

1. *Stipagrostis pennata* (Trinius) De Winter, *Kirkia* 3: 135. 1963.

羽毛针禾 *yu mao zhen he*

Aristida pennata Trinius, *Mém. Acad. Imp. Sci. St. Pétersbourg Hist. Acad.* 6: 488. 1815; *Aristida pungens* var. *pennata* (Trinius) Trautvetter; *Arthratherum pennatum* (Trinius) Tzvelev.

Perennial with slender rhizomes, roots tomentose. Culms tussocky, 20–60 cm tall, much branched at base. Leaf sheaths smooth or scabrid, longer than internodes; leaf blades involute, 10–30 cm, glaucous, abaxial surface scabrid, adaxial surface puberulent; ligule short, margin with 0.5–1 mm hairs. Panicle lax, open, base usually included in uppermost leaf sheath, 5–20 cm; branches paired, rarely solitary. Spikelets 1.3–1.7 cm, stramineous; glumes narrowly lanceolate, smooth or scabrid, pubescent within, subequal, lower slightly longer than upper, lower glume 3–5-veined, upper glume 3-veined, apex acuminate; callus ca. 1 mm; lemma 5–7 mm, smooth on back, apex truncate, ciliolate; awn with short 0.3–1 mm column, all 3 branches densely plumose throughout, hairs 2–4 mm, central branch 1–1.5 cm, lateral branches a little shorter. Fl. and fr. Jul–Sep.

Fixed dunes; 300–500 m. Xinjiang, Yunnan [Afghanistan, Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan; SW Asia (Caucasus, Iran)].

This species provides good fodder when young and is also good for binding sand.

2. *Stipagrostis grandiglumis* (Roshevitz) Tzvelev, *Zlaki SSSR*, 618. 1976.

大颖针禾 *da ying zhen he*

Aristida grandiglumis Roshevitz, *Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR* 11: 18. 1949.

Perennial, roots tomentose. Culms densely tufted, 30–65 cm tall, branched at base. Leaf sheaths smooth or scabrid, longer than internodes; leaf blades involute, 10–35 cm, abaxial surface smooth, adaxial surface pubescent; ligule short, ciliate. Panicle lax with few spikelets, 15–30 cm; branches capillary, solitary, 3–10 cm. Spikelets 2.5–3 cm, stramineous or yellowish white; glumes narrowly lanceolate, smooth or scabrid, densely pubescent within upward, unequal, lower glume 2.5–3 cm, 5–7-veined, marginal veins obscure, upper glume 2–2.3 cm, 3-veined, apex acuminate; callus 1–1.5 mm; lemma 8–9 mm, apex slightly 2-lobed, glabrous; awn with short ca. 1 mm column, all 3 branches densely plumose throughout, hairs 4–5 mm, central branch ca. 2.5 cm, lateral branches 2–2.2 cm. Fl. and fr. Jun–Sep.

Desert sands, banks of watercourses; 1100–1500 m. Gansu (Dunhuang), S Xinjiang [Mongolia].

21. Tribe PAPPOPHOREAE

冠芒草族 *guan mang cao zu*

Chen Shouliang (陈守良); Sylvia M. Phillips

Annual or perennial. Leaf blades linear, often convolute; ligule a line of hairs. Inflorescence a contracted, rather narrow panicle. Spikelets all alike, slightly laterally compressed, with (1 or) 2 to several florets, lower florets bisexual, the upper progressively reduced, disarticulating above glumes but not usually between florets; glumes persistent, membranous, usually enclosing the florets, obviously 1- to many-veined, entire; lemmas broad, rounded on back, 9–11-veined, veins extended into 5–19 awns, sometimes alternating with hyaline lobes; palea broad, subequaling lemma body, keels ciliate. Caryopsis with large embryo and punctiform hilum. Leaf anatomy: Kranz PS type; microhairs slender, bulbous-tipped. $x = 9$ or 10.

Five genera and 41 species: tropics and subtropics extending to temperate E Asia, usually in dry places; one genus and two species in China.

