

188. **MISCANTHUS** Andersson, Öfvers. Kongl. Vetensk.-Akad. Förh. 12: 165. 1855.

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Diandranthus L. Liu; *Imperata* subg. *Triarrhena* Maximowicz; *Rubimons* B. S. Sun; *Triarrhena* (Maximowicz) Nakai.

Perennial, tufted or rhizomatous. Culms slender to robust, erect, solid. Leaves basal or cauline; leaf blades large, linear, flat, broad or narrow; ligule membranous. Inflorescence a panicle, often large and plumose, of racemes arranged on a long or short axis; raceme axis tough, internodes slender, spikelets paired, both spikelets pedicelled, pedicels slender, flattened, slightly clavate. Spikelets similar, lanceolate, dorsally compressed; callus bearded with hairs shorter than, as long as, or longer than the spikelet; glumes papery or membranous; lower floret usually represented by a hyaline sterile lemma; upper floret bisexual, lemma hyaline, awned or awnless. Stamens 2–3. Caryopsis oblong or ellipsoid.

Fourteen species, mostly in SE Asia and the Pacific Islands, extending to tropical Africa; seven species (two endemic) in China.

This genus is readily recognized by its paniculate inflorescence of racemes, which have a tough rachis, and also by its paired spikelets, both of which are pedicelled.

1a. Stamens 2.

2a. Callus hairs longer than spikelet, golden brown in color 6. *M. nepalensis*

2b. Callus hairs shorter than spikelet, purple or white in color 7. *M. nudipes*

1b. Stamens 3.

3a. Panicle spikeletlike with short racemes appressed to the axis; spikelets straight-awned; lower glume distinctly 2-keeled 1. *M. paniculatus*

3b. Panicle large, usually open with spreading racemes; spikelets awnless or geniculately awned; lower glume weakly 2-keeled.

4a. Spikelets awnless.

5a. Culms 300–700 cm tall, branching at nodes; inflorescence 20–40 cm 2. *M. lutarioriparius*

5b. Culms 65–160 cm tall, unbranched; inflorescence 7–30 cm 3. *M. sacchariflorus*

4b. Spikelets awned.

6a. Axis more than 2/3 the length of the panicle 4. *M. floridulus*

6b. Axis up to 1/2 the length of the panicle 5. *M. sinensis*

1. *Miscanthus paniculatus* (B. S. Sun) Renvoize & S. L. Chen, Kew Bull. 60: 607. 2006.

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Rubimons paniculatus B. S. Sun, Acta Bot. Yunnan. 19: 239. 1997.

Plant rhizomatous. Culms 30–100 cm tall, 3–4 mm in diam., 3–4-noded, nodes puberulous. Leaf sheaths slightly compressed, usually shorter than internodes, glabrous, ciliate at apex; leaf blades linear, flat, 10–40 × 0.2–0.8 cm, glabrous or pilose, narrowed to midrib toward base, apex acuminate; ligule 0.5–1.5 mm, ciliate, obtuse. Panicle 5–15 cm; axis glabrous. Racemes short, 2–6 cm, appressed. Spikelets lanceolate, 5–6 mm, awned; callus hairs 0.5–2 mm; glumes unequal; lower glume ca. 5 mm, back scabrid, pilose, obscurely 2–3-veined between 2 keels, or veinless, keels hispidulous, upper margin pilose, apex 2-lobed or 2-toothed; upper glume ca. 6 mm, obscurely 3–5-veined or veinless, scabrid, margins pilose, apex acuminate; lower lemma linear-lanceolate, 4.5–6 mm, 3–5-veined, puberulous; upper lemma ca. 5 mm, 1–3-veined, margins pilose, apex acuminate, awned; awn ca. 2 mm, straight. Anthers 3, ca. 3 mm. Caryopsis oblong.

• Dry mountain slopes; 2500–3100 m. W Guizhou, Sichuan, Yunnan.

This is a distinctive species easily recognized by its reduced inflorescence. The spikelets are typical of *Miscanthus*, and for this reason the recognition of the separate genus *Rubimons* is unjustified.

2. *Miscanthus lutarioriparius* L. Liu ex Renvoize & S. L. Chen, Kew Bull. 60: 605. 2006.

