

**10. SCHOENOPLECTUS** (Reichenbach) Palla, Verh. K. K. Zool.-Bot. Ges. Wien 38  
(Sitzungsber.): 49. 1888, nom. cons.

水葱属 shui cong shu

Liang Songyun (梁松筠 Liang Song-jun); Gordon C. Tucker, Tetsuo Koyama

*Scirpus* subg. *Schoenoplectus* Reichenbach, Icon. Fl. Germ. Helv. 8: 40. 1846; *Schoenoplectiella* Lye.

Herbs, annual or perennial, sometimes with creeping rhizomes. Culms tufted, not nodose above base. Leaves usually reduced to a sheath or more rarely developing a ligulate blade. Involucral bracts culmlike, erect. Inflorescence a pseudolateral anthela or more frequently capitate with (1 or) few to many spikelets. Spikelets ovoid to ellipsoid. Glumes many, spiral (rarely pseudodistichous), deciduous or rarely persistent, often each subtending a bisexual flower. Perianth bristles 0–6, needlelike, shorter to longer than nutlet, smooth, scabrous, or plumose, deciduous with nutlet. Stamens 1–3. Style base not distinct, not thickened, persistent. Nutlet obovoid, ± 3-sided or biconvex, smooth to rugose, apex beaked or not.

About 77 species: worldwide; 22 species (five endemic) in China.

- 1a. Perianth bristles plumosely fringed.
  - 2a. Culms terete; perianth bristles longer than nutlet; stigmas 2 ..... 1. *S. subulatus*
  - 2b. Culms 3-angled to obtusely 3-angled just below inflorescence; perianth bristles ± as long as nutlet; stigmas 3 ..... 2. *S. litoralis*
- 1b. Perianth bristles retrorsely scabrous.
  - 3a. Glumes apex emarginate and with a 1-veined costa excurrent into an awn; nutlet smooth; culms scattered; leaves developed.
    - 4a. Involucral bracts much overtopping inflorescence, 1.5–2.5 cm; creeping rhizomes not red ..... 3. *S. ehrenbergii*
    - 4b. Involucral bracts usually shorter than inflorescence, 1.5–5.5 cm; creeping rhizomes red.
      - 5a. Culms sharply 3-angled but sometimes basally terete and only 3-angled apically; creeping rhizomes slender ..... 4. *S. triqueter*
      - 5b. Culms terete; creeping rhizomes stout.
        - 6a. Spikelets 4–7(–10) mm; glumes abaxially with reddish resinous spots; stigmas 2; nutlet plano-convex ..... 5. *S. tabernaemontani*
        - 6b. Spikelets 6–15 mm; glumes abaxially smooth; stigmas usually 3; nutlet compressed 3-sided ..... 6. *S. lacustris*
  - 3b. Glumes apex acute to obtuse and without an awn; nutlet mostly rugose; culms tufted (except *S. lineolatus*); leaves absent.
    - 7a. Culms 3-angled (3–5-angled in *S. trapezoideus* and *S. monocephalus*), sometimes winged.
      - 8a. Perianth bristles longer than nutlet, retrorsely scabrous; nutlet compressed 3-sided ..... 7. *S. mucronatus*
      - 8b. Perianth bristles shorter than nutlet, retrorsely scabrous or not; nutlet 3-sided or biconvex.
        - 9a. Nutlet 3-sided; perianth bristles glabrous ..... 8. *S. chuanus*
        - 9b. Nutlet biconvex; perianth bristles retrorsely scabrous ..... 9. *S. trapezoideus*
    - 7b. Culms terete.
      - 10a. Plants with a creeping rhizome; culms scattered.
        - 11a. Glumes oblong to elliptic, margin not ciliate; perianth bristles as long to 2 × as long as nutlet ..... 10. *S. lineolatus*
        - 11b. Glumes broadly ovate, margin ciliate; perianth bristles absent or 1–3 and very short ..... 11. *S. monocephalus*
      - 10b. Plants without a creeping rhizome; culms densely tufted.
        - 12a. Culms 56–120 cm tall.
          - 13a. Involucral bracts often deflexed; culms without transverse septa; stigmas 2 ..... 12. *S. clemensii*
          - 13b. Involucral bracts erect; culms with many transverse septa; stigmas 3 ..... 13. *S. articulatus*
        - 12b. Culms 15–30(–?40) cm tall.
          - 14a. Nutlet 3-sided, distinctly rugulose; stigmas 3.
            - 15a. Perianth bristles very well developed, slightly longer than nutlet, retrorsely scabrous ..... 20. *S. chen-moui*
            - 15b. Perianth bristles very short and glabrous or absent.
              - 16a. Culms 2.5–3.5 mm thick; involucral bract 10–30 cm; perianth bristles very short, glabrous ..... 21. *S. schoofii*
              - 16b. Culms ca. 1 mm thick; involucral bract 1.5–12 cm; perianth bristles absent .... 22. *S. supinus*
          - 14b. Nutlet biconvex, obscurely rugulose or smooth; stigmas 2.

- 17a. Glumes oblong, 2–3 mm; nutlet 1–1.5 mm.
- 18a. Spikelets yellow, 7–20 mm; glume margin apically ciliate; nutlet obscurely rugulose ..... 18. *S. jingmenensis*
- 18b. Spikelets brownish green, 4–7 mm; glume margin entire; nutlet subsmooth ..... 19. *S. komarovii*
- 17b. Glumes broadly ovate, oblong-ovate, or elliptic, 3.5–5.5 mm; nutlet 1.6–2.5 mm.
- 19a. Glumes pale green to brownish green, oblong-ovate, 4–5.5 mm, apex acuminate; nutlet broadly ellipsoid, ca. 2.5 mm; stigmas 2; perianth bristles 4, longer than nutlet ..... 17. *S. wallichii*
- 19b. Glumes brown to dark brown, broadly ovate to ovate, 3.5–4 mm, apex acute; nutlet broadly obovoid to obovoid, 2–2.5 mm; stigmas 3; perianth bristles 5 or 6, shorter than or as long as nutlet.
- 20a. Culms spaced in row along rhizome; involucre bracts horizontal; glumes 3–3.2 mm ..... 16. *S. fuscrobens*
- 20b. Culms tufted; involucre bracts ± erect; glumes to 4.5 mm.
- 21a. Culms 0.7–1 mm thick, rigid, shiny; spikelets ovoid, 4–6 mm wide; nutlets trigonous; stigmas 3 ..... 15. *S. hotarui*
- 21b. Culms 1.5–7 mm thick, subrigid, opaque; spikelets elliptic to subcylindric, 3.5–5 mm wide; nutlets plano-convex; stigmas 2 ..... 14. *S. juncooides*

