

18. PYCREUS P. Beauvois, Fl. Oware 2: 48. 1816.

扁莎属 *bian suo shu*

Dai Lunkai (戴伦凯); Gordon C. Tucker, David A. Simpson

Herbs, annual or perennial. Rhizomes present or absent. Culms usually tufted, 3-angled or compressed 3-angled, rarely triquetrous. Leaves basal, 3-ranked; ligule absent; leaf blade usually present. Involucral bracts (1 or)2–5(–8), leaflike, rarely very thin. Inflorescences terminal, a simple or rarely compound anthela; rays several, long or very short, or inflorescence capitate. Spikelets few to many, arranged into a short spike or capitulum at apex of rays, or fascicled; rachilla not articulate at base, persistent, wingless or narrowly winged. Glumes distichous, gradually deciduous from base to apex of rachilla at maturity, basal 1 or 2 usually without a flower but remaining ones each with a bisexual flower. Flowers without hypogynous bristles or scalelike perianth parts. Stamens 1–3; connective apex prominent or not prominent beyond anthers. Style base not swollen; stigmas 2, deciduous at maturity. Nutlet biconvex, slightly compressed or slightly turgid, one margin facing rachilla, punctulate and reticulately striate or transversely undulately striate.

More than 70 species: Africa, America, Asia, Europe, oceanic islands; 11 species (three endemic) in China.

- 1a. Cells on nutlet surface transversely oblong with an elevated margin resulting in nutlet surface transversely undulately striate or scabrously rugose.
 - 2a. Culms 10–35 cm tall; spikelets narrowly oblong-ovoid to narrowly linear-ovoid, 0.8–2 cm × 3–3.5 mm, 16–30-flowered; glumes brown to dark brown 9. *P. diaphanus*
 - 2b. Culms 3–15 cm tall; spikelets ovoid, oblong-ovoid, or narrowly ovoid, 5–15 cm × 2.5–4 mm, 8–16-flowered; glumes straw-colored, yellowish brown, or purplish red.
 - 3a. Culms slender; leaves 0.3–1.5 mm wide; anthela rays very short; spikelets 1 to several per ray, nearly fascicled; glumes purplish red to reddish brown on both surfaces 10. *P. setiformis*
 - 3b. Culms slightly thick; leaves 1–3 mm wide; anthela rays mostly to 2.5 cm; spikelets 3–8 per ray, congested; glumes straw-colored to yellowish brown 11. *P. pseudolatespicatus*
- 1b. Cells on nutlet surface hexagonally reticulately striate or punctulate.
 - 4a. Glumes broadly sulcate on both surfaces 8. *P. sanguinolentus*
 - 4b. Glumes not broadly sulcate on both surfaces.
 - 5a. Glume apices truncate to emarginate and excurved mucronate to awned 7. *P. pumilus*
 - 5b. Glume apices obtuse or acute and not excurved mucronate.
 - 6a. Spikelets narrowly linear-ovate, narrowly ovoid, narrowly oblong-ovoid, or oblong-ovoid; glumes densely imbricate, ca. 3 mm or more; stamens 3.
 - 7a. Spikelets ca. 2.5(–3) mm wide; glumes blackish brown 1. *P. delavayi*
 - 7b. Spikelets 3–5 mm wide; glumes straw-colored or yellowish brown 2. *P. unioides*
 - 6b. Spikelets linear, linear-oblong, narrowly linear-ovoid, or narrowly ovoid; glumes slightly laxly imbricate or rarely densely imbricate, 1.5–2 mm; stamens 1 or 2.
 - 8a. Nutlet oblong, both surfaces concave sulcate; stamen 1 6. *P. sulcinus*
 - 8b. Nutlet obovoid-oblong or obovoid, both surfaces not concave sulcate; stamens (1 or)2.
 - 9a. Anthelae with very short rays; spikelets narrowly ovoid to narrowly linear-ovoid; glumes subelliptic, abaxially not conspicuously keeled 5. *P. lijiangensis*
 - 9b. Anthelae simple, lax, usually with slightly long or rarely very short rays; spikelets linear-oblong or linear; glumes oblong-ovate or subovate, abaxially keeled.
 - 10a. Spikelets radiately arranged; rachilla 4-angled, with trabeculae in both lateral sulculi; glumes brown to dark brown, laxly imbricate, apex obtuse; anthers oblong 3. *P. flavidus*
 - 10b. Spikelets suberect; rachilla flexuose, narrowly winged; glumes straw-colored to rarely pale brown, densely imbricate, apex sometimes mucronate; anthers linear 4. *P. polystachyos*

1. *Pycrus delavayi* C. B. Clarke, J. Linn. Soc., Bot. 36: 203. 1903.

