly longer than broad.

Nine species: SW China, Himalaya; six species (two endemic) in China.

8. *Cyananthus lobatus* Wallich ex Bentham in Royle, Ill. Bot. Himal. Mts. 1: 309. 1836.

裂叶蓝钟花 lie ye lan zhong hua

Cyananthus lobatus var. *farreri* C. Marquand.

Roots carrot-shaped, up to 1.3 cm in diam. Caudexes robust, branched, with persistent scales toward apex; scales ovate or lanceolate, ca. 4 mm. Stems caespitose, decumbent or ascending, 10–50 cm, simple or branched, sparsely villous toward apex. Leaves alternate, sessile or with petiole less than 5 mm; blade obovate, oblanceolate, spatulate, or rhombic, 7–35 × 5–18 mm, subleathery, abaxially villous, adaxially sparsely hispidulous or glabrescent, base cuneate, margin slightly revolute, 3–9-parted or -lobed toward apex. Flowers solitary, terminal on main stems and branches; pedicels 1–3 cm, brown hirsute. Calyx tube cylindrical, 0.3–1.5 cm, densely brown-red to brown-black hispid; lobes triangular to lanceolate, 1/4–1/2 as long as tube, both sides brown hispid. Corolla pale blue to blue-purple, tubular-campanulate, 3–5.5 cm, outside glabrous, inside densely villous at throat; lobes suborbicular, almost 1/2 as long as tube, apex with a tuft of short brown hairs in center. Ovary

conical, subequal to calyx tube in length; style extending up to middle part of corolla; stigma large, 5-fid. Fl. Aug–Sep.

Grassy slopes, forests; 2800–4500 m. SE Xizang (Nyingchi, Yadong, Zayü), NW Yunnan (Bijiang, Gongshan, Weixi) [Bhutan, N India, N Myanmar, Nepal].

“*Cyananthus insignis*” (R. E. Grahame, Gard. Chron., ser. 3, 107: 10. 1940) belongs here but was not validly published because no Latin description or diagnosis was provided (*Vienna Code*, Art. 36.1).

9. *Cyananthus pedunculatus* C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 434. 1881.

有梗蓝钟花 you geng lan zhong hua

Roots carrot-shaped, up to 1.2 cm in diam. Caudexes robust, branched, covered with persistent scales toward apex; scales straw-colored, elliptic to lanceolate. Stems caespitose, ascending or sprawling, 10–20 cm, usually simple, hispidulous. Leaves alternate, gradually increasing in size toward apex, subsessile; blade elliptic, ovate-lanceolate, lanceolate, or linear-lanceolate, 7–16 × 2–6 mm, both surfaces hispidulous, base rounded, obtuse, or cuneate, margin entire or shallowly sinuous above middle. Flowers solitary, terminal; pedicels 1.2–4 cm,

brown- or black villous. Calyx densely brown-black hirsute; tube cylindrical, 9–15 × 5–10 mm; lobes lanceolate-triangular, 2/5–1/2 as long as tube. Corolla purple-blue, funnelform-campanulate, 2.5–4.5 cm, throat glabrous or sparsely villous; lobes suborbicular, ca. 1/2 as long as tube, apex with brown hirsute tuft. Ovary subequal to calyx in length; style extending up to corolla throat; stigma 5-fid. Fl. Aug–Sep.

Alpine scrub; 3600–4900 m. S Xizang (Yadong) [Bhutan, NE India, Nepal].

10. *Cyananthus sericeus* Y. S. Lian, Acta Phytotax. Sin. 17(3): 122. 1979.