**1. *Schoenoplectus subulatus*** (Vahl) Lye, Bot. Not. 124: 290. 1971.

钻苞水葱 zuan bao shui cong

*Scirpus subulatus* Vahl, Enum. Pl. 2: 268. 1805; *Schoenoplectus litoralis* (Schrader) Palla subsp. *subulatus* (Vahl) Soják; *S. litoralis* var. *subulatus* (Vahl) Chiovenda.

Rhizomes short. Culms 50–120 cm tall, 3–8 mm thick, terete, clothed at base with several bladeless leaf sheaths. Leaf sheaths to 20 cm, subpapery, membranous at mouth, disintegrating into fibers. Involucral bract 1, culmlike, longer to shorter than inflorescence, nearly subulate, stiff, hyaline margins basally ca. 1 mm wide. Inflorescence a pseudolateral simple or decompound anthela; rays 5–8, to 5 mm, compressed 3-angled, scabrous. Spikelets solitary or binate, ovoid to oblong-ovoid, 6–20 mm, many flowered. Glumes pale brown to yellowish brown, ovate-elliptic, 3–4 mm, membranous, 1-veined, margin white hyaline, apex obtuse to emarginate. Perianth bristles 4 or 5, longer than nutlet, plumosely fringed. Stamens 2; anthers linear; connective apex with a fimbriate appendage. Stigmas 2. Nutlet brown at maturity, broadly obovoid, ca. 2 mm, compressed biconvex. Fl. and fr. Jul–Oct.

Moist places. Hainan (Qiongsan) [India, Indonesia, Japan, Malaysia, Sri Lanka, Thailand; Pacific islands].

Tang and F. T. Wang (Fl. Reipubl. Popularis Sin. 11: 17. 1961) give a much wider distribution in China than indicated here, but the specimens outside of Hainan in China should be referred to *Schoenoplectus litoralis*.

**2. *Schoenoplectus litoralis*** (Schrader) Palla, Bot. Jahrb. Syst. 10: 299. 1888.

羽状刚毛水葱 yu zhuang gang mao shui cong

*Scirpus litoralis* Schrader, Fl. Germ. 1: 142. 1806.

Rhizomes short; stolons long creeping, slender. Culms

erect, 50–120 cm tall, 3–10 mm thick, 3-angled to obtusely 3-angled just below inflorescence, glaucous. Leaves reduced to a bladeless or a shortly laminate sheath. Involucral bract 1, simulating a continuation of culm, 2–5(–10) cm, erect, rigid. Inflorescence a pseudolateral simple or compound anthela, 4–6 cm, with few to many spikelets; rays slender, smooth. Spikelets solitary, reddish brown, ovoid to oblong-ovoid, 6–12 × 1.5–3 mm, terete, densely many flowered, apex ± acute. Glumes broadly elliptic, 3.5–4 × ca. 2 mm, membranous, margin broadly white hyaline and apically minutely ciliolate, apex obtuse to ± notched and with a prominent green vein excurrent into a short mucro.

Perianth bristles (3 or)4(or 5), rust-colored, ligulate-spatulate,  $\pm$  as long as nutlet, antrorsely scabrous, apically plumosely fringed. Stamens (2 or)3; anthers 1.5–2 mm; connective apex with a fimbriate appendage. Stigmas 3. Nutlet dark reddish brown to blackish, broadly obovoid, ca.  $2 \times 1.3$  mm, biconvex, smooth. Fl. and fr. Jul–Sep.  $2n = 42, 78, 80, 84$ .

Water margins, swampy places; ca. 600 m. Gansu, Ningxia, W Qinghai, Shanxi, Sichuan, Xinjiang [Afghanistan, India, Indonesia, Kazakhstan, Kyrgyzstan, W Mongolia, Pakistan, Papua New Guinea, Philippines, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam; Africa, SW Asia, Australia, Europe, Indian Ocean islands, Madagascar, Pacific Ocean islands].

**3. *Schoenoplectus ehrenbergii*** (Boeckeler) Soják, Čas. Nár. Mus., Odd. Přír. 140: 127. 1972.

剑苞水葱 jian bao shui cong

*Scirpus ehrenbergii* Boeckeler, Linnaea 36: 712. 1870.

Plants stoloniferous. Culms 1–1.5 m tall, ca. 1 cm thick, sharply 3-angled, angles slightly winged, base clothed with long leaf sheaths. Leaf blade 40–60  $\times$  ca. 0.8 cm, abaxially ribbed, basally folded. Involucral bract 1, culmlike, to 25 cm, erect, greatly overtopping inflorescence, obtusely 3-angled. Inflorescence a pseudolateral head,  $\pm$  dense, with 3–5 spikelets. Spikelets oblong to oblong-ovoid, 8–10  $\times$  2–3 mm, 10-flowered. Glumes brown, broadly ovate to elliptic, ca. 5 mm, membranous, margin white hyaline, apex emarginate with a 1-veined costa excurrent into a short awn. Perianth bristles 6, longer than nutlet, retrorsely scabrous. Stamens 3; anthers linear, ca. 2 mm. Style slender; stigmas 3, shorter than style. Nutlet broadly ovoid, ca. 2 mm, plano-convex. Fl. and fr. Aug–Oct.

Near water margins. Gansu, Hebei, Ningxia, Shandong, Xinjiang [Kazakhstan, Russia; E Europe].

