

79. KOELERIA Persoon, Syn. Pl. 1: 97. 1805.

落草属 qia cao shu

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Perennials, tufted, sometimes shortly rhizomatous. Culms unbranched. Leaf sheaths of tillering leaves usually closed; leaf blades mainly basal, narrow, flat, or inrolled and filiform to setaceous; ligule membranous. Inflorescence a dense spikelike panicle, shining; branches short, erect, hispidulous to woolly. Spikelets with 2 to several florets; rachilla puberulous or glabrous, disarticulating below each floret; glumes narrow, unequal or subequal, equaling or shorter than florets, strongly keeled, thinly herbaceous, 1–3(–5)-veined, margins broad, hyaline, shining; floret callus small, glabrous or very shortly hairy; lemmas membranous or papery, strongly compressed, sharply keeled, 3–5-veined, margins hyaline, shining, apex obtuse to acuminate, awnless or with a subapical mucro; palea subequaling lemma, hyaline, gaping free from lemma margins. Stamens 3. Ovary glabrous. Endosperm sometimes liquid.

About 35 species: temperate regions throughout the world, also on tropical mountains; four species in China.

This is a genus of narrowly defined, closely related species. They provide good forage in mountain steppe.

- 1a. Lemmas shortly awned, awns 0.5–2.5 mm; rachilla with 0.3–1 mm hairs 1. *K. litvinowii*
- 1b. Lemmas awnless or minutely mucronate; rachilla glabrous or puberulous.
 - 2a. Glumes and lemmas pilose 2. *K. altaica*
 - 2b. Glumes and lemmas glabrous, smooth or scabrid.
 - 3a. Plant densely tufted; culms hairy mainly below panicle; spikelets punctate scabrid 3. *K. macrantha*
 - 3b. Plant with short rhizomes, forming loose mats; culms hairy throughout; spikelets smooth 4. *K. atroviolacea*

1. *Koeleria litvinowii* Domin, Biblioth. Bot. 14(65): 116. 1907.

芒落草 mang qia cao

Perennial, loosely to densely tufted. Culms up to 50 cm tall, thinly pubescent to tomentose below panicle, 1- or 2-noded, or node basal and obscured. Leaf sheaths glabrous or pubescent; leaf blades flat, 4–15 cm, 1–4 mm wide, pubescent or glabrous, margins sometimes setose near ligule; ligule 1–2 mm. Panicle elliptic-oblong to narrowly oblong in outline, 1.5–12 cm, sometimes interrupted, silvery green, grayish or purplish; axis and branches densely pubescent. Spikelets 4.7–6 mm, florets 2 or 3; rachilla hairs 0.3–0.5(–1) mm; glumes slightly unequal, lower glume narrowly lanceolate, 3.5–5 mm, keel scabrid, upper glume elliptic-oblong, 4.3–5.8 mm, keel scabrid or ciliate, margins broadly membranous; lemmas lanceolate, 3.7–5.5 mm, finely scabrid to shortly pubescent, shortly awned from upper 1/4 or above, apex acute or 2-mucronate; awn 0.5–2.5 mm, straight; palea keels scabrid to ciliate. Anthers 0.6–1.5 mm. Fl. and fr. Jun–Sep.

Grassy or stony mountain slopes, alpine meadows; 3000–5200 m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [Afghanistan, Kashmir, E Kazakhstan, Kyrgyzstan, Tajikistan (Pamirs)].

This species is intermediate between the closely related genera *Trisetum* and *Koeleria*, especially in the possession of a short, straight awn. A hybrid origin has been postulated (*T. spicatum* × *K. macrantha*). Variation in the high mountains of W China and neighboring regions is poorly understood. In particular, the boundary with short-awned forms of *T. spicatum* is obscured by intermediates. Forms with a very short, straight awn are here all included in *K. litvinowii*.