绢毛蓝钟花 juan mao lan zhong hua

Caudexes robust, branched, densely covered with narrowly ovate or ovate-oblong persistent scales toward apex; scales 3–5 mm. Stems slender, 20–30 cm tall, densely sericeous when young, eventually glabrescent. Leaves alternate, those toward base scalelike, ca. 2 × 1 mm, sparsely villous; blade of middle and upper leaves narrowly elliptic, 8–12 × 2–4 mm, abaxially densely retrorsely and appressed sericeous, adaxially glabrous or sparsely hairy. Flowers solitary and terminal, subtended by a whorl-like aggregation of 3 or 4 leaves; pedicels 5–12 mm, brown- or black villous. Calyx densely brown- or black hirsute; tube cylindrical, 15–20 × 9–11 mm; lobes lanceolate-triangular, ca. 1/2 as long as tube, margin white villous. Corolla blue, with darker blue veins, 3.5–4 cm, glabrous; lobes broadly obovate, ca. 1/2 as long as tube. Ovary conical, slightly shorter than calyx. Style almost extending up to corolla throat. Fl. Sep.

• Rocky crevices; 3500–3600 m. SE Xizang (Cona).

11. *Cyananthus microphyllus* Edgeworth, Trans. Linn. Soc. London 20: 81. 1846.

小叶蓝钟花 xiao ye lan zhong hua

Cyananthus linifolius Wallich ex J. D. Hooker & Thomson, nom. illeg. superfl.; *C. nepalensis* Kitamura.

Caudexes robust, branched, densely covered with scales toward apex; scales elliptic to lanceolate, ca. 5 × 2 mm. Stems brownish red, slender, 5–25 cm, branched toward base, glabrous or sparsely puberulent. Leaves alternate, almost sessile; blade ovate, lanceolate, or linear-elliptic, 5–13 × 1.5–5 mm, abaxially sericeous, adaxially glabrous, base rounded to subcordate, margin revolute, entire, or sinuous, apex obtuse or acute. Flowers solitary and terminal; pedicels 3–10 mm, brown- or black setose. Calyx brown- or black setose; tube cylindrical, 7–10 mm, base truncate; lobes triangular, 1/2–2/3 as long as tube, both sides hairy. Corolla blue-purple or blue, cylindrical-campanulate, 1.8–2.8 cm, glabrous or brown- or black setose, densely white fimbriate villous inside; lobes obovate-oblong, subequal to tube in length. Ovary conical, nearly as long as calyx; style extending up to corolla throat. Seeds shiny brown, oblong, ca. 2 × 0.5–0.7 mm. Fl. Sep.

3. *Cyananthus* sect. *Annui* (Y. S. Lian) D. Y. Hong & L. M. Ma, Acta Phytotax. Sin. 29: 48. 1991.

蓝钟花组 lan zhong hua zu

Mountain slopes; 3300–4300 m. S Xizang (Nyalam) [N India, Nepal].

Chinese plants are *Cyananthus microphyllus* subsp. *microphyllus*; *C. microphyllus* subsp. *williamsonii* K. K. Shrestha is known only from Nepal.

12. *Cyananthus cordifolius* Duthie, Bull. Misc. Inform. Kew 1912: 37. 1912.

心叶蓝钟花 xin ye lan zhong hua

Caudexes robust, branched. Stems decumbent, slender, 14–27 cm, sparsely arachnoid-villous, sterile-branched at middle. Leaves alternate, subsessile, those of main stem with blade cordate to triangular-ovate, 10–15 × 5–9 mm, abaxially sparsely villous, adaxially glabrous or sparsely puberulent, base cordate, obtuse, or rounded, margin serrate, apex acute or obtuse; leaves on sterile branches with blade much smaller, elliptic-ovate, almost entire, base rounded or rarely cordate. Flowers solitary and terminal; pedicels 5–18 mm, brown- or black setose. Calyx densely brown- or black setose; tube cylindrical, 11–16 × 5–8 mm, base truncate; lobes lanceolate-triangular, slightly shorter than tube, inside both black- and white villous. Corolla blue or pale blue, cylindrical-campanulate, 2.5–3.5 cm, densely villous at throat; lobes oblong, 12–15 × 5–6 mm. Ovary conical-ovoid, slightly shorter than calyx; style extending up to corolla throat. Fl. Aug.

Mountain thickets; 3000–4000 m. S Xizang (Gyirong) [NW India, Nepal].

13. *Cyananthus sherriffii* Cowan, New Fl. & Silva 10: 181. 1938.

