

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 persicum* 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*

- 10b. Racemes deciduous; glumes as long as the spikelet 130. *Dinebra*
- 5b. Lemmas usually entire at apex, glabrous.
- 11a. Inflorescence a panicle 131. *Eragrostis*
- 11b. Inflorescence of one or more racemes.
- 12a. Inflorescence a single terminal raceme.
- 13a. Spikelets erect; lemmas disarticulating leaving the persistent paleas 132. *Eragrostiella*
- 13b. Spikelets deflexed, falling entire with pedicel attached 133. *Harpachne*
- 12b. Inflorescence of 2 or more racemes.
- 14a. Racemes inserted singly, crowded along an elongate central axis; grain smooth 134. *Desmostachya*
- 14b. Racemes digitate or ± whorled; grain ornamented with a free pericarp.
- 15a. Racemes terminating in a sharp point 135. *Dactyloctenium*
- 15b. Racemes terminating in a fertile or abortive spikelet.
- 16a. Racemes terminating in an abortive spikelet; paleas persistent 136. *Acrachne*
- 16b. Racemes terminating in a fertile spikelet; paleas falling with lemmas 137. *Eleusine*

124. AELUROPUS Trinius, Fund. Agrost. 143. 1820.

獐毛属 zhang mao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Perennials, tough, stoloniferous or rhizomatous. Leaf blades stiff, rolled, often markedly distichous, pungent; ligule a narrow ciliate membrane. Inflorescence spikelike or capitate, composed of short, erect racemes of sessile, tightly imbricate spikelets appressed to a central axis. Spikelets ovate-lanceolate, laterally compressed, florets several to many, rachilla disarticulating above glumes and between florets; glumes shorter than lemmas, papery with broad scarios margins, lower glume 1–3-veined, upper glume 5–7-veined; lemmas ovate, resembling glumes in texture, strongly 7–11-veined, glabrous or hairy on margins, rounded on back, acute or mucronate; palea keels ciliate or scabrid, apex truncate.

About ten species: Mediterranean region to N China, also in NE tropical Africa, S India, and Sri Lanka; four species (two endemic) in China.

This is a genus of grasses adapted to saline soils in desert regions, where they provide valuable fodder where little else will grow. The tough, widely spreading rhizomes and stolons make them effective soil stabilizers.

All the species listed here are offshoots from the widespread and highly variable species *Aeluropus littoralis* (Gouan) Parlature, which occurs from Europe to temperate Asia. The most appropriate status for the taxa within this species complex is still uncertain.

- 1a. Racemes congested on inflorescence axis, often not strictly distichous; lemmas usually glabrous.
- 2a. Leaf blades 3–6 mm broad; spikelets 4–6 mm 1. *A. sinensis*
- 2b. Leaf blades 1–2 mm broad; spikelets 2–3 mm 2. *A. micrantherus*
- 1b. Racemes rather spaced on inflorescence axis, strictly distichous; lemmas usually pubescent.
- 3a. Glumes and lemmas ciliate only along middle vein and margins, or glumes glabrous 3. *A. pungens*
- 3b. Glumes and lemmas pubescent or hispidulous throughout 4. *A. pilosus*

1. *Aeluropus sinensis* (Debeaux) Tzvelev, Rast. Tsentr. Azii 4: 128. 1968.

獐毛 zhang mao

Aeluropus littoralis (Gouan) Parlature var. *sinensis* Debeaux, Actes Soc. Linn. Bordeaux 33: 73. 1879; *A. littoralis* subsp. *sinensis* (Debeaux) Tzvelev.

Culms 15–35 cm tall, 1.5–2 mm in diam., many-noded, nodes ± pubescent. Leaf sheaths glabrous but pilose at mouth and base; leaf blades flat, glabrous, 3–6 × 0.3–0.6 cm; ligule truncate, ca. 0.5 mm. Inflorescence spikelike, 2–5 × 0.5–1.5 cm; racemes congested. Spikelets 4–6 mm, florets 4–6; glumes and lemmas glabrous or scabrid along midvein; lower glume ca. 2 mm; upper glume ca. 3 mm; lowest lemma ca. 3.5 mm. Fl. and fr. summer.

• Maritime or alkaline sand; near sea level to 3000 m. Gansu, Hebei, Henan, Jiangsu, Liaoning, Nei Mongol, Ningxia, Shandong, Shanxi, Xinjiang.

Aeluropus sinensis is rather more robust than typical *A. littoralis* and has a more compact inflorescence.

2. *Aeluropus micrantherus* Tzvelev, Rast. Tsentr. Azii 4: 128. 1968.

微药獐毛 wei yao zhang mao

Aeluropus littoralis (Gouan) Parlature subsp. *micrantherus* (Tzvelev) Tzvelev; *A. littoralis* var. *micrantherus* (Tzvelev) K. L. Chang.

Culms procumbent or ascending, usually branched at base, 6–30 cm tall. Leaf sheaths glabrous or puberulous, pilose along mouth and margin; leaf blades flat or involute toward apex, 1.5–4.5 × 0.1–0.3 cm, hirtellous on both surfaces; ligule ca. 0.2 mm, usually pilose. Inflorescence spikelike, 2–7 × ca. 0.3 cm; racemes congested. Spikelets ovate, 2–3 mm, florets 2–6; glumes ovate, scabrid along middle vein; lower glume 1–1.2 mm; upper glume 1.5–1.8 mm; lemmas ovate or broadly ovate, lowest 2.5–3.2 mm, 5–9-veined, glabrous throughout or ciliate near lower margins, apex acute or mucronate; palea subequal to lemma. Anthers 0.6–0.8 mm. Fl. and fr. summer.

Water courses, sandy places, desert slopes. Xinjiang [Mongolia].

This species is distinguished from *Aeluropus littoralis* by its smaller anthers (0.6–0.8 mm vs. 1.2–1.6 mm).

3. *Aeluropus pungens* (M. Bieberstein) K. Koch, *Linnaea* 21: 408. 1848.

小獐毛 xiao zhang mao

Culms erect or decumbent, usually branched at base, 5–25 cm tall, scabrid or puberulous below inflorescence. Leaf sheaths glabrous; leaf blades flat or involute, 0.5–6 × ca. 0.15 cm, glabrous or adaxial surface hirsute, abaxial surface pilose; ligule very short, margin ciliate. Inflorescence spike-like, 2–7 × 0.3–0.5 cm; racemes solitary, rather spaced, strictly distichous, spikelets also distichous on the raceme rachis. Spikelets 2–4 mm, florets (2–)4–8; glumes ovate, laxly ciliate or nearly glabrous; lower glume 1–2 mm; upper glume 1.5–2.5 mm; lemmas ovate, lowest 1.5–3 mm, 5–9-veined, margins membranous and ciliate, apex cuspidate; palea equal to lemma, keels ciliate, apex truncate or emarginate. Anthers ca. 1.5 mm. Fl. and fr. May–Aug.

Sandy places on alkaline soils, desert sands. Gansu, Xinjiang [India, Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan; SW Asia, Europe].

Aeluropus pungens differs from typical *A. littoralis* by its somewhat shorter lemmas with membranous, ciliate margins.

- 1a. Leaf blades glabrous 3a. var. *pungens*
 1b. Leaf blades densely hirsute on adaxial surface, pilose on abaxial surface 3b. var. *hirtulus*

3a. *Aeluropus pungens* var. *pungens*

小獐毛(原变种) xiao zhang mao (yuan bian zhong)

Poa pungens M. Bieberstein, *Tabl. Prov. Mer. Casp.* 130. 1800; *Aeluropus littoralis* (Gouan) Parlatores subsp. *pungens* (M. Bieberstein) Tzvelev.

Leaf blades glabrous on both surfaces. Fl. and fr. May–Aug.

Sandy places on alkaline soils. Gansu, Xinjiang [India, Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan; SW Asia, Europe].

3b. *Aeluropus pungens* var. *hirtulus* S. L. Chen & X. Y. Yang, *Bull. Bot. Res.*, Harbin 4: 123. 1984.

刺叶獐毛 ci ye zhang mao

Leaf blades densely hirsute on adaxial surface, pilose on abaxial surface.

- Desert sands. Xinjiang.

4. *Aeluropus pilosus* (H. L. Yang) S. L. Chen & H. L. Yang, *Fl. Reipubl. Popularis Sin.* 10(1): 8. 1990.

毛叶獐毛 mao ye zhang mao

Aeluropus littoralis (Gouan) Parlatores var. *pilosus* H. L. Yang, *Acta Bot. Yunnan.* 5: 74. 1983.

Plants with both long rhizomes and stolons. Culms erect or decumbent, 12–20 cm tall, densely pubescent. Leaf sheaths densely pubescent, longer than internodes; leaf blades flat or involute, 1.5–3.5 × 0.15–0.25 cm, adaxial surface hispid along veins, abaxial surface densely pubescent; ligule ca. 1 mm, margin ciliate. Inflorescence spike-like, 3–4 × 0.25–0.4 cm; racemes solitary, remote, 5–12 mm, spikelets distichous along rachis, rachis hirtellous along edges. Spikelets ovate, 3–4 mm, florets 3–4(–6); glumes ovate or ovate-lanceolate, pubescent, hispid along middle vein, margins ciliate; lower glume 1.2–1.5 mm; upper glume ca. 2 mm; lemmas ovate-oblong to ovate, lowest ca. 2.5 mm, (7–)9-veined, hispidulous throughout, apex cuspidate; palea equal to or slightly longer than lemma, keels hispidulous, apex lacerate. Anthers 1.1–1.5 mm. Fl. Jul.

- Desert sands. Xinjiang.

125. NEYRAUDIA J. D. Hooker, *Fl. Brit. India* 7: 305. 1896 [“1897”].

类芦属 lei lu shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Perennials, stout. Culms tall, reedlike, solid. Leaf blades cauline, linear, flat, finally deciduous from sheaths; ligule a line of long hairs. Inflorescence a large plumose panicle, primary branches in clusters or solitary on central axis. Spikelets laterally compressed, florets several, all bisexual or lowest sterile and without a palea; rachilla glabrous, disarticulating above glumes and sterile floret (when present) and between fertile florets; glumes lanceolate, shorter than lemmas, subequal or unequal, scarious-membranous, 1–3-veined, obtuse to acuminate or aristulate; lemmas ovate-lanceolate, scarious-membranous, 3-veined, long-ciliate on lateral veins, keeled, apex setaceously bidentate with a short, often recurved awn from the sinus; palea shorter than lemma, hyaline, keels very shortly ciliate. Callus oblong, bearded. Caryopsis narrow, subterete.

Five species: Old World tropics; four species (two endemic) in China.

Although *Neyraudia* has slender, arundinoid microhairs, its other features, including the embryo, are typically eragrostoid.

- 1a. Lowest floret sterile, its lemma glabrous, palea absent.
 2a. Culms 1–3 m tall; florets 4–10; lemmas ca. 4 mm 1. *N. reynaudiana*
 2b. Culms ca. 1 m tall; florets 2–3; lemmas 2–3 mm 2. *N. fanjingshanensis*
 1b. Lowest floret fertile, its lemma ciliate, palea present.
 3a. Basal leaf sheaths glabrous; glumes 2–3 mm 3. *N. arundinacea*
 3b. Basal leaf sheaths densely hairy with brown hairs; glumes 4–5 mm 4. *N. montana*

1. *Neyraudia reynaudiana* (Kunth) Keng ex Hitchcock, Amer. J. Bot. 21: 131. 1934.

类芦 lei lu

Arundo reynaudiana Kunth, Révis. Gramin. 1: 275. 1830; *A. henslowiana* Nees; *A. zollingeri* Buse; *Neyraudia arundinacea* var. *zollingeri* (Buse) Henrard; *N. madagascariensis* (Kunth) J. D. Hooker var. *zollingeri* (Buse) J. D. Hooker; *N. mezii* (Janowsky) Veldkamp; *Thysanolaena mezii* Janowski.

Perennial, robust, caespitose from a short woody scaly rhizome. Culms erect, 1–3 m tall, 3–10 mm in diam., usually fasciculately branched, many-noded, internodes somewhat glaucous, nodes purple. Leaf sheaths glabrous but pilose at mouth; leaf blades flat or involute, 20–70 × 0.4–1 cm, glabrous or adaxial surface pilose, apex long acuminate; ligule 1–2 mm. Panicle ample, loose to dense, glistening, 30–70 cm, branches slender, nodding; pedicels 1–4 mm. Spikelets 6–9 mm, florets 4–10, lowest sterile, resembling glumes but somewhat longer; glumes golden-brown or purplish, glabrous, subequal, 2–3 mm, acute; lemmas purplish, ca. 4 mm, lateral veins ciliate with white, soft, ca. 2 mm hairs, awn recurved, 1–2 mm. Fl. and fr. Aug–Dec.

Streamsides, hill slopes, rocky places, old walls. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, Cambodia, NE India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

The lower glume lies tight against the lowest sterile lemma and is easily overlooked.