黑鳞扁莎 *hei lin bian suo*

Cyperus delavayi (C. B. Clarke) Kükenthal.

Perennials. Roots fibrous. Rhizomes short. Culms tufted, 40–60 cm tall, slender, acutely triquetrous, with a few leaves basally. Leaves shorter than culm; leaf blade 1–2 mm wide, usually folded. Involucral bracts 2, subulate, longer than inflorescence. Inflorescence a simple anthela; rays 2 or 3, mostly to

only 2 cm, sometimes very short and inflorescence almost capitate, each with 2–10 spikelets. Spikelets laxly arranged, narrowly linear-ovoid to narrowly ovoid, 0.6–1.6 cm × 2.5–3 mm, obliquely spreading, 6–16-flowered; rachilla 4-angled, wingless, with successive glumes ca. 1.2 mm apart. Glumes blackish brown on both surfaces, slightly laxly imbricate, ovate, 2.7–3 mm, subleathery, veins 3 and straw-colored, apex acute. Stamens 3; anthers linear, 1–1.2 mm. Style slightly short; stigmas 2, slender. Nutlet black, oblong-obovoid, ca. 1.2 mm, ca. 1/2 as long as subtending glume, biconvex, densely prominently punctulate, apex mucronate. Fl. and fr. Jun.

• Swamps, boggy seepages, shallow water; 2000–3000 m. Yunnan.

2. *Pycreus unioloides* (R. Brown) Urban, Symb. Antill. 2: 164. 1900.

禾状扁莎 he zhuang bian suo

Cyperus unioloides R. Brown, Prodr. 216. 1810; *Pycreus chekiangensis* Tang & F. T. Wang.

Perennials. Rhizomes short. Culms tufted, 40–90 cm tall, slender, stiff, 3-angled, smooth, with a few leaves basally. Leaves shorter than culm; sheath reddish brown, to 8 cm; leaf blade 3–4 mm wide, folded or flat, somewhat rigid. Involucral bracts 2–4, leaflike, basal 1 or 2 longer than inflorescence. Inflorescence a simple anthela; rays 2–6, mostly to 6 cm, sometimes short, each with 3–12 spikelets arranged into a spike. Spikelets narrowly oblong-ovoid, narrowly ovoid, or oblong-ovoid, 0.6–1.8 cm × 3–5 mm, compressed, spreading to downward reflexed at basal part at maturity, (6–)10–22-flowered; rachilla flexuose, wingless. Glumes straw-colored, yellowish brown, or sometimes slightly reddish brown on both surfaces, slightly densely to slightly laxly imbricate, ovate, 4–5 mm, subleathery, veins 3 and green, apex acute. Stamens 3; anthers linear; connective prominent beyond anthers. Style long; stigmas 2, slightly shorter than style. Nutlet yellowish when young but black when mature, broadly obovoid to globose-obovoid, 1/4–1/3 as long as subtending glume, compressed biconvex, densely prominently punctulate. Fl. and fr. Jun–Oct.

Wet places, river margins in valleys; 200–2200 m. Guangdong, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Japan, Myanmar, Nepal, Papua New Guinea, Philippines, Thailand, Vietnam; Africa, E Australia, Central, North, and South America, Madagascar].

Pycreus chekiangensis appears to be based on immature plants of *P. unioloides*. Although the glumes are lighter, this variation can be found in *P. unioloides* in various parts of its pantropical range.

3. *Pycreus flavidus* (Retzius) T. Koyama, J. Jap. Bot. 51: 316. 1976.