**4. *Schoenoplectus triqueter*** (Linnaeus) Palla, Verh. K. K. Zool.-Bot. Ges. Wien 38: 49. 1888.

三棱水葱 san leng shui cong

*Scirpus triqueter* Linnaeus, Syst. Nat., ed. 12, 2: 83; Mant. Pl. 29. 1767; *Schoenoplectus trisetosus* (Tang & F. T. Wang) S. Yun Liang; *Scirpus trisetosus* Tang & F. T. Wang.

Rhizomes long creeping, reddish brown, slender. Culms solitary, erect, 20–100 cm tall, 2–8 mm thick, 3-angled, sub-rigid, clothed at base with 2 or 3 leaf sheaths. Leaf sheath pale green, 5–15 cm, membranous, distinctly transversely septate, mouth obliquely truncate; leaf blade flat, 1.3–5.5(–8) cm  $\times$  1.5–2 mm. Involucral bract 1, culmlike, 1.5–7 cm, 3-angled, usually shorter than inflorescence, apex subacute. Inflorescence a pseudolateral anthela, 3–6 cm, laxly bearing 3–20 spikelets or sometimes congested in a headlike cluster; rays to 5 cm,  $\pm$  stout, scabrous. Spikelets oblong to ovoid-oblong, 6–12  $\times$  3–7 mm, densely many flowered, apex obtuse. Glumes yellowish brown, elliptic, oblong, or broadly ovate, 3–4 mm, membranous, margin sparsely ciliate, apex emarginate to rounded with a green costa excurrent into a mucro. Perianth bristles 3–5, almost as long as nutlet, retrorsely scabrous. Stamens 3; anthers linear; connective apex dark brown, evident beyond anthers. Style short; stigmas 2. Nutlet brownish at maturity, obovoid, 2–3 mm,

plano-convex, shiny. Fl. and fr. Jun–Oct.  $2n = 40, 42$ .

Wet places at river margins, ditches, pond margins, swamps; 100–2300 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, N Guangxi, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, E Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, S Xizang, Yunnan, Zhejiang [Afghanistan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Pakistan, Russia, Tajikistan, Uzbekistan; N Africa, SW Asia, Atlantic Ocean islands, Europe].

**5. *Schoenoplectus tabernaemontani*** (C. C. Gmelin) Palla, Verh. K. K. Zool.-Bot. Ges. Wien 38: 49. 1888.

水葱 shui cong

*Scirpus tabernaemontani* C. C. Gmelin, Fl. Bad. 1: 101. 1805; *Schoenoplectus validus* (Vahl) Á. Löve & D. Löve; *Scirpus lacustris* Linnaeus subsp. *validus* (Vahl) T. Koyama; *S. lacustris* var. *validus* (Vahl) Kükenthal; *S. validus* Vahl; *S. validus* var. *laeviglumis* Tang & F. T. Wang.

Rhizomes brown, horizontally creeping. Culms 1–2[–3] m tall, terete, smooth, clothed at base with 3 or 4 leaf sheaths. Leaf sheaths to 38 cm, membranous, apicalmost sheath with a blade; leaf blade linear, 1.5–11 cm. Involucral bract 1, culmlike, subulate, usually shorter to rarely slightly longer than inflorescence, erect. Inflorescence a pseudolateral simple or decomposed anthela; rays 4–13 or more, unequal in length, to 5 cm, concave to convex, scabrous. Spikelets solitary or in clusters of 2 or 3, ovoid to oblong, 4–10  $\times$  2–3.5 mm, densely many flowered, apex acute to obtuse. Glumes brown to purplish brown, elliptic to broadly ovate, 2.5–3 mm, membranous, abaxially with reddish resinous spots on apical median part, margin broadly white hyaline and ciliate toward apex, apex obtuse to emarginate with a green costa excurrent into a mucro. Perianth bristles (2–)6, reddish brown, shorter than to equaling nutlet, retrorsely scabrous except at base. Stamens 3; anthers linear; connective apex evident beyond anthers. Style ca. 2 mm; stigmas 2(or 3, and 3rd when present shorter than other 2). Nutlet grayish, broadly obovoid to ellipsoid, 2–2.5 mm, subplano-convex, apically contracted into a 0.2–0.4 mm beak. Fl. and fr. Jun–Sep.  $2n = 42$ .

Lake margins, shallow water; (near sea level to) 300–3200 m. Gansu, Guangdong, Guizhou, Hebei, Heilongjiang, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Afghanistan, India, Japan, Kashmir, Kazakhstan, Korea, Kyrgyzstan, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Russia, Tajikistan, Turkmenistan, Uzbekistan, Vietnam; N Africa, SW Asia, Australia, Central, North, and South America, Europe, Pacific islands].

**6. *Schoenoplectus lacustris*** (Linnaeus) Palla, Verh. K. K. Zool.-Bot. Ges. Wien 38: 49. 1888.

沼生水葱 zhao sheng shui cong

*Scirpus lacustris* Linnaeus, Sp. Pl. 1: 48. 1753.

Rhizomes stout, horizontally creeping. Culms erect, green, 1–2.5 m tall, ca. 2(–3) cm thick, terete, smooth. Leaves mostly reduced to a sheath, glabrous; basal sheath brownish; apical 2 sheaths with leaf blades; leaf blade subulate to linear, 1–10

cm. Involucral bract 1, culmlike, subulate, as long as to slightly overtopping inflorescence. Inflorescence a pseudolateral simple or decompound anthela; rays 2–8, unequal in length, 5–8 cm. Spikelets reddish brown, oblong to ovoid, 0.6–1.5 cm, apex acute. Glumes ovate, abaxially glabrous, margin ciliate, apex emarginate with a 1-veined costa excurrent into a short awn. Perianth bristles 5 or 6, slightly longer than nutlet, retrorsely scabrous. Stamens 3; anthers linear, 1.5–2 mm; connective apex with a pyramidal-ovoid bearded appendage. Stigmas 3. Nutlet grayish, obovoid, ca. 3 mm, compressed 3-sided (ridge evident on abaxial surface when immature). Fl. and fr. Jun–Aug.  $2n = 38, 42, 80$ .

Swamps, shallow water; ca. 1000 m. Xinjiang (Shawan) [Afghanistan, N India, Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N and S Africa, SW Asia, Europe].