This is an ornamental and soil-retaining grass.

2. *Neyraudia fanjingshanensis* L. Liu, Fl. Reipubl. Popularis Sin. 9(2): 388. 2002.

梵净山类芦 fan jing shan lei lu

Perennial, caespitose from a short woody rhizome. Culms erect, hard, bamboolike, 0.8–1.2 m tall, 2–3 mm in diam., branched, 5–6-noded, internodes floury-white below nodes. Leaf sheaths pilose with long soft hairs at mouth; leaf blades stiff, 10–20 × 0.2–0.4 cm, apex long acuminate. Panicle large, ca. 30 cm; branches slender, up to 20 cm. Spikelets ca. 4 mm, florets 2 or 3, lowest sterile, resembling glumes; lower glume ca. 1.5 mm, upper glume ca. 2 mm; floret callus bearded; lowest lemma ca. 2 mm, glabrous; second lemma ca. 3 mm, lateral veins ciliate with soft, 1–2 mm hairs, margin shortly ciliate; awn recurved, 1–2 mm. Fl. and fr. Aug–Sep.

• Mountain slopes, streams; ca. 900 m. Guizhou (Fanjing Shan).

This species is apparently known only from the type gathering, which has not been seen.

3. *Neyraudia arundinacea* (Linnaeus) Henrard, Meded. Rijks-Herb. 58: 8. 1929.

大芦 da lei lu

Aristida arundinacea Linnaeus, Mant. 2: 186. 1771.

Perennial, robust, caespitose from a short woody scaly rhizome. Culms erect, 2–4 m tall, up to 10 mm in diam., often fasciculately branched, many-noded, somewhat glaucous. Leaf sheaths glabrous; leaf blades mostly involute, 20–60 × 0.4–1 cm, glabrous, apex filiform; ligule 1–2 mm. Panicle ample, dense, glistening, 30–80 cm, branches slender, nodding; pedicels 1–4 mm. Spikelets 6–9 mm, florets 5–7, all fertile; glumes light brown, glabrous, subequal, 2–3 mm, acute; lemmas pallid or purplish, 3.5–4.5 mm, lateral veins ciliate with white, soft, ca. 2 mm hairs; awn recurved, 1.5–2.5 mm.

Hainan [NW India, Pakistan, Thailand; Africa, Mascarenes].

This species is very similar to *Neyraudia reynaudiana*, but is slightly more robust and with all the florets fertile.

4. *Neyraudia montana* Keng, Sinensia 6: 151. 1935.

山类芦 shan lei lu

Perennial, caespitose from a short woody rhizome clothed in tomentose sheath remnants. Culms erect, up to 1 m tall, 2–3 mm in diam., 4–5-noded. Basal leaf sheaths tomentose with golden brown hairs, upper leaf sheaths glabrous; leaf blades firm, involute, up to 60 × 0.5–0.7 cm, glabrous or adaxial surface pilose, apex long acuminate; ligule ca. 2 mm. Panicle 30–45 cm, open, branches to 15 cm, distant, inserted singly, stiffly divaricate, branchlets and pedicels appressed. Spikelets 7–10 mm, florets 3–6, all fertile; glumes 1-veined, ca. 5 mm, or lower glume ca. 4 mm, apex acuminate or subulate; lemmas 5–6 mm, lateral veins ciliate, awn straight, 0.8–2 mm. Callus hairs ca. 2 mm. Fl. and fr. Aug.

• Mountain slopes, roadsides. Anhui, Fujian, Hubei, Jiangxi, Zhejiang.

Neyraudia montana is distinctive on account of its basal sheaths with brown, velvety hairs and much more open panicle with stiffer branches than in the other species.

126. CLEISTOGENES Keng, Sinensia 5: 147. 1934.

隐子草属 yin zi cao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Kengia Packer, nom. illeg. superfl.

Perennial. Culms usually tufted, many-noded. Leaf blades linear or linear-lanceolate, often inrolled when dry, lower blades usually disarticulating from the sheaths; ligule a line of hairs, sometimes on a very short membranous base. Inflorescence of often few-spicate lax racemes spaced along a central axis, or a sparsely branched panicle, spikelets distant or loosely imbricate, shortly pedicellate; axillary cleistogamous spikelets also present concealed within the upper leaf sheaths. Spikelets laterally compressed, florets 1 to several, loosely spaced, rachilla slender, disarticulating above glumes and between florets, rachilla internodes pubescent at apex;

glumes membranous, very unequal with the lower shorter, 1–5(–7)-veined; lemmas narrowly lanceolate to ovate, 3–5(–7)-veined, keeled, usually pubescent near margins, apex narrow, bidenticulate or rarely entire, acute, mucronate or shortly awned; palea keels glabrous or ciliolate. Floret callus shortly bearded. Anthers 3, linear.

About 13 species: S Europe and Turkey eastward through C Asia, Pakistan, and NW India to Japan, concentrated in NE China; ten species (five endemic) in China.

A large proportion of the species comprises plants of semi-arid regions, where they provide useful fodder. The genus is remarkable for the regular formation of cleistogamous spikelets in the axils of the upper leaf sheaths that ensure the production of seed even under unfavorable climatic conditions. These cleistogamous spikelets generally have fewer florets, smaller, hyaline glumes, and narrower lemmas with longer awns than the chasmogamous spikelets.

The glumes are very variable even in the terminal, exserted inflorescences. Those of the lower spikelets, near the inflorescence base, tend to be smaller and fewer nerved than those above. Spikelets near the top of the inflorescence should be inspected. Awn measurements should be taken on the lowest floret of a spikelet near the top.

- 1a. Culms forming dense tussocks, fasciculately branched; uppermost internode elongate, serpentine when dry 1. *C. squarrosa*
 1b. Culms solitary or tufted, unbranched or simply branched; uppermost internode not obviously longer than the rest, straight.
 2a. Lemmas awnless or shortly mucronate; mucro less than 0.5 mm.
 3a. Lemmas ovate, 3–4.5 mm; panicle branches spreading; culm bases slightly swollen with whitish old sheaths 2. *C. songorica*
 3b. Lemmas lanceolate, 4–6 mm; panicle branches laxly ascending; culm bases slender, old sheath remnants in dense clusters.
 4a. Lowest lemma 5–7 mm; leaf blades ascending, uppermost not noticeably shorter 3. *C. ramiflora*
 4b. Lowest lemma 4–5.5 mm; leaf blades patent, uppermost much shorter than blades at culm center 4. *C. mucronata*
 2b. Lemmas awned; awn 0.5–9 mm.
 5a. Leaf blades narrowly linear, 1–2(–2.7) mm wide; culms 0.5–1.5 mm in diam.
 6a. Glumes acuminate, lower glume 1.4–4.3 mm, 1(–3)-veined; awn 0.8–2.5 mm 5. *C. festucea*
 6b. Glumes obtuse to acute, lower glume 0.8–2 mm, 0–1-veined; awn 0.5–1 mm 6. *C. caespitosa*
 5b. Leaf blades linear to narrowly lanceolate, 2–9 mm wide; culms 1–2.5 mm in diam.
 7a. Panicle contracted, base included in uppermost leaf sheath; glumes 3–7-veined.
 8a. Leaf sheaths glabrous; basal scaly buds present 7. *C. kitagawae*
 8b. Leaf sheaths tuberculate-hispid; basal scaly buds absent 8. *C. polyphylla*
 7b. Panicle open, exserted from uppermost leaf sheath (if shortly included, glumes not 3–7-veined).
 9a. Lower glume 0–1-veined, often obtuse; awn 2–9 mm; lowest branch of panicle up to 4 cm, simple 9. *C. hackelii*
 9b. Lower glume 1–3-veined, acuminate; awn 1–2 mm; lowest branch of panicle up to 8 cm, often with branchlets 10. *C. hancei*

1. *Cleistogenes squarrosa* (Trinius) Keng, Sinensia 5: 156. 1934.

糙隐子草 cao yin zi cao

Molinia squarrosa Trinius in Ledebour, Fl. Altaic. 1: 105. 1829; *Cleistogenes andropogonoides* Honda; *C. squarrosa* var. *longearistata* (Rendle) Keng; *Diplachne squarrosa* (Trinius) Maximowicz; *D. squarrosa* var. *longearistata* Rendle; *Kengia andropogonoides* (Honda) Packer; *K. squarrosa* (Trinius) Packer.

Culms densely tufted, forming low tussocks, lacking basal scaly buds, 10–30 cm tall, 0.5–0.8 mm in diam. at base, lower internodes much shorter than their leaf sheaths, upper internodes elongate, serpentine when dry. Leaf sheaths glabrous, the lower imbricate in fascicles; leaf blades narrowly linear, erect, flat or involute, 3–6 × 0.1–0.2 cm, scabrid, apex filiform; ligule ca. 0.2 mm. Panicle depauperate, 4–7 cm, scarcely exceeding leaves, composed of few spikelets borne directly on the central axis or lowermost on patent 2–3-spiculate branchlets. Spikelets 5–10 mm, green or purplish green, florets 2–4; glumes narrowly lanceolate, subacute to acuminate-aristulate; lower glume 1–2.4 mm, 1-veined; upper glume 3–5 mm, 1(–3)-veined; lemmas lanceolate, lowest 5–6 mm, pilose near margins, minutely 2-

toothed; awn 2.5–7 mm; palea keels scabrid, extended into 2 mucros to 0.7 mm. Anthers ca. 2.5 mm. Fl. and fr. Jul–Sep.

Grasslands, mountain slopes, dry sandy and stony places. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang [Kazakhstan, Mongolia, Russia; SW Asia (Caucasus)].

This distinctive species of arid places is recognized by its low mounds of dense foliage, few-flowered panicles of awned spikelets, and the curling, elongate upper internodes of the dried culm.

This is an excellent forage grass.

2. *Cleistogenes songorica* (Roshevitz) Ohwi, J. Jap. Bot. 18: 540. 1942.

无芒隐子草 wu mang yin zi cao

Diplachne songorica Roshevitz, Fl. URSS. 2: 752. 1934; *Cleistogenes mutica* Keng; *Kengia mutica* (Keng) Packer; *K. songorica* (Roshevitz) Packer.

Culms compactly tufted with tomentose roots, bases slightly swollen and clothed in pale papery old sheaths, lacking basal scaly buds, erect or ascending, 15–35(–50) cm tall, ca. 1

mm in diam., unbranched, leafy to base. Leaf sheaths longer than internodes, glabrous but pilose at mouth; leaf blades linear, grayish green, tough, flat or slightly involute, stiffly patent, 2–6 × 0.15–0.25 cm, glabrous, acute; ligule ca. 0.5 mm. Panicle open, 2–5 cm, exerted or not from uppermost leaf sheath; branches pilose in the axils, usually widely spreading, racemose, lowest branch 2–3.5 cm. Spikelets 4–8 mm, green or purple, florets 3–6; glumes lanceolate, 1-veined, acute; lower glume 2–3 mm; upper glume 3–4 mm; lemmas ovate, lowest 3–4.5 mm, pilose on lower flanks and back, apex entire, acute or with mucro less than 0.5 mm; palea keels ciliate. Anthers 1–2 mm. Fl. and fr. Jul–Sep.

Dry, sandy, or stony open grasslands, deserts. Gansu, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Turkmenistan, Uzbekistan].

This species of desert steppe is recognized by its dense tufts of gray-green leaves, and awnless, often purple spikelets with broader lemmas than the other species of the genus. The name *Cleistogenes thoroldii* (*Orinus thoroldii* in this account) has been misapplied to *C. songorica* in C Asian literature.

This is an excellent forage grass.

3. *Cleistogenes ramiflora* Keng & C. P. Wang, Bull. Bot. Res., Harbin 6(1): 175. 1986.

枝花隐子草 zhi hua yin zi cao

Kengia ramiflora (Keng & C. P. Wang) H. Yu & N. X. Zhao.

Culms tufted, erect or slightly decumbent at base, 25–35 cm tall. Leaf sheaths glabrous but pilose at mouth; leaf blades narrowly linear, flat or involute, ascending, 3–10 × ca. 0.2 cm; ligule short. Panicle narrow, 5–9 cm, lowest branch 2–4 cm. Spikelets 7–9 mm, florets 3–4; glumes lanceolate, 1-veined; lower glume 2–4 mm; upper glume 4–5 mm; lemmas lanceolate, purplish at margin and apex, lowest 5–6(–7) mm, acute or with a mucro to 0.5 mm; palea slightly shorter than lemma. Anthers ca. 3 mm. Fl. and fr. Jul–Sep.

• Mountain meadows, thickets. Nei Mongol.

No material of this species has been seen. The description is taken from the protologue. The spikelets are very similar to those of *Cleistogenes mucronata*, but the habit is different, as shown in the illustration accompanying the protologue, with softly ascending leaf blades of more or less equal length throughout.

4. *Cleistogenes mucronata* Keng ex P. C. Keng & L. Liu, Acta Bot. Sin. 9: 70. 1960.

