

4. SCIRPUS Linnaeus, Sp. Pl. 1: 47. 1753, nom. cons.

蘆草屬 biao cao shu

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

Herbs, perennials. Culms tufted, 3-angled to obtusely 3-angled, rarely terete, few to many nodose. Leaves basal and cauline; leaf blade linear, grasslike, ligulate, base sheathing. Involucral bracts leaflike, spreading. Inflorescence a terminal corymbiform anthela, with many spikelets. Spikelets ovoid to ellipsoid, generally rather small. Glumes spirally arranged, deciduous, each subtending a flower. Flowers bisexual. Perianth bristles 3–6, as long as to much longer than nutlet, deciduous with nutlet. Stamens 1–3. Style base not thickened, persistent; stigmas 2 or 3. Nutlet obovoid to ellipsoid, compressed 3-sided to biconvex, smooth, apex beaked.

About 35 species: mostly in temperate regions of N Hemisphere, greatest diversity in North America; 12 species (four endemic) in China.

- 1a. Involucral bracts spathe-like 11. *S. maximowiczii*
- 1b. Involucral bracts leaflike.
 - 2a. Prophyll subtending a bisexual flower 12. *S. paniculato-corymbosus*
 - 2b. Prophyll absent.
 - 3a. Spikelets dark green (to grayish).
 - 4a. Perianth bristles erect, retrorsely scabrous, nearly as long as nutlet 1. *S. orientalis*
 - 4b. Perianth bristles prominently flexuose to contorted, retrorsely scabrous only near apex, 2–4 × as long as nutlet 2. *S. radicans*
 - 3b. Spikelets ± reddish brown.
 - 5a. Spikelets narrowly ovoid; basal several glumes empty 9. *S. filipes*
 - 5b. Spikelets globose, ovoid, oblong, or ellipsoid; all glumes with a flower.
 - 6a. Perianth bristles basally glabrous and apically densely pubescent with long yellowish brown hairs 10. *S. hainanensis*
 - 6b. Perianth bristles antrorsely scabrous but not pubescent.
 - 7a. Glumes 1-veined, apex acuminate; perianth bristles flexuose, 1.5–4 × as long as nutlet; nutlet compressed 3-sided; stigmas 3.
 - 7b. Glumes 1-, 3-, or 5-veined, apex obtuse; perianth bristles slightly flexuose, less than 1.5 × as long as nutlet; nutlet biconvex; stigmas 2.
 - 8a. Glumes lanceolate to ovate-lanceolate, 2.5–3 mm 3. *S. karuisawensis*
 - 8b. Glumes deltoid-ovate to oblong-ovate, 1.3–2 mm.
 - 9a. Spikelets globose-ellipsoid; glumes 1.3–1.5 mm, apex obtuse 4. *S. lushanensis*
 - 9b. Spikelets globose; glumes 1.8–2 mm, apex acute 5. *S. wichuriae*

1. *Scirpus orientalis* Ohwi, Acta Phytotax. Geobot. 1: 76. 1932.

东方蘆草 dong fang biao cao

Scirpus sylvaticus Linnaeus var. *maximowiczii* Regel; *S. sylvaticus* var. *subradicans* Kükenthal ex Tang.

Rhizomes short, stoloniferous. Culms 0.6–1.8 m tall, 7–12 mm thick, obtusely 3-angled, 5–7-nodose. Leaves cauline, as long as or shorter than inflorescence; leaf blade 4–15 mm wide, flat, abaxial midvein and margin usually scabrous. Involucral bracts 2–4, leaflike, much longer than inflorescence. Inflorescence a terminal large compound anthela; rays many, to 10 cm, apically scabrous. Spikelets usually solitary or in clusters of 2 or 3, dark gray, ovoid to narrowly ovoid to rarely ovoid, 4–6 × ca. 2 mm, many flowered. Glumes dark green, broadly ovate, ca. 1.5 mm, with 3 yellowish green veins, apex acute to subrounded. Perianth bristles 5 or 6, as long as or slightly longer than nutlet, erect, retrorsely scabrous. Stamens 3; anthers linear-oblong, ca. 1 mm; connective apex very short. Style slightly

longer than nutlet; stigmas 3. Nutlet pale yellow, obovoid to ellipsoid, compressed 3-sided. Fl. Jun–Jul, fr. Aug. $2n = 60$.