**7. *Schoenoplectus mucronatus* (Linnaeus) Palla subsp. *robustus* (Miquel) T. Koyama, Fl. Taiwan 5: 214. 1978.**

水毛花 shui mao hua

*Scirpus mucronatus* Linnaeus var. *robustus* Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 143. 1865; *Schoenoplectus mucronatus* var. *robustus* (Miquel) T. Koyama; *S. triangulatus* (Roxburgh) Soják; *Scirpus acutus* J. Presl & C. Presl (1828), not Muhlenberg ex Bigelow (1814); *S. mucronatus* subsp. *robustus* (Miquel) T. Koyama; *S. mucronatus* var. *subleiocarpus* Franchet & Savatier; *S. preslii* A. Dietrich; *S. triangulatus* Roxburgh; *S. triangulatus* var. *sanguineus* Tang & F. T. Wang; *S. triangulatus* var. *trialatus* Tang & F. T. Wang; *S. triangulatus* var. *tripteris* Tang & F. T. Wang.

Rhizomes short. Culms deep green, slightly densely tufted, 45–130 cm tall, 5–11 mm thick, sharply 3-angled with shallowly concave sides, clothed at base with 2–4 leaf sheaths. Leaf sheaths brown, 7–25 cm, membranous to herbaceous, obliquely truncate at mouth. Involucral bract 1, culmlike, upright or obliquely bent, 2–10 cm. Inflorescence a pseudolateral hemispheric head, with (3–)5–20 spikelets. Spikelets brownish greenish, ovoid, oblong-ovoid, or narrowly ovoid, 10–20 × 4–6 mm, terete, densely many flowered, apex subacute. Glumes pale green and brownish tinged usually with reddish brown, broadly obovate, ovate, or broadly ovate, 3.8–5 × 2.5–3 mm, very concave, papery, margin apically minutely ciliolate, apex with a green 1–3-veined costa excurrent into a mucro. Perianth bristles 6, 1.5–2 × as long as nutlet, retrorsely scabrous. Stamens 3; anthers linear, ca. 2.5 mm; connective apex slightly prominent beyond anthers. Style ca. 4 mm; stigmas 3. Nutlet blackish brown at maturity, obovoid to broadly obovoid, 2–2.5 × 1.5–2 mm, compressed 3-sided, conspicuously or inconspicuously transversely wrinkled, ± shiny, base contracted to cuneate, apex rounded to mucronate. Fl. and fr. May–Nov.  $2n = 44$ .

Pond and lake margins, swamps, grasslands in streambanks, paddy fields; 100–2700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Malaysia, Sri Lanka; Africa, S Europe, Madagascar].

Only specimens of *Schoenoplectus mucronatus* subsp. *robustus*, as interpreted here, have been seen from China by the present authors. If recognized at specific rank, this taxon would be correctly named *S. triangulatus*. *Schoenoplectus mucronatus* subsp. *mucronatus* occurs in Europe and is naturalized in North America.

**8. *Schoenoplectus chuanus* (Tang & F. T. Wang) S. Yun Liang & S. R. Zhang, Novon 20: 170. 2010.**

曲氏水葱 qu shi shui cong

*Scirpus chuanus* Tang & F. T. Wang, Fl. Reipubl. Popularis Sin. 11: 222. 1961.

Rhizomes short, creeping. Culms laxly tufted, 66–76 cm tall, ± stout, 3-angled, distinctly channeled, smooth, clothed at base with 2 or 3 leaf sheaths. Leaf sheaths to 25 cm; basal sheaths dark brown, with prominent transverse veins; apical sheaths green to greenish brown, mouth obliquely truncate with hyaline margin. Involucral bract 1, erect to obliquely spreading, culmlike, 5–9 cm, 3-angled, smooth. Inflorescence a pseudolateral head, with ca. 10 spikelets. Spikelets oblong to ellipsoid, 5–10 × 3–5 mm, densely many flowered. Glumes brown with dark brown short lines, broadly ovate, 2.5–3 mm, concave, papery, many veined, margin hyaline, apex rounded with a yellowish green costa excurrent into a mucro. Perianth bristles 6, 1/4–1/3 as long as nutlet, glabrous. Stamens 3; anthers narrowly deltoid, apex obtuse; connective apex slightly dilated. Style short; stigmas 3, slender. Nutlet black at maturity, obovoid, 1.5–2 mm, 3-sided, shiny. Fl. and fr. Jul–Aug.

• Shallow water. Jiangsu (Nanjing).

**9. *Schoenoplectus trapezoideus* (Koidzumi) Hayasaka & H. Ohashi, J. Jap. Bot. 75: 224. 2000.**

五棱水葱 wu leng shui cong

*Scirpus trapezoideus* Koidzumi, Bot. Mag. (Tokyo) 39: 26. 1925; *S. erectus* Poirlet var. *triangularis* Honda; *S. juncoideus* Roxburgh var. *triangularis* (Honda) Ohwi.

Rhizomes short. Culms tufted, erect, 40–70 cm tall, ± slender, 3–5-angled, clothed at base with bladeless leaf sheaths. Leaf sheaths pale brown at base, to 12 cm, oblique at mouth. Involucral bract 1, erect, culmlike, 5–15 cm. Inflorescence a pseudolateral head, with 2–9 spikelets. Spikelets sessile, pale rust-colored brown, oblong-ovoid to ovoid, 8–14 × 4–6 mm. Glumes pale rust-colored brown, broadly elliptic, 3–4 mm, thinly leathery, with a green costa excurrent into a mucro, apex acute. Perianth bristles 6, ca. 2/3 as long as nutlet, retrorsely scabrous. Stamens 3; anthers 1.2–1.5 mm. Style ca. 3 mm; stigmas (2 or) 3. Nutlet blackish brown, broadly obovoid to subspherical, ca. 2 mm, biconvex or unequally biconvex, obscurely wrinkled. Fl. and fr. Aug–Oct.

Wet places, swamps by streams; 200–1000 m. Fujian, Guangxi, Hebei, Jilin, Shandong [Japan].