小尖隐子草 xiao jian yin zi cao

Cleistogenes gracilis Keng ex P. C. Keng & L. Liu; *Kengia gracilis* (Keng ex P. C. Keng & L. Liu) Packer; *K. mucronata* (Keng ex P. C. Keng & L. Liu) Packer.

Culms densely tufted, clothed at base in old sheath remnants, lacking basal scaly buds, erect, wiry, 30–60 cm tall, 0.5–0.8 mm in diam., unbranched. Leaf sheaths longer than internodes, glabrous but pilose at mouth; leaf blades stiff, patent, longest at culm center, here 3–7 × 0.1–0.2 cm, uppermost 1–2 cm, glabrous, adaxial surface and margins scabrid, abaxial sur-

face smooth, lower blades disarticulating; ligule 0.2–0.3 mm. Panicle open, 5–12 cm, exerted from uppermost leaf sheath; branches laxly ascending or spreading, racemose or lower branches with branchlets, lowest branch 4–8 cm. Spikelets oblong, (6–)8–14 mm, yellowish brown or purplish green, florets 3–8; glumes lanceolate, acute; lower glume 1.6–3.5 mm, 1(–3)-veined; upper glume 3.5–4.5 mm, 1–3-veined; lemmas lanceolate, lowest 4–5 mm, loosely pilose near margins; mucro 0.1–0.2 mm; palea keels ciliate. Anthers 2–3 mm. Fl. and fr. Jul–Sep.

• Rocky hills, mountain slopes. Gansu, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi.

This is a densely tufted, wiry species with clumps of old sheaths at the base, numerous stiff, patent, narrow leaf blades, the uppermost very short, and exerted, flexuose panicles of spikelets with relatively short, inconspicuously mucronate lemmas. It is close to *Cleistogenes festucacea* and perhaps intergrades with that species through forms with slightly longer lemmas and awnlets.

5. *Cleistogenes festucacea* Honda, Rep. First Sci. Exped. Manchoukuo, Sect. IV, 4: 98. 1936.

薄鞘隐子草 bao qiao yin zi cao

Cleistogenes foliosa Keng; *C. kitagawae* Honda var. *foliosa* (Keng) S. L. Chen & C. P. Wang; *C. striata* Honda; *Kengia festucacea* (Honda) Packer; *K. foliosa* (Keng) Packer; *K. kitagawae* (Honda) Packer var. *foliosa* (Keng) H. Yu & N. X. Zhao; *C. longiflora* Keng ex P. C. Keng & L. Liu.

Culms densely tufted, base with old sheath remnants, lacking basal scaly buds, erect, wiry, 30–45 cm tall, 0.5–0.8 mm in diam., unbranched. Leaf sheaths longer than internodes, glabrous but pilose at mouth; leaf blades flat or involute when dry, ascending to stiffly spreading, 4.5–7 × 0.12–0.2(–0.27) cm, scaberulous especially toward the subulate-involute apex, lower blades disarticulating; ligule ca. 0.5 mm. Panicle lax, slightly flexuose, 7–10 cm, usually shortly exerted from uppermost leaf sheath; branches mostly narrowly ascending, few-spiculate, simple, lowest branch 3–5 cm. Spikelets 6–9 mm, pale green or purple-tinged, florets 2–5; glumes narrowly lanceolate, 1–3(–5)-veined, acuminate; lower glume 1.4–4.3 mm; upper glume (2.5–)3.5–5.7 mm; lemmas narrowly lanceolate, lowest (4.5–)5–6.5 mm, thinly pilose near margins; awn (0.2–)1–2(–2.5) mm; palea keels ciliate. Anthers 2.2–2.5 mm. Fl. and fr. Aug–Oct.

• Gansu, Hebei, Nei Mongol, Ningxia, Shandong, Shanxi.

This species has a characteristic, densely tufted habit with very slender, wiry culms, narrow, spreading leaf blades and a loose, rather flexuose panicle. However, the spikelet parts are variable, which has led to the application of several different species names. The glumes are usually acuminate and 1-veined or faintly 2- or 3-veined. The name *Cleistogenes striata* was given to an unusually strongly veined variant with up to 5 prominent veins in the glumes and 7 veins in the lemmas. The length of the lemmas and awns is also variable, sometimes even within a single panicle.

6. *Cleistogenes caespitosa* Keng, Sinensia 5: 154. 1934.

丛生隐子草 cong sheng yin zi cao

Kengia caespitosa (Keng) Packer.

Culms densely tufted, base thickened by clustered old leaf sheaths, lacking basal scaly buds, 30–40 cm tall, 0.8–0.9 mm in diam., unbranched. Leaf sheaths longer than the internodes, glabrous but pilose at mouth; leaf blades flat or involute toward apex, stiffly spreading, $3-7.5 \times 0.2-0.4$ cm; ligule ca. 0.5 mm. Panicle open, lax, 4–6 cm; branches spreading at maturity, simple or lowest with branchlets, lowest branch 1–3 cm. Spikelets 5–12 mm, florets (1–)3–6; glumes ovate-lanceolate, obtuse; lower glume 0.8–2 mm, 0–1-veined; upper glume 1.5–3.5 mm, 1–3-veined; lemmas lanceolate, lowest 4–5.5 mm, pilose near margins; awn 0.4–1 mm; palea keels scabrid. Anthers ca. 3 mm. Fl. and fr. Jul–Oct.

• Dry hill slopes, forest margins. Gansu, Hebei, Henan, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi.

This is a variant from the *Cleistogenes festucacea* gene pool with unusually short, obtuse glumes.

7. *Cleistogenes kitagawae* Honda, Rep. First Sci. Exped. Manchoukuo, Sect. IV, 4: 99. 1936.

凌源隐子草 ling yuan yin zi cao

Kengia kitagawae (Honda) Packer.

Culms densely tufted with small scaly buds at base, erect, ca. 50 cm tall, 1–1.5 mm in diam. Leaf sheaths longer than internodes, lower clustered, glabrous but pilose at mouth; leaf blades linear or linear-lanceolate, usually involute, stiffly spreading, $5-7(-9) \times 0.2-0.4$ cm; ligule 0.2–0.3 mm. Panicle contracted, 5–8 cm, base included in uppermost sheath; branches narrowly ascending, simple, compactly spiculate, lowest branch (2–)3–4.5 cm. Spikelets 7–9 mm, florets 2–5; glumes narrowly lanceolate-oblong, acuminate; lower glume 2.8–4 mm, 3-veined; upper glume 4.2–5.5 mm, 3–5-veined; lemmas lanceolate-oblong, lowest 5–5.3 mm, glabrous or sparsely pilose near margins and toward base; awn 0.5–1 mm; palea keels scabrid.

Mountain slopes, forest margins. Hebei, Liaoning [Mongolia, Russia (Far East)].

Cleistogenes hackelii (Honda) Honda var. *brachyphylla* Ohwi (J. Jap. Bot. 18: 540. 1942; *Kengia hackelii* (Honda) Packer var. *brachyphylla* (Ohwi) H. Yu & N. X. Zhao), described from Hebei, may belong here. The type has not been seen.

8. *Cleistogenes polyphylla* Keng ex P. C. Keng & L. Liu, Acta Bot. Sin. 9: 69. 1960.

多叶隐子草 duo ye yin zi cao

Cleistogenes hancei Keng var. *jeholensis* (Honda) Kitagawa; *C. serotina* (Linnaeus) Keng var. *jeholensis* Honda; *Kengia hancei* (Keng) Packer var. *jeholensis* (Kitagawa) H. Yu & N. X. Zhao; *K. polyphylla* (Keng ex P. C. Keng & L. Liu) Packer.

Culms loosely tufted from a knotty base with old sheath remnants, lacking basal scaly buds, erect, slender to moderately stout, 25–90 cm tall, 0.8–1.5 mm in diam., many-noded, sometimes branching. Leaf sheaths longer than internodes, tuberculate-hispid (especially the lower), older lower sheaths with disarticulated blades, glabrescent and spotted with tubercles; leaf blades lanceolate or linear-lanceolate, stiffly erect or becoming divaricate, flat with involute apex, $2-10 \times (0.2-0.3-0.6$

cm; ligule ca. 0.5 mm. Panicle contracted, 4–8.5 cm, base included in uppermost sheath; branches glabrous in the axils, simple, lowest branch 2–2.5 cm. Spikelets 8–13 mm, green or purple, florets 4–9; glumes lanceolate or oblong; lower glume 1.5–3.5(–4) mm, 1–3(–5)-veined; upper glume 3–5 mm, 3–5-veined; lemmas lanceolate, lowest 4–5.5 mm, loosely pilose near margins and base, emarginate; awn 0.5–1.8 mm; palea keels scabrid. Anthers ca. 2 mm. Fl. and fr. Jul–Oct.

• Dry mountain slopes, along banks of streams. Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi.

The habit is distinctive, with many nodes obscured by the overlapping leaf sheaths, broad, often erect leaf blades, and a contracted inflorescence with the base included in the uppermost sheath. The tubercles on the lower leaf sheaths are often purple colored and obvious. Robust specimens are similar to *Cleistogenes hackelii* var. *nakaii*, but that taxon has scaly basal buds, longer internodes with the nodes often exposed, and glabrous leaf sheaths.

This is a good mountain forage grass.

9. *Cleistogenes hackelii* (Honda) Honda, Bot. Mag. (Tokyo) 50: 437. 1936.

朝阳隐子草 chao yang yin zi cao

Culms loosely tufted from a knotty base with scaly buds, erect, very slender to moderately stout, 30–90 cm tall, 0.5–1.5 mm in diam., often branched above base, internodes often purple. Leaf sheaths mostly shorter than internodes, pilose above middle with tubercle-based hairs or glabrous; leaf blades linear-lanceolate, thin, flat, patent, $3-15 \times 0.3-1$ cm, glabrous or thinly pilose, acute; ligule 0.3–0.5 mm. Panicle open, exserted, 4–10 cm; branches few, laxly spreading, lowest branch 2–5 cm. Spikelets 5–9 mm, florets 2–5; glumes lanceolate or lanceolate-ovate; lower glume 0.5–3 mm, 0–1-veined, obtuse to acute; upper glume wide, 1–4.7 mm, 1–3-veined (or terminal spikelet 3–5-veined), narrowly obtuse to acute; lemmas lanceolate, lowest 4–6 mm, usually with dark transverse blotches, pilose along lower margins and keel, emarginate; awn 2–9 mm; palea keels scabrid. Fl. and fr. Jul–Nov. $2n = 40$.

Hill slopes in forests, along forest margins. Anhui, Fujian, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea].

This is a rather tall species with a sparse panicle, found in shady places. The spikelets are distinguished by the small, hyaline glumes and relatively long awns, although awn length is very variable. The scaly basal buds are an obvious feature. Japanese specimens (var. *hackelii*) are relatively uniform, but in China the species is much more variable and often slightly more robust with thicker culms and larger leaf blades (var. *nakaii*). It forms part of an intergrading complex with *Cleistogenes hancei*, which has a larger, open panicle, often with secondary branching, and spikelets with longer, acuminate glumes and shorter awns.

- 1a. Leaf blades $3.5-9 \times 0.3-0.6$ mm; leaf sheaths often tuberculate-hispid; lowest lemma 4–5.4 mm; upper glume 2.2–3.5 mm, 1-veined 9a. var. *hackelii*
- 1b. Leaf blades $6.5-12 \times 0.4-0.8$ mm; leaf sheaths usually glabrous; lowest lemma

5.4–6 mm; upper glume 3–4.7 mm,
1–3-veined 9b. var. *nakaii*

9a. *Cleistogenes hackelii* var. *hackelii*

朝阳隐子草(原变种) chao yang yin zi cao (yuan bian zhong)

Diplachne hackelii Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 112. 1930; *Cleistogenes caespitosa* Keng var. *ramosa* F. Z. Li & C. K. Ni; *C. chinensis* (Maximowicz) Keng; *C. hackelii* var. *chinensis* (Maximowicz) Ohwi; *C. serotina* (Linnaeus) Keng var. *aristata* (Hackel) Keng; *C. serotina* var. *chinensis* (Maximowicz) Handel-Mazzetti; *Diplachne serotina* (Linnaeus) Link var. *aristata* Hackel; *D. serotina* var. *chinensis* Maximowicz; *Kengia caespitosa* (Keng) Packer var. *ramosa* (F. Z. Li & C. K. Ni) H. Yu & N. X. Zhao; *K. chinensis* (Maximowicz) Packer; *K. hackelii* (Honda) Packer.

Leaf sheaths often tuberculate-hispid; leaf blades 3.5–9 × 0.3–0.6 mm. Culms 0.6–1.2 mm in diam. Lower glume 1–2 mm, 0–1-veined; upper glume 2.2–3.5 mm, 1-veined; lowest lemma 4–5.4 mm. Fl. and fr. Jul–Nov. $2n = 40$.