Swampy places in woods, wet places; 400–2700 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Xinjiang [Japan, Korea, Mongolia, Russia (Far East, Siberia)].

2. *Scirpus radicans* Schkuhr, Ann. Bot. (Usteri) 4: 48. 1793.

单穗蘆草 dan sui biao cao

Nemocharis radicans (Schkuhr) Beurling; *Scirpus sylvaticus* Linnaeus var. *radicans* (Schkuhr) Willdenow; *Seidlia radicans* (Schkuhr) Opiz.

Rhizomes short. Culms slightly tufted, 0.7–1.5 m tall, obtusely 3-angled, 7- or 8-nodose, smooth but slightly scabrous near inflorescence. Leaves cauline, shorter than inflorescence; sheath ± long; leaf blade 7–10 mm wide, abaxial midvein and margin slightly scabrous. Involucral bracts 2 or 3, leaflike, overtopping inflorescence. Inflorescence a terminal large compound anthela, with many rays; first rays to 9 cm, glabrous. Spikelets

solitary, oblong-ovoid to narrowly ovoid, 5–8 × ca. 2 mm, many flowered, apex acuminate. Glumes densely arranged, oblong, ca. 2 mm, membranous, both surfaces dark grayish black, midvein pale yellow, base sometimes straw-colored, margin apically ciliate, apex rounded. Perianth bristles 6, usually 2–4 × as long as nutlet, prominently flexuose, retrorsely scabrous only near apex. Anthers ca. 1 mm, linear-oblong. Style slightly short; stigmas 3. Nutlet pale yellow, obovoid, ca. 1 mm, compressed 3-sided. Fl. and fr. Jun–Sep. $2n = 56$.

In water, swampy places; 400–900 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Kazakhstan, Korea, Mongolia, Russia; Europe].

3. *Scirpus karuisawensis* Makino, Bot. Mag. (Tokyo) 18: 119. 1904.

华东蘆草 hua dong biao cao

Scirpus fuirenooides Maximowicz var. *jaluanus* Komarov; *S. jaluanus* (Komarov) Nakai ex Mori.

Rhizomes short. Culms 0.8–1.5 m tall, stout, rigid, obtusely 3-angled, 5–7-nodose, clothed at base with a few bladeless leaf sheaths. Leaves shorter than culm; sheath reddish brown; leaf blade linear, 4–10 mm wide, stiff. Involucral bracts 1–4, leaflike, overtopping inflorescence. Inflorescences consisting of a terminal and 2–4 lateral lax anthelae; lateral anthelae simple, with 5 or fewer ca. 7 cm rays; terminal decompound anthela with many rays. Spikelets in spherical clusters of 5–10, oblong to ovoid, 5–9 × 3–4 mm, densely many flowered, apex obtuse. Glumes reddish brown, lanceolate to oblong-ovate, 2.5–3 mm, membranous, 1-veined, apex acute. Perianth bristles 6, white, 3–4 × as long as nutlet, basally flexuose, apically sparsely antrorsely scabrous. Anthers linear. Style of medium length; stigmas 3. Nutlet yellowish, oblong to obovoid, ca. 1 mm, compressed 3-sided, shiny, apex shortly beaked. Fl. and fr. Aug–Sep.

Wet places, swamps; 600–1200 m. Anhui, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Yunnan, Zhejiang [Japan, Korea].

4. *Scirpus lushanensis* Ohwi, Acta Phytotax. Geobot. 7: 134. 1938.