球穗扁莎 qiu sui bian suo

Perennials. Roots fibrous. Rhizomes short. Culms tufted, 2–50 cm tall, obtusely 3-angled, smooth, with a few leaves basally. Leaves shorter or longer than culm; sheath reddish brown at basal part, long; leaf blade 1–2 mm wide, folded or flat. Involucral bracts 2–4, longer than inflorescence, slender. Inflorescence a simple anthela; rays 1–6, mostly to 6 cm, unequal in length, sometimes very short, each with many to rarely few spikelets. Spikelets congested at apex of rays, linear-oblong to linear, 0.3–1.8 cm × 1–3 mm, strongly compressed, radially spreading and forming a globose spike, 6–34(–66)-flowered; rachilla straight, 4-angled, with trabeculae in both lateral sulculi. Glumes yellowish brown, reddish brown, dark purplish red, dark grayish brown, or purplish brown on both surfaces, lax or dense, oblong-ovate, 1.5–2 mm, 3-veined, keel abaxially green, margin narrowly white hyaline, apex obtuse. Stamens 2; anthers oblong, ca. 0.5 mm. Style of medium length; stigmas 2, slender. Nutlet brown to dark grayish brown, obovoid, 0.8–1.2 mm, ca. 1/3 as long as subtending glume, slightly com-

pressed, biconvex, prominently punctulate, apex mucronate. Fl. and fr. Jun–Nov.

Swamps, shallow water, river margins, shady wet places, meadows, water margins, ditch margins, paddy field margins; below 100–3400 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, SE Xizang, Yunnan, Zhejiang [Afghanistan, Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Kashmir, Kazakhstan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Russia, Sri Lanka, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam; Africa, SW Asia, Australia, S Europe, Indian Ocean islands, Madagascar].

- 1a. Culms 2–3 cm tall; inflorescence a simple anthela, with only 1 ray and 3–9 spikelets 3d. var. *minimus*
- 1b. Culms 7–50 cm tall; inflorescence a simple anthela, with 2–6 rays each with many or rarely few spikelets.
 - 2a. Leaves usually longer than culm; spikelets 3–8 × 1–1.5 mm, 6–14-flowered 3c. var. *strictus*
 - 2b. Leaves shorter than culm; spikelets 6–18 × 1.5–3 mm or narrower, 12–34(–66)-flowered.
 - 3a. Spikelets 1.5–3 mm wide; glumes yellowish brown, reddish brown, or dark purplish red, lax 3a. var. *flavidus*
 - 3b. Spikelets less than 1.5 mm wide; glumes dark grayish brown to purplish brown, dense 3b. var. *nilagiricus*

3a. *Pycreus flavidus* var. *flavidus*

球穗扁莎(原变种) qiu sui bian suo (yuan bian zhong)

Cyperus flavidus Retzius, Observ. Bot. 5: 13. 1788; *C. globosus* Allioni (1789), not Forskål (1775); *Pycreus globosus* Reichenbach.

Culms tufted, 7–50 cm tall. Leaves shorter than culm. Inflorescence a simple anthela; rays 2–6, each with many to rarely few spikelets. Spikelets 0.6–1.8 cm × 1.5–3 mm, 12–34(–66)-flowered. Glumes yellowish brown, reddish brown, or dark purplish red, lax. Fl. and fr. Jun–Nov.

Wet places at river margins, ditch margins, herbaceous along trails, field margins; below 100–3400 m. Anhui, Chongqing, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, SE Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Kashmir, Kazakhstan, Korea, Laos, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Russia, Sri Lanka, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam; SW Africa, SW Asia, Australia, S Europe, Indian Ocean islands, Madagascar].

3b. *Pycreus flavidus* var. *nilagiricus* (Hochstetter ex Steudel) C. Y. Wu ex Karthikeyan, Fl. Ind. Enumerat. Monocot. 65. 1989.

小球穗扁莎 *xiao qiu sui bian suo*

Cyperus nilagiricus Hochstetter ex Steudel, Syn. Pl. Glumac. 2: 2. 1854; *C. globosus* var. *nilagiricus* (Hochstetter ex Steudel) C. B. Clarke; *Pycneus globosus* var. *nilagiricus* (Hochstetter ex Steudel) C. B. Clarke.

Culms ± tall. Leaves shorter than culm. Inflorescence a simple anthela. Spikelets less than 1.5 mm wide. Glumes dark grayish brown to purplish brown, densely arranged. Fl. and fr. Jul–Sep.

Swamps, shallow water, river margins, shady wet places; 100–3000 m. Fujian, Gansu, Guangdong, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan, Zhejiang [India, Japan, Kazakhstan, Korea, Malaysia, Myanmar, Philippines, Russia, Sri Lanka, Uzbekistan, Vietnam; E Africa, Madagascar].