Hill slopes in forests, along forest margins. Anhui, Fujian, Gansu, Guizhou, Hebei, Henan, Hubei, Jiangsu, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan [Japan, Korea].

In Japan the leaf sheaths are always conspicuously tuberculate-hispid; the older, lower sheaths with disarticulated blades are glabrescent and spotted with tubercles.

9b. *Cleistogenes hackelii* var. *nakaii* (Keng) Ohwi, Bot. Mag. (Tokyo) 55: 309. 1941.

宽叶隐子草 kuan ye yin zi cao

Cleistogenes serotina var. *nakaii* Keng, Sinensia 5: 151. 1934, based on *Diplachne latifolia* Nakai, Bot. Mag. (Tokyo) 35: 139. 1921, not (Grisebach) Hackel (1902); *C. nakaii* (Keng) Honda; *Kengia hackelii* subsp. *nakaii* (Keng) T. Koyama; *K. hackelii* var. *nakaii* (Keng) H. Yu & N. X. Zhao; *Kengia nakaii* (Keng) Packer.

Leaf sheaths usually glabrous; leaf blades 6.5–12 × 0.4–0.8 mm. Culms 0.9–1.5 mm in diam. Lower glume 2–3.6 mm, 1(–3)-veined; upper glume 3–4.7 mm, 1–3-veined; lowest lemma 5.4–6 mm. Fl. and fr. Jul–Oct.

Hill slopes in forests, along forest margins. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Zhejiang [Korea].

This is a good forage and sand-binding grass.

Cleistogenes ramiflora Keng & C. P. Wang var. *tianmushanensis*

F. Z. Li & C. K. Ni (Bull. Bot. Res., Harbin 15: 436. 1995; *Kengia ramiflora* (Keng & C. P. Wang) H. Yu & N. X. Zhao var. *tianmushanensis* (F. Z. Li & C. K. Ni) H. Yu & N. X. Zhao) is based on a specimen from Zhejiang (Tianmu Shan). It appears to match *C. hackelii* var. *nakaii*, the only *Cleistogenes* species known from Zhejiang, except for its awnless lemmas. The type has not been seen.

10. *Cleistogenes hancei* Keng, Sinensia 11: 408. 1940.

北京隐子草 bei jing yin zi cao

Diplachne sinensis Hance, J. Bot. 8: 76. 1870, not *Cleistogenes chinensis* (Maximowicz) Keng (1934); *C. hancei* var. *jeholensis* (Honda) Kitagawa; *C. nakaii* (Keng) Honda var. *purpurascens* Honda; *C. serotina* (Linnaeus) Keng var. *jeholensis* Honda; *C. serotina* var. *sinensis* (Hance) Keng; *C. serotina* var. *vivipara* Honda; *Kengia hancei* (Keng) Packer; *K. serotina* (Linnaeus) Packer var. *vivipara* (Honda) H. Yu & N. X. Zhao.

Culms loosely tufted from a knotty base with scaly buds, erect, 50–100 cm tall, 1–2 mm in diam., usually unbranched, internodes often purple. Leaf sheaths longer or slightly shorter than internodes, usually glabrous, rarely sparsely pilose with tubercle-based hairs, older lower sheaths with disarticulated blades; leaf blades linear, flat, stiffly divaricate to patent, 6–15 × 0.4–0.9 cm, scabrid on both surfaces, sharply acuminate; ligule ca. 0.5 mm. Panicle open, exserted, (6–)10–15 cm; branches widely spreading, clothed in loosely imbricate spikelets, lower branches often with branchlets, lowest 3–8 cm. Spikelets 8–14 mm, green or purplish, florets (3–)5–10; glumes lanceolate, acuminate; lower glume 2–4.2 mm, 1–3-veined; upper glume 3.5–5.7 mm, (1–)3–7-veined; lemmas lanceolate, lowest 5.5–6.5 mm, usually with dark transverse blotches, thinly pilose along lower margins or subglabrous, emarginate; awn (0.6–)1–2(–3) mm; palea keels scabrid. Fl. and fr. Jul–Nov.

Mountain slopes, roadsides, forest margins. Anhui, Fujian, Hebei, Henan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Russia (Far East)].

This species is one of the largest in the genus, with relatively robust culms, long, broad leaf blades, and an open inflorescence, often with secondary branching. The spikelets typically have multiveined, acuminate glumes, long lemmas, and short awns, but there is much variation and the species is difficult to separate from *Cleistogenes hackelii* var. *nakaii*.

The epithet of *Diplachne sinensis* cannot be used in *Cleistogenes* because the heterotypic name *C. chinensis* already exists. The epithets “*sinensis*” and “*chinensis*” form homonyms when combined under the same generic name (Saint Louis Code, Art. 53.3 and Ex. 9).

This is a good forage and sand-binding grass.

127. ORINUS Hitchcock, J. Wash. Acad. Sci. 23: 136. 1933.

固沙草属 gu sha cao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Perennials, with long scaly rhizomes. Leaf blades linear to involute, with setiform slightly pungent apex; ligule membranous. Inflorescence a sparse panicle of few to several ascending racemose branches along a central axis. Spikelets shortly pedicelled, laterally compressed, florets (1 or)2 to several, rachilla disarticulating above glumes and between florets; glumes thin, lower 1-veined,

upper 3-veined, acute to obtuse; lemmas lanceolate-oblong, 3-veined, pilose, lightly keeled, entire, acute or mucronate; palea equal to or slightly shorter than lemma, ± ciliate along keels, ± hairy between keels. Caryopsis cylindrical.

Four species: Himalayas from Kashmir to Nepal and W China, at high altitudes; four species (three endemic) in China.

The widely spreading, scaly rhizomes are well adapted to survival in shifting sands, and the species are good stabilizers of dunes.

1a. Lemmas pilose all over; leaf sheaths usually pilose.

2a. Spikelets 5–6.5(–11) mm; florets 2–5 1. *O. thoroldii*

2b. Spikelets 8–11 mm; florets 5–8 2. *O. tibetica*

1b. Lemmas pilose only along margins and lower keel; leaf sheaths usually glabrous.

3a. Spikelets 7–8.5 mm; florets 3–5; lemmas obviously pilose 3. *O. kokonorica*

3b. Spikelets 5–6 mm; florets 1–2; lemmas inconspicuously pilose 4. *O. anomala*

1. *Orinus thoroldii* (Stapf ex Hemsley) Bor, Kew Bull. [6] 1951: 454. 1952.

固沙草 gu sha cao

Diplachne thoroldii Stapf ex Hemsley, J. Linn. Soc., Bot. 30: 121. 1894; *Cleistogenes thoroldii* (Stapf ex Hemsley) Roshevitz; *Kengia thoroldii* (Stapf ex Hemsley) H. Yu & N. X. Zhao; *Orinus arenicola* Hitchcock.

Rhizomes clothed in hard imbricate scales, roots woolly. Culms erect, slender, 12–20(–50) cm tall, smooth and glabrous or rarely loosely pilose. Leaf sheaths hirsute, densely so at mouth; leaf blades flat, finally involute, pale green, 2–9 × 0.2–0.5 cm, hirsute to subglabrous, base rounded, apex pungent; ligule lacerate, 1–1.5 mm. Panicle up to 15 cm, racemes 4–8, inserted singly, (1–)3–5(–7) cm, ascending or eventually spreading. Spikelets cuneate, 5–6.5(–11) mm, florets 2–5; rachilla glabrous, internodes 1–2.5 mm; glumes lanceolate, dorsally often purplish, margins hyaline, glabrous or loosely pilose; lower glume 3–5 mm; upper glume 4–6 mm; lemmas purplish brown to brown-black or blotched with purple, lowest 4.5–5(–7) mm, pilose all over, acute or mucronate; palea pilose along keels, between upper keels and on outer flaps, apex 2-lobed. Callus glabrous. Anthers (1–)3–3.5 mm. Caryopsis narrowly oblong. Fl. Aug.

High arid sandy or gravelly steppe, sometimes with *Artemisia*, fixed sand dunes; 3300–4300 m. Qinghai, Xinjiang, Xizang [Kashmir, Nepal].

The name *Cleistogenes thoroldii* has been misapplied to *C. songorica* in C Asian literature.

2. *Orinus tibetica* N. X. Zhao, Acta Bot. Yunnan. 16: 228. 1994.

西藏固沙草 xi zang gu sha cao

Culms erect, 15–35 cm tall, densely long-pilose. Leaf sheaths pilose, especially along margins and at mouth; leaf blades linear-lanceolate, usually flat, 2–8 × 0.2–0.4 cm, villous on both surfaces, rarely tuberculate-hairy at the base; ligule lacerate, ca. 1 mm. Panicle (3.5–)5–9 cm; racemes inserted singly, the lowest 3–5 cm. Spikelets purplish brown, 8–11 mm, florets 5–8; glumes lanceolate, dorsally purplish brown, membranous with hyaline margins, glabrous or laxly pilose; lower glume 4.5–5.5 mm; upper glume 5–6 mm; lemmas pilose all over, lowest 5–6 mm, apex acute or lowest mucronate; palea keels pilose, apex narrow or emarginate. Anthers ca. 3 mm. Caryopsis oblong. Fl. Jul–Aug.

• Mountain slopes; ca. 4400 m. Xizang (Dingjie).

3. *Orinus kokonorica* (K. S. Hao) Keng ex X. L. Yang, Fl. Reipubl. Popularis Sin. 10(1): 40. 1990.

青海固沙草 qing hai gu sha cao

Cleistogenes kokonorica K. S. Hao, Bot. Jahrb. Syst. 68: 582. 1938; *Diplachne kokonorica* (K. S. Hao) Conert; *Kengia kokonorica* (K. S. Hao) Packer.

Culms erect, (20–)30–50 cm tall, smooth or scabrid. Leaf sheaths glabrous, scabrid or rarely hirtellous; leaf blades stiff, usually involute, 4–9 × 0.2–0.3 cm, scabrid or hirtellous on both surfaces, apex long acuminate; ligule lacerate, 0.5–1 mm. Panicle 4–7(–19) cm, very narrow; racemes inserted singly, erect, bearing (3–)4–6(–11) spikelets. Spikelets 7–8.5 mm, florets (2–)3–5, rachilla puberulous, internodes 1–1.5 mm; glumes lanceolate, dorsally black-purple, margins membranous, yellowish brown, glabrous; lower glume 3.5–5 mm, acute; upper glume 4.5–6 mm, acute or obtuse; lemmas thin, dorsally black-brown but yellow-brown at base and apex, lowest 5–5.5 mm, margins and lower keel loosely pilose, apex denticulate, middle vein exerted into a short mucro; palea keels ciliate, loosely puberulous on outer flaps, apex acute or emarginate. Callus laterally puberulous. Anthers ca. 3 mm. Caryopsis narrowly oblong. Fl. Aug.

• Dry mountain slopes, steppe; 3000–3500 m. Gansu, Qinghai.

This is an excellent sand-binding grass.

4. *Orinus anomala* Keng ex P. C. Keng & L. Liu, Acta Bot. Sin. 9: 68. 1960.

鸡爪草 ji zhua cao

Culms loosely tufted, erect, 35–50 cm tall, puberulous below nodes. Leaf sheaths glabrous or pilose at the mouth; leaf blades stiff, erect, involute, 7–12 × 0.2–0.35 cm, glabrous or adaxial surface scabrid or loosely pilose at base, apex long acuminate; ligule erose, ca. 0.5 mm. Panicle ca. 10 cm, linear; racemes solitary or rarely paired, erect, 3.5–4 cm, with 7–9 spikelets. Spikelets yellowish or purplish green, 5–6 mm, florets 1–2, rachilla minutely puberulous, internodes ca. 1.5 mm; glumes glabrous, scabrid along upper keel, acuminate; lower glume 3–3.5 mm; upper glume 4–4.5 mm; lemmas oblong-lanceolate, lower 4.5–5 mm, margins and keel shortly and inconspicuously pilose in lower 1/3, apex acute; palea scabrid on upper keels, apex emarginate. Anthers yellow, ca. 2 mm. Fl. Aug.

• Mountain slopes. Qinghai, Sichuan.

128. TRIPOGON Roemer & Schultes, Syst. Veg. 2: 34. 1817.草沙蚕属 *cao sha can shu*

Chen Shouliang (陈守良); Sylvia M. Phillips

Perennials, often small. Culms densely tufted, slender, unbranched. Leaf blades mainly basal, filiform to setaceous, usually involute; ligule a narrow membrane fringed with hairs. Inflorescence a solitary unilateral terminal raceme. Spikelets sessile, biserial, broadside to rachis, linear to elliptic, laterally compressed, florets 2 to several, rachilla disarticulating above glumes and between florets; glumes narrow, shorter than lemmas or upper glume exceeding lowest lemma, unequal, membranous, 1-veined or upper glume sometimes 3-veined, keeled, acute to emarginate and mucronate, lower glume often with a lobe or tooth on one side; lemmas lanceolate to ovate, membranous, 3-veined, glabrous, lightly keeled or rounded, 2-dentate, midvein produced into an awn, teeth usually also mucronate or awned; palea keels scabrid or ciliolate, often winged. Floret callus bearded. Stamens 1–3. Caryopsis narrow, trigonous to subterete.