庐山蘆草 lu shan biao cao

Scirpus lineatus Michaux var. *lushanensis* (Ohwi) T. Koyama; *S. rongchenensis* F. Z. Li; *S. wichurae* Boeckeler var. *lushanensis* (Ohwi) T. Koyama.

Rhizomes short, stout. Culms 1–1.5 m tall, stout, erect, rigid, obtusely 3-angled, 5–8-nodose. Leaves shorter than culm; sheath usually reddish brown, 3–10 cm; leaf blade 0.5–1.5 cm wide, ± stiff. Involucral bracts 2–4, leaflike, usually shorter to rarely longer than inflorescence. Inflorescences terminal and lateral, a large compound or decompound anthela, with many rays; first ray to 20 cm, slender; rays and peduncles scabrous. Spikelets mostly solitary, sometimes in clusters of 2–8, globose-ellipsoid, 2.5–3.5 mm, densely many flowered, apex rounded. Glumes rust-colored (concolorous), deltoid-ovate to broadly ovate, 1.3–1.5 × 0.7–0.8 mm, membranous, with 1(–3) brown

veins, apex acute. Perianth bristles 6, ca. 1.5 × as long as nutlet, basally flexuose, distally straight, apically antrorsely scabrous. Anthers linear-oblong. Style of medium length; stigmas 3. Nutlet pale yellow, ellipsoid, ca. 1.5 × 0.5 mm, compressed 3-sided, slightly exceeding subtending glume when mature. Fl. Jun–Jul, fr. Aug–Sep.

Moist grasslands, swamps, trail margins on slopes, stream margins; 300–2800 m. Anhui, S Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, SE Sichuan, SE Xizang, Yunnan, Zhejiang [NE India, Indonesia (Sumatra), Japan, Korea, Russia (Far East), Thailand, Vietnam].

5. *Scirpus wichurae* Boeckeler, Linnaea 36: 729. 1870 [“*wichurai*”].

球穗蘆草 qiu sui biao cao

Scirpus asiaticus Beetle; *S. lineatus* Michaux subsp. *wichurae* (Boeckeler) T. Koyama; *S. wichurae* var. *asiaticus* (Beetle) T. Koyama ex W. T. Lee.

Culms 60–100 cm tall, stout, 3-angled, several nodose. Leaves shorter than culm; basal sheaths blackish purple, shiny, apex with a distinct tongue; leaf blade usually shorter than culm, 0.5–1.5 m × 1–1.5 cm, flat, stiff, leathery, margin slightly scabrous. Involucral bracts 5 or 6, leaflike, basal 3 or 4 overtopping inflorescence. Inflorescence a large compound or decompound anthela, turbinate with concave center, 7–10 × 8–15 cm; rays 5 or more, to 9 cm, slender, spreading (often in same direction), pubescent. Spikelets sessile, in glomerules of 3–7, globose, 3–8 × 2.5–3.5 mm, many flowered, apex obtuse. Glumes rusty brown (concolorous), densely arranged, ovate to ovate-deltate, 1.8–2 × ca. 0.8 mm, membranous, with 1 pale brown vein, apex attenuate to mucronate and woolly at maturity from exerted bristle tips. Perianth bristles 6, 1.5–2 × as long as nutlet, erect, basally connate, apical half sparsely antrorsely scabrous. Style filiform, 1.2–1.5 mm. Nutlet pale yellowish brown, ellipsoid to obovoid, ca. 1.3 mm, 3-sided, apex subulate beaked. Fl. and fr. probably Jul–Oct.

Wet places, hillsides, valleys; 1800–2500 m. Guizhou, Liaoning, Qinghai, Shandong, Yunnan [Bangladesh, Bhutan, N India, Indonesia (Sumatra), Japan, Korea, N Thailand].

Scirpus wichurae and *S. lushanensis* were treated together as *S. asiaticus* by Tang and F. T. Wang (Fl. Reipubl. Popularis Sin. 11: 12. 1961), but we consider them to be quite distinct as can be seen from the key differences. If varieties are recognized for *S. wichurae*, plants from Japan are the typical variety, and plants from China and elsewhere in the range are *S. wichurae* var. *asiaticus*.

