

80. *DESCHAMPSIA* P. Beauvois, Ess. Agrostogr. 91. 1812.

发草属 *fa cao shu*

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*Avenella* (Bluff & Fingeruth) Drejer; *Aira* sect. *Avenella* Bluff & Fingerhuth.

Perennials, densely tufted. Leaf blades mainly basal, linear to setaceous, flat, folded or rolled; ligule membranous. Inflorescence usually an open panicle, infrequently contracted or spike-like; branches and pedicels usually filiform. Spikelets oblong to gaping, shining, laterally compressed, florets 2–3(–5), disarticulating below each floret; rachilla pilose, extended beyond uppermost floret; glumes lanceolate to oblong, subequal, ± equaling spikelet, membranous, shining, keeled, lower glume 1-veined, upper glume 1–3-veined; floret callus small, pubescent to conspicuously bearded; lemmas lanceolate to oblong, hyaline to shiny cartilaginous, back rounded, finely 4-veined (5th midvein extended into awn), glabrous, awned from near base or in lower half, apex membranous, broad, 4-toothed or denticulately truncate; awn straight or weakly geniculate, usually not exerted from spikelet; palea hyaline, subequal to lemma. Ovary glabrous. Caryopsis with solid endosperm.

About 40 species: temperate and cold regions of the world; three species in China.

- 1a. Awns geniculate, clearly exerted from spikelet; leaf blades setaceous, smooth ..... 1. *D. flexuosa*  
1b. Awns straight or almost so, included in spikelet or only shortly exerted; leaf blades linear, usually adaxially scabrid.  
2a. Panicle dense, spike-like, 1–7 cm, ovate to oblong, brownish purple with golden sheen ..... 2. *D. koelerioides*  
2b. Panicle lax and open, or contracted but not spike-like, 6–30 cm, narrowly oblong to ovate ..... 3. *D. cespitosa*

**1. *Deschampsia flexuosa*** (Linnaeus) Trinius, Mém. Acad. Imp. Sci. Saint-Petersbourg, Sér. 6, Sci. Math., Seconde Pt. Sci. Nat. 4, 2(1): 9. 1836.

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*Aira flexuosa* Linnaeus, Sp. Pl. 1: 65. 1753; *A. kawakamii* Hayata; *Avenella flexuosa* (Linnaeus) Drejer; *Deschampsia kawakamii* (Hayata) Honda; *Lerchenfeldia flexuosa* (Linnaeus) Schur.

Perennial, tufted, sometimes rhizomatous; old basal sheaths tightly overlapping. Culms slender, erect, 15–60 cm tall, 2- or 3-noded. Leaf sheaths longer than internodes, smooth or scaberulous upward; leaf blades setaceous, rather stiff, 3–15 cm, 0.3–0.5 mm wide, abaxial (outer) surface smooth; ligule lanceolate, 2–4 mm. Panicle open, ovate in outline, 5–10 cm, silvery with purple or brown tinge; branches usually paired, capillary, flexuous, bearing spikelets on distal part. Spikelets 4–6(–8) mm, florets 2, rachilla internode short; glumes thinly membranous, 1-veined, lower shorter than upper, apex acute; callus hairs ca. 1 mm; lemmas 3.5–5(–6) mm, asperulous, awned from near base, apex denticulate or erose; awn 5–8 mm, exerted from spikelet, geniculate in middle, column dark brown, twisted. Anthers 1.5–2.5 mm. Fl. and fr. Jul–Sep. *2n* = 28.

Exposed mountain peaks, on stony soil and rocky slopes. Taiwan [Japan, Philippines (Luzon), Russia; Africa (high mountains), SW Asia (Caucasus), Europe, North America, South America (S Argentina, S Chile)].

A variant of this widespread species found on Yu Shan (Mt. Morrison) in Taiwan has larger spikelets than usual (6–8 mm), since the glumes are drawn out into long caudate tips, with the upper glume 1–2 mm longer than the lower. This variant is the basis of *Deschampsia kawakamii*. Typical *D. flexuosa* also occurs in Taiwan.

**2. *Deschampsia koelerioides*** Regel, Bull. Soc. Imp. Naturalistes Moscou 41: 299. 1868.

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*Deschampsia cespitosa* (Linnaeus) P. Beauvois subsp. *koelerioides* (Regel) Tzvelev.

Perennial, forming small dense tussocks. Culms erect, 5–40 cm tall, 1–1.7 mm in diam., 1(or 2)-noded. Leaf sheaths loose, glabrous; leaf blades linear, flat or rolled, up to 20 cm, 1–3 mm wide, abaxial surface smooth, adaxial surface with coarse sharp ridges, smooth or scaberulous; ligule acuminate, up to 8 mm. Panicle densely contracted to spike-like, ovoid to oblong, 1–7 cm, brownish purple with golden sheen; branches very short, visible or not. Spikelets 4–6 mm, florets 2, rachilla internode ca. 1 mm; glumes subequal to spikelet, lower glume slightly shorter than or equaling upper glume, 1-veined, upper glume 3-veined, apex acute or obtuse, often lacerate; callus hairs ca. 1/3 lemma length; lemmas 3–4 mm, awned from or near lower 1/4, apex broadly 2-toothed, teeth irregularly lacerate; awn straight or slightly bent, equaling or slightly longer than lemma. Anthers 1.5–2.2 mm. Fl. Jul–Aug.