About 30 species: Old World tropics, one species in tropical America; 11 species (five endemic) in China.

- 1a. Central awn much shorter than lemma; anthers 3.
 2a. Lemma midvein extended into 0.2–0.5 mm mucro; lateral veins not extended 1. *T. purpurascens*
 2b. Lemma midvein extended into 0.5–2 mm awn; lateral veins extended into 0.2–0.7 mm mucros.
 3a. Culms 5–8 cm; racemes 2–4 cm, purple-brown 2. *T. humilis*
 3b. Culms 10–30 cm; racemes 6–15 cm, gray-green 3. *T. chinensis*
- 1b. Central awn slightly shorter to distinctly longer than lemma; anthers 1–3.
 4a. Anthers 3 (rarely 2).
 5a. Central awn 1.8–3.3 mm; lower glume without lateral lobe.
 6a. Racemes erect or slightly curved; upper glume 3.5–4.3 mm, apex subacute, mucronate; awn 1.8–3.3 mm 4. *T. sichuanicus*
 6b. Racemes drooping; upper glume 4–5 mm, apex 2-denticulate; awn 3–4 mm 5. *T. debilis*
 5b. Central awn 5–11 mm; lower glume lobed on one side.
 7a. Plant robust, up to 50 cm; lemmas with lateral awns arising from tips of teeth; anthers 1.4–1.7 mm 6. *T. trifidus*
 7b. Plant slender, up to 35 cm; lemmas with apical teeth between awns; anthers 0.5–0.9 mm 7. *T. rupestris*
- 4b. Anther 1.
 8a. Central awn distinctly longer than its lemma, flexuose or reflexed; lateral awns 1–2 mm.
 9a. Raceme with closely imbricate spikelets; central awn flexuose, at most gently reflexed 8. *T. filiformis*
 9b. Raceme with spaced spikelets; central awns all strongly and stiffly reflexed 9. *T. longearistatus*
 8b. Central awn slightly shorter to slightly longer than its lemma; lateral awns 0–1 mm.
 10a. Spikelets their own length apart or slightly imbricate; lemmas 3.3–4.5 mm; central awn 2.5–4 mm 10. *T. yunnanensis*
 10b. Spikelets closely imbricate; lemmas 2.2–2.6 mm; central awn 1.8–2.8 mm 11. *T. liouae*

1. *Tripogon purpurascens* Duthie, Ann. Roy. Bot. Gard. Calcutta 9: 74. 1901.

玫瑰紫草沙蚕 *mei gui zi cao sha can*

Tripogon jacquemontii Stapf var. *submuticus* J. D. Hooker.

Culms 5–35 cm tall. Basal leaf sheaths finally splitting into dense clumps of fibers; leaf blades 1–10 × 0.1–0.3 cm, adaxial surface densely scabrid-hispidulous, loosely pilose with long scattered hairs, abaxial surface glabrous. Racemes 2–10 (–17) cm, stiff, straight or slightly curved, spikelets tightly appressed to concavities in rachis, imbricate by 1/4–1/3 their length. Spikelets 4–7 mm, usually purplish; florets 2–4(–6), imbricate, rachilla mostly hidden; lower glume narrowly triangular, symmetrical, 1.5–2.5 mm, acuminate; upper glume narrowly oblong, 2.5–4.5 mm, thickened along midvein, margins broad, scarios, apex scabrid-apiculate; lemmas oblong-lanceolate, 2–3.4 mm to sinus, 2-dentate, midvein produced into a 0.2–0.5 mm mucro, teeth rounded, lateral veins not extended; palea keels wingless, scabrid. Anthers 3, 1.2–2 mm. Fl. and fr. Jul–Sep.

Arid places, especially open stony mountainsides, sometimes forming a sward; 700–2400 m. Xinjiang [Afghanistan, Bhutan, NW India, Nepal, Pakistan; SW Asia (Saudi Arabia, Yemen)].

This is the only species in China with a short mucro from the lemma tip not exceeding 0.5 mm, lateral veins not at all extended from the apical teeth, and wingless, scabrid palea keels. It was misidentified as *Tripogon abyssinicus* Nees ex Steudel in Fl. Brit. India (7: 287. 1896, “1897”).

The name “*Tripogon hookerianus* Bor” (Grasses Burma, Ceylon, India, Pakistan, 522. 1960) belongs here, but was not validly published because no type was indicated.

2. *Tripogon humilis* H. L. Yang, Acta Bot. Yunnan. 5: 72. 1983.

矮草沙蚕 *ai cao sha can*

Culms 5–8 cm tall. Basal leaf sheaths persistent in tight bunches; leaf blades setaceous, 1.5–6 × ca. 0.1 cm, adaxial surface densely hirtellous and thinly pilose, abaxial surface glabrous, sometimes scabrid. Racemes 2–4 cm, slender, rachis slightly laterally compressed, margins hirtellous, spikelets appressed to rachis, not or only slightly imbricate. Spikelets 3.5–

5.5 mm, purplish brown; florets 2–4, imbricate; lower glume lanceolate, symmetrical, 2–3 mm, acuminate; upper glume lanceolate, 3–4 mm, apex acute-apiculate; lemmas oblong-ovate, 3–3.5 mm, 2-dentate, central awn 1.75–2.5 mm, erect, teeth broad, acute to truncate, lateral veins extended into 0.2–0.7 mm awns; palea keels ciliolate. Anthers 3, 0.5–0.8(–1.2) mm. Fl. Jul.

- Mountain slopes; ca. 2800 m. Xizang.

In the protologue, this small species was distinguished from *Tripogon chinensis* by its low stature and short racemes; it also has a rather longer central awn and short anthers. The type has not been seen. The awn length, anther length, and ciliolate palea keels of *T. humilis* exclude it from *T. purpurascens*.

3. *Tripogon chinensis* (Franchet) Hackel, Bull. Herb. Boissier, sér. 2, 3: 503. 1903.

中华草沙蚕 zhong hua cao sha can

Nardurus filiformis (Salzmann ex Willkomm & Lange) C. Vicioso var. *chinensis* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 7: 149. 1884; *Tripogon chinensis* subsp. *coreensis* (Hackel) T. Koyama; *T. chinensis* var. *coreensis* Hackel; *T. coreensis* (Hackel) Ohwi.

Culms 10–30 cm tall. Basal leaf sheaths papery, tardily fibrous; leaf blades 5–15 × ca. 0.1 cm, adaxial surface scabrid, sometimes loosely pilose with long scattered hairs, abaxial surface glabrous. Racemes 6–15 cm, slender, spikelets appressed to rachis, slightly imbricate by up to 1/3 their length. Spikelets 4.5–8 mm, gray-green; florets 3–5, loosely imbricate, rachilla usually partially visible; lower glume lanceolate, nearly symmetrical, 1.2–3 mm, acuminate-mucronate; upper glume elliptic-oblong, 2.5–4.5 mm, thickened along midvein, margins broad, scarious, apex sharply acute or subacute and mucronate; lemmas oblong-ovate, 2–3.3 mm to sinus, 2-dentate, central awn clearly shorter than its lemma, 1–2 mm, erect, teeth broad, obliquely truncate to acute, lateral veins extended into 0.2–0.5 mm awns; palea keels very narrowly winged, ciliolate. Anthers 3, 1–1.5 mm. Fl. and fr. Jul–Sep.

Dry stony slopes, among rocks; 200–2200 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan [Mongolia, Philippines, E Russia].

4. *Tripogon sichuanicus* S. M. Phillips & S. L. Chen, Kew Bull. 57: 916. 2002.

四川草沙蚕 si chuan cao sha can

Culms 15–30 cm tall. Basal leaf sheaths papery; leaf blades inrolled or flat, 1–10 × 0.1–0.2 cm, adaxial surface scabrid, sometimes pilose with long scattered hairs, abaxial surface glabrous. Racemes 5–13 cm, spikelets imbricate by 1/3–1/2 their length. Spikelets 5–13 mm, olive green; florets 5–10, approximate, rachilla partially visible; lower glume lanceolate, nearly symmetrical, 2.1–2.7 mm, acuminate-mucronate; upper glume lanceolate-oblong, 3.5–4.3 mm, 1–3-veined and thickened along midline, margins broad, scarious, apex subacute, mucronate; lemmas oblong-ovate, 2.8–3 mm to sinus, 2-dentate, central awn slightly shorter to slightly longer than its lem-

ma, 1.8–3.3 mm, erect, teeth rounded to truncate, lateral veins extended into 0.1–0.5 mm mucros; palea keels wingless, ciliolate. Anthers 3, 1.2–1.3 mm. Fl. and fr. Jun–Aug.

- Mountain slopes, dry valleys; 1600–3200 m. Sichuan.

Tripogon sichuanicus has been misidentified as either *T. filiformis* or the Indian species *T. bromoides* Roth ex Roemer & Schultes. It is clearly separated from *T. filiformis* by its short, blunt lemma teeth and by the presence of 3 anthers. *Tripogon bromoides* differs in having a much broader raceme, 0.8–1.5 cm wide, with spikelets diverging at an angle from the rachis, a lower glume with a lateral lobe, prominent, acute lemma teeth, and longer lateral awns. *Tripogon sichuanicus* is actually much closer to *T. chinensis*, although that species has shorter awns and a more easterly distribution.

5. *Tripogon debilis* L. B. Cai, Novon 15: 390. 2005.

柔弱草沙蚕 rou ruo cao sha can

Culms 25–34 cm tall. Leaf sheaths white-villous below blade; leaf blades inrolled, 4–11 cm, adaxial surface scabrid or sometimes pubescent toward base, abaxial surface glabrous. Racemes 8–15 cm, drooping, spikelets their own length apart or slightly imbricate. Spikelets 6–8 mm, brownish green; florets 6–8, imbricate; lower glume lanceolate, nearly symmetrical, 2.5–3.5 mm, apex entire, sharply acuminate; upper glume lanceolate, 4–5 mm, margins narrowly membranous, apex 2-denticulate; lemmas lanceolate, 3.5–4.5 mm, 2-dentate, central awn 3–4 mm, erect, teeth acute, lateral veins extended into 0.3–0.5 mm mucros from outer edge of teeth; palea ca. 1 mm shorter than lemma, keels wingless, ciliate. Anthers 3, 1.3–1.5 mm.

- Stony slopes, roadsides, wasteland; 3100–3800 m. Sichuan (Hengduan Shan).

This species is close to *Tripogon sichuanicus*, which also occurs in similar habitats in W Sichuan. The protologue states that there is usually only 1 anther, but the accompanying illustration shows 3. The presence of a single anther is not otherwise recorded among the species related to *T. chinensis*.

6. *Tripogon trifidus* Munro ex J. D. Hooker, Fl. Brit. India 7: 286. 1896 [“1897”].

三裂草沙蚕 san lie cao sha can

Culms up to 50 cm tall, relatively robust. Basal leaf sheaths papery, finally fibrous; leaf blades flat or inrolled, 24–30 × ca. 0.2 cm, adaxial surface scaberulous, pilose with long hairs toward ligule, abaxial surface glabrous. Racemes 10–20 cm, flexuose, fairly dense, spikelets loosely erect to slightly diverging from rachis, imbricate by 1/2–2/3 their length. Spikelets 7–14 mm, pallid to dark gray; florets 5–13, loosely to densely imbricate; lower glume lanceolate, asymmetrical, broadened on one side into a lobe or tooth, 2.4–4.2 mm, acute; upper glume narrowly oblong-elliptic, 4–6.5 mm, apex subacute and mucronate; lemmas lanceolate, 2.6–4 mm to sinus, narrowly bifid, central awn 6–11 mm, flexuose, teeth acuminate, lateral veins extended from their tips into 0.4–1.5 mm awns; palea keels winged, ciliolate. Anthers 2–3, 1.4–1.7 mm. Fl. and fr. Jul.

Stony ground, among rocks, in the open or in shade; 1300–2600 m. Xizang, Yunnan [Bhutan, India, Myanmar, Nepal, Thailand, Vietnam].

This is a relatively stout species of *Tripogon*, taller than other Chinese members of the genus, with longer, thicker leaf blades and a taller tuft of basal sheaths. Most specimens have florets with 3 anthers, but specimens from the Himalayas tend to have only 2 anthers in some or all florets.

Material of this species was misidentified in Fl. Xizang. (5: 73. 1987) as *Tripogon wardii* Bor, a little-known species from N Myanmar differing from *T. trifidus* by its much denser racemes and lemmas with a lateral tooth between the central and lateral awns. *Tripogon wardii* is similar to *T. bromoides* Roth ex Roemer & Schultes from India.

7. *Tripogon rupestris* S. M. Phillips & S. L. Chen, Kew Bull. 57: 917. 2002.