**10. *Schoenoplectus lineolatus* (Franchet & Savatier) T. Koyama, Fl. Taiwan 5: 215. 1978.**

细匍匐茎水葱 xi pu fu jing shui cong

*Scirpus lineolatus* Franchet & Savatier, Enum. Pl. Jap. 2: 545. 1878.

Rhizomes creeping, long, slender. Culms solitary at nodes of rhizome, distantly arranged in a row, dark green, 7–35 cm tall, 0.8–1.2 mm thick, terete, clothed at base with 1 or 2 bladeless short leaf sheaths. Leaf sheaths pale brown, 1–5 cm, hyaline, mouth obliquely truncate. Involucral bract 1, erect, culmlike, apex subulate. Inflorescence generally a single pseudolateral spikelet. Spikelet sessile, greenish straw-colored, oblong to broadly narrowly ovoid, 4–6 × 2–3 mm, densely many flowered. Glumes pale yellow with some brown lines, oblong to elliptic, 4–4.5 × 1.8–2 mm, membranous, keel green, margin white hyaline, apex acute to obtuse. Perianth bristles 4 or 5, as long to 2 × as long as nutlet. Stamens 2 or 3; anthers linear, ca. 2.5 mm. Style 4–5 mm; stigmas 2. Nutlet black, obovoid to ellipsoid, 1.7–2.2 × 1.2–1.8 mm, plano-convex, shiny. Fl. and fr. Jul–Oct.  $2n = ca. 60$ .

Marshy places; near sea level. Guangdong, Taiwan, Zhejiang [Japan, Russia (Far East)].

**11. *Schoenoplectus monocephalus*** (J. Q. He) S. Yun Liang & S. R. Zhang, Novon 20: 170. 2010.

单穗水葱 dan sui shui cong

*Scirpus monocephalus* J. Q. He, Acta Phytotax. Sin. 37: 291. 1999.

Rhizomes creeping, with several fusiform bulblets. Culms scattered, 10–20 cm tall, 0.5–1.5 mm thick, terete, channeled, smooth, clothed at base with 1 or 2 dark brown bladeless leaf sheaths. Leaf sheaths 1–3 cm, hyaline, mouth obliquely truncate. Involucral bract 1, erect, culmlike, 1–2.5 cm, apex subacute. Inflorescence generally a single pseudolateral spikelet. Spikelet sessile, oblong to ovoid, 4–10 × 2–4 mm, densely 6–10-flowered. Glumes pale brown with minute brown spots, broadly ovate to ovate-oblong, 1–3.5 mm, veinless or 1-veined, apex obtuse. Perianth bristles absent or 1–3 unequal short bristles, when present 1/6–4/5 as long as nutlet, glabrous. Stamens 3; anthers linear, 1–1.5 mm. Style slender, ca. 3 mm; stigmas 2, ca. 1 mm. Nutlet brown, broadly ovoid, 1.5–2.5 mm, plano-convex, shiny, glabrous. Fl. and fr. Jun–Sep.

• Trail margins, wet places. Anhui (Fuyang).

**12. *Schoenoplectus clemensii*** (Kükenthal) G. C. Tucker, **comb. nov.**

佛海水葱 fo hai shui cong

Basionym: *Scirpus mucronatus* Linnaeus subsp. *clemensii* Kükenthal, Bot. Jahrb. Syst. 69: 259. 1938; *Schoenoplectus fohaiensis* (Tang & F. T. Wang) Hayasaka; *S. mucronatus* (Linnaeus) Pallas subsp. *clemensii* (Kükenthal) Soják; *Scirpus clemensii* (Kükenthal) Ohwi; *S. fohaiensis* Tang & F. T. Wang.

Rhizomes short, without creeping stolons. Culms 60–120 cm tall, 5–8 mm thick, terete, smooth, clothed at base with 3 or 4 leaf sheaths. Leaf sheaths brown to greenish, mouth obliquely truncate and bladeless or sometimes setaceous. Involucral bract 1, culmlike, 2.5–5 mm, often deflexed, terete, apex acuminate.

Inflorescence a pseudolateral head with many spikelets. Spikelets sessile, dark brown, ovoid to oblong, 4–5 × ca. 3 mm, many flowered. Glumes pale brown with dark brown lines, obovate to elliptic, 2–2.5 mm, membranous, margin ciliolate, apex acute to obtuse with a costa excurrent into a mucro. Perianth bristles 5 or 6, as long as to slightly longer than nutlet, retrorsely scabrous. Stamens 3; anthers linear; connective apex evident beyond anthers. Style long; stigmas 2. Nutlet black at maturity, broadly obovoid to obovoid, ca. 1.2 mm, plano-convex, shiny. Fl. and fr. Mar–Jun.

Ponds; ca. 1600 m. Yunnan (Fuhai) [Papua New Guinea, Vietnam].

**13. *Schoenoplectus articulatus*** (Linnaeus) Palla, Bot. Jahrb. Syst. 10: 299. 1888.

节苞水葱 jie bao shui cong

*Scirpus articulatus* Linnaeus, Sp. Pl. 1: 47. 1753; *Schoenoplectiella articulata* (Linnaeus) Lye; *Schoenoplectus pseudoarticulatus* (L. K. Dai & S. M. Huang) S. Yun Liang & S. R. Zhang; *Scirpus pseudoarticulatus* L. K. Dai & S. M. Huang.

Plants 30–85 cm tall (including involucral bract). Rhizomes shortly creeping. Culms densely tufted, 12–30 cm tall, 5–7 mm thick, terete, transversely septate, clothed at base with 1 or 2 bladeless leaf sheaths. Leaf sheaths 10–25 cm, terete, obliquely truncate at mucronate mouth. Involucral bract 1, erect, culmlike, usually longer than culm, with many transverse septate nodes. Inflorescence a pseudolateral head with many spikelets. Spikelets sessile, ovoid, 7–9 × 4–4.5 mm, many flowered. Glumes brownish yellow with dark brown lines, deltoid-ovate, 5–5.5 mm, concave, thinly membranous, veins many and ± conspicuous, apex with a costa excurrent into a mucro. Perianth bristles absent. Stamens 3; stigmas 3. Nutlet yellowish gray at maturity, obovoid, 2–2.2 mm, 3-sided, smooth. Fl. and fr. May–Jul.

