

TYPHACEAE

香蒲科 xiang pu ke

Sun Kun (孙坤)¹; David A. Simpson²

Herbs, perennial, aquatic or in marshes, with creeping rhizomes. Stems simple or branched, robust or slender. Leaves alternate, distichous, erect, emergent or floating, sheathed at base. Plants monoecious. Bracts leaflike. Inflorescence either of globose heads on upper part of stems and branches with several male and female heads in a panicle, raceme, or spike, male heads above female, or of a single cylindrical spike with lower part female and upper part male. Flowers minute, numerous. Perianth segments of 3–6 chaffy elongate scales or absent. Male flowers with 1 or more stamens; anthers basifixed, longitudinally dehiscent. Female flowers bracteolate or with fine hairs at base; ovary 1-loculed, rarely 2-loculed, narrow at base or on a long capillary stalk; styles simple or forked; stigma unilateral, broadened or spatulate; ovule 1. Fruit minute, nutlike, indehiscent, falling off together with stalk if present. Seeds with thin testa.

Two genera and ca. 35 species: tropical and temperate regions; two genera and 23 species (six endemic) in China.

Chen Yaodong. 1992. Typhaceae and Sparganiaceae. In: Sun Xiangzhong, ed., Fl. Reipubl. Popularis Sin. 8: 1–12, 23–31.

- 1a. Male and female flowers in separate globose heads 1. *Sparganium*
- 1b. Flowers in a dense cylindrical spike, lower part female and upper part male, sometimes separated by a gap 2. *Typha*

1. SPARGANIUM Linnaeus, Sp. Pl. 2: 971. 1753.

黑三棱属 hei san leng shu

Herbs, perennial, aquatic or in marshes, with creeping rhizomes. Stems simple or branched, robust or slender. Leaves alternate, distichous, emergent or floating, sheathed at base. Flowers minute, densely crowded in globose heads on upper part of stems and branches; several male and female heads in panicle, raceme, or spike, male heads above female. Perianth segments of 3–6 chaffy elongate scales. Male flowers with 3 or more stamens; anthers basifixed, longitudinally dehiscent; filaments free or partly united. Female flowers bracteolate; ovary 1-loculed or rarely 2-loculed, narrow at base; styles simple or forked, with a unilateral stigma; ovule 1, pendulous. Fruit nutlike, indehiscent.

About 19 species: mainly in temperate and cool regions of the world, best represented in the N Hemisphere; 11 species (three endemic) in China.

- 1a. Stems floating or slightly prostrate in water; leaves usually floating, flattened.
 - 2a. Stems stout, 1.3–1.5 m tall; leaves ca. 10 mm wide; male heads 8–10 8. *S. yunnanense*
 - 2b. Stems slender, less than 70 cm tall; leaves 2–4 mm wide; male heads 1–4.
 - 3a. Styles absent or inconspicuous; fruit broadly obovoid 11. *S. hyperboreum*
 - 3b. Styles conspicuous; fruit fusiform, elliptic, or lanceolate.
 - 4a. Stems floating, more than 20 cm; male heads 2–4 9. *S. angustifolium*
 - 4b. Stems slightly prostrate or rarely erect, less than 20 cm; male heads 1 or 2 10. *S. natans*
- 1b. Stems erect; leaves aerial, not flattened.
 - 5a. Inflorescences paniculate, with conspicuous lateral branches with male and female heads; ovary sessile.
 - 6a. Panicles with 3–7 lateral branches; stigmas 3–4 mm 1. *S. stoloniferum*
 - 6b. Panicles with 1(or 2) lateral branches; stigmas less than 2 mm.
 - 7a. Leaves 2–3 mm wide; main axis and lateral branch of panicles not zigzag; styles ca. 0.5 mm 2. *S. subglobosum*
 - 7b. Leaves 4–5 mm wide; main axis and lateral branch of panicles usually zigzag; styles 1–1.5 mm 3. *S. limosum*
 - 5b. Inflorescences racemose or spicate, degenerated into 1 female head or completely degenerated; ovary with short stalk.
 - 8a. Inflorescences spicate; perianth segments lobate to parted 7. *S. confertum*
 - 8b. Inflorescences racemose; perianth segments serrate-lobate to lobate.
 - 9a. Axis of racemes curved; ovary attenuate toward base and forming an inconspicuous stalk 4. *S. fallax*
 - 9b. Axis of racemes not curved; ovary with a conspicuous stalk.
 - 10a. Male heads 4–8, distinctly separate from female ones; stigmas 1.5–1.8 mm 5. *S. emersum*
 - 10b. Male heads 1–3, not separate from female ones; stigmas ca. 0.5 mm 6. *S. glomeratum*

1. *Sparganium stoloniferum* (Buchanan-Hamilton ex Graebner) Buchanan-Hamilton ex Juzepczuk in Komarov, Fl. URSS 1: 219. 1934.