Pappophoreae can be easily recognized by the many-veined, many-awned lemmas on a tough rachilla, with the florets all falling together from the glumes. Anatomically it is related to *Eragrostideae*, but its stalked microhairs, with bulbous glandular tips, are unique.

123. ENNEAPOGON Desvaux ex P. Beauvois, *Ess. Agrostogr.* 81. 1812.

九顶草属 *jiu ding cao shu*

Perennial or sometimes annual. Culms tufted. Leaf blades usually narrow, often convolute. Panicle contracted, sometimes spikelike or capitate. Spikelets with 2–3(–6) florets, lowermost floret bisexual, second floret smaller, usually staminate, remaining florets reduced to barren lemmas forming a brushlike apical clump; glumes lanceolate, unequal with the upper longer, 1- to several-veined; lemmas papery to leathery, smooth or ribbed, villous below middle, veins extended into 7–9 awns forming a circlet around top of lemma; awns stout and ciliate for much of their length, slender and scaberulous toward tips.

Twenty-eight species: tropics and subtropics, especially Africa and Australia, extending to temperate E Asia; two species in China.

1a. Third lemma vestigial, 0.5–3 mm including awns; basal sheaths enclosing cleistogamous spikelets 1. *E. desvauxii*
1b. Third lemma sterile but well developed, 4–10 mm including awns; basal sheaths lacking cleistogamous spikelets .. 2. *E. persicus*

1. *Enneapogon desvauxii* P. Beauvois, *Ess. Agrostogr.* 82. 1812.

九顶草 *jiu ding cao*

Enneapogon borealis (Grisebach) Honda; *E. brachysta-*

chyus (Jaubert & Spach) Stapf; *E. desvauxii* subsp. *borealis* (Grisebach) Tzvelev; *E. jinjiangensis* B. S. Sun & S. Wang; *Pappophorum boreale* Grisebach; *P. brachystachyum* Jaubert & Spach.

Perennial. Culms densely tufted, wiry, usually geniculate

at base, 5–35 cm tall, pubescent. Basal leaf sheaths tough, whitish, enclosing cleistogamous spikelets, finally becoming fibrous; leaf blades usually involute, filiform, 2–12 cm, 1–3 mm wide, densely pubescent or the abaxial surface with longer white soft hairs, finely acuminate. Panicle gray, dense, spike-like, linear to ovate, 1.5–5 × 0.6–1 cm. Spikelets with 3 florets, 5.5–7 mm; glumes pubescent, 3–9-veined, lower glume 3–3.5 mm, upper glume 4–5 mm; lowest lemma 1.5–2 mm, densely villous; awns 2–4 mm, subequal, ciliate in lower 2/3 of their length; third lemma 0.5–3 mm, reduced to a small tuft of awns. Anthers 0.3–0.6 mm. Fl. and fr. Aug–Nov. $2n = 36$.

Dry hill slopes; 1000–1900 m. Anhui, Hebei, Liaoning, Nei Mongol, Ningxia, Qinghai, Shanxi, Xinjiang, Yunnan [India, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, E Russia; Africa, America, SW Asia].

This species is one of the most widespread in the genus and is the only one to develop cleistogamous spikelets within the basal leaf sheaths. Mature grains can often be found at the base of the plant.

2. *Enneapogon persicus* Boissier, Diagn. Pl. Orient., ser. 1, 5: 71. 1844.

波斯九顶草 bo si jiu ding cao

Enneapogon schimperianus (A. Richard) Renvoize; *Pappophorum aucheri* Jaubert & Spach; *P. persicum* (Boissier) Steudel; *P. schimperianum* Hochstetter ex A. Richard; *P. turcomanicum* Trautvetter.