Moist places, pond margins; low elevations. S Hainan (Sanya) [India, Indonesia, Nepal, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, N Australia, Indian Ocean islands, Madagascar].

This species is widely distributed and very variable in the size of its vegetative parts. The Hainan plants were separated (as *Scirpus pseudoarticulatus*) mainly by their taller culms and relatively more pointed spikelets, but such features certainly fall within the variation range of *Schoenoplectus articulatus*.

**14. *Schoenoplectus juncooides*** (Roxburgh) Palla, Bot. Jahrb. Syst. 10: 299. 1888.

萤蔺 ying lin

*Scirpus juncooides* Roxburgh, Fl. Ind. 1: 216. 1820; *Schoenoplectiella juncooides* (Roxburgh) Lye; *Scirpus juncooides* var. *ohwianus* (T. Koyama) T. Koyama; *S. ohwianus* T. Koyama.

Roots many, fibrous. Rhizomes short. Culms tufted, 18–70 cm tall, 1.5–7 mm thick, slightly stiff, opaque, obtusely to faintly several angled, smooth, clothed at base with 2 or 3 bladeless leaf sheaths. Leaf sheaths pale green, 5–15 cm, obliquely truncate at mucronate mouth. Involucral bract 1, erect, pale green, culmlike, 3–15 cm. Inflorescence a pseudo-

lateral head with (2 or)3–5(–9) spikelets. Spikelets brown to pale brown, oblong-ovoid, 8–17 × 3.5–5 mm, many flowered. Glumes brown or brown with brown lines, broadly ovate to ovate, 3–4 × 1.8–2 mm, membranous, apex with a 3-veined green costa excurrent into a mucro. Perianth bristles 5 or 6, equaling or shorter than nutlet, retrorsely scabrous except at base. Stamens 3; anthers oblong; connective apex evident beyond anthers. Style 2–2.2 mm; stigmas 2. Nutlet dark brown at maturity, broadly obovoid to obovoid, ca. 2 mm, plano-convex, obscurely transversely wrinkled, shiny. Fl. and fr. Aug–Nov.

Wetlands, paddy field margins; 800–2000 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, S Xinjiang, SE Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Kashmir, Korea, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Tajikistan, Thailand, Uzbekistan; SW Asia, Australia, Indian Ocean islands, Madagascar, Pacific islands].

A putative hybrid between *Schoenoplectus juncooides* and *S. schoofii*, described from NE Yunnan (Dongchuan), was named *Scirpus ×intermedius* Tang & F. T. Wang (Fl. Reipubl. Popularis Sin. 11: 224. 1961), but that name is illegitimate because it is a later homonym of *S. intermedius* Thuillier (Fl. Env. Paris, ed. 2, 21. 1799).

**15. *Schoenoplectus hotarui*** (Ohwi) T. Koyama, Makinoa, n.s., 7: 58. 2008.

细秆萤蔺 xi gan ying lin

*Scirpus hotarui* Ohwi, Repert. Spec. Nov. Regni Veg. 36: 44. 1934; *Schoenoplectus juncooides* (Roxburgh) Palla subsp. *hotarui* (Ohwi) Soják; *Scirpus juncooides* Roxburgh var. *hotarui* (Ohwi) Ohwi.

Plants annual. Roots fibrous. Culms tufted, 13–40 cm tall, 0.7–1 mm thick, terete, slender, rigid, shiny, clothed at base with ca. 3 bladeless sheaths. Involucral bracts erect. Inflorescence a pseudolateral head with 1–3(or 4) spikelets. Spikelets ovoid, 6–14 × 4–6 mm, apex acute. Glumes ovate-orbicular, 3–4.5 mm, brownish tinged on both sides of green costa, apex rounded. Perianth bristles 6, ca. 1.5 × as long as nutlet. Stigmas 3. Nutlets blackish at maturity, broadly ovate-orbicular, 2–2.5 mm, trigonous, transversely wrinkled.

Wet places; ca. 1200 m. Jilin, S Liaoning [Japan, Korea, N Myanmar, Russia (Far East)].

This species can be easily discerned by the slender, rigid, and spiny culms with only 1–3 spikelets in contrast to the thicker, subrigid, and opaque culms bearing 4–9 spikelets of *Schoenoplectus juncooides*. *Schoenoplectus hotarui*, unlike *S. juncooides*, is found growing more frequently in natural habitats rather than as a rice field weed and has a more northerly distribution.

**16. *Schoenoplectus fuscorubens*** (T. Koyama) T. Koyama in H. Hara, Stearn & L. H. J. Williams, Enum. Fl. Pl. Nepal 1: 118. 1978.

褐红鳞水葱 he hong lin shui cong

*Scirpus fuscorubens* T. Koyama, Willdenowia 5: 491. 1969.

Roots many, fibrous. Rhizomes elongated, bearing culms in a well-spaced row forming a single rank. Culms not tufted, 15–70 cm tall, 1–4 mm thick, slightly stiff, terete or obtusely several angled, smooth, clothed at base with 2 or 3 bladeless leaf sheaths. Leaf sheaths pale green, 5–15 cm, obliquely truncate at mucronate mouth. Involucral bract 1, pale green, looking like a continuation of culm, 3–15 cm, perpendicular to it. Inflorescence a pseudolateral head with 2–4 spikelets. Spikelets brown to pale brown, ovoid to oblong-ovoid, 3–6 × ca. 3 mm, several flowered. Glumes brown or brown with brown lines, broadly ovate to ovate, 3–3.2 × 1.8–2 mm, membranous, marked with dark purplish brown on margins (and sometimes on sides as well), apex mucronate. Perianth bristles 5 or 6, equaling or shorter than nutlet, retrorsely scabrous except at base. Stamens 3; anthers oblong; connective apex evident beyond anthers. Style 2–2.2 mm; stigmas 2 or 3. Nutlet dark brown at maturity, broadly obovoid to obovoid, ca. 2 mm, plano-convex or 3-sided, obscurely transversely wrinkled, shiny. Fl. and fr. Aug–Nov.

