

140. **MUHLENBERGIA** Schreber in Linnaeus, Gen. Pl., ed. 8, 1: 44. 1789.

乱子草属 luan zi cao shu

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Perennial, usually with creeping scaly rhizomes. Culms erect, ascending or decumbent at base. Leaf blades linear to narrowly lanceolate; ligule membranous, sometimes minutely ciliolate. Inflorescence an open or contracted panicle. Spikelets with 1 floret, lanceolate, slightly laterally compressed, rachilla disarticulating above glumes; glumes shorter than or equal to lemma, subequal or the upper shorter, thin, usually 1-veined or the lower veinless, persistent; callus small, obtuse; lemma 3-veined, membranous, dark green mottled with dark gray, laxly pilose toward base on abaxial surface, awned from acute apex or from between two minute teeth; awn straight or flexuose; palea equal to the lemma, membranous. Caryopsis usually fusiform, rarely ellipsoid.  $x = 10$ .

About 155 species: mainly SW North America and Mexico, also Central and South America and SE Asia; six species in China.

*Muhlenbergia duthieana* Hackel (Oesterr. Bot. Z. 52: 11. 1902) has recently been reported from Yunnan (Fl. Yunnan. 9: 467. 2003). It is a loosely tufted species lacking rhizomes, with a dense, narrow panicle, and spikelets distinguished by their long glumes, at least 4/5 as long as the spikelet. Outside China it is known from montane forests in the Himalayas, from Pakistan to Nepal.

Many species of this genus are good fodder plants.

- 1a. Culms decumbent or ascending at base; plants usually without creeping rhizomes, rarely with short rhizomes.  
2a. Glumes 1.5–2.2 mm; culms decumbent at base ..... 1. *M. japonica*  
2b. Glumes 3–4 mm; culms ascending at base ..... 2. *M. himalayensis*
- 1b. Culms erect or ascending; plants with long, creeping, scaly rhizomes.  
3a. Glumes 0.5–1.2 mm, 1/4–1/3 length of lemma, apex obtuse ..... 3. *M. huegelii*  
3b. Glumes 1.5–4 mm, 1/2–4/5 length of lemma, apex acute or acuminate.  
4a. Culms with many branches in the upper part; spikelets ca. 3 mm; glumes 1/2–2/3 length of spikelet; anthers ca. 0.5 mm ..... 4. *M. ramosa*  
4b. Culms without branches in the upper part; spikelets 3–5 mm; glumes 2/3–4/5 length of spikelet; anthers 1–2 mm.  
5a. Anthers 1.5–2 mm; spikelets 4–5 mm; inflorescence branches appressed with few spikelets; leaf blades 2–4 mm wide ..... 5. *M. hakonensis*  
5b. Anthers ca. 1 mm; spikelets 3–4 mm; inflorescence branches loosely ascending with many spikelets; leaf blades 3–6 mm wide ..... 6. *M. curviaristata*

1. **Muhlenbergia japonica** Steudel, Syn. Pl. Glumac. 1: 422. 1854.

日本乱子草 ri ben luan zi cao

Plants usually without rhizomes or rarely with short rhizomes. Culms usually decumbent at base and rooting at nodes, 15–50 cm tall, ca. 1 mm thick. Leaf sheaths glabrous, usually shorter than internodes; leaf blades narrowly lanceolate, flat, 2–9.5 × 0.15–0.4 cm, scabrid on both surfaces and margins, apex acuminate; ligule 0.2–0.4 mm, ciliate. Panicle 4–12 cm, narrow; branches one per node, scabrid, with many spikelets near base. Spikelets lanceolate, 2.5–3 mm, purplish gray-green, mottled dark gray; glumes 1.5–2.2 mm, membranous, scabrid, 1-veined, apex acute; lower glume 1.5–2 mm, upper glume 2–2.2 mm; lemma 2.5–3 mm, lower 1/4 of back pubescent, otherwise glabrous or scaberulous; awn 5–9 mm, slender, purplish, scabrid. Anthers ca. 0.6 mm. Fl. and fr. Jun–Nov.  $2n = 40$ .