Stems emersed, erect, robust, 70–120 cm tall or more. Leaves (20–)40–90 cm × 7–16 mm, upper flattened, lower keeled or trigonous on abaxial side. Panicles (8–)20–60 cm, with 3–7 lateral branches, each with (1 or)7–11 male heads and 1 or 2 female heads; main axis consisting of 3–5 or more male

黑三棱 hei san leng

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heads. Male flowers: perianth segments spatulate, lobate at apex; filaments ca. 3 mm; anthers obconic, (0.5–)1–1.2 × ca. 0.5 mm. Female flowers: perianth segments 5–7 × 1–1.5 mm; ovary sessile; styles forked or simple, ca. 1.5 mm; stigmas 3–4 mm. Fruit obconic, (3.5–)6–9 mm, ribbed. Fl. and fr. May–Oct.

Lakes, ponds, swamps, streams; below 3600 m. ?Anhui, Gansu, Hebei, Heilongjiang, ?Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, ?Shandong, Shanxi, Xinjiang, Xizang, Yunnan, ?Zhejiang [Afghanistan, Japan, Kazakhstan, Korea, Mongolia, Pakistan, Russia, Tajikistan, Uzbekistan; SW Asia, North America].

- 1a. Panicles 20–60 cm, each branch with 7–11 male heads; anthers 1–1.2 mm; fruit 6–9 mm 1a. subsp. *stoloniferum*
 1b. Panicles 8–15 cm, each branch with only 1 male head; anthers ca. 0.5 mm; fruit ca. 3.5 mm 1b. subsp. *choui*

1a. *Sparganium stoloniferum* subsp. *stoloniferum*

黑三棱(原亚种) *hei san leng* (yuan ya zhong)

Sparganium ramosum Hudson subsp. *stoloniferum* Buchanan-Hamilton ex Graebner in Engler, Pflanz. 2(IV. 10): 14. 1900; *S. arcuscaulis* D. Yu & G. T. Yang; *S. erectum* Linnaeus subsp. *stoloniferum* (Buchanan-Hamilton ex Graebner) H. Hara; *S. multiporcatum* D. Yu.

Panicles 20–60 cm, each branch with 7–11 male heads. Anthers 1–1.2 mm. Fruit 6–9 mm.

Lakes, ponds, swamps, streams; below 3600 m. Gansu, Hebei, Heilongjiang, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi, Xinjiang, Xizang, Yunnan [Afghanistan, Japan, Kazakhstan, Korea, Pakistan, Russia, Tajikistan, Uzbekistan; SW Asia].

Some specimens from Heilongjiang were respectively described as *Sparganium multiporcatum* (Bull. Bot. Res., Harbin 11(2): 20. 1991) and *S. arcuscaulis* (loc. cit.: 37), distinguished either by the female flowers with perianth segments slightly lobate, stigmas 1.5–2 mm, or by the stems arcuate at the upper part, fruit slightly small. They represent local variant individuals rather than distinct taxa.

Govaerts (2010. World Checklist of Typhaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/> accessed 16 Feb 2010) treats this as *Sparganium erectum* subsp. *stoloniferum*.

1b. *Sparganium stoloniferum* subsp. *choui* (D. Yu) K. Sun, comb. et stat. nov.

周氏黑三棱 *zhou shi hei san leng*

Basionym: *Sparganium choui* D. Yu, Bull. Bot. Res., Harbin 12: 257. 1992.

Panicles 8–15 cm, each branch with only 1 male head. Anthers ca. 0.5 mm. Fruit ca. 3.5 mm.

- Nei Mongol.

2. *Sparganium subglobosum* Morong, Bull. Torrey Bot. Club 15: 81. 1888.

狭叶黑三棱 *xia ye hei san leng*

Sparganium stenophyllum Maximowicz ex Meinshausen.

Stems erect, 20–36 cm tall, slender. Leaves 25–35 cm × 2–3 mm, upper flattened, lower keeled or trigonous on abaxial side. Panicles 7–15 cm, main axis consisting of 5–7 male heads and 2 or 3 female heads, usually with 1 lateral branch at base; lateral branch 5–8 cm, with 2 or 3 male and 1 or 2 female heads. Male flowers: perianth segments spatulate, ca. 2 mm, lobate at apex; filaments ca. 2 mm; anthers oblong, ca. 1 × 0.3 mm. Female flowers: perianth segments spatulate, ca. 2 mm, lobate at apex; ovary sessile; styles ca. 0.5 mm; stigmas unilateral, ca. 1.5 mm. Fruit obovoid, ca. 4 mm. Fl. and fr. Jun–Sep.