Damp meadows on mountains; 2000–2700 m. Guizhou, Xizang [Bhutan, Nepal].

**17. *Schoenoplectus wallichii*** (Nees) T. Koyama, Fl. Taiwan 5: 210. 1978.

猪毛草 zhu mao cao

*Scirpus wallichii* Nees in Wight, Contr. Bot. India, 112. 1834; *Schoenoplectiella wallichii* (Nees) Lye; *Scirpus erectus* Poiret var. *wallichii* (Nees) Beetle; *S. sasakii* Hayata.

Plants without a distinct rhizome. Culms tufted, 10–40 cm tall, smooth, clothed at base with 2–4 leaf sheaths. Leaf sheaths 2–10 cm, with basal ones straw-colored and apical ones pale green, mouth obliquely truncate and with a subulate ca. 0.8 mm appendage. Involucral bract 1, erect, culmlike, 4.5–16 cm, base dilated, apex acute. Inflorescence a pseudolateral head, with 1–3 spikelets. Spikelets pale green to pale brownish green, narrowly ovoid to oblong-ovoid, 7–20 × 3–6 mm, densely many flowered, apex acute. Glumes oblong-ovate, 4–5.5 × ca. 2.5 mm, thinly leathery, apex acuminate with a green costa excurrent into a mucro. Perianth bristles 4(or 5), longer than nutlet, retrorsely scabrous except at base. Stamens 3; anthers oblong; connective apex slightly evident beyond anthers. Style 2–2.5 mm; stigmas 2. Nutlet blackish brown, broadly ellipsoid, ca. 2.5 mm, plano-convex, ± transversely wrinkled, shiny. Fl. and fr. Aug–Nov.

Wet places, stream margins, river margins, paddy fields; 800–1300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, Yunnan, Zhejiang [NE India, Japan, Korea, Malaysia, Myanmar, Philippines, Vietnam].

**18. *Schoenoplectus jingmenensis*** (Tang & F. T. Wang) S. Yun Liang & S. R. Zhang, *Novon* 20: 170. 2010.

荆门水葱 jing men shui cong

*Scirpus jingmenensis* Tang & F. T. Wang, *Fl. Reipubl. Popularis Sin.* 11: 222. 1961.

Rhizomes short. Culms tufted, 10–32 cm tall, 2–3 mm thick, terete, smooth, clothed at base with 2 or 3 leaf sheaths. Leaf sheaths 1.5–9 cm, mouth obliquely truncate; apicalmost sheath usually with a slender 1–1.7 cm blade. Involucral bract 1, culmlike, 13–18 cm, sometimes longer than culm, subterete, base dilated, margin hyaline; bractlets pale brown, glumelike, ovate to broadly lanceolate, 4–10 mm. Inflorescence a pseudolateral head, with 5–10 spikelets. Spikelets sessile, oblong to narrowly ovoid, 7–20 × ca. 1 mm, many flowered. Glumes pale brown with brown lines, oblong, ca. 2 mm, membranous, deciduous at nutlet maturity, margin apically ciliate, apex rounded and with a 1–3-veined costa excurrent into a mucro. Perianth bristles 4–6, ± as long as nutlet, retrorsely scabrous. Stamens 1 or 2; anthers ellipsoid, short. Style long; stigmas 2, slender. Nutlet blackish brown, obovoid, ca. 1 mm, plano-convex, indistinctly transversely wrinkled, shiny. Fl. Sep.

• Hubei (Jingmen).

**19. *Schoenoplectus komarovii*** (Roshevitz) Soják, *Čas. Nár. Mus.*, Odd. Přír. 140: 127. 1972.

吉林水葱 ji lin shui cong

*Scirpus komarovii* Roshevitz in Komarov, *Fl. URSS* 3: 579. 1935; *S. honoensis* Ohwi var. *leiocarpus* (Komarov) Ohwi; *S. okuyamae* Ohwi; *S. sasakii* Hayata var. *leiocarpus* (Komarov) Kitagawa; *S. supinus* Linnaeus var. *leiocarpus* Komarov.

Rhizomes very short. Culms tufted, 10–50 cm tall, terete, smooth, clothed at base with 2 or 3 bladeless leaf sheaths. Leaf sheaths green, 1–10 cm, base sometimes pale brown, mouth obliquely truncate. Involucral bract 1, culmlike, 8–18 cm, base slightly dilated. Inflorescence a pseudolateral head, with 2–10 or more spikelets. Spikelets sessile, ovoid to oblong-ovoid, 4–7(–10) × 2–3 mm, many flowered. Glumes pale brown with dark brown lines, oblong, ca. 2 mm, membranous, veins obscure, with green 1-veined costa excurrent into a mucro at rounded apex. Perianth bristles 4, ± as long as nutlet, retrorsely scabrous. Stamens 3; anthers narrowly ovoid, short; connective apex slightly evident beyond anthers. Style long; stigmas 2. Nutlet blackish brown, broadly obovoid, 1–1.5 mm, compressed biconvex, obscurely transversely wrinkled, shiny. Fl. and fr. Jun–Oct.

Swamps, wet places, paddy fields; near sea level to 100 m. Heilongjiang, Jilin, Liaoning, NE Nei Mongol [Japan, Korea, Russia (Far East)].

**20. *Schoenoplectus chen-moui*** (Tang & F. T. Wang) Haya-saka, *J. Jap. Bot.* 84: 49. 2009 [“*chen-mouii*”].

陈谋水葱 chen mou shui cong

*Scirpus chen-moui* Tang & F. T. Wang, *Fl. Reipubl. Popularis Sin.* 11: 223. 1961 [“*chen-mouii*”].