杂毛蓝钟花 za mao lan zhong hua

Caudexes robust, somewhat lignified, branched, densely covered toward apex with persistent scales; scales oblong or lanceolate, up to 10 mm. Stems caespitose, dark brown, slender, 5–15 cm, sparsely arachnoid-pubescent. Leaves alternate, gradually increasing in size toward apex, sessile or shortly petiolate; blade linear or narrowly elliptic, 4–8 × 1–3 mm, abaxially silvery sericeous, adaxially sparsely arachnoid-villous along midvein. Flowers solitary, terminal on longer stems, subtended by a whorl-like aggregation of 4 or 5 leaves that are 8–12 × 2–3.5 mm; pedicels 5–8 mm. Calyx glaucous and densely brown- or black setose; tube cylindrical, 10–15 × 5–7 mm, base truncate; lobes triangular or lanceolate, ca. 1/3 as long as tube, both sides pubescent. Corolla blue or gray-blue, cylindrical-campanulate, ca. 2.5 cm, outside glabrous, inside villous at throat; lobes oblong, apex with a brown villous tuft. Ovary conical, nearly as long as calyx; style extending up to corolla throat; stigma 5-fid. Fl. Jul–Aug.

• Alpine meadows or thickets; 3200–5000 m. S Xizang (Lhünzê, Nangxian).

Cyananthus subsect. *Annu* Y. S. Lian in D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 183. 1983.

Plants annual, lacking a caudex. Calyx sometimes 4-lobed. Corolla sometimes 3- or 4-lobed. Ovary sometimes 3- or 4-locular.

Four species: Himalaya and the Hengduan Mountains; four species (two endemic) in China.

14. *Cyananthus lichiangensis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 109. 1913.

丽江蓝钟花 li jiang lan zhong hua

Stems caespitose, 10–30 cm tall, glabrous, simple or with slender branches. Leaves sparse, alternate; petiole 2–5 mm, villous; blade ovate or triangular, 5–13 × 5–11 mm, both surfaces hispidulous, base truncate or obtuse, margin revolute, entire, sinuous, or crenulate, apex obtuse. Flowers solitary, terminal on both main stems and branches, subtended by a whorl-like aggregation of 4 or 5 leaves; pedicels 2–5 mm, glabrous. Calyx with red-brown setae outside, base of setae swollen, often black verrucose; tube cylindrical, 8–10 × 6–9 mm; lobes obovate-oblong or obdeltoid, ca. 1/3 as long as tube, broadest part at or above middle, outside sparsely red-brown setose, inside appressed red-brown villous. Corolla pale or greenish yellow, sometimes blue- or purple striate, cylindrical-campanulate, ca. 2 × as long as calyx tube, outside glabrous, inside densely villous at throat; lobes oblong, 1/3–1/2 as long as tube, apex acute or obtuse. Ovary nearly as long as calyx tube; style extending up to corolla throat. Capsules exerted beyond calyx at maturity. Seeds oblong, ca. 1 × 0.5 mm, obtuse at both ends. Fl. Aug.

• Grassy slopes, grassy places at forest margins; 3000–4000 m. SW Sichuan, Xizang, N Yunnan (Dêqên, Lijiang, Zhenxiong).

15. *Cyananthus fasciculatus* C. Marquand, Bull. Misc. Inform. Kew 1924: 247. 1924.

束花蓝钟花 shu hua lan zhong hua

Stems 30–100 cm, branched, glabrous or sparsely villous; branches long and spreading. Leaves alternate, scattered; petiole slender, 5–10 mm, glabrous or sparsely villous; blade ovate or suborbicular, 4–16 × 4–15 mm, abaxially usually glabrous, adaxially sparsely hispidulous, base obtuse, truncate, or subcordate, apex rounded or obtuse. Flowers in dichasia, aggregated at top of main stems and branches, subtended by whorl-like aggregations of 4 or 5 leaves; pedicels 2–4 mm, slender, glabrous. Calyx moderately to densely brown setose; tube subcylindrical, broader toward rounded base, 5–8 × 3–5 mm; lobes usually 5 (some on lower branches with only 4), narrowly triangular, ciliate. Corolla pale blue, cylindrical-campanulate, 14–17 mm, outside glabrous, inside villous near throat; lobes (4 or)5, obovate-oblong, ca. 5 × 1.5–3 mm. Ovary subequaling calyx tube; style exerted above corolla tube. Capsules exceeding calyx at maturity. Seeds ellipsoid, ca. 0.5 × 0.2 mm, both ends acute. Fl. Sep–Oct.