Shallow water of lakes, swamps, and streams. Hebei, Heilongjiang, Jilin, Liaoning [Japan, Korea, Russia].

3. *Sparganium limosum* Y. D. Chen, Acta Phytotax. Sin. 19: 52. 1981.

沼生黑三棱 *zhao sheng hei san leng*

Stems emersed, erect, 33–57 cm tall. Leaves erect, 50–70 cm × 4–5 mm, upper flattened, lower keeled or trigonous on abaxial side. Panicles 7–16 cm, with 1 lateral branch at base, main axis and lateral branch usually zigzag; main axis with 5–8 male heads and 2 or 3 female heads; lateral branch with 3(–5) male and 1 female heads. Male flowers: perianth segments ca. 1.5 × 0.2 mm; filaments 3–4 mm; anthers oblong, ca. 1 × 0.2 mm. Female flowers: perianth segments 1.7–2.5 × ca. 1 mm, serrate-lobate at apex; ovary sessile; styles 1–1.5 mm; stigmas linear, 1–1.2 mm. Fl. and fr. Jun–Sep.

- Swamps; ca. 1800 m. NW Yunnan (Gaoligong Shan).

Govaerts (2010. World Checklist of Typhaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/> accessed 16 Feb 2010) treats this as a synonym of *Sparganium subglobosum*.

4. *Sparganium fallax* Graebner in Engler, Pflanz. 2(IV. 10): 15. 1900.

曲轴黑三棱 *qu zhou hei san leng*

Stems emersed, erect, 40–55(–80) cm tall. Leaves 45–65 cm × 4–10 mm, upper flattened, lower keeled or trigonous on abaxial side. Racemes 15–17 cm, basally curved; male heads 4–7, distinctly separated from female ones; female heads 3 or 4(–7), relatively widely separated, sessile or lowest pedunculate. Male flowers: perianth segments linear, 2–2.5 mm, serrate-lobate at apex; filaments 3–4.5 mm; anthers oblong, ca. 1.5 × 0.4 mm. Female flowers: perianth segments broadly spatulate, ca. 3 × 1–1.5 mm, serrate-lobate at apex; ovary attenuate toward base; styles short; stigmas 1.5–2 mm. Fruit broadly fusiform, 5–6 mm. Fl. and fr. Jun–Oct.

Shallow water of lakes, ponds, swamps, and streams. Fujian, Guizhou, Taiwan, Yunnan, Zhejiang [India, Indonesia (Sumatra), Japan, Myanmar, New Guinea].

5. *Sparganium emersum* Rehm, Verh. Naturf. Vereins Brünn 10: 80. 1872.

小黑三棱 *xiao hei san leng*

Sparganium simplex Hudson, Fl. Angl., ed. 2, 2: 401. 1778, nom. illeg. superfl.

Stems emersed, erect, 30–70 cm tall, slender. Leaves 40–80 cm, aerial or floating, lower keeled on abaxial side. Racemes 10–20 cm; male heads 4–8, distinctly separate from female ones; female heads 3 or 4, relatively widely separated, sessile or lowest 1 or 2 pedunculate. Male flowers: perianth segments linear or spatulate, 2–2.5 mm, lobate at apex; filaments ca. 4 mm; anthers oblong, ca. 1.6 × 0.4 mm. Female flowers: perianth segments spatulate, ca. 3.5 mm, lobate at apex; ovary with short stalk; styles ca. 1 mm; stigmas 1.5–1.8 mm. Fruit fusiform. Fl. and fr. Jun–Oct. $2n = 30$.

Margins of lakes, swamps, and streams. Gansu, ?Hebei, Heilongjiang, ?Henan, Jilin, Liaoning, Nei Mongol, ?Shaanxi, Xinjiang [Japan, Kazakhstan, Kyrgyzstan, Mongolia, Myanmar, Russia; Europe, North America].

6. *Sparganium glomeratum* Laestadius ex Beurling, Öfvers. Kongl. Vetensk.-Akad. Förh. 9: 192. 1853.

短序黑三棱 duan xu hei san leng

Sparganium manshuricum D. Yu.