岩生草沙蚕 yan sheng cao sha can

Culms 10–35 cm tall. Basal leaf sheaths papery becoming slightly fibrous; leaf blades 4–12 × 0.08–0.12 cm, adaxial surface scabrid, sparsely pilose with long scattered hairs, abaxial surface glabrous. Racemes 5–20 cm, flexuose, spikelets loosely appressed to the slender rachis, spaced their own length apart or only slightly imbricate. Spikelets 4.3–8 mm, tinged brownish purple; florets 4–7, tightly to loosely imbricate; lower glume narrowly lanceolate, asymmetrical, broadened into a prominent lateral tooth on one side, 2.2–3 mm, acuminate; upper glume narrowly lanceolate-oblong, 3.2–5 mm, apex emarginate and mucronate; lemmas elliptic-lanceolate, 2.4–3 mm to sinus, 3-awned with 2 teeth between the awns, central awn 5–9 mm, flexuose, often recurving, teeth variable, obtuse to acuminate, lateral veins extended into (1.5–)2–3.5 mm awns; palea keels winged, shortly ciliate. Anthers 3, 0.5–0.9 mm. Fl. and fr. Aug.

Damp rocks, often among moss; 2300–3000 m. Xizang, Yunnan [N India, Nepal].

This small species, forming delicate tufts with dark, flexuose racemes, was formerly usually identified as *Tripogon filiformis*. *Tripogon rupestris* has a looser raceme of spaced spikelets with widely spreading awns. Identification can be confirmed by inspecting the number of anthers.

8. *Tripogon filiformis* Nees ex Steudel, Syn. Pl. Glumac. 1: 301. 1854.

小草沙蚕 xiao cao sha can

Tripogon filiformis var. *tenuispicus* J. D. Hooker; *T. namus* Keng ex P. C. Keng & L. Liu; *T. unidentatus* Nees ex Steudel.

Culms 8–40 cm tall. Basal leaf sheaths papery becoming slightly fibrous; leaf blades 3–15 × 0.1–0.15 cm, adaxial surface scabrid, sparsely pilose, abaxial surface glabrous. Racemes 3–20 cm, variable, straight or flexuose, spikelets loosely erect or diverging from the slender rachis, imbricate by 1/2–3/4 their length. Spikelets 5–9 mm, pale green or tinged gray or purple; florets 4–10, tightly to loosely imbricate; lower glume narrowly lanceolate, asymmetrical, broadened into a prominent lateral tooth on one side, 1.6–2.7 mm, subacute; upper glume narrowly lanceolate-oblong, 3–4.5 mm, apex acuminate or emarginate and mucronate; lemmas elliptic-lanceolate, 2–2.7 mm to sinus, 3-awned with 2 teeth between the awns, central awn 3–8 mm, flexuose, sometimes recurving, teeth variable, acute, acuminate or awnlike, lateral veins extended into 1–3 mm awns; palea keels winged, shortly ciliate. Anther 1, 0.7–1.3 mm. Fl. and fr. Jun–Oct.

Dry grassy slopes, often among rocks; 1200–4200 m. Fujian,

Guizhou, Henan, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, N India, N Myanmar, Nepal, Pakistan].

Tripogon filiformis is a Himalayan species distinguished by its slender habit with dense, feathery racemes of long-awned spikelets, lemmas with teeth between the awns, and a single anther. The racemes are variable in length and color, but are usually rather flexuose with the leaf blades extending up among them.

9. *Tripogon longearistatus* Hackel ex Honda, Bot. Mag. (Tokyo) 41: 11. 1927 [*“longe-aristatus”*].

长芒草沙蚕 chang mang cao sha can

Tripogon japonicus (Honda) Ohwi; *T. longearistatus* subsp. *japonicus* (Honda) T. Koyama; *T. longearistatus* var. *japonicus* Honda; *T. panxianensis* H. Peng.

Culms 15–30 cm tall. Basal leaf sheaths papery; leaf blades 4–13 × ca. 0.1 cm, adaxial surface glabrous or loosely pilose, abaxial surface glabrous. Racemes 8–20 cm, usually slightly flexuose, spikelets loosely erect, distant by about their own length along the slender rachis. Spikelets 4.5–9 mm, pale green to dark gray; florets 4–7(–9), loosely arranged, rachilla visible; lower glume linear-lanceolate, asymmetrical, broadened or toothed on one side, 2.5–3 mm, subacute to acuminate; upper glume narrowly lanceolate-oblong, 4–4.5 mm, apex acuminate-rostrate or emarginate and mucronate; lemmas elliptic-lanceolate, 2.5–3.3 mm to sinus, 2-dentate, central awn 3.6–8 mm, stiff, strongly reflexed, teeth acute, lateral veins extended into 0.3–2 mm awns arising free from lemma tooth or from its outer margin; palea keels very narrowly winged, ciliolate. Anther 1, 1–1.5 mm. Fl. and fr. Sep–Oct.

Rocky slopes; 300–1000 m. Fujian, Gansu, Guangdong, Guizhou, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan, Zhejiang [Japan, Korea].

Tripogon longearistatus is close to *T. filiformis*, with which it is sometimes confused. They can usually be distinguished on habit. In *T. longearistatus*, the widely spaced spikelets with stiff, strongly reflexed awns make it one of the easiest Chinese species to recognize. Moreover, there is little overlap in their geographic range: *T. filiformis* is an upland and high-altitude species, whereas *T. longearistatus* is confined to the eastern lowlands.

The name “*Tripogon coreensis* var. *longearistatus* Hackel ex T. Mori” (Enum. Pl. Corea, 56. 1922) is a *nomen nudum* and was therefore not validly published; “*T. chinensis* var. *longearistatus* Hackel ex Honda” was not validly published because it was merely cited as a synonym in the protologue of *T. longearistatus*; and the same combination published by I. C. Chung (J. Wash. Acad. Sci. 45: 216. 1955) was not validly published because a full and direct reference to the basionym was not provided.

10. *Tripogon yunnanensis* J. L. Yang ex S. M. Phillips & S. L. Chen, Kew Bull. 57: 921. 2002.

云南草沙蚕 yun nan cao sha can

Culms 25–33 cm tall. Basal leaf sheaths finally forming dense fibrous clumps; leaf blades 2.5–10 × ca. 0.1 cm, adaxial surface pilose with long scattered hairs or subglabrous, abaxial surface glabrous. Racemes 9–15 cm, spikelets distant by about their own length on lower part of rachis, imbricate above. Spikelets (8.5–)10–22 mm, dark gray or gray-green; florets (4–)6–17, loosely imbricate, rachilla visible; lower glume lanceolate, asymmetrical, broadened on one side into a lateral lobe, 1.5–3.5 mm, acuminate; upper glume narrowly lanceolate-ob-

long, 4–5.5 mm, apex emarginate and mucronate; lemmas lanceolate-oblong, 3.3–4.5 mm to sinus, 2-dentate, central awn a little shorter or about equaling its lemma, 2.5–4 mm, slightly flexuose, teeth acute to truncate, lateral veins extended into 0.4–1 mm mucros; palea keels very narrowly winged, ciliate. Anther 1, 1.4–2 mm. Fl. and fr. Jul–Aug.

• Dry mountain slopes, among rocks; 2800–4500 m. Sichuan, Xizang, Yunnan.

The name *Tripogon yunnanensis* was not previously validly published by J. L. Yang (Acta Bot. Yunnan. 5: 51. 1981) because two types were indicated. Consequently the intended new combination "*T. bromoides* var. *yunnanensis* (Keng ex J. L. Yang) S. L. Chen & X. L. Yang" (FRPS 10(1): 59. 1990) was also not validly published.

11. *Tripogon liouae* S. M. Phillips & S. L. Chen, Kew Bull. 57: 922. 2002.

丽藕草沙蚕 li ou cao sha can

Culms 10–30 cm tall. Basal leaf sheaths finally splitting

into dense clumps of fibers; leaf blades 1.5–6 × ca. 0.1 cm, much shorter than the culms, adaxial surface pilose with long scattered hairs, abaxial surface glabrous. Racemes 2–8 cm, slightly flexuose, very dense, spikelets diverging from rachis, imbricate by 1/2 their length or more. Spikelets 6–15 mm, blackish; florets 7–15, loosely imbricate, rachilla visible; lower glume lanceolate, asymmetrical, broadened on one side below middle, sometimes lobed, subacute and mucronate; upper glume narrowly lanceolate-oblong, 2.7–4 mm, apex emarginate and mucronate; lemmas lanceolate-oblong, 2.2–2.6 mm to sinus, 2-dentate, central awn a little shorter or about equaling its lemma, 1.8–2.8 mm, teeth acute to truncate, lateral veins extended into 0–0.5 mm mucros; palea keels narrowly winged, ciliate. Anther 1, 1.3–1.8 mm. Fl. and fr. Jul–Sep.

• Dry open spaces, sometimes forming a turf; 3000–4600 m. Xizang.

Tripogon liouae has a distinctive habit, with a basal tuft of short leaves and dense, blackish racemes on culms that are conspicuously taller than the basal tuft.

129. LEPTOCHLOA P. Beauvois, Ess. Agrostogr. 71. 1812.

千金子属 qian jin zi shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Diplachne P. Beauvois.

Annuals or perennials. Leaf blades linear; ligule membranous, sometimes with a ciliate fringe. Inflorescence open, composed of several to many slender racemes of usually imbricate spikelets scattered along a central axis. Spikelets laterally compressed or subterete, florets 1 to several, rachilla disarticulating above glumes and between florets; glumes usually shorter than lemmas, unequal, membranous, 1-veined; lemmas membranous, 3-veined, generally hairy along the veins, keeled or rounded, obtuse or 2-dentate, sometimes mucronate to short-awned; palea equal to or slightly shorter than lemma. Stamens (1–)3. Caryopsis laterally or dorsally compressed. $x = 10$.

Thirty-two species: throughout the tropics and in warm-temperate parts of America and Australia; three species in China.

- 1a. Spikelets 6–10 mm, subterete, slightly imbricate or distant on indistinctly unilateral racemes; lemmas shortly awned; perennial 1. *L. fusca*
 1b. Spikelets 1.4–4 mm, laterally compressed, imbricate on clearly unilateral racemes; lemmas not awned; annual.
 2a. Leaf sheaths and blades glabrous; racemes flexuose; spikelets 2–4 mm, 3–6(–7)-flowered 2. *L. chinensis*
 2b. Leaf sheaths and blades pilose; racemes straight; spikelets 1.4–2 mm; 2–4-flowered 3. *L. panicea*

1. *Leptochloa fusca* (Linnaeus) Kunth, Révis. Gramin. 1: 91. 1829.

双稔草 shuang fu cao

Festuca fusca Linnaeus, Syst. Nat., ed. 10, 2: 876. 1759; *Diplachne fusca* (Linnaeus) P. Beauvois ex Roemer & Schultes; *D. malabarica* (Linnaeus) Merrill, nom. rej.; *Leptochloa malabarica* (Linnaeus) Veldkamp, nom. rej.; *Poa malabarica* Linnaeus, nom. rej.

Perennial, loosely tufted to rhizomatous. Culms erect or geniculate and rooting from lower nodes, up to 100 cm or more tall. Leaf sheaths glabrous; leaf blades tough, usually involute, 5–30(–50) × 0.15–0.3(–0.6) cm, adaxial surface scabrid, abaxial surface subglabrous; ligule 3–12 mm, acute. Inflorescence 15–25 cm, scabrid; racemes 3–28, indistinctly unilateral, 4–20 cm, straight, ascending or spreading, spikelets usually distant. Spikelets glaucous-green, subterete, 6–14 mm, florets 5–12; glumes

keeled; lower glume lanceolate, 2–3 mm, acute; upper glume narrowly oblong, 3–4 mm, acute or mucronate; lemmas narrowly oblong, dorsally subrounded, lowest 4–5 mm, lower lateral veins pilose, entire or 2-dentate, midvein often produced into a short 0.3–1.6 mm awn; palea ciliate along upper keels. Callus laterally pilose. Anthers 0.5–0.75(–2.5) mm. Caryopsis elliptic-oblong, 1.5–2.5 mm, dorso-ventrally flattened. Fl. and fr. Jun–Sep. $2n = 20$.

Shallow water, marshy, sometimes brackish ground. Anhui, Fujian, Guangdong, Hainan, Hebei, Henan, Hubei, Jiangsu, Liaoning, Shandong, Taiwan, Yunnan, Zhejiang [India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand; Africa, SW Asia, Australia].

This is a widespread, polymorphic species varying in habit, height, and robustness of the culm, compactness of the inflorescence, and in the lemma tip. It is a salt-tolerant species and is known to excrete salt through glands on the leaves.

2. *Leptochloa chinensis* (Linnaeus) Nees, Syll. Pl. Nov. 1: 4. 1824.

千金子 qian jin zi

Poa chinensis Linnaeus, Sp. Pl. 1: 69. 1753.