3c. *Pycneus flavidus* var. *strictus* C. Y. Wu ex Karthikeyan, Fl. Ind. Enumerat. Monocot. 65. 1989.

直球穗扁莎 *zhi qiu sui bian suo*

Cyperus strictus Roxburgh, Fl. Ind. 1: 203. 1820, not Lamarck (1791); *C. globosus* var. *strictus* C. B. Clarke; *Pycneus globosus* var. *strictus* C. B. Clarke.

Culms ± tall, slightly stiff. Leaves usually longer than culm. Spikelets 3–8 × 1–1.5 mm, 6–14-flowered. Glumes brown to brownish yellow but sometimes more pale. Fl. and fr. Jun–Aug.

Meadows, swamps, river margins, water margins, shallow water, ditch margins, shady wet places, paddy field margins; 200–1400 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Jiangsu, Jiangxi, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Afghanistan, Bhutan, India, Japan, Kashmir, Nepal; SW Asia (Iran), Australia, Indian Ocean islands, Madagascar].

3d. *Pycneus flavidus* var. *minimus* (Kükenthal) L. K. Dai, **comb. nov.**

矮球穗扁莎 *ai qiu sui bian suo*

Basionym: *Cyperus globosus* f. *minimus* Kükenthal, Acta Horti Gothob. 5: 108. 1930; *Pycneus globosus* var. *minimus* (Kükenthal) Tang & F. T. Wang.

Culms 2–3 cm tall. Leaves longer than culm. Inflorescences with 1 ray and 3–9 spikelets. Spikelets arranged into a spike. Glumes dark purplish brown. Fl. and fr. Sep–Oct.

- Shady wet places; ca. 800 m. Shanxi.

4. *Pycneus polystachyos* (Rottbøll) P. Beauvois, Fl. Oware 2: 48. 1816.

多枝扁莎 *duo zhi bian suo*

Cyperus polystachyos Rottbøll, Descr. Pl. Rar. 21. 1772; *Pycneus polystachyos* var. *brevispiculatus* How ex Y. F. Deng.

Annuals or short-lived perennials. Roots fibrous. Rhizomes short. Culms densely tufted, 8–60 cm tall, compressed 3-angled, stiff, smooth. Leaves shorter than culm; sheath brown at

basal part, long; leaf blade 2–4 mm wide, flat, sometimes folded, slightly rigid. Involucral bracts 4–6, leaflike, longer than inflorescence. Inflorescence a simple or almost capitate anthela; rays 5–8, mostly to 3.5 cm but sometimes short, each with many spikelets. Spikelets linear to linear-oblong, (0.5–)0.7–1.8 cm × 1.5–2 mm, congested into a globose spike, 6–30-flowered or more; rachilla flexuose, narrowly winged. Glumes on both surfaces straw-colored, reddish brown, dark grayish brown, or blackish dark grayish brown, densely imbricate, ovate-oblong, ca. 2 mm, membranous, 3-veined, keel abaxially green, apex sometimes mucronate. Stamens (1 or)2; anthers linear; connective prominent beyond anthers. Style long; stigmas 2, slender. Nutlet suboblong to ovoid-oblong, ca. 1/2 as long as subtending glume, biconvex, punctulate, apex mucronate. Fl. and fr. May–Oct.

Wet places, sandy areas at seashores, water margins, shady areas in wet sand, paddy field margins; near sea level to 300 m. Fujian, Guangdong, E Guangxi, Hainan, Jiangsu, S Liaoning, Taiwan, Xisha Qundao, Zhejiang [Cambodia, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Pakistan, Philippines, Russia (Far East), Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Australia, Central, North, and South America, S Europe, Indian Ocean islands, Madagascar, Pacific islands].

Plants with anthela rays short or nearly absent occur sporadically throughout the range of this pantropical and warm-temperate species. Such plants have been collected in S China (Guangdong) and given the name *Pycneus polystachyos* var. *brevispiculatus*. When the species is revised on a worldwide basis, it may be appropriate to provide a formal designation for these plants with a capitulum-like inflorescence.

5. *Pycneus lijiangensis* L. K. Dai in Tang & F. T. Wang, Fl. Reipubl. Popularis Sin. 11: 233. 1961.