Stems emersed, erect, 20–50 cm tall. Leaves 30–56 cm, lower keeled or trigonous on abaxial side. Racemes 6–15 cm; male heads 1–3, not separate from female ones; female heads 3 or 4(–8), relatively near each other, lowest one pedunculate. Male flowers: perianth segments ca. 1.5 mm, serrate-lobate at apex; filaments 3–3.5 mm; anthers oblong, ca. 1 mm. Female flowers: perianth segments 2–2.5 mm, lobate at apex; ovary fusiform, with short stalk; styles short; stigmas ca. 0.5 mm. Fruit broadly fusiform, ca. 3 mm. Fl. and fr. Jun–Sep. $2n = 30$.

Margins of lakes, swamps, and slow-moving rivers. Heilongjiang, Jilin, Liaoning, Nei Mongol, Xizang, Yunnan [Japan, Mongolia, Russia; Europe, North America].

A specimen with seven or eight female heads and larger flowers from Heilongjiang, which was described as *Sparganium manshuricum* (Bull. Bot. Res., Harbin 12: 255. 1992) mainly according to some quantitative characters, perhaps represents a local variant suite of specimens rather than a distinct taxon.

7. *Sparganium confertum* Y. D. Chen, Acta Phytotax. Sin. 19: 53. 1981.

穗状黑三棱 sui zhuang hei san leng

Stems emersed, erect, 15–45 cm tall. Leaves 25–55 cm × 3–5 mm, lower keeled on abaxial side. Spikes with many densely arranged heads, 6–11 cm; male heads (6–)8–12, deciduous; female heads 1–3, sessile or rarely lowest one sterile, pedunculate. Female flowers: perianth segments 3–5 × ca. 1.5 mm, lobate to parted at apex; ovary elliptic, with stalk 1.5–2 mm; styles ca. 1 mm; stigmas unilateral, 1–1.5 mm. Fruit 4–5 mm. Fl. and fr. Sep–Oct.

• Shallow water of rivers, swamps, and ponds; ca. 3100 m. NW Yunnan (Gaoligong Shan).

Govaerts (2010. World Checklist of Typhaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/> accessed 16 Feb 2010) treats this as a synonym of *Sparganium fallax*.

8. *Sparganium yunnanense* Y. D. Chen, Acta Phytotax. Sin. 19: 54. 1981.

云南黑三棱 yun nan hei san leng

Stems floating, 1.3–1.5 m, stout. Leaves floating, ca. 1.5 m × 1 cm, flattened, spongy, lower slightly convex on abaxial side. Racemes 20–35 cm, lower part ?curved; male heads 8–10; female heads 3 or 4(–7), sessile or lowest 1 or 2 pedunculate. Male flowers: perianth segments spatulate, 3–3.5 mm; filaments 3–4 mm; anthers linear, ca. 2 mm. Female flowers: perianth segments white, spatulate, 4–5 mm, lobate at apex; ovary fusiform, attenuate toward base; styles ca. 1.5 mm; stigmas oblong to ovate, 1.5–2 mm, lacerate or forked. Fl. and fr. May–Sep.

• About 1500 m. SW Yunnan (Menghai).

Govaerts (2010. World Checklist of Typhaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/> accessed 16 Feb 2010) treats this as a synonym of *Sparganium fallax*.

9. *Sparganium angustifolium* Michaux, Fl. Bor.-Amer. 2: 189. 1803.

线叶黑三棱 xian ye hei san leng

Stems floating, 30–50 cm, slender. Leaves floating, 25–40 cm × ca. 4 mm, flattened. Racemes 6–16 cm; male heads 2–4; female heads 2–4, relatively widely separated, sessile or lowest 1 or 2 pedunculate. Male flowers: perianth segments spatulate to obtriangular; filaments ca. 5 mm; anthers elliptic, 1–1.2 × ca. 0.5 mm. Female flowers: perianth segments linear to spatulate, serrate-lobate to parted; ovary fusiform, attenuate toward base and forming a short stalk; styles ca. 2 mm; stigmas narrowly elliptic. Fruit fusiform to elliptic, ca. 4 mm. Fl. and fr. Jul–Sep. $2n = 30$.

Lakes, streams, swamps; above 1500 m. Heilongjiang, Jilin, Xinjiang [India, Japan; Europe, North America].

10. *Sparganium natans* Linnaeus, Sp. Pl. 2: 971. 1753.

矮黑三棱 ai hei san leng

Sparganium minimum Wallroth.

Stems slightly prostrate or rarely erect, to 20 cm, slender. Leaves aerial or floating, 20–25 cm × ca. 4 mm, flattened. Spikes or racemes 2–3.5 cm; male heads 1(or 2); female heads 2(or 3), lowest one sometimes pedunculate. Male flowers: perianth segments ca. 1.5 mm, lobate at apex; filaments ca. 2 mm; anthers oblong, ca. 1 mm. Female flowers: perianth segments spatulate, ca. 2 mm, lobate to parted at apex; ovary lanceolate, with or without short stalk; styles short; stigmas ca. 1 mm. Fruit broadly lanceolate. Fl. and fr. Jul–Sep. $2n = 30$.