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Plant robust, from a rhizomatous rootstock. Culms stout, canelike, 3–7 m tall, 10–20 mm in diam. in lower part, branching, branches ascending, branch buds invested with pubescent or pilose scales, internodes mostly hollow, becoming solid toward apex, nodes glabrous in lower part of culm, pubescent in upper part, lower nodes often bearing adventitious roots. Leaves cauline, glabrous; leaf blades linear, flat, 50–90 × 1.5–3 cm, midrib prominent, adaxial surface pilose at base behind ligule, margins scabrid, base rounded or tapering to a pseudopetiole, apex finely acuminate; ligule ca. 0.5 mm, margin pilose, auricles ca. 1 mm or absent. Panicle large, 20–40 × 10–15 cm; axis glabrous, 10–25 cm. Racemes 20–40, 10–30 cm, rachis puberulous at base, otherwise glabrous; lower pedicel 1.5–2 mm, upper pedicel 4.5–5.5 mm. Spikelets 4–6.5 mm, pilose, awnless; callus hairs ca. 10 mm, exceeding the spikelet; glumes subequal, membranous, apex attenuate; lower glume 3–5-veined, back pilose with ca. 10 mm hairs; upper glume 3-veined, back glabrous, margins pubescent; lower lemma

lanceolate, hyaline, 3.5–4.5 mm, veinless, pilose; upper lemma similar to lower, 3–4 mm; upper palea hyaline, pilose, reduced to a small scale. Anthers 3, ca. 2 mm. Caryopsis lanceolate, ca. 2 mm.

- River banks, lakesides; below 100 m. Hubei, Hunan.

3. *Miscanthus sacchariflorus* (Maximowicz) Hackel in Engler & Prantl, Nat. Pflanzenfam. 2: 23. 1887.

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Imperata sacchariflora Maximowicz, Prim. Fl. Amur 331. 1859; *Triarrhena sacchariflora* (Maximowicz) Nakai.

Plant rhizomatous; rhizomes long, slender, covered by short, striate, glabrous or pubescent cataphylls. Culms slender, erect, 65–160 cm tall, solid, unbranched. Leaves cauline; leaf sheaths striate, glabrous; leaf blades linear, flat, 20–50 × 0.5–1.5 cm, glabrous, midrib prominent, base tapering, straight or rounded, margins scabrid, apex acuminate; ligule ca. 0.5 mm, fringed with 1–2 mm cilia. Panicle 7–30 cm; axis 5–15 cm, glabrous or pilose at base. Racemes 4–24, 5–20 cm; rachis internodes glabrous, nodes pilose or glabrous; lower pedicel 1–2.5 mm, upper pedicel 2–5 mm. Spikelets 4–6 mm, pilose, awnless; callus hairs 8–12 mm, exceeding the spikelet; glumes subequal, membranous, 4–6 mm, veins obscure, apex acuminate; lower glume densely pilose with long hairs on margins; upper glume shortly pilose at apex; lower lemma lanceolate, hyaline, ca. 3 mm, 0–1-veined, apex and margins puberulous; upper lemma similar to lower; upper palea a small, veinless, puberulous scale. Anthers 3, 2–2.5 mm. Caryopsis oblong.

Mountain slopes, river banks. Gansu, Hebei, Henan, Shaanxi [Japan, Korea, Russia].

4. *Miscanthus floridulus* (Labillardière) Warburg ex K. Schumann & Lauterbach, Fl. Schutzgeb. Südsee 166. 1901.

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Saccharum floridulum Labillardière, Sert. Austro-Caledon. 13: t. 18. 1824; *Eulalia japonica* Trinius; *Miscanthus japonicus* (Trinius) Andersson.