丽江扁莎 *li jiang bian suo*

Perennials. Roots few, fibrous. Rhizomes very short. Culms scattered, (5–)15–40 cm tall, slightly slender, stiff, obtusely 3-angled or sometimes nearly half-cylindric, smooth, with a few leaves basally. Leaves shorter than culm; sheath grayish brown, ± short; leaf blade 1–2 mm wide, usually folded, apical margin scabrous. Involucral bracts 3, leaflike, longer than inflorescence. Inflorescence a simple anthela; rays very short, rarely to 1.5 cm, with 7 to many spikelets clustered into a globose capitulum. Spikelets narrowly to very narrowly ovoid, 4.5–11 × 1.5–2.2 mm, 10–26-flowered; rachilla 4-angled, with trabeculae in both lateral sulci. Glumes dark purplish red on both surfaces, slightly laxly imbricate, elliptic to ovate-elliptic, 1.8–2 mm, membranous, veins 3 and greenish yellow, keel inconspicuous, apex obtuse and mucinous. Stamens 2; filaments ca. 1.2 mm; anthers linear, ca. 0.5 mm; connective barely prolonged beyond anthers. Style short; stigmas 2, slender. Nutlet dark grayish brown, oblong to obovoid-oblong, ca. 0.9 mm, 2/5–1/2 as long as subtending glume, compressed biconvex, densely punctulate. Fl. and fr. Jun.

- Wet places at river and pond margins; 2000–3000 m. SW Sichuan, NW Yunnan.

6. *Pycneus sulcinus* (C. B. Clarke) C. B. Clarke in J. D. Hooker, Fl. Brit. India 6: 593. 1893.

槽果扁莎 *cao guo bian suo*

Cyperus sulcinix C. B. Clarke, J. Linn. Soc., Bot. 21: 56. 1884; *Pycrus substellatus* E. G. Camus.

Annuals. Roots fibrous. Culms tufted, 5–40 cm tall, slender, 3-angled, smooth, with a few leaves basally. Leaves shorter than culm; sheath purplish brown; leaf blade 0.5–2 mm wide, usually folded, apical margin scabrous. Involucral bracts 3–5, spreading, leaflike, usually basal 1 or 2 longer than inflorescence. Inflorescence a simple anthela; rays 3–8, mostly to 7 cm, slender, each with 3–15 spikelets arranged into a spike. Spikelets spreading, linear, 0.5–1.5[–3.5] cm × 1–1.5 mm, compressed, 8–20-flowered; rachilla flexuose, narrowly winged. Glumes straw-colored to brownish yellow on both surfaces, lax, ovate to oblong-ovate, ca. 1.8 mm, medially veins 3 and green, laterally membranous and veinless, margin narrowly white hyaline, apex obtuse and mucronate. Stamen 1; anther oblong, ca. 0.3 mm. Style of medium length; stigmas 2. Nutlet blackish brown, oblong, 1.2–1.3 mm, ca. 2/3 as long as subtending glume, slightly compressed, both surfaces concave sulcate and punctulate. Fl. and fr. Jun–Aug.

Under sparse forests in valleys, along trails on mountain slopes; 100–500 m. Guangdong, Guangxi, Hainan, Taiwan, SE Xizang, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, Vietnam; N Australia, Pacific islands].

7. *Pycrus pumilus* (Linnaeus) Nees, Linnaea 9: 283. 1834.

矮扁莎 ai bian suo

Cyperus pumilus Linnaeus, Cent. Pl. 2: 6. 1756; *C. nitens* Retzius.

Annuals. Roots fibrous. Culms tufted, 2–20[–35] cm tall, slightly slender, compressed 3-angled, smooth, with a few leaves basally. Leaves shorter to longer than culm; leaf blade 1–2 mm wide, folded or flat. Involucral bracts 3–5, leaflike, longer than inflorescence. Inflorescence a simple anthela; rays 3–6, mostly to 2 cm, sometimes very short into a capitulum, each with 10–20 or more spikelets congested into a subglobose spike. Spikelets oblong to linear-oblong, 3–15 × 1.5–2 mm, compressed, 8–30(–40)-flowered; rachilla straight, wingless. Glumes pale to yellowish white, densely imbricate, ovate to ovate-elliptic, 1.2–1.5 mm, 3–5-veined, keel abaxially green, laterally membranous and veinless, apex truncate-emarginate and with a 0.3–0.5 mm mucro. Stamens 1 or 2; anthers oblong, ca. 0.2 mm. Style ca. 0.5 mm; stigmas 2, ca. 0.3 mm. Nutlet grayish brown, obovoid to oblong, ca. 0.6 mm, 1/3–2/5 as long as subtending glume, biconvex, densely prominently punctulate, apex obtuse. Fl. and fr. Aug–Nov.