Annual or sometimes perennial. Culms erect, geniculate or decumbent and rooting from nodes, 30–100 cm tall, smooth and glabrous. Leaf sheaths glabrous; leaf blades flat or slightly involute, 5–25 × 0.2–0.9 cm, glabrous, scabrid on both surfaces or abaxial surface smooth, apex acuminate; ligule membranous, 1–5 mm. Inflorescence 10–50 cm; racemes numerous, unilateral, to 10 cm, slender, flexuose, laxly ascending, rachis scabrid, spikelets usually imbricate. Spikelets purplish or brownish green, narrowly elliptic-oblong, laterally compressed, 2–4 mm, florets 3–7; glumes scabrid along keels and sometimes laterally; lower glume lanceolate, 1–1.5 mm, acute; upper glume elliptic-oblong, 1.2–2 mm, obtuse; lemmas elliptic-oblong, keeled, lowest ca. 1.5 mm, shortly appressed-hairy along lower margins and on either side of midvein, obtuse or minutely emarginate; palea minutely hispid on keels, appressed hairy on back and flaps. Anthers ca. 0.5 mm. Caryopsis oblong, 0.7–0.9 mm, plano-convex. Fl. and fr. Aug–Oct. $2n = 40$.

Moist places; 200–1000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Japan, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; Africa].

This species is a forage grass.

3. *Leptochloa panicea* (Retzius) Ohwi, Bot. Mag. (Tokyo) 55: 311. 1941.

虬子草 ji zi cao

Poa panicea Retzius, Observ. Bot. 3: 11. 1783; *Cynosurus tenerrimus* Hornemann; *Eleusine tenerrima* (Hornemann) Hornemann; *Leptochloa tenerrima* (Hornemann) Roemer & Schultes.

Annual. Culms tufted, slender, ascending, 30–80 cm tall. Leaf sheaths papillate-pilose with spreading hairs; leaf blades thin, flat, 4–18 × 0.3–0.6 cm, glabrous or pilose, attenuate; ligule membranous, 1–2 mm, usually lacerate. Inflorescence 10–30(–50) cm, brushlike; racemes 5–35, unilateral, 2–11 cm, very slender, straight, ascending, rachis scabrid, spikelets imbricate. Spikelets glaucous-green or purplish green, elliptic, lightly laterally compressed, 1.4–2 mm, florets 2–4; glumes scabrid along keel; lower glume lanceolate, 0.7–1.5 mm, apex acuminate; upper glume narrowly oblong, 0.9–1.6 mm, cuspidate or obtuse and mucronate; lemmas elliptic-oblong, keeled, lowest 0.8–1.3 mm, veins puberulous, usually also a few appressed hairs between veins, obtuse; palea keels scaberulous. Anthers ca. 0.2 mm. Caryopsis broadly elliptic, 0.7–0.8 mm, obtusely trigonous, apex obtuse. Fl. and fr. Jul–Oct.

Roadsides, rice fields, damp weedy places. Anhui, Fujian, Guangdong, Guizhou, Hainan, Henan, Hubei, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan, Malaysia, Philippines, Sri Lanka, Thailand, Vietnam; Africa, America].

All Old World material of this species belongs to the typical race, subsp. *panicea*. Two further subspecies occur in America.

This species is an excellent forage grass.

130. *DINEBRA* Jacquin, Fragm. Bot. 77, t. 121, fig. 1. 1809.

弯穗草属 wan sui cao shu

Sun Bixing (孙必兴 Sun Bi-sin); Sylvia M. Phillips

Annuals. Culms tufted. Leaf blades linear, flat; ligule a lacerate or ciliate membrane. Inflorescence of elongate or cuneate racemes along a central axis, these deciduous or with deciduous secondary branchlets; spikelets sessile, biseriate, closely imbricate. Spikelets cuneate, laterally compressed, florets (1 or) 2 to several, rachilla eventually disarticulating above glumes and between florets; glumes much longer than and enclosing the florets, subequal, often leathery, sometimes 3-veined, strongly keeled, acute to caudate or aristate; lemmas thinly membranous, 3-veined, pubescent on veins or glabrous, keeled, acute to emarginate, with or without a mucro; palea slightly shorter than lemma, hyaline. Caryopsis elliptic, trigonous.

Three species: native from Africa and Madagascar to India; one species (introduced) in China.

1. *Dinebra retroflexa* (Vahl) Panzer, Ideen Revis. Gras. 59–60. 1813.

弯穗草 wan sui cao

Cynosurus retroflexus Vahl, Symb. Bot. 2: 20. 1791; *Dinebra brevifolia* Steudel; *D. retroflexa* var. *brevifolia* (Steudel) T. Durand & Schinz.

Culms usually straggling from a decumbent base, much branched, rooting at lower nodes, infrequently erect, green or purplish green, up to 50 cm or more tall. Leaf sheaths glabrous or with scattered hairs; leaf blades linear, 3–25 × 0.3–0.5 cm, glabrous or thinly pilose, apex acuminate; ligule lacerate. Inflo-

rescence 6–20 cm, narrowly elliptic-oblong to pyramidal, open; racemes 0.5–4 cm, stiff, ascending when young, reflexing and finally deciduous from the axis at maturity; rachis flattened, narrowly winged. Spikelets narrowly cuneate, florets 2–3; glumes narrowly elliptic with caudate diverging tips, 6–8 mm, keel scabrid, minutely glandular; lemmas greenish, narrowly ovate, 2–3 mm, lower part of veins appressed-pilose, acute to emarginate, mucronate; palea appressed-pilose on the flaps. Callus obtuse, glabrous. Anthers purplish red, ca. 0.3 mm. Fl. and fr. Nov–Dec.

Dry open places, an introduced weed; ca. 1100 m. Fujian, Yunnan [native to India, Africa, and Madagascar].

131. ERAGROSTIS Wolf, Gen. Pl. 23. 1776.

画眉草属 hua mei cao shu

Chen Shouliang (陈守良); Paul M. Peterson

Annual or perennial, often glandular particularly on the leaf sheaths and inflorescence. Leaf blades mostly flat, sometimes rolled, rarely pungent; ligule a line of hairs or sometimes membranous. Inflorescence an open, contracted, spiciform or glomerate panicle, very rarely of racemes on a central axis. Spikelets 2- to many-flowered, laterally compressed, orbicular to vermiform, variously disarticulating. Glumes unequal, deciduous or persistent, 1(-3)-veined. Lemmas membranous to coriaceous, keeled or rounded, glabrous to asperulous or rarely hairy, 3-veined or the veins sometimes very faint and occasionally suppressed, apex entire, obtuse to acuminate, rarely mucronate. Palea keels sometimes winged or ciliate. Stamens 2 or 3. Fruit mostly globose, ellipsoid, or rectangular-prismatic, usually a caryopsis but sometimes the pericarp free.

About 350 species: tropics and subtropics throughout the world; 32 species (11 endemic, one introduced) in China.

- 1a. Florets disarticulating from above downward, falling together with the rachilla joints.
- 2a. Panicle contracted, spikelike or cylindrical.
- 3a. Perennial; lemmas 1.8–2.5 mm, ciliolate along the margins below 27. *E. ciliata*
- 3b. Annual; lemmas 0.8–1.3 mm, glabrous or scabrous along the margins 28. *E. ciliaris*
- 2b. Panicle usually open.
- 4a. Perennial 29. *E. collina*
- 4b. Annual.
- 5a. Palea-keels long ciliate; branchlets and pedicels glandular 30. *E. tenella*
- 5b. Palea-keels glabrous to ciliolate; branchlets and pedicels eglandular.
- 6a. Culms 120–150 cm tall, ca. 5 mm in diam.; panicle branches solitary or in pairs; spikelets yellowish green 31. *E. alta*
- 6b. Culms 30–100 cm tall, 1.5–2.5 mm in diam., panicle branches clustered or verticillate; spikelets purplish at maturity 32. *E. japonica*
- 1b. Florets disarticulating from below upward, usually leaving the rachilla entire.
- 7a. Annual.
- 8a. Palea falling together with its lemma at maturity.
- 9a. Spikelets oblong, 5–10 × 2–4 mm, 10–20-flowered 25. *E. unioides*
- 9b. Spikelets filiform, 11–25 × 1–2.5 mm, 10–40-flowered.
- 10a. Upper glumes ca. 1 mm; lower lemma ca. 1.5 mm; palea ca. 1 mm; anthers ca. 0.2 mm 20. *E. multicaulis*
- 10b. Upper glumes 1.3–2.3 mm; lower lemma 1.8–2.2 mm; palea ca. 1.6–1.8 mm; anthers 0.7–0.9 mm 7. *E. atrovirens*
- 8b. Palea persistent or tardily falling.
- 11a. Plants glandular on the culms, leaf sheaths, and panicle.
- 12a. Spikelets 2–3 mm broad, lower lemma 2.2–2.8 mm 22. *E. cilianensis*
- 12b. Spikelets 1.5–2.5 mm broad, lower lemma 1.5–2 mm.
- 13a. Palea subequal to its lemma; midrib of lemma glandular 23. *E. minor*
- 13b. Palea shorter than its lemma; midrib of lemma eglandular 24. *E. suaveolens*
- 11b. Plants eglandular.
- 14a. Lower glume 1-veined, 1–2 mm, the upper ca. 2 mm.
- 15a. Spikelets 5–20 × 2–2.5 mm, 8–40 florets 16. *E. cumingii*
- 15b. Spikelets 3–5 × ca. 2 mm, 3–10 florets 21. *E. autumnalis*
- 14b. Lower glume without a vein, less than 1 mm, the upper less than 1.4 mm.
- 16a. Summit of sheaths pilose; panicles 3.5–14 cm wide, axils pilose; pedicels as long or longer than the spikelets 19. *E. pilosa*
- 16b. Summit of sheaths glabrous; panicles 1.5–3 cm wide, axils glabrous; pedicels usually shorter than the spikelets 20. *E. multicaulis*
- 7b. Perennial.
- 17a. Lemma falling together with the palea at maturity.
- 18a. Spikelets 2–4 mm wide; stamens 2, anthers 0.2–0.5 mm; leaf blades sublanceolate, 3–6 mm broad 25. *E. unioides*
- 18b. Spikelets 1.5–2.5 mm wide; stamens 3, anthers 0.7–0.9 mm; leaf blades linear, 2–4 mm broad 7. *E. atrovirens*
- 17b. Palea persistent or tardily falling at maturity.
- 19a. Panicle contracted and spikelike, less than 3(–5) cm wide.
- 20a. Spikelets 1–2 mm broad; lower panicle branches (1.5–)3–8 cm 4. *E. nutans*
- 20b. Spikelets 2–3 mm broad; lower panicle branches 0.5–2.5 cm.

- 21a. Palea apex acute, the keels ciliate but not winged; panicle 2–8 cm, pilose in axils 5. *E. cylindrica*
 21b. Palea apex toothed, the keels winged, ciliolate along the wings; panicle 10–15 cm, glabrous in axils 6. *E. nevinii*
- 19b. Panicle open, usually more than 3 cm wide.
- 22a. Branchlets and pedicels distinctly or obscurely glandular.
- 23a. Caryopsis rectangular-prismatic with a shallow adaxial groove, laterally compressed, 0.7–1.5 mm 15. *E. ferruginea*
 23b. Caryopsis obovoid to ellipsoid, terete, without a groove, 0.7–0.9 mm 13. *E. perennans*
- 22b. Branchlets and pedicels eglandular.
- 24a. Branches densely spiculate to base.
- 25a. Stamens 3, anthers 0.3–1.3 mm; caryopsis dark brown 1. *E. brownii*
 25b. Stamens 2, anthers 0.2–0.3 mm; caryopsis cinnamon 2. *E. elongata*
- 24b. Branches naked at base.
- 26a. Leaf blades long pilose on both surfaces.
- 27a. Spikelets 7–14-flowered; caryopsis furrowed on one side, bluntly triangular in section 10. *E. pilosissima*
 27b. Spikelets usually 7-flowered; caryopsis compressed, elliptical in section 11. *E. pilosiuscula*
- 26b. Leaf blades glabrous, pubescent or pilose in part.
- 28a. Spikelets livid green, black-green, purplish black, or plumbeous; leaf sheaths compressed at the base.
- 29a. Culms 80–120 cm tall; leaf blades flat or involute, up to 40 cm; panicle up to 40 cm.
- 30a. Caryopsis ellipsoid to obovoid, smooth and mostly translucent, dorsally compressed, adaxial surface sometimes with a shallow, broad groove, light brown 9. *E. curvula*
 30b. Caryopsis rectangular-prismatic, faintly striate, laterally compressed, with a shallow, narrow groove, reddish brown ... 15. *E. ferruginea*
- 29b. Culms 30–80 cm tall; leaf blades flat or involute, 5–25 cm, panicle up to 23 cm.
- 31a. Plants with scaly buds at the base; spikelets 4–13 mm, 6–24-flowered.
- 32a. Lower glume ca. 1 mm; upper glume ca. 1.3 mm, 1–3-veined; caryopsis 0.8–1 mm 16. *E. cumingii*
 32b. Lower glume ca. 1.2 mm; upper glume ca. 1.8 mm, 1-nerved; caryopsis 0.5–0.6 mm 17. *E. duricaulis*
- 31b. Plants without scaly buds at the base; 3–12-flowered.
- 33a. Spikelets 2–2.5 mm wide, 5–10 mm; lemmas 2–2.2 mm; caryopsis elliptical, terete 14. *E. nigra*
 33b. Spikelets 1–1.5 mm wide, 3–6 mm; lemmas 2.4–3 mm; caryopsis rectangular-prismatic, laterally compressed ... 15. *E. ferruginea*
- 28b. Spikelets purplish, yellowish, or greenish; leaf sheaths not compressed at the base.
- 34a. Palea tardily deciduous at maturity; spikelets 7–15 mm, 10–44-flowered 18. *E. hainanensis*
- 34b. Palea persistent; spikelets 0.5–20 mm, 5–60-flowered.
- 35a. Axils of panicle and branches glabrous.
- 36a. Spikelets 5–10 × ca. 2.5 mm, 5–15-flowered; anthers ca. 0.5 mm 8. *E. fauriei*
 36b. Spikelets 5–25 × ca. 3 mm, 6–60-flowered; anthers ca. 0.3 mm 12. *E. perlaxa*
- 35b. Axils of panicle and branches pilose.
- 37a. Culms 50–110 cm tall; panicle 20–35 cm; anthers ca. 1 mm 13. *E. perennans*
 37b. Culms 20–60 cm tall; panicle 3–12 cm; anthers 0.2–0.4 mm.
- 38a. Leaf blades pilose on adaxial surface; lemmas with reddish or yellowish lateral veins 3. *E. rufinerva*
 38b. Leaf blades glabrous; lemmas with inconspicuous lateral veins 26. *E. montana*