Below 3500 m. Heilongjiang, Nei Mongol, Sichuan [Kazakhstan, Mongolia, Russia; Europe, North America].

Specimens described as *Sparganium amplexicaulium* D. Yu (Bull. Bot. Res., Harbin 12: 257. 1992) and *S. tenuicaule* D. Yu & L. H. Liu (Bull. Bot. Res., Harbin 11(2): 19. 1991) are similar to this species. Because the two species were mainly described according to some quantitative characters and based on only one specimen, respectively, their taxonomic positions need to be further studied.

11. Sparganium hyperboreum Laestadius ex Beurling, Öfvers. Kongl. Vetensk.-Akad. Förh. 9: 192. 1853.

无柱黑三棱 wu zhu hei san leng

Stems floating, 30–50 cm or more, slender. Leaves floating, 30–40 cm × 1–3 mm, transverse section semilunate. Racemes 5–7 cm, axis straight; male heads 1 or 2, smaller; female heads 2 or 3, lowest one pedunculate. Male flowers: peri-

anth segments 2–2.5 mm, attenuate toward base; filaments short; anthers oblong, ca. 1 × 0.5 mm. Female flowers: perianth segments linear to obtriangular, ca. 1.5 × 1–1.3 mm, serrate-lobate at apex; ovary elliptic; styles absent or inconspicuous; stigmas elliptic, ca. 1 mm. Fruit broadly obovoid, ca. 4 mm. Fl. and fr. Jul–Aug. $2n = 30$.

Lakes, ponds, swamps; ca. 1500 m. Heilongjiang, Jilin [Japan, Korea, Russia; Europe, North America].

2. TYPHA Linnaeus, Sp. Pl. 2: 971. 1753.

香蒲属 xiang pu shu

Herbs, perennial, in marshes or aquatic, with creeping rhizomes. Leaves alternate, erect, distichous, linear, usually spongy, margin entire, sheathed at base. Flowers unisexual, minute, numerous, densely crowded in a cylindric spike with lower part female and upper part male; bracts leaflike. Perianth absent. Male flowers consisting of 1–3 stamens usually connate at base of filaments, surrounded by hairs; anthers 2-theous, basifixed, longitudinally dehiscent; filaments short; pollen grains in monads or tetrads. Female flowers: ovary 1-loculed, on a long capillary stalk with many fine hairs or bracteoles at base; styles capillary; stigmas broadened or spatulate; ovule 1; sterile ovary without style. Fruit minute, falling off together with stalk.

About 16 species: tropical and temperate regions; 12 species (three endemic) in China.

1a. Female flowers without bracteoles; female part of spikes connected with or separated from male part.

2a. Female part of spikes not separated from male part.

3a. Stigmas spatulate; hairs on stalk of female flowers ca. as long as style 1. *T. orientalis*

3b. Stigmas lanceolate; hairs on stalk of female flowers shorter than style 2. *T. latifolia*

2b. Female part of spikes separated from male part.

4a. Stigmas linear, slender; axis of male part in spikes with brown hairs, hairs furcate or not 3. *T. przewalskii*

4b. Stigmas spatulate; axis of male part in spikes with whitish or yellowish brown hairs, hairs not furcate.

5a. Stems 1.5–2 m tall; hairs on stalk of female flowers shorter than style 4. *T. changbaiensis*

5b. Stems 0.8–1.3 m tall; hairs on stalk of female flowers ca. as long as style 5. *T. laxmannii*

1b. Female flowers with bracteoles; female part of spikes separated from male part.

6a. Stems less than 0.8 m, with sheathlike leaves at base.

7a. Axis of male part in spikes with hairs; leaves 2–4 mm wide 12. *T. lugdunensis*

7b. Axis of male part in spikes without hairs; leaves 1–2 mm wide.

8a. Hairs on stalk of female flowers swelling at tip, shorter than style 10. *T. minima*

8b. Hairs on stalk of female flowers not swelling at tip, ca. as long as style 11. *T. pallida*

6b. Stems more than 1 m, without sheathlike leaves.

9a. Bracteoles spatulate or subtriangular; stigmas lanceolate (to linear) 9. *T. davidiana*

9b. Bracteoles not spatulate; stigmas linear to lanceolate.

10a. Leaves abaxially carinate, transverse section triangular; bracteoles linear 6. *T. elephantina*

10b. Leaves abaxially convex, transverse section semicircular; bracteoles filiform to triangular.