Damp alpine meadows, wet places near rivers and stream banks; 3500–5100 m. Gansu, Nei Mongol, Qinghai, Xinjiang, Xizang [E Afghanistan, Kashmir, Kazakhstan (Tarbagatai Mountains), Kyrgyzstan, Mongolia, N Pakistan, Russia (S Siberia), Tajikistan (Pamirs), Uzbekistan].

This is a distinctive, high-altitude variant from the *Deschampsia cespitosa* complex, distinguished by its short, spike-like, purple-brown panicles.

A specimen collected in S Xizang (N of Kumaon, N India) has been assigned to *Deschampsia cespitosa* subsp. *sikkimensis* Noltie, which is otherwise known only from India (Sikkim). It is a small plant with compact panicles, close to *D. koelerioides*, but differing in its pyramidal panicle with the spikelets aggregated into fascicles.

**3. *Deschampsia cespitosa*** (Linnaeus) P. Beauvois, Ess. Agrostogr. 91. 1812.

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*Aira cespitosa* Linnaeus, Sp. Pl. 1: 64. 1753.

Perennial, densely tufted. Culms erect, slender to stout,

30–150 cm tall, 1–3 mm in diam., 1–3-noded. Leaf sheaths loose, glabrous; leaf blades linear, flat or folded, up to 30 cm, 1–5 mm wide, abaxial surface smooth, adaxial surface with coarse sharp ridges, densely scabrid; ligule obtuse to acuminate, 2–7(–12) mm. Panicle usually open, often nodding, infrequently loosely contracted, ovate to narrowly oblong in outline, up to 30 cm or more, greenish or purplish sometimes with golden sheen; branches slender, bearing spikelets on distal part. Spikelets 2.5–7 mm, florets (1–)2(–3), rachilla internode ca. 1 mm; glumes slightly longer to slightly shorter than florets, lower glume slightly shorter than or equaling upper glume, 1-veined, upper glume 3-veined, apex acute; callus hairs ca. 1/3 lemma length; lemmas 2.5–3.5 mm, awned from near base to near middle, rarely awnless, apex broad, toothed or erose; awn straight or slightly bent, slightly shorter to longer than lemma. Anthers 1.2–2 mm. Fl. and fr. Jul–Sep.

Wet meadows, river sand and gravel, among bushes, wet places; 1500–4500 m. Gansu, Heilongjiang, Nei Mongol, Qinghai, Shaanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan [Bhutan, India (Sikkim), Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Uzbekistan; SW Asia, Europe, North America; introduced elsewhere].

*Deschampsia cespitosa* is an extremely polymorphic, widely distributed grass. Many regional and local variants have been accorded separate status, either at specific or infraspecific rank. Variation is complex due to polyploidy and introgression, and morphological and cytological variation often do not coincide. There is extensive overlapping of diagnostic characters leading to a lack of clear boundaries between taxa. Variation is nowadays usually consigned to subspecies, mostly strongly linked to geographic distribution. The main variants reported in China are given below.

The position of the awn on the lemma back refers to the lowest lemma. In general the awn arises higher up on the second lemma, and short awns arise higher on the lemma back than do longer awns. A specimen collected at 2800 m on a grassy spur in Shennongjia, Hubei, has been described as *Deschampsia cespitosa* var. *exaristata* Z. L. Wu (Acta Biol. Plateau Sin. 2: 15. 1984). In this plant the lower lemma has a ca. 0.5 mm awn arising from the upper 1/5, or both lemmas are awnless. It is not possible from the protologue to assign it to a subspecies.

- 1a. Panicle lax and open.
  - 2a. Plant robust, up to 120 cm tall; leaf blades 2–5 mm wide; panicle branches and adaxial leaf surface densely scabrid ..... 3a. subsp. *cespitosa*
  - 2b. Plant slender, up to 70 cm tall; leaf blades 1–2 mm wide, panicle branches and adaxial leaf surface scaberulous or smooth ..... 3b. subsp. *orientalis*
- 1b. Panicle loosely to densely contracted.
  - 3a. Spikelets 4.5–5 mm; glumes obtuse, subequal to adjoining lemmas .... 3c. subsp. *pamirica*
  - 3b. Spikelets 4.5–8 mm; glumes acuminate, much exceeding adjoining lemmas ..... 3d. subsp. *ivanovae*

**3a. *Deschampsia cespitosa* subsp. *cespitosa***

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Culms up to 120 cm tall. Leaf blades 2–5 mm wide, adax-

ially densely scabrid. Panicle open, broadly pyramidal, erect, 8–30 cm, silvery green or tinged purple and gold; branches spreading, densely scabrid. Spikelets 4–4.5 mm; glumes equaling or slightly shorter than spikelet, apex acute; lemmas usually awned from near base; awn not or only slightly longer than lemma.