1. *Eragrostis brownii* (Kunth) Nees, Cat. Indian Pl. 105. 1834.

长画眉草 chang hua mei cao

Poa brownii Kunth, Révis. Gramin. 1: 112. 1829; *Eragrostis zeylanica* Nees & Meyen; *E. bellissima* B. S. Sun & S. Wang.

Perennial. Culms slender, tufted, erect or geniculate at base, 15–60 cm tall, 0.5–1 mm in diam., 2–5-noded. Leaf sheaths glabrous and smooth, pilose along summit; ligules membranous, ca. 0.2 mm; leaf blades flat or involute, 3–10 cm × 1–3 mm. Panicle 3–18 cm; branches solitary with spikelets at base. Spikelets livid green, purplish or dark brown, oblong-elliptic, 4–20 × 1.5–2.5 mm, 7- to many-flowered, subsessile or with very short pedicel, apex acute. Glumes ovate-lanceolate, 1–2 mm; lower glume 1-veined, ca. 1.2 mm; upper glume 1–3-veined, the laterals usually faint, ca. 1.8 mm. Lower lemmas 2–2.5 mm. Palea slightly shorter than lemma, 1.5–2 mm, ciliolate along keels, apex emarginate. Stamens 3; anthers 0.3–1.3 mm. Caryopsis dark brown, ca. 0.5 mm. Fl. spring.

Mountain slopes, open places, roadsides; ca. 1000 m. Anhui, Fujian, Hainan, Yunnan, Zhejiang [India, Indonesia, Japan, Malaysia, New Guinea, Philippines, Sri Lanka; Australia, Pacific Islands].

2. *Eragrostis elongata* (Willdenow) J. Jacquin, Ecl. Gram. Rar. 3. 1813.

双药画眉草 shuang yao hua mei cao

Poa elongata Willdenow, Enum. Pl. 1: 108. 1809.

Perennial. Culms erect, loosely tufted, 20–90 cm tall, 0.5–1 mm in diam., 2–4-noded. Leaf sheaths usually shorter than internodes, glabrous; ligules 0.3–0.4 mm; leaf blades flat to involute, adaxial surface scabrous, sometimes hairy below, 5–21 cm × 1–3 mm. Panicle spicate to narrowly ovate, 5–30 × 1–4 cm; branches appressed or diverging up to 80° from the rachises with spikelets at base. Spikelets stramineous to greenish or light brown, 3–12(–20) × 1.5–2.5 mm, 6–25-flowered; subsessile or with a very short pedicel, rachilla fragile. Glumes linear-lanceolate to lanceolate, 1-veined, 0.8–2 mm. Lower lemmas lanceolate to ovate, 1.3–2.2 mm. Palea shorter and narrower than the lemmas, hyaline, 1.1–1.7 mm, ciliolate along keel. Stamens 2; anthers 0.2–0.3 mm. Caryopsis cinnamon, ovoid-ellipsoid, 0.4–0.7 mm, smooth to finely reticulate.

• Open grasslands, moist places, roadsides; near sea level to 1000 m. Fujian, Guangdong, Hainan, Jiangxi.

3. *Eragrostis rufinerva* L. C. Chia, Fl. Hainan. 4: 539. 1977.

红脉画眉草 hong mai hua mei cao

Perennial. Culms loosely tufted, 20–35 cm tall, ca. 1.5 mm in diam., 3–5-noded. Leaf sheaths usually shorter than internodes, glabrous but pilose around summit; ligules membranous; leaf blades flat or involute, adaxial surface pilose, abaxial surface glabrous, 3–11 cm × 2–4 mm. Panicle open, 3–12 × 0.2–0.5 cm; branch single, sparsely pilose in axils. Spikelets glaucous-green, densely imbricate, oblong or elliptic, 3–7 × 2–2.5 mm, 16–30-flowered; rachilla persistent. Glumes membranous, ovate, 1-veined, lower glume ca. 1 mm, apex acute, the up-

per 1.2–1.4 mm. Lemma broad ovate, apex acute; margin membranous, reddish or yellow. Palea persistent, apex obtuse, along keels ciliolate. Stamens 3; anthers ca. 0.3 mm. Caryopsis brown-red, ellipsoid, ca. 0.6 mm. Fl. and fr. winter.

• Open grasslands. Hainan.

4. *Eragrostis nutans* (Retzius) Nees ex Steudel, Nomencl. Bot., ed. 2, 1: 563. 1840.

细叶画眉草 xi ye hua mei cao

Poa nutans Retzius, Observ. Bot. 4: 19. 1786; *Eragrostis guangxiensis* S. C. Sun & H. Q. Wang.

Perennial. Culms erect, 30–60 cm. Leaf sheaths long silky hairs along summit; ligules fringed, ca. 0.3 mm; leaf blades 6–12 × 0.15–0.3 cm. Panicle contracted, spikelike, 7–14 × 1.5–3 (–5) cm; branches naked at lower part, ascending, glabrous in axils, lower branches (1.5–)3–8 cm. Spikelets 3–6 × 1–2 mm, usually (3–)5–12-flowered. Glumes chartaceous, broadly lanceolate to ovate, subequal, 1-veined. Lemmas 1.6–2 mm, ovate, chartaceous. Palea the same texture and length as lemma, 2-keeled, scabrous to ciliolate along keels. Stamens 3; anthers ca. 0.8 mm. Caryopsis ellipsoid, ca. 0.7 mm; embryo 1/2 length of the caryopsis.

Open, moist places, roadsides. Guangxi, Taiwan, Yunnan [India, Japan (Ryukyu Islands), Philippines].

This species is frequently confused with *Eragrostis gangetica* (Roxburgh) Steudel, which is an annual.

5. *Eragrostis cylindrica* (Roxburgh) Nees ex Hooker & Arnott, Bot. Beechey Voy. 251. 1838.

短穗画眉草 duan sui hua mei cao

Poa cylindrica Roxburgh, Fl. Ind. 1: 335. 1820; *Eragrostis geniculata* Nees & Meyen.

Perennial. Culms 30–90 cm tall, 1–2.5 mm in diam., tufted, rigid, 3–4-noded. Leaf sheaths shorter than internodes, pilose and long-pilose near summit; ligules a line of hairs; leaf blades 3–15 cm × 2–5 mm, linear, usually involute, pilose. Panicle 2–8 × 1–2.5 cm, contracted, cylindrical in outline; branches ascending, long pilose in axils, lower branches 0.5–1.5 cm. Spikelets yellowish brown or purplish, oblong, subsessile or with very short pedicels, ca. 7 × 2.5–3 mm, 4–17-flowered. Glumes 1-veined, apex acute, lower glume ca. 1.5 mm, upper glume ca. 2 mm. Lemmas chartaceous, ovate-oblong, apex mucronate, lowest lemma ca. 2 mm. Palea persistent, elliptical, chartaceous, ca. 1.8 mm, apex acute, along keels without wing only ciliate, margins unrolled and ciliate. Stamens 3; anthers yellowish, ca. 0.4 mm. Caryopsis yellow, elliptical, ca. 0.5 mm. Fl. and fr. Apr–Oct.

• Mountain slopes. Anhui, Fujian, Guangdong, Guangxi, Hainan, Jiangsu, Taiwan.

6. *Eragrostis nevinii* Hance, J. Bot. 18: 302. 1880.

华南画眉草 hua nan hua mei cao

Perennial. Culms rigid, tufted, erect or geniculate at base, 20–50 cm tall, 2–4 mm in diam., 5–6-noded. Leaf sheaths long

pilose throughout; ligules a line of hairs; leaf blades linear, usually involute, 4–11 × 0.3–0.4 cm, pubescent in both surfaces. Panicle contracted and spikelike, 10–15 × 1–2 cm, 1- to several-branched; branches ascending, tightly appressed glabrous or with short hairs in axils, lower branches 1.5–2.5 cm. Spikelets yellow or purplish, oblong or linear-oblong, 4–8 × 2–3 mm, 4–14 florets. Glumes lanceolate, 1-veined, lower glume ca. 1.5 mm, the upper ca. 2 mm. Lemmas ovate, apex acute, lower lemma ca. 2.5 mm. Palea persistent, apex toothed, along keels winged, along wings ciliolate. Stamens 3; anthers ca. 0.5 mm. Caryopsis brown, oblong, ca. 1 mm. Fl. and fr. Apr–Oct.

• Mountain slopes, waste places. Fujian, Hainan, Shanghai, Taiwan.

7. *Eragrostis atrovirens* (Desfontaines) Trinius ex Steudel, Nomencl. Bot., ed. 2, 1: 562. 1840.

鼠妇草 shu fu cao

Poa atrovirens Desfontaines, Fl. Atlant. 1: 73. 1798; *Eragrostis chariis* (Schultes) Hitchcock; *E. elegantula* (Kunth) Nees ex Steudel (1854), not Nees (1851); *E. fracta* S. C. Sun & H. Q. Wang; *E. longispicula* S. C. Sun & H. Q. Wang; *E. multinodis* B. S. Sun & S. Wang; *Poa chariis* Schultes; *P. elegantula* Kunth.

Perennial. Culms loosely tufted, erect or geniculate at base, 15–100 cm tall, ca. 4 mm in diam., 4–8-noded. Leaf sheaths glabrous but pilose along summit; ligules a ciliolate membrane, 0.2–0.3 mm; leaf blades flat or involute, 4–17 × 0.2–0.4 cm, adaxial surface scabrous, near base pilose, abaxial surface glabrous. Panicle open, 5–20(–25) × 2–15 cm; branches one to several per node. Spikelets plumbeous and purplish, narrowly oblong, 5–15(–25) × 1.5–2.5 mm, 8–40-flowered, pedicels 0.5–5(–15) mm; rachilla persistent. Glumes 1-veined, 1–2.3 mm; lower glume ovate, 1–1.3 mm, apex acute, upper glume narrowly ovate, 1.3–2.3 mm, apex acuminate. Lemmas broad ovate, 1.8–2.2 mm, apex acute, lower lemma 2–2.2 mm, deciduous with palea. Palea loosely ciliate along keel, 1.6–1.8 mm. Stamens 3; anthers 0.7–0.9 mm. Caryopsis ca. 1 mm. Fl. and fr. summer and autumn. $2n = 40$.

Roadsides, river banks. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Sichuan, Yunnan [tropical and subtropical regions of Africa and Asia].

8. *Eragrostis fauriei* Ohwi, Bot. Mag. (Tokyo) 55: 278. 1941.

佛欧里画眉草 fo ou li hua mei cao

Perennial. Culms densely caespitose, 30–60 cm tall, erect, glabrous. Leaf sheaths usually shorter than internodes; ligules margin ciliate; leaf blades subcoriaceous, 2–5 mm broad, margin involute. Panicle open, 10–15 cm; branches ascending, scabrous, glabrous in axils. Spikelets palely purplish, lanceolate, 5–10 × ca. 2.5 mm, 5–15-flowered, pedicellate; rachilla persistent. Glumes broadly lanceolate, 1-veined, apex acuminate, lower glume 1–1.5 mm, the upper 1.5–1.7 mm. Lemmas ovate, apex acute, minutely punctate