• Forests, thickets, grassy slopes; 2400–3500 m. W Sichuan, N Yunnan.

16. *Cyananthus inflatus* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 21. 1857.

胀萼蓝钟花 zhang e lan zhong hua

Cyananthus forrestii Diels; *C. pseudoinflatus* P. C. Tsoong.

Stems erect or ascending, up to 80 cm, branched, sparsely villous or glabrous. Leaves alternate, sparse; petiole slender, 2–7 mm, villous; blade orbicular, ovate, or triangular, 5–15 × 3–10 mm, abaxially hirsute, adaxially hispidulous, base rounded, truncate, or obtuse, margin entire or obscurely crenulate, apex obtuse. Flowers usually solitary, terminal on main stems and branches, subtended by a whorl-like aggregation of 3–5 leaves; pedicels 2–5 mm, slender, brown hirsute. Calyx densely brown hirsute outside; tube urceolate at anthesis, 7–12 mm, becoming conspicuously inflated after flowering; lobes 5, deltoid, 1/4–2/5 as long as tube, both sides brown hirsute. Corolla pale blue, cylindrical-campanulate, almost 2 × as long as calyx, outside glabrous, inside densely villous at throat; lobes 5, narrowly obovate, nearly 1/2 as long as tube. Ovary slightly shorter than calyx; style extending up to corolla throat. Capsules ovoid, exceeding calyx in height at maturity, 5-loculicidal. Seeds brown-red, ellipsoid, ca. 0.5 × 0.2 mm, obtuse at both ends. Fl. Aug–Sep. $2n = 14$.

Alpine meadows, grassy and shrubby slopes; 1900–4900 m. W Guizhou (Weining), W Sichuan, S Xizang, N Yunnan [Bhutan, N India, Myanmar, Nepal].

17. *Cyananthus hookeri* C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 435. 1881.

蓝钟花 lan zhong hua

Cyananthus cronquistii K. K. Shrestha; *C. hookeri* var. *densus* C. Marquand; *C. hookeri* var. *grandiflorus* C. Marquand; *C. hookeri* var. *hispidus* Franchet; *C. hookeri* var. *levicalyx* Y. S. Lian; *C. hookeri* var. *levicaulis* Franchet.

Stems usually caespitose, suberect or ascending, 4–20 cm, glabrous to rather densely villous; branches 1.5–10 cm. Leaves alternate; blade rhombic or ovate, 3–7 × 2–6 mm, abaxially sparsely to rather densely hirsute, adaxially sparsely to rather densely hispidulous, base obtuse or truncate, abruptly attenuate into petiole, margin crenate or sometimes entire, apex obtuse or subacute; petiole 1–4 mm. Flowers small, solitary, terminal on main stems and branches, subtended by a whorl-like aggregation of 3–5 leaves, almost sessile. Calyx densely hirsute outside with long stiff yellow-brown hairs, rarely subglabrous; tube ovoid, 3–8 mm; lobes (3 or)4(or 5), triangular, 1/3–1/2 as long as tube, both sides hirsute. Corolla purple-blue, cylindrical, 7–15 mm, outside glabrous, inside densely villous at throat; lobes usually (3 or)4(or 5), narrowly obovate or oblong, apex often with 3 or 4 brown-yellow villous hairs. Stamens 4. Style extending above corolla throat; stigma 4-fid. Capsules ovoid, exerted above calyx at maturity. Seeds narrowly ovoid, ca. 1.2 × 0.4 mm. Fl. Aug–Sep.

Thickets, grasslands; 2700–4500 m. SE Gansu (Tao He basin), S Qinghai (Tongren, Yushu), W Sichuan (W of Kangding and Lixian), E Xizang (E of Namling), N Yunnan [Bhutan, NE India (Sikkim), Nepal].