6. *Scirpus ternatanus* Reinwardt ex Miquel, Fl. Ned. Ind. 3: 307. 1856.

百穗蘆草 bai sui biao cao

Culms 60–100 cm tall, stout, 3-angled, several nodose. Leaves longer than culm; basal sheaths blackish purple, shiny; leaf blade 1–1.5 cm wide, flat, stiff, leathery, margin slightly scabrous. Involucral bracts 5 or 6, leaflike, basal 3 or 4 overtopping inflorescence. Inflorescence a large compound or decompound anthela, 7–10 × 8–15 cm; rays 5 or more, to 9 cm,

stout, spreading, smooth. Spikelets sessile, in headlike clusters of 4–10, ovoid, ellipsoid, or oblong, 3–8 × 2.5–3.5 mm, many flowered, apex obtuse. Glumes brown, densely arranged, broadly ovate to ovate-orbicular, ca. 1.2 mm, membranous, with 1 pale brown vein, apex obtuse to rounded. Perianth bristles 2 or 3, longer than nutlet, erect, apical half sparsely antrorsely scabrous. Style filiform, 1.2–1.5 mm; stigmas ?2. Nutlet pale yellow, ellipsoid, obovoid, or subspherical, 0.7–1 mm, biconvex. Fl. and fr. (May–)Jun–Aug.

Wet places, hillsides, valleys; 300–1400(–1800) m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Jiangxi, Shandong, Sichuan, Taiwan, SE Xizang, Yunnan [Bhutan, India, Indonesia, Japan, Myanmar, Papua New Guinea, Philippines, Thailand, Vietnam; Pacific islands].

7. *Scirpus chunianus* Tang & F. T. Wang, Fl. Reipubl. Popularis Sin. 11: 221. 1961.

陈氏蘆草 chen shi biao cao

Culms 0.9–1.5 m tall, stout, obtusely 3-angled, acutely 3-angled just basal to inflorescence. Leaves longer than culm; sheath 5–7.5 cm; leaf blade 0.8–1.4 cm wide, flat, stiff, abaxial midvein and margin scabrous. Involucral bracts 7, leaflike, overtopping inflorescence, abaxial midvein and margin scabrous. Inflorescence a large terminal decompound anthela; rays many, scabrous; first rays to 9 cm, stout, 3-angled. Spikelets sessile, in headlike clusters of 3–7, ellipsoid to oblong, 4–6 × 2–3 mm, many flowered, apex obtuse to rounded. Glumes brown with dark brown short lines, deltoid-ovate, ca. 1.5 mm, membranous, 5-veined, apex rounded. Perianth bristles 2 or 3, white, slightly longer than nutlet, erect, apically sparsely antrorsely scabrous. Stamens 2. Stigmas ?2. Nutlet yellow, broadly ellipsoid to subspherical, ca. 1.5 mm, biconvex, densely minutely verruculose. Fl. and fr. Mar–Apr.

• Forests along valleys; 300–600 m. Guangdong, Guangxi, Hainan (Baoting), Hunan.

8. *Scirpus rosthornii* Diels, Bot. Jahrb. Syst. 29: 228. 1900.

百球蘆草 bai qiu biao cao

Rhizomes short. Culms 70–100 cm tall, stout, 3-angled, stiff, nodose. Leaves overtopping inflorescence; sheath 3–12 cm, with transverse veins; leaf blade 0.6–1.5 cm wide, ± stiff, abaxial midvein and margin scabrous. Involucral bracts 3–5, leaflike, usually overtopping inflorescence. Inflorescence a large terminal decompound anthela; rays 6 or 7, to 12 cm, stout, scabrous. Spikelets sessile, in headlike clusters of 4–15, ovoid to ellipsoid, 2–3 × ca. 1.5 mm, many flowered, apex subrounded. Glumes straw-colored to brown but later becoming blackish brown, broadly ovate, ca. 1 mm, with 3 green veins, apex obtuse. Perianth bristles 2 or 3, longer than nutlet, erect, apical half antrorsely scabrous. Stigmas 2. Nutlet yellow, ellipsoid to subspherical, 0.6–0.7 mm, biconvex. Fl. and fr. May–Sep.