Roots fibrous. Culms 10–30 cm tall, ca. 1.5 mm thick, terete, smooth, clothed at base with 2–4 green to pale brown leaf sheaths. Leaf sheaths 1–10 cm, mouth obliquely truncate and sometimes with a setaceous ca. 1 cm blade. Involucral bract 1, erect, culmlike, 10–20 cm, subterete, smooth, base slightly dilated, margin membranous. Inflorescence a pseudolateral head, with 2–10 spikelets. Spikelets oblong-ovoid to oblong, 5–10 × ca. 3 mm, many flowered. Glumes yellow with brown lines, obovate to oblong, membranous, margin ciliate, apex with a green costa excurrent into a mucro. Perianth bristles (5 or)6, longer than nutlet, retrorsely scabrous. Stamens 3; anthers oblong, short; connective apex slightly evident beyond anthers. Style of medium length; stigmas 3. Nutlet yellow when young but turning black at maturity, obovoid to broadly obovoid, 1–1.2 mm, 3-sided, transversely wrinkled. Fl. and fr. Aug–Oct.

• Paddy fields; ca. 1800 m. W Yunnan (Dali).

**21. *Schoenoplectus schoofii*** (Beetle) Soják, *Čas. Nár. Muz. Praz.*, Rada Přír. 148: 194. 1980.

滇水葱 dian shui cong

*Scirpus schoofii* Beetle, *Amer. J. Bot.* 29: 654. 1942.

Culms tufted, 30–60 cm tall, 2.5–3.5 mm thick, compressed terete to terete, smooth, clothed at base with 2 or 3 bladeless pale brown leaf sheaths. Leaf sheaths 2–16 cm, mouth obliquely truncate and with a mucro. Involucral bract 1, culmlike, 8–30 cm. Inflorescence a pseudolateral head, with 8–20 spikelets. Spikelets ovoid to oblong-ovoid, 3–10 × 2–3 mm, many flowered. Glumes brownish yellowish to brown, elliptic to subobovate, ca. 3 mm, membranous, obscurely many veined, margin ciliate, apex rounded and with a green 1–3-veined costa excurrent into a mucro. Perianth bristles very short, glabrous. Stamens 3; anthers nearly narrowly ovate, short; connective apex evident beyond anthers. Style of medium length; stigmas 3. Nutlet black at maturity, broadly obovoid, ca. 1 mm, 3-sided, densely transversely wrinkled. Fl. and fr. Aug–Sep.

• Wet places along lake margins; ca. 2300 m. Jiangsu, Yunnan.

**22. *Schoenoplectus supinus*** (Linnaeus) Palla, *Bot. Jahrb. Syst.* 10: 299. 1888.

仰卧秆水葱 yang wo gan shui cong

*Scirpus supinus* Linnaeus, *Sp. Pl.* 1: 49. 1753; *Schoenoplectiella supina* (Linnaeus) Lye.

Roots fibrous. Culms greenish, tufted, 4–30 cm tall, 1–1.7 mm thick, 3-angled or terete, clothed at base with 2 or 3 leaf sheaths. Leaf sheaths pale green, 2–6 cm, membranous, mouth obliquely truncate and with a mucro; leaf blade present or absent. Involucral bract 1, culmlike, 1.5–12 cm. Inflorescence a pseudolateral head or corymbose with 4 short rays. Spikelets 3–10, narrowly ovoid, ovoid, or oblong, 4–8 × 2–3 mm, subdensely many flowered, apex subacute. Glumes elliptic and boat-shaped, 1.8–2.5 mm, with a prominent green 3-veined keel, margins membranous, apex ± obtuse and shortly mucronate. Perianth bristles absent or rarely rudimentary. Style ca. 1.5 mm; stigmas 3. Nutlet black at maturity, broadly obovoid, 1–1.3 mm, 3-sided, obscurely or distinctly transversely wrinkled, both ends

suddenly contracted, apex mucronate. Fl. and fr. Jul–Sep or Nov–Jan.

Wet places, paddy fields, moist meadows along valleys; 600–2300 m. Anhui, Guangdong, Guangxi, Hainan, S Jiangsu, Taiwan, Xinjiang, Yunnan [Afghanistan, India, Indonesia, Kazakhstan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Russia, Sri Lanka, Thailand, Uzbekistan, Vietnam; Africa, SW Asia, N Australia, Europe, Madagascar, South America].

*Schoenoplectus supinus* subsp. *supinus* occurs in N Africa, C and SW Asia, and S Europe.

- 1a. Culms 3-angled; basal leaf sheaths with a blade; nutlet sides obscurely transversely wrinkled ..... 22a. subsp. *lateriflorus*
- 1b. Culms terete; basal leaf sheaths bladeless; nutlet sides distinctly transversely wrinkled ..... 22b. subsp. *densicorrugatus*

**22a. *Schoenoplectus supinus* subsp. *lateriflorus*** (J. F. Gmelin) Soják, Čas. Nár. Mus., Odd. Přír. 141: 62. 1972.

稻田仰卧秆水葱 dao tian yang wo gan shui cong

*Scirpus lateriflorus* J. F. Gmelin, Syst. Nat. 1: 127. 1791; *Isolepis oryzetorum* Steudel; *Schoenoplectus lateriflorus* (J. F. Gmelin) Lye; *Scirpus erectogracilis* Hayata; *S. oryzetorum* (Steudel) Ohwi; *S. supinus* var. *lateriflorus* (J. F. Gmelin) T. Koyama.

Culms 7–30 cm tall, 3-angled. Basal leaf sheaths with a blade. Nutlet sides obscurely transversely wrinkled. Fl. and fr. Nov–Jan.

Wet places, paddy fields; ca. 1000 m. Anhui, Guangdong, Guangxi, S Jiangsu, Taiwan, Yunnan [Afghanistan, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Africa, N Australia, Madagascar].

**22b. *Schoenoplectus supinus* subsp. *densicorrugatus*** (Tang & F. T. Wang) S. Yun Liang & S. R. Zhang, Novon 20: 171. 2010.

多皱纹果仰卧秆水葱 duo zhou wen guo yang wo gan shui cong

*Scirpus supinus* var. *densicorrugatus* Tang & F. T. Wang, Fl. Reipubl. Popularis Sin. 11: 223. 1961.

Culms 4–10 cm tall, terete. Basal leaf sheaths bladeless. Inflorescence a pseudolateral head. Spikelets 3–6 mm, in clusters of 2 or 3, sessile. Nutlet sides finely and densely transversely wrinkled. Fl. and fr. Jul–Sep.

- Moist meadows along valleys; 600–2300 m. Xinjiang.