Moist ground of river banks, around margins of shrubs; 1400–3000 m. Anhui, Beijing, Fujian, Guizhou, Heilongjiang, Henan, Hubei, Shaanxi, Shandong, Sichuan, Yunnan, Zhejiang [Japan].

2. **Muhlenbergia himalayensis** Hackel ex J. D. Hooker, Fl. Brit. India 7: 259. 1896 [“1897”].

喜马拉雅乱子草 xi ma la ya luan zi cao

Plants with short rhizomes. Culms tufted, usually ascending at base, 30–50 cm tall, 0.5–1 mm thick, many-noded, sub-inflated at nodes, branches glabrous. Leaf sheaths loose, longer

than internodes; leaf blades 1–9 × 0.1–0.3 cm, flat, flaccid, scabrid on both surfaces; ligule ca. 0.5 mm, lacerate, glabrous. Panicle 5–15 cm, narrow, lax; branches slender, flexuose, usually naked below the middle. Spikelets narrowly lanceolate, 3–4 mm, purplish gray-green; glumes 3–4 mm, subequal or lower glume shorter than the upper, lanceolate, membranous, 1-veined, apex acuminate or acute; lemma 3–4 mm, equal to or slightly longer than glumes, lower 1/3 of back pilose; awn 9–14 mm, usually purple, slender, erect or slightly flexuose, scabrid. Anthers ca. 1.5 mm. Fl. and fr. Jul–Oct.

Moist ground of mountain slopes, valleys, ditches, under thickets; 2000–2900 m. Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, Kashmir, Nepal].

3. **Muhlenbergia huegelii** Trinius, Mém. Acad. Imp. Sci. Saint-Petersbourg, Sér. 6, Sci. Math., Seconde Pt. Sci. Nat. 6, 4(3–4): 293. 1841.

乱子草 luan zi cao

*Muhlenbergia arisanensis* Hayata; *M. geniculata* Nees ex Steudel; *M. longistolon* Ohwi; *M. viridissima* Nees ex Steudel.

Plants usually with long, scaly rhizomes. Culms erect, 70–90 cm tall, rigid, puberulent below nodes. Leaf sheaths loose, glabrous, usually shorter than internodes; leaf blades 4–14 × 0.4–1 cm, flat, scabrid on both surfaces and margins, apex acuminate; ligule ca. 1 mm, glabrous or ciliate. Panicle 8–27 cm, rather open, sometimes nodding; branches few to many at each node, branches and pedicels all slender, scabrid. Spikelets lan-

ceolate, 2–3 mm, gray-green or purplish; glumes 0.5–1.2 mm with lower glume slightly shorter than the upper, hyaline, veinless or upper glume 1-veined, apex obtuse; lemma 2–3 mm, gray-green or purple, scaberulous, lower 1/4 of back pilose; awn 8–16 mm. Anthers ca. 0.8 mm. Fl. and fr. Jul–Oct.  $2n = 40, 42$ .

Moist places in mountain valleys, riversides, forests; 900–3000 m. Anhui, Fujian, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, India, Japan, Korea, Nepal, Pakistan, Philippines, Russia].

**4. *Muhlenbergia ramosa*** (Hackel ex Matsumura) Makino, J. Jap. Bot. 1(4): 13. 1917.

多枝乱子草 duo zhi luan zi cao

*Muhlenbergia japonica* Steudel var. *ramosa* Hackel ex Matsumura, Bot. Mag. (Tokyo) 11: 444. 1897; *M. frondosa* (Poiret) Fernald subsp. *ramosa* (Hackel ex Matsumura) T. Koyama & Kawano.