11a. Anthers ca. 2 mm; stigmas ca. as broad as styles 7. *T. angustifolia*

11b. Anthers ca. 1.4 mm; stigmas broader than styles 8. *T. domingensis*

1. Typha orientalis C. Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 599; Epimel. Bot. 239. 1851.

东方香蒲 dong fang xiang pu

Typha latifolia Linnaeus var. *orientalis* (C. Presl) Rohrbach; *T. orientalis* var. *brunnea* Skvortsov; *T. shuttleworthii* Lehmann (1846), not W. D. J. Koch & Sonder (1844); *T. shuttleworthii* subsp. *orientalis* (C. Presl) Graebner; *T. shuttleworthii* var. *orientalis* (C. Presl) Rohrbach.

Stems 1.3–2 m tall, stout. Leaves 40–70 cm × 4–9 mm, abaxially convex, transverse section semicircular. Male part of spikes 2.7–9 cm, with 1–3 deciduous bracts at base or occasionally in middle portion; female part of spikes not separated from male part, 4.5–15 cm, with 1 deciduous bract at base. Male

flowers: stamens 3, rarely 2 or 4; anthers ca. 3 mm. Female flowers without bracteoles; ovary fusiform to lanceolate; stalk ca. 2.5 mm, slender; styles 1.2–2 mm; stigmas spatulate, 0.5–0.8 mm; hairs on stalk ca. as long as style. Fruit elliptic. Fl. and fr. May–Aug. $2n = 60$.

Lakes, ponds, channels, swamps, slow-moving rivers. Anhui, Guangdong, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Taiwan, Yunnan, Zhejiang [Japan, Korea, Mongolia, Myanmar, Philippines, Russia; Australia].

2. Typha latifolia Linnaeus, Sp. Pl. 2: 971. 1753.

宽叶香蒲 kuan ye xiang pu

?*Typha latifolia* f. *remota* Skvortsov.

Stems 1–2.5 m tall, stout. Leaves 45–95 cm × 5–15 mm, abaxially convex, transverse section semilunate. Male part of spikes 3.5–12 cm, with 1–3 deciduous bracts at base or occasionally in middle portion; female part of spikes not separated from male part, 5–23 cm. Male flowers: stamens usually 2; anthers ca. 3 mm. Female flowers without bracteoles; ovary lanceolate; stalk ca. 4 mm, slender; styles 2.5–3 mm; stigmas lanceolate, 1–1.2 mm; hairs on stalk shorter than style. Fruit lanceolate. Fl. and fr. May–Aug. $2n = 30$.

Lakes, ponds, channels, swamps, slow-moving rivers. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Shaanxi, Sichuan, Xinjiang, Xizang, Yunnan, Zhejiang [Afghanistan, Japan, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; Africa, SW Asia, Australia, Europe, North and South America].

3. *Typha przewalskii* Skvortsov, Diagn. Pl. Nov. Mandshur. 1. 1943.

普香蒲 pu xiang pu

Stems 1.3–2.2 m tall, stout at base. Leaves 80–100 cm × 5–13 mm, abaxially convex, transverse section semilunate or rarely semicircular. Male part of spikes with 1 or 2 deciduous bracts, axis with brown hairs; female part of spikes separated from male part, 8–20 cm, ca. 2.5 cm in diam., with 1 bract at base. Female flowers without bracteoles; ovary obconic; stalk 3.5–4.5 mm, slender; styles 2–4 mm; stigmas linear, ca. 1 mm; hairs on stalk shorter than style. Fruit fusiform. Fl. and fr. Jun–Sep.

• Shallow rivers or swamps. Heilongjiang, Jilin, Liaoning.

4. *Typha changbaiensis* M. J. Wu & Y. T. Zhao, Bull. Bot. Res., Harbin 20: 251. 2000.

长白香蒲 chang bai xiang pu

Stems 1.5–2 m tall, stout. Leaves 80–100 cm × 6–10 mm, abaxially convex, transverse section semilunate. Male part of spikes 12–14 cm, axis with curved whitish hairs, usually with 1 bract at base and 1 bract near apex; bracts deciduous; female part of spikes 10–12 cm, ca. 1 cm in diam., separated from male part. Male flowers: stamens 2 or 3; anthers ca. 2 mm. Female flowers without bracteoles; ovary fusiform, ca. 0.2 mm; stalk ca. 0.8 mm, slender; stigmas yellowish brown, narrowly spoon-shaped, 0.4–0.5 mm; hairs on stalk shorter than style. Fl. and fr. Jun–Aug.

• S Jilin (Changbai Shan).