- 1a. Leaf sheaths densely pubescent; panicle grayish violet 1a. subsp. *litvinowii*
- 1b. Leaf sheaths glabrous or thinly pilose; panicle silvery green 1b. subsp. *argentea*

1a. *Koeleria litvinowii* subsp. *litvinowii*

芒落草(原亚种) mang qia cao (yuan ya zhong)

Koeleria enodis Keng; *K. hosseana* Domin; *K. hosseana* var. *tafelii* Domin; *K. litvinowii* var. *tafelii* (Domin) P. C. Kuo & Z. L. Wu; *Trisetum litvinowii* (Domin) Nevski.

Perennial forming small dense tussocks. Culms tinged purple, tomentose below panicle. Leaf sheaths densely pubescent. Panicle grayish violet. Lemma apex acute.

Grassy or stony mountain slopes, alpine meadows; 3000–5200 m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [E Kazakhstan, Kyrgyzstan, Tajikistan (Pamirs)].

This subspecies tends to have a more northwestern distribution than subsp. *argentea*.

1b. *Koeleria litvinowii* subsp. *argentea* (Grisebach) S. M. Phillips & Z. L. Wu, **comb. nov.**

银落草 yin qia cao

Basionym: *Koeleria argentea* Grisebach, Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ. 3: 77. 1868; *K. argentea* var. *nepalensis* Domin; *Trisetum litvinowii* subsp. *argenteum* (Grisebach) Tzvelev; *T. litvinowii* var. *argenteum* (Grisebach) Tzvelev.

Perennial, loosely tufted. Culms green, pubescent or subglabrous below panicle. Leaf sheaths usually glabrous. Panicle pale silvery green. Lemma apex minutely 2-mucronate.

Damp meadows, alluvial gravel by rivers and mountain streams; ca. 4000 m. Qinghai, Xizang [Afghanistan, Kashmir].

2. *Koeleria altaica* (Domin) Krylov, Fl. Sibir. Occid. 2: 261. 1928.

阿尔泰落草 a er tai qia cao

Koeleria eriostachya Pančić var. *altaica* Domin, Biblioth.

Bot. 14(65): 163. 1907.

Perennial, densely tufted or shortly rhizomatous; old basal sheaths encircling 2 or 3 culms together into bunches, finally splitting into fibers. Culms slender, 13–50 cm tall, pubescent below panicle, otherwise glabrous. Leaf sheaths densely pubescent at base, upper culm sheaths subglabrous; leaf blades usually rolled, hard, recurved, 2–13 cm, 0.5–2.5 mm wide, hirsute or sometimes glabrous; ligule 1–2 mm. Panicle 2–3 cm, very dense, lower part interrupted, yellowish green or tinged grayish violet. Spikelets 3.5–5 mm, florets 2(–3); glumes unequal, lanceolate or oblong-lanceolate, appressed pilose, keel ciliate, lower glume 3–3.5 mm, upper glume 4–4.5 mm; lemmas lanceolate, ca. 4.5 mm, shortly pilose, apex mucronate. Fl. and fr. Jun–Jul.

Dry stony grassy hills. Nei Mongol, Xinjiang [Kazakhstan (Tarbagatai Mountains), Mongolia, Russia (S Siberia)].

This is a good forage grass.

3. *Koeleria macrantha* (Ledebour) Schultes, Mant. 2: 345. 1824.

落草 qia cao

Aira macrantha Ledebour, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 5: 515. 1815; *Koeleria cristata* Persoon var. *poiformis* (Domin) Tzvelev; *K. cristata* subsp. *pseudocristata* (Domin) Domin; *K. cristata* var. *pseudocristata* (Domin) P. C. Kuo & Z. L. Wu; *K. gracilis* Persoon, nom. illeg. superfl.; *K. poiformis* Domin; *K. pseudocristata* Domin; *K. tokiensis* Domin.