Plant tufted, robust. Culms erect, 1.5–4 m tall, 6–15 mm in diam., unbranched, nodes usually glabrous, or uppermost sometimes bearded. Leaves cauline, congested; leaf sheaths longer than internodes, overlapping, glabrous, pilose at throat; leaf blades linear, flat, tough, 20–85 × 0.5–4 cm, glabrous, midrib prominent, margins scabrid, base rounded, apex acuminate; ligule 1–3 mm, densely pilose on back. Panicle oblong or elliptic, dense, 20–50 cm; axis 25–45 cm. Racemes numerous, 10–30 cm, appressed or ascending, glabrous, scaberulous; rachis internodes puberulous, nodes glabrous; lower pedicel 1–3.5 mm, upper pedicel 2.5–8 mm. Spikelets 2.5–4(–6) mm, awned; callus hairs 4–6 mm, white, spreading, as long as the spikelet; glumes subequal, membranous, golden brown, 2.5–4(–6) mm, margins pilose near apex, veins obscure, apex acuminate; lower lemma lanceolate, hyaline, 3–3.5 mm, veinless, pilose; upper lemma similar to lower, 2–2.5 mm; awn geniculate, 5–6(–10) mm; upper palea a small hyaline scale. Anthers 3, 1–1.5 mm. Caryopsis oblong, ca. 1.5 mm.

Slopes, valleys, grassy places. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Jiangsu, Sichuan, Taiwan, Yunnan, Zhejiang [SE Asia].

The plants are cultivated for hedges and as ornamentals, the rhizomes are used for medicine, the culms are used for papermaking, and the young leaves are used for forage.

5. *Miscanthus sinensis* Andersson, Öfvers. Kongl. Vetensk.-Akad. Förh. 12: 166. 1855.

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Miscanthus condensatus Hackel; *M. flavidus* Honda; *M. kanehirae* Honda; *M. purpurascens* Andersson; *M. sinensis* subsp. *purpurascens* (Andersson) Tzvelev; *M. sinensis* var. *condensatus* (Hackel) Makino; *M. sinensis* var. *purpurascens* (Andersson) Matsumura; *M. transmorrisonensis* Hayata.

Plant tufted or shortly rhizomatous. Culms (30–)80–200 (–400) cm tall, 3–10 mm in diam., solid, unbranched, nodes glabrous or puberulous. Leaves basal and cauline; leaf sheaths glabrous or pilose; leaf blades linear, flat, 18–75 × 0.3–2(–4) cm, glabrous, glaucous or pilose, midrib prominent, margins scabrid or smooth, base tapering or broad and rounded, apex acuminate; ligule 0.5–4 mm, ciliolate. Panicle (10–)20–36 cm; axis 6–16 cm, subglabrous to pilose or puberulous. Racemes (4–)10–40(–100), (8–)10–30 cm; rachis internodes glabrous, scaberulous or smooth, nodes glabrous; lower pedicel 0.5–1.5 mm, upper pedicel 1.5–4 mm. Spikelets 4–6.5 mm, pilose or glabrous, awned; callus hairs 5–8 mm, exceeding the spikelet; glumes subequal, membranous, 4–6.5 mm, 5-veined, back glabrous or pilose, puberulous at apex and along upper margins, apex acuminate; lower lemma lanceolate, hyaline, 3.5–4 mm, veinless, apex and margins puberulous, otherwise glabrous; upper lemma similar to lower, 2.5–3.5 mm; awn geniculate, 4–12 mm; upper palea a 1–2 mm scale. Anthers 3, ca. 2.5 mm. Caryopsis ellipsoid, ca. 2 mm.

Mountain slopes, coasts, disturbed places; below 2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Hubei, Jiangsu, Jiangxi, Jilin, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

This is a widespread species with a broad range of variation. Although the variants may be locally distinct, there are too many intermediates to allow a more detailed taxonomy to be followed. The main variants are as follows: *Miscanthus condensatus*: plants robust, 200–400 cm tall; leaf blades broad, 20–40 mm wide; panicle dense, of up to 100 racemes; Japan (including Ryukyu Islands), especially on coasts; *M. purpurascens*: glumes conspicuously pilose; throughout the range of *M. sinensis*; *M. transmorrisonensis*: panicles of 5–10 racemes; Taiwan.

The name “*Miscanthus jinxianensis* L. Liu” (Fl. Reipubl. Popularis Sin. 10(2): 7. 1997) was not validly published because no Latin description was provided. It probably refers to a slightly large form of *M. sinensis*. The specimen on which it is based has not been seen.

6. *Miscanthus nepalensis* (Trinius) Hackel in A. Candolle & C. Candolle, Monogr. Phan. 6: 104. 1889.