5. *Typha laxmannii* Lepechin, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 12: 84. 1801.

无苞香蒲 wu bao xiang pu

Stems 0.8–1.3 m tall, slender. Leaves 50–90 cm × 2–4 mm, abaxially convex, transverse section semicircular. Male part of spikes 6–14 cm, axis with whitish or yellowish brown hairs, with 1 or 2 deciduous bracts at base and in middle portion; female part of spikes distinctly separated from male part, 4–6 cm, with 1 deciduous bract. Male flowers: stamens 2 or 3; anthers ca. 1.5 mm. Female flowers without bracteoles; ovary lanceolate; stalk 2.5–3 mm, slender; styles 0.5–1 mm; stigmas spatulate, 0.6–0.9 mm; hairs on stalk ca. as long as style. Fruit elliptic. Fl. and fr. Jun–Sep. $2n = 30$.

Lakes, ponds, channels, swamps, shallow rivers. Gansu, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang [Afghanistan, Japan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

Typha laxmannii var. *mongolica* Kronfeld (Verh. K. K. Zool.-Bot. Ges. Wien 39: 169. 1889) was treated in Fl. Hebei. (3: 217. 1991).

6. *Typha elephantina* Roxburgh, Fl. Ind., ed. 1832, 3: 566. 1832.

象蒲 xiang pu

Stems 2–2.5 m tall, stout. Leaves 1.3–1.5 m × 8–10 mm, abaxially carinate, transverse section triangular. Male part of spikes with 1 bract at base, axis densely brown hairy; female part of spikes distinctly separated from male part, 14–16 cm, 2–2.5 cm in diam. Female flowers with bracteoles; bracteoles whitish, linear; ovary lanceolate; stalk ca. 3.5 mm; styles 1–2 mm; stigmas lanceolate, ca. 1 mm; hairs on stalk shorter than style. Fl. and fr. Jun–Sep.

Swamps, riversides. Yunnan [India, Myanmar, Nepal, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; Africa].

7. *Typha angustifolia* Linnaeus, Sp. Pl. 2: 971. 1753.

水烛 shui zhu

Stems 1.5–3 m tall, stout. Leaves 52–120 cm × 4–9 mm, abaxially convex, transverse section semicircular. Male part of spikes ca. 8 cm, with 1–3 deciduous bracts; female part of spikes (5–)15–30 cm, separated from male part by an axis 2.5–7 cm. Male flowers: stamens 3, rarely 2 or 4; anthers ca. 2 mm. Female flowers with bracteoles; bracteoles filiform; ovary fusiform; stalk ca. 5 mm, slender; styles 1–1.5 mm; stigmas linear to lanceolate, 1.3–1.8 mm; hairs on stalk shorter than style. Fruit narrowly elliptic. Fl. and fr. Jun–Sep. $2n = 30$.

Shallow water of lakes, ponds, and rivers. ?Anhui, ?Fujian, Gansu, Guizhou, ?Hainan, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, ?Qinghai, Shaanxi, Shandong, Taiwan, Xinjiang, Yunnan, ?Zhejiang [?Afghanistan, India, Indonesia, Japan, Kazakhstan, Kyrgyzstan, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Russia, Tajikistan, Thailand, Uzbekistan; SW Asia, Australia, Europe, North America].

8. *Typha domingensis* Persoon, Syn. Pl. 2: 532. 1807.

长苞香蒲 chang bao xiang pu

Typha angustata Bory & Chaubard; *T. angustifolia* Linnaeus subsp. *angustata* (Bory & Chaubard) Briquet; *T. angustifolia* var. *angustata* (Bory & Chaubard) Jordan.

Stems 0.7–2.5 m tall, stout. Leaves 40–150 cm × 3–8 mm, abaxially convex, transverse section semicircular. Male part of spikes 7–30 cm, with 1 or 2 bracts; bracts to ca. 32 cm, deciduous; female part of spikes 5–23 cm, distinctly separated from male part, with 1 bract at base, with sparse and curved hairs on axis. Male flowers: stamens 3, rarely 2; anthers ca. 1.4 mm. Female flowers with bracteoles; ovary lanceolate; stalk 3–6 mm, slender; styles 0.5–1.5 mm; stigmas linear to lanceolate, 0.8–1.5 mm, broader than styles; hairs on stalk shorter than style. Fruit fusiform. Fl. and fr. Jun–Aug.

Shallow water of lakes, ponds, rivers, and swamps, channels.

?Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan [India, Indonesia, Japan, Kazakhstan, Korea, Kyrgyzstan, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Russia, Sri Lanka, Tajikistan, Uzbekistan, Vietnam; Africa, SW Asia, Australia, Europe, North and South America].