Perennial, densely tufted; old basal sheaths papery, persistent around each culm base. Culms stiffly erect, 5–60 cm tall, woolly especially below panicle, 2–3-noded. Leaf sheaths glabrous or pubescent; leaf blades grayish green, usually rolled, sometimes flat, up to 30 cm, 1–2 mm wide, pubescent or adaxial surface glabrous; ligule 0.2–2 mm. Panicle linear-oblong in outline, 1.5–13 cm, lower part often interrupted and lobed, silvery green or tinged purple; axis and branches woolly. Spikelets 3–7 mm, florets 2–3(–4); rachilla hairs less than 0.4 mm or glabrous; glumes slightly unequal, punctate-scaberulous, keel scabrid, lower glume narrowly lanceolate, 1.5–4 mm, upper glume elliptic-oblong, 2.5–5.5 mm, apex acute; lemmas lanceolate, 2.6–5.5 mm, punctate-scaberulous, apex acute, cuspidate, or rarely keel extended up to 0.3 mm into apical mucro; palea keels ciliolate. Anthers 1.2–2.3 mm. Fl. and fr. May–Sep.

Mountain slopes, grassland, roadsides; sea level to 3900 m. Anhui, Fujian, Hebei, Heilongjiang, Henan, Hubei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Sichuan, Xinjiang, Xizang, Zhejiang [Afghanistan, NW India, Kashmir, Kazakhstan, Kyrgyzstan, Japan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; North America, SW Asia, Europe; introduced to Australia and elsewhere].

This species has usually been known in the past as *Koeleria cristata* Persoon, an illegitimate, superfluous name that included the types of two earlier names in its circumscription. It is a highly polymorphic species, widespread in temperate parts of the N hemisphere, to which many infraspecific names have been applied. Variable characters include hairiness, stiffness, rolling and color of the leaf blades, panicle

color, and spikelet size and hairiness. These variants are mostly ill-defined, intergrading, and of negligible practical value.

4. *Koeleria atrovioleacea* Domin, Biblioth. Bot. 14(65): 252. 1907.

匍茎落草 pu jing qia cao

Koeleria asiatica Domin subsp. *atrovioleacea* (Domin) Tzvelev; *K. asiatica* subsp. *ledebourii* (Domin) Tzvelev; *K. atrovioleacea* var. *tsinghaica* Tzvelev; *K. geniculata* Domin; *K. ledebourii* Domin.

Perennial, shortly rhizomatous, forming loose mats; old basal sheaths papery, persistent. Culms erect or geniculate at base, 10–50 cm tall, pilose throughout length, 2–3-noded. Leaf sheaths of cauline leaves inflated; leaf blades green, flat or rolled, 5–15 cm, 1–2 mm wide, smooth or scabrid, occasionally pilose; ligule ca. 0.2 mm. Panicle rather lax, pyramidal to oblong in outline, 2.5–8 cm, lower part often interrupted, grayish violet. Spikelets 4–6 mm, florets 2 or 3; glumes usually glabrous, occasionally shortly ciliate on keel, lower glume narrowly lanceolate, 3.5–4 mm, upper glume broadly lanceolate, 4.5–5 mm; lemmas narrowly ovate, ca. 5 mm, smooth, glabrous, awnless, apex acuminate; palea keels scabrid. Anthers ca. 2 mm. Fl. Jun–Aug.

Grassy places on dry mountain slopes; 2900–4600 m. Qinghai, Xizang [Mongolia, Russia (Altai and Sayan Mountains of S Siberia)].

This species is closely related to, and is sometimes regarded as a subspecies of, *Koeleria asiatica* Domin. That species, in the strict sense, is confined to arctic regions of E Europe, Russia, and W North America, and usually has densely hairy spikelets.

It is uncertain whether this grass does in fact occur in China, as was reported in FRPS (9(3): 134, fig. 33. 1987, as *Koeleria asiatica*), or whether that record relates to an unusually loosely tufted form of *K. macrantha*. No specimens have been seen.

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