Forests, forest margins, slopes, trail margins, wet places, swamps; 300–2600 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Shandong, Sichuan, Xizang, Yunnan, Zhejiang [Japan, Nepal].

9. *Scirpus filipes* C. B. Clarke, J. Linn. Soc., Bot. 36: 249. 1903.

细枝蘆草 xi zhi biao cao

Rhizomes short, woody. Culms 25–100 cm tall, 3-angled, stiff, scabrous, obscurely nodose, clothed at base with several pale brown leaf sheaths. Leaves shorter than culm; sheath very long; leaf blade 5–6 mm wide, stiff, veins and margin scabrous. Involucral bracts 1 or 2, leaflike, overtopping inflorescence, both surfaces and margin scabrous. Inflorescence a terminal simple anthela or pseudolateral head; rays 7–12, to 6 cm, ± slender. Spikelets solitary or in clusters of 2–6, brown, narrowly ovoid, 7–9 × 1.5–2 mm, ca. 10-flowered, basally several glumes empty. Glumes reddish brown, lanceolate-oblong to oblong-ovate, ca. 4 mm, with 1–3 dark yellow veins, apex acute to obtuse. Perianth bristles 6, longer than nutlet, antrorsely scabrous. Stamens 3; anthers linear, ca. 2.5 mm. Stigmas 3. Nutlet yellow, obovoid, less than 1/2 as long as subtending glume, compressed 3-sided. Fl. and fr. May–Jun.

• Forests, forest margins, slopes, trail margins, grassy slopes, wet places, stream margins, swamps, on rocks; 300–2400 m. Fujian, Guangdong, Guangxi.

- 1a. Culms 70–100 cm tall; inflorescence a terminal simple anthela; spikelets in clusters of 2–6 9a. var. *filipes*
1b. Culms ca. 25 cm tall; inflorescence a pseudolateral head; spikelets 1 or 2 9b. var. *paucispiculatus*

9a. *Scirpus filipes* var. *filipes*

细枝蘆草(原变种) xi zhi biao cao (yuan bian zhong)

Culms 70–100 cm tall. Inflorescence a terminal simple anthela. Spikelets in clusters of 2–6.

• Forests, forest margins, slopes, trail margins, grassy slopes, wet places, stream margins, swamps; 300–2400 m. Fujian, Guangdong, Guangxi.

9b. *Scirpus filipes* var. *paucispiculatus* Tang & F. T. Wang, Fl. Reipubl. Popularis Sin. 11: 221. 1961.

少花细枝蘆草 shao hua xi zhi biao cao

Culms ca. 25 cm tall. Inflorescence a pseudolateral head. Spikelets 1 or 2.

• On rocks. Fujian (Nanping).

10. *Scirpus hainanensis* S. M. Huang, Fl. Hainan. 4: 538. 1977.

海南蘆草 hai nan biao cao

Rhizomes short or not. Culms tufted, 60–90 cm tall, slender, erect, terete, nodose, glabrous. Leaves basal or 3–5 on culm, shorter than culm; sheath brown, 1.5–3 cm, mouth obliquely truncate; leaf blade linear, 3–5 mm wide, flat, abaxial midvein and margin scabrous, apex acuminate. Involucral bracts leaflike, usually shorter than inflorescence, sheathing. Inflorescences consisting of a terminal and 3–5 lateral anthelae; rays long, each with 3–12 spikelets. Spikelets solitary, sessile or pedunculate, oblong to ovoid-oblong, 5–7 × 2–3 mm, 10–15-