Water margins, wet places in fields; below 100–500 m. Fujian, Guangdong, SE Guangxi, Hainan, Hunan, Jiangxi, S Taiwan [Bangladesh, Bhutan, India, Indonesia, Kashmir, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, N Australia, Indian Ocean islands, Madagascar].

Pycrus pumilus is naturalized in North and South America.

8. *Pycrus sanguinolentus* (Vahl) Nees ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 6: 590. 1893.

红鳞扁莎 hong lin bian suo

Cyperus sanguinolentus Vahl, Enum. Pl. 2: 351. 1805,

nom. cons.; *C. eragrostis* Lamarck var. *cyrtostachys* Miquel; *C. eragrostis* var. *humilis* Miquel; *C. eragrostis* f. *melanocephalus* (Miquel) J. V. Suringar; *C. flavescens* Linnaeus f. *rubromarginatus* Schrenk; *C. korshinskii* Meinshausen; *C. melanocephalus* Miquel; *C. sanguinolentus* f. *humilis* (Miquel) Kükenthal; *C. sanguinolentus* f. *melanocephalus* (Miquel) Kükenthal; *C. sanguinolentus* f. *rubromarginatus* (Schrenk) Kükenthal; *Pycrus korshinskii* (Meinshausen) V. I. Kreczetowicz; *P. sanguinolentus* var. *cyrtostachys* (Miquel) L. K. Dai; *P. sanguinolentus* f. *humilis* (Miquel) L. K. Dai; *P. sanguinolentus* f. *melanocephalus* (Miquel) L. K. Dai; *P. sanguinolentus* f. *rubromarginatus* (Schrenk) L. K. Dai.

Annuals. Roots fibrous. Culms densely tufted, 5–50 cm tall, compressed 3-angled, smooth, with several leaves basally. Leaves several, usually shorter than culm to rarely longer; sheath usually reddish brown, short; leaf blade 2–4 mm wide or less, flat, apical margin denticulate. Involucral bracts 2–5, leaflike, longer than inflorescence, subspreading. Inflorescence a simple anthela; rays 3–5, mostly to 4.5 cm to sometimes very short and inflorescence a capitulum, each with 4–12 or more spikelets congregated into a short spike or nearly a capitulum. Spikelets radially spreading, narrowly ovoid to narrowly oblong-ovoid, 0.5–1.8 cm × 2.5–3 mm, 6–24-flowered; rachilla straight, 4-angled, wingless. Glumes straw-colored, brownish yellow, or blackish brown on both surfaces but middle yellowish green, slightly laxly imbricate, ovate, ca. 2 mm, membranous, medially 3–5-veined, often distinctly furrowed on both sides of keel, margin dark blood-red to dark brownish red, apex obtuse. Stamens (2 or)3; anthers linear, 0.7–1 mm. Style long; stigmas 2, exerted, slender. Nutlet black at maturity, globose-obovoid to broadly ellipsoid, 1–1.3 mm, 1/2–3/5 as long as subtending glume, biconvex, slightly turgid, minutely punctate. Fl. and fr. Jul–Dec. $2n = 48, 50$.

Sparse forest margins, grasslands on mountain slopes, meadows, swamps, lake margins, sunny places at river margins or shallow water, valleys, wet places along trails, field margins, old fields; below 100–3400 m. Anhui, Chongqing, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, S and SE Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Kashmir, Kazakhstan, Korea, Kyrgyzstan, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Russia, Sri Lanka, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam; Africa, SW Asia, Australia, Pacific islands].

Pycrus sanguinolentus is naturalized in North America.

9. *Pycrus diaphanus* (Schrader ex Schultes) S. S. Hooper & T. Koyama, J. Jap. Bot. 51: 316. 1976.

宽穗扁莎 kuan sui bian suo

Cyperus diaphanus Schrader ex Schultes, Mant. 2: 477. 1824; *C. latespicatus* Boeckeler; *C. latespicatus* var. *diaphanus* (Schrader ex Schultes) Kükenthal; *Pycrus latespicatus* (Boeckeler) C. B. Clarke.