Plants with creeping scaly rhizomes; rhizomes 11–30 × ca. 0.2 cm. Culms usually erect, 30–120 cm tall, 1–2.5 mm thick, with many branches in upper part. Leaf sheaths loosely overlapping, glabrous; leaf blades 5–12 × 0.3–0.6 cm, flat, thinner, scabrid on both surfaces and margins; ligule ca. 0.5 mm, truncate. Panicle 10–18 cm, narrow; branches one or two per node, usually with spikelets to the base. Spikelets narrowly lanceolate, ca. 3 mm, purplish gray-green; glumes 1.5–2.2 mm with lower glume usually shorter than the upper, broadly lanceolate, 1-veined, apex acute to acuminate; lemma 2.5–3.1 mm, lower 1/4 of back pilose; awn 5–10 mm, gray-green or purple, scabrid. Anthers ca. 0.5 mm. Caryopsis ca. 0.5 mm, brown, narrowly oblong. Fl. and fr. Jul–Oct.

Open forest of mountain valleys, moist places on mountain slopes; 100–1300 m. Anhui, Fujian, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Yunnan, Zhejiang [Japan].

**5. *Muhlenbergia hakonensis*** (Hackel ex Matsumura) Makino, J. Jap. Bot. 1(4): 13. 1917.

箱根乱子草 xiang gen luan zi cao

*Muhlenbergia japonica* Steudel var. *hakonensis* Hackel ex Matsumura, Bot. Mag. (Tokyo) 11: 444. 1897.

Plants with creeping scaly rhizomes; rhizomes 3–5 cm, ca. 2 mm thick. Culms erect, 40–80 cm tall, ca. 1 mm thick at base, slender, not branching in upper part. Leaf sheaths loose, glabrous; leaf blades 5.5–12 × 0.2–0.4 cm, flat, scabrid on both surfaces and margins or abaxial surface smooth; ligule 0.5–1 mm, truncate, lacerate. Panicle 15–23 × ca. 0.5 cm, narrow, branches one or two per node, sparse, appressed. Spikelets narrowly lanceolate, 4–5 mm, gray-green; glumes 3–4 mm, papery, subequal or lower glume slightly shorter than the upper, 1-veined, scaberulous along veins, apex acuminate; lemma 4–5 mm, pale with gray-green variegation, equal to spikelet, lower 1/4 of back pubescent; awn 5–9 mm, straight. Anthers 1.5–2 mm. Caryopsis ca. 3 mm, red-brown, terete, hilum narrowly ovate, 1/3 length of the caryopsis. Fl. and fr. Jul–Oct.  $2n = 40$ .

Wet places on mountain slopes, roadsides. Anhui, Sichuan [Japan, Korea].

**6. *Muhlenbergia curvيارistata*** (Ohwi) Ohwi, Bot. Mag. (Tokyo) 55: 397. 1941.

弯芒乱子草 wan mang luan zi cao

*Muhlenbergia ramosa* var. *curvيارistata* Ohwi, Acta Phytotax. Geobot. 6: 292. 1937; *M. curvيارistata* var. *nipponica* Ohwi; *M. tenuiflora* (Willdenow) Britton, et al. subsp. *curvيارistata* (Ohwi) T. Koyama & Kawano.

Plants with creeping scaly rhizomes; rhizomes up to 10 cm, 2–3 mm thick. Culms erect, 60–100 cm tall, ca. 2 mm thick, not branching in upper part, smooth or puberulent below nodes. Leaf sheaths loose, glabrous or scaberulous; leaf blades 8–19 cm × 3–6 mm, flat, scabrid on both surfaces and margins; ligule 0.5–1 mm, apex truncate, lacerate. Panicle 15–35 × 0.5–1.5 cm, effuse or contracted; branches usually two per node, ascending, scabrid. Spikelets lanceolate, 3–3.5 mm, pale purplish; glumes membranous, 1-veined, scabrid on veins, apex acute; lower glume 1.5–2 mm, upper glume 2–2.5 mm; lemma equal to spikelet, 3–3.5 mm, glaucous and variegated with dark gray, lower 1/4 of back pilose; awn 5–10 mm, flexuose or erect, pale or sometimes purplish, scabrid. Anthers ca. 1 mm. Fl. and fr. Jul–Sep.  $2n = 40$ .

Grassy places on mountain slopes, forests, moist ground along roadsides; 900–1400 m. Hebei, Jilin, Liaoning [Japan].

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