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Eulalia nepalensis Trinius, Mém. Acad. Imp. Sci. St.-Petersbourg, Sér. 6, Sci. Math. 2: 333. 1833; *Diandranthus ne-*

palensis (Trinius) L. Liu.

Plant tufted. Culms erect, 20–200 cm tall, 2–7 mm in diam., glabrous or pilose immediately below inflorescence, nodes glabrous. Leaves basal and cauline; leaf sheaths glabrous, striate, pilose at throat; leaf blades linear, flat or folded, 15–60 × 0.3–2.5 cm, glabrous or pilose, margins scabrid, base tapering, straight or rounded, apex acuminate; ligule 1–3 mm, ciliolate, dorsally pilose. Panicle oblong or equidimensional, 8–24 cm; axis 1.5–16 cm, glabrous. Racemes 7–80, flexuous, 8–18 cm; rachis glabrous; lower pedicel 1–2 mm, upper pedicel 2.5–5.5 mm. Spikelets 2–3 mm, golden brown, awned; callus hairs 5–11 mm, much longer than spikelet, pale to golden brown; glumes subequal or upper slightly longer, membranous, 1–5-

veined; lower glume glabrous or margins sparsely pilose with 4–6 mm hairs, apex emarginate; upper glume glabrous, margins and apex hyaline, apex acute; lower lemma ovate, hyaline, 1.5–2 mm, veinless; upper lemma lanceolate, hyaline, 1.5–2 mm; awn straight or flexuous, 5–17 mm; upper palea ca. 1 mm scale. Anthers 2, 1–1.5 mm. Caryopsis ellipsoid, ca. 1.5 mm.

Mountain slopes; 1900–2800 m. Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal; introduced in Malaysia].

7. *Miscanthus nudipes* (Grisebach) Hackel in A. Candolle & C. Candolle, Monogr. Phan. 6: 109. 1889.

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Erianthus nudipes Grisebach, Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ. 3: 92. 1868; ?*Diandranthus aristatus* L. Liu; *D. brevopilus* (Handel-Mazzetti) L. Liu; *D. corymbosus* L. Liu; *D. eulalioides* (Keng) L. Liu; *D. nudipes* (Grisebach) L. Liu; ?*D. ramosus* L. Liu; *D. szechuanensis* (Keng ex S. L. Zhong) L. Liu; *D. taylorii* (Bor) L. Liu; *D. tibeticus* L. Liu; *D. wardii* (Bor) L. Liu; *D. yunnanensis* (A. Camus) L. Liu; *Miscanthus brevopilus* Handel-Mazzetti; *M. eulalioides* Keng; *M. nudipes* subsp. *yunnanensis* A. Camus; *M. szechuanensis* Keng ex S. L. Zhong; *M. taylorii* Bor; *M. wardii* Bor; *M. yunnanensis* (A. Camus) Keng.

Plant tufted. Culms erect, 25–120 cm tall, unbranched, 3–5-noded, nodes glabrous. Leaves basal and cauline; leaf sheaths pilose, glabrescent; leaf blades linear, flat or folded, 10–40 cm × 0.15–0.8 cm, pilose, base straight or rounded, apex tapering to a fine point; ligule 1–1.5 mm, dorsally ciliate. Panicle 10–30 cm; axis 3–20 cm, glabrous or pilose. Racemes 4–20, 5–20 cm; rachis pilose; lower pedicel 0.5–1.5 mm, or lower spikelet subsessile, upper pedicel 1.5–4 mm; pubescent apex. Spikelets 4–6.5 mm, pilose, awned; callus hairs 1–5 mm, purple or white; glumes subequal, membranous, 5–7-veined, pilose, margins hyaline, apex acute to 2-toothed or truncate; lower lemma membranous or hyaline, 3.5–6 mm, 0–1-veined, apex acute or obtuse; upper lemma membranous or hyaline, 2.5–5 mm, 0–1-veined, 2-toothed, the teeth finely acuminate, or apex entire; awn geniculate or flexuous, 6–11 mm; upper palea 2–5 mm. Anthers 2, 2–3.5 mm. Caryopsis fusoid, ca. 2 mm.

Mountain slopes; 1000–3600 m. Guizhou, Sichuan, Xizang, Yunnan [Bhutan, India (Assam, Sikkim), Nepal].

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