Annuals. Roots fibrous. Culms densely tufted, 10–35 cm tall, slightly slender, obtusely 3-angled, smooth, with a few leaves basally. Leaves shorter than culm; leaf blade 1.5–2.5 mm wide, apical margin denticulate. Involucral bracts 2 or 3(or 4),

leaflike, longer than inflorescence. Inflorescence a simple anthela; rays 2–4, mostly to 7 cm but sometimes short, each with 3–6 spikelets arranged into a spike. Spikelets radiate spreading, narrowly oblong-ovoid to narrowly linear-ovoid, 0.8–2 cm × 3–3.5 mm, compressed, 16–36-flowered; rachilla slightly flexuose, wingless. Glumes dark grayish brown to brown on both surfaces, densely imbricate, broadly ovate, ca. 3 mm, membranous, shiny, 3-veined, keel abaxially green, margin with broad whitish undulate border, apex obtuse. Stamens 2; anthers oblong, 0.8–1 mm. Style long; stigmas 2, shorter than style. Nutlet grayish black, broadly obovoid, 1–1.3 mm, ca. 1/3 as long as subtending glume, biconvex, turgid, transversely undulately striate. Fl. and fr. Sep–Oct.

Water margins, wet places; 600–1800 m. Guizhou, Hainan, Jiangxi, Xizang, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Kashmir, Korea, Nepal, Philippines, Russia (Far East), Thailand, Vietnam].

10. *Pycreus setiformis* (Korshinsky) Nakai, Bot. Mag. (Tokyo) 26: 201. 1912.

东北扁莎 dong bei bian suo

Cyperus setiformis Korshinsky, Trudy Imp. S.-Peterburgsk. Bot. Sada 12: 405. 1892.

Annuals. Roots fibrous. Culms tufted, 5–30 cm tall, slender, 3-angled, smooth, with a few leaves basally. Leaves shorter than culm; sheath slightly reddish brown; leaf blade 0.3–1.5 mm wide, flat. Involucral bracts 1–3, usually longer than inflorescence, spreading, sometimes basalmost bract erect. Inflorescence a simple anthela; rays very short, each with 1 to several spikelets. Spikelets obliquely spreading, oblong to narrowly oblong-ovoid, 0.5–1.5 cm × 3–4 mm, compressed, 8–16-flowered; rachilla flexuose, narrowly winged. Glumes purplish red to reddish brown on both surfaces, slightly densely imbricate, ovate, ca. 2.5 mm, 3-veined, keel green, margin white hyaline, apex obtuse. Stamens 2; anthers linear; connective apex prominent beyond anthers. Style long; stigmas 2, slightly short. Nutlet black, broadly obovoid, ca. 1.5 mm, biconvex, inconspicuously transversely undulately striate to nearly reticulately striate, apex mucronate. Fl. and fr. Jul–Sep.

Meadows, wet sandy areas. Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, Russia (Far East)].

11. *Pycreus pseudolatespicatus* L. K. Dai in Tang & F. T. Wang, Fl. Reipubl. Popularis Sin. 11: 233. 1961.

似宽穗扁莎 si kuan sui bian suo

Annuals. Culms 3–15 cm tall, 3-angled, smooth, base with leaves. Leaves shorter to longer than culm; sheath reddish brown, short, usually split; leaf blade 1–3 mm wide, flat, margin laxly denticulate. Involucral bracts 3 or 4, spreading, leaflike, longer than inflorescence. Inflorescence a simple anthela; rays 3–5, mostly to 2.5 cm, each with 3–8 spikelets arranged into a short spike. Spikelets congregated near apex of ray, oblong-ovoid to subovoid, 6–10 × ca. 2.5 mm, radially spreading, 8–14-flowered; rachilla substrict, wingless. Glumes straw-colored to yellowish brown, slightly laxly imbricate, ovate, ca. 3 mm, concave, slightly thick, 3-veined, apex obtuse and mucous. Stamens 2; anthers broadly linear; connective slightly

prominent beyond anthers. Style long; stigmas 2. Nutlet brownish, obovoid, ca. 1/3 as long as subtending glume, slightly turgid, conspicuously and transversely undulately striate. Fl. and fr. Aug–Sep.

- Paddy field margins; 1500–2100 m. Guizhou, Sichuan.