9. *Typha davidiana* (Kronfeld) Handel-Mazzetti, Oesterr. Bot. Z. 87: 133. 1938.

达香蒲 da xiang pu

Typha martini Jordan var. *davidiana* Kronfeld, Verh. K. K. Zool.-Bot. Ges. Wien 39: 149. 1889; *T. laxmannii* Lepechin var. *davidiana* (Kronfeld) C. F. Fang.

Stems ca. 1 m tall. Leaves 60–70 cm × 3–5 mm, abaxially convex, transverse section semicircular. Male part of spikes 12–18 cm, with 1 deciduous bract, axis smooth; female part of spikes distinctly separated from male part, 4.5–11 cm, 1.5–2 cm in diam., with deciduous bract. Female flowers with bracteoles; bracteoles spatulate or subtriangular; ovary lanceolate; stalk 3–4 mm; styles short; stigmas linear to lanceolate, 1–1.2 mm; hairs on stalk ca. as long as style. Fruit lanceolate. Fl. and fr. May–Aug. $2n = 30^*$.

• Margins of lakes and rivers. ?Hebei, ?Henan, Jiangsu, Liaoning, Nei Mongol, Xinjiang, Zhejiang.

10. *Typha minima* Funck ex Hoppe, Bot. Taschenb. Anfänger Wiss. Apothekerkunst 5: 187. 1794.

小香蒲 xiao xiang pu

Rohrbachia minima (Funck ex Hoppe) Mavrodiev.

Stems 16–65 cm tall, slender. Leaves usually basal, sheathlike, often without blade or sometimes with blade, 15–40 cm × 1–2 mm, shorter than scape. Male part of spikes 3–8 cm, without hair on axis, with 1 deciduous bract at base; female part of spikes distinctly separated from male part, 1.6–4.5 cm, with bract at base. Male flowers: stamens 1, rarely 2 or 3; anthers ca. 1.5 mm. Female flowers with bracteoles; ovary fusiform; stalk ca. 4 mm, slender; styles ca. 0.5 mm; stigmas linear, ca. 0.5 mm; hairs on stalk swelling at tip, shorter than styles. Fruit elliptic. Fl. and fr. May–Aug.

Shallow water of ponds and rivers. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shan-

xi, Sichuan, Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

11. *Typha pallida* Pobedimova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 11: 17. 1949.

球序香蒲 qiu xu xiang pu

Stems 70–80 cm tall, slender. Leaves dimorphic; sheathlike leaves 4–12 cm; linear leaves 40–45 cm × 1–2 mm, abaxially convex, transverse section semicircular. Male part of spikes 4–5 cm, without hairs on axis, with 1 deciduous bract at base; female part of spikes separated from male part, 2.5–4.5 cm, with a deciduous bract at base. Male flowers: stamen 1; anthers ca. 1.5 mm. Female flowers with bracteoles; ovary elliptic; styles ca. 0.6 mm; stigmas linear, ca. 0.8 mm; hairs on stalk ca. as long as styles. Fruit elliptic. Fl. and fr. May–Sep.

Ponds, streams, swamps. Hebei, Nei Mongol, Xinjiang [C Asia].

Closely related to *Typha minima*, this species is treated as *T. minima* by Govaerts (2010). World Checklist of Typhaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/> accessed 16 Feb 2010). Further work is needed to determine the relationships between these two taxa.

12. *Typha lugdunensis* P. Chabert, Bull. Soc. Hort. Prat. Dép. Rhône 1850: 149. 1850.

短序香蒲 duan xu xiang pu

Typha gracilis Jordan, Index Seminum [Grenoble] 1849: 24. 1849, not Rafinesque (1837), nor Reichenbach (1847).

Stems 45–70 cm tall, slender. Leaves dimorphic; sheathlike leaves basal, 4–9 cm; linear leaves 2–4, slightly longer than scape, 50–75 cm × 2–4 mm, abaxially convex, transverse section semicircular. Male part of spikes 3–6 cm, axis hairy, with 1 bract; female part of spikes separated from male part, 1.5–3 cm, 1–1.5 cm in diam. Male flowers: stamens 1; anthers ca. 1.2 mm. Female flowers with small, brown bracteoles; ovary fusiform to elliptic; stalk 2.5–4 mm; styles ca. 0.5 mm, slender; stigmas lanceolate, ca. 0.7 mm; hairs on stalk swelling at tip, shorter than style. Fruit elliptic. Fl. and fr. May–Aug.

Sides of channels, swamps, wetlands. Hebei, Nei Mongol, Shandong, Xinjiang [N and SW Asia, Europe].