Perennial. Culms compactly tufted, wiry, erect or geniculate, 15–45 cm tall, pubescent especially below nodes. Basal leaf sheaths tough, lacking cleistogamous spikelets, not becoming fibrous; leaf blades usually involute, rarely flat, often diverging at a wide angle from the culm, 3–17 cm, 3–4 mm wide, pubescent, acuminate. Panicle olive-gray or tinged purplish, contracted to spike-like, narrowly oblong, 4–18 × 1–2 cm. Spikelets with 3 or 4 florets, 8–14 mm; glumes puberulous, (5–) 7–9-veined, lower glume 5–10 mm, upper glume 7–11 mm; lowest lemma 2–3.2 mm, shortly villous; awns 4.5–7 mm, unequal with 4 shorter, ciliate in lower 2/3–3/4 of their length; third lemma sterile but well developed, 3–5 mm (including awns); fourth lemma vestigial or absent. Anthers 0.5–1.3 mm. Fl. May. $2n = 20$.

Dry, stony or sandy soils. Xinjiang [Afghanistan, NW India, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; NE Africa, SW Asia].

22. Tribe ERAGROSTIDEAE

画眉草族 hua mei cao zu

Chen Shouliang (陈守良), Wu Zhenlan (吴珍兰), Lu Shenglian (卢生莲), Sun Bixing (孙必兴 Sun Bi-sin);
Sylvia M. Phillips, Paul M. Peterson

Annual or perennial. Leaf blades linear to filiform; ligule a line of hairs, infrequently membranous. Inflorescence a panicle or composed of tough unilateral racemes of biseriate spikelets (bottlebrush in *Harpachne*); racemes digitate or scattered along an axis or rarely single, persistent or deciduous. Spikelets usually laterally compressed, with one floret or more usually several to many, the uppermost ± reduced, disarticulating below each floret or sometimes by other abscission modes; glumes mostly persistent, usually 1-veined, membranous and shorter than lowest lemma, rarely longer; floret callus sometimes bearded; lemmas membranous to leathery, 1–3-veined (7–11 in *Aeluropus*), glabrous or hairy, apex entire or 2–3-toothed occasionally with small subsidiary lobes between teeth, mucronate or awned from apex or sinus; palea keels sometimes winged. Stamens 1–3. Fruit sometimes with free pericarp. Leaf anatomy: Kranz PS type; microhairs usually short and stout. $x = 10$, less often 9, 12.

About 80 genera and 1000 species; tropics and subtropics; 17 genera and 92 species (30 endemic, three introduced) in China.

This tribe is characterized by unspecialized spikelets usually with several florets, 3-veined lemmas, and a rather cartilaginous texture, and also by a ciliate ligule, although there are exceptions to all these characters. This contrasts with the 5-veined lemmas and membranous ligule of most *Poeae*, which are often superficially similar, especially when the inflorescence is a panicle. Anatomically the two tribes are quite different.

1a. Spikelets with 1 floret.

2a. Ligule membranous; lemma 3-veined, awned; fruit a caryopsis 140. *Muhlenbergia*

2b. Ligule a line of hairs; lemma 1-veined, awnless; fruit with free pericarp.

3a. Inflorescence an open or spike-like panicle, exerted from uppermost leaf sheath 138. *Sporobolus*

3b. Inflorescence a short dense head, subtended by an inflated leaf sheath with rudimentary blade 139. *Crypsis*

1b. Spikelets with 2 or more florets.

4a. Lemmas 7–11-veined 124. *Aeluropus*

4b. Lemmas 3-veined (subsidiary veins in keel in *Eleusine*).

5a. Lemmas emarginate or 2-toothed at apex, or if entire marginal veins or flanks hairy.

6a. Cleistogamous spikelets concealed within the upper leaf sheaths 126. *Cleistogenes*

6b. Cleistogamous spikelets absent.

7a. Plants tall, reedlike; inflorescence a large plumose panicle 125. *Neyraudia*

7b. Plants smaller; inflorescence composed of racemes.

8a. Plants with long scaly rhizomes 127. *Orinus*

8b. Plants lacking long scaly rhizomes.

9a. Inflorescence a single terminal raceme 128. *Tripogon*

9b. Inflorescence of 2 to many racemes along a central axis.

10a. Racemes persistent; glumes shorter than lowermost lemma 129. *Leptochloa*