flowered, sometimes spikelets bearing small plants. Glumes yellowish brown to pale yellow, ovate to oblong-ovate, 2–2.5 mm, membranous, both surfaces with dark brown short lines, with 1 yellowish green vein, apex acute to very shortly mucronate. Perianth bristles 6, ca. 1 mm, basally glabrous, apically densely yellowish brown long pubescent. Stamen 1; anther oblong, ca. 1 mm; connective apex short. Style ca. 1.5 mm, base slightly thickened; stigmas 3. Nutlet yellowish brown, obovoid to broadly obovoid, ca. 1.5 mm, 3-sided, shiny. Fl. and fr. Aug–Dec.

• Moist places, forests along valleys. Fujian, Hainan, Hong Kong, Jiangsu.

11. *Scirpus maximowiczii* C. B. Clarke, Bull. Misc. Inform. Kew, Addit. Ser. 8: 30. 1908.

佛焰苞蘆草 fo yan bao biao cao

Eriophorum japonicum Maximowicz; *E. maximowiczii* (C. B. Clarke) Beetle; *Scirpus japonicus* (Maximowicz) Fernald (1905), not (Miquel) Franchet & Savatier (1877).

Rhizomes oblique, stoloniferous. Culms solitary, 15–30 cm tall, 3-angled, nodose, basally clothed with leaf sheaths eventually disintegrating into fibers, apically slightly scabrous. Basal leaves shorter than culm; leaf blade broadly linear, 3–6 mm wide, flat, apically abruptly narrowed to 3-angled, abaxial midvein and margin slightly scabrous, apex obtuse. Cauline leaves 2 or 3; sheath green, nearly black at apex; leaf blade linear-lanceolate, 3–6 cm × 4–6 mm, flat or slightly plicate. Involucral bracts 1–3, spathe-like, suberect, base blackish brown. Inflorescence a terminal anthela; rays unequal in length, to 3 cm, each terminated by (1 or) 2 or 3 (or 4) spikelets, nodding on side, scabrous. Spikelets grayish brown, ellipsoid to ovoid, 5–7 mm, many flowered. Glumes elliptic to oblong, 3–4 × 1.2–1.5 mm, membranous, 1-veined, apex obtuse. Perianth bristles 6, 4–6 mm, flexuose, antrorsely scabrous at apex. Stamens 3; anthers 2–2.5 mm. Style slender; stigmas 3. Nutlet narrowly obovoid, 1.8–2 × ca. 1 mm, 3-sided. Fl. and fr. Jul–Sep. $2n = 64$.

Wet places, slopes, alpine frozen soil; 1800–2400 m. S Jilin (Changbai Shan) [Japan, Korea, Russia (Far East, E Siberia)].

12. *Scirpus paniculatocorymbosus* Kükenthal, Acta Horti Gothob. 5: 35. 1930.

高山蘆草 gao shan biao cao

Rhizomes 3–5 cm, slender, creeping. Culms 18–30 cm tall, slender, scattered, glabrous. Leaves shorter than culm; sheath reddish purple; leaf blade 4–5 mm wide, flat, abaxial midvein and margin scabrous. Inflorescence a large panicle, consisting of a terminal and 2 or 3 lateral anthelae; rays 3 or 4, 1.5–4 cm; prophyll subtending a bisexual flower at base, on opposite side of bractlet. Spikelets solitary at ends of rays or raylets (secondary rays), narrowly ovoid, 7–10 × 1.5–2.5 mm, 6–8-flowered. Glumes reddish purple, lanceolate, 5–7 mm (including awn), papery, with 3 green costae excurrent into a scabrous awn. Perianth bristles 6, very short, glabrous. Stamens 3; anthers linear. Style slender; stigmas 3, nearly as long as style. Nutlet narrowly obovoid, ca. 1.5 mm, 3-sided; persistent style base blackish purple. Fl. May, fr. Jun–Jul.

• Stream margins in grasslands; 2000–2800 m. W Sichuan.