Meadows, river banks, among bushes; 1500–4500 m. Qinghai, Xinjiang, Yunnan [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Uzbekistan; SW Asia, Europe, North America; introduced elsewhere].

This is the most widely distributed subspecies, either native or introduced in most cold-temperate regions of the world.

**3b. *Deschampsia cespitosa* subsp. *orientalis*** Hultén, Kongl. Svenska Vetensk. Acad. Handl., ser. 3, 5: 109. 1927.

小穗发草 xiao sui fa cao

*Aira sukatschewii* Poplavskaia; *Deschampsia cespitosa* var. *festucifolia* Honda; *D. cespitosa* var. *microstachya* Roshevitz; *D. cespitosa* subsp. *sukatschewii* (Poplavskaia) Chiapella & Probatova; *D. orientalis* (Hultén) B. S. Sun; *D. sukatschewii* (Poplavskaia) Roshevitz; *D. sukatschewii* subsp. *orientalis* (Hultén) Tzvelev.

Culms 10–70 cm tall. Leaf blades 1–2 mm wide. Panicle open, 6–18 cm; branches flexuous, smooth or scaberulous. Spikelets 2.5–5 mm; glumes subequaling spikelet; lemmas awned between lower 1/3–1/2; awn usually longer than lemma.

Flood plains, river sand and gravel, wet meadows; below 3800 m. Heilongjiang, Nei Mongol, Qinghai, Taiwan, Xinjiang, Yunnan [Japan, Korea, Mongolia, Russia (Far East, Siberia); North America].

*Deschampsia cespitosa* subsp. *orientalis* is the most common subspecies in E Asia, where it is a vicariant of subsp. *cespitosa*, which is native in Europe and western parts of Asia and introduced in E Asia.

**3c. *Deschampsia cespitosa* subsp. *pamirica*** (Roshevitz) Tzvelev, Zlaki SSSR, 285. 1976.

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*Deschampsia pamirica* Roshevitz in Komarov, Fl. URSS 2: 750. 1934.

Culms 30–80 cm tall. Leaf blades 2–3 mm wide. Panicle contracted but not spikelike, narrowly elliptic or narrowly oblong in outline, erect, 6–15 cm, greenish yellow or gray-green, infrequently tinged violet-brown; branches suberect, smooth, lowest up to 5 cm. Spikelets 4.5–5 mm; glumes slightly shorter than or subequaling adjoining lemmas, apex obtuse, often lacerate; lemmas awned from slightly below middle to lower 1/4, or awnless; awn shorter than lemma. Fl. Jun–Aug.

Swampy, often saline, montane grasslands; 1800–3100 m. Xinjiang [Tajikistan (Pamirs)].

This is a local variant, intermediate between typical *Deschampsia cespitosa*, with an open panicle, and *D. koelerioides*. This subspecies is a taller, stouter plant than *D. koelerioides*, with a paler, less dense panicle, and occurs at somewhat lower altitudes.

**3d. *Deschampsia cespitosa* subsp. *ivanovae*** (Tzvelev) S. M. Phillips & Z. L. Wu, **comb. et stat. nov.**

短枝发草 duan zhi fa cao

Basionym: *Deschampsia ivanovae* Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 21: 49. 1961; *D. littoralis* (Gaudin) Reuter var. *ivanovae* (Tzvelev) P. C. Kuo & Z. L. Wu; *D. multiflora* P. C. Kuo & Z. L. Wu.

Culms 30–70 cm. Leaf blades 1–3 mm wide. Panicle usually loosely contracted, often nodding, 5–15 cm, purplish brown tinged golden; branches flexuous, smooth or scaberulous, lowest up to 7 cm. Spikelets 4.5–8 mm; glumes much longer than adjoining lemmas, apex acuminate; lemmas awned from near base or near middle; awn not or only slightly longer than lemma. Fl. and fr. Jul–Sep.

• Alpine meadows, pebbly river beds, roadsides, damp places; 3200–5100 m. Gansu, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan.

*Deschampsia cespitosa* subsp. *ivanovae* is distinguished mainly by its long-acuminate glumes. The name *D. littoralis* (Gaudin) Reuter has been misapplied to this taxon in Chinese literature. Genuine *D. littoralis* refers to a variant from Switzerland with short ligules and proliferating spikelets.

*Deschampsia multiflora* appears to be based on an aberrant gathering from Qinghai with 3–5 florets per spikelet. The type has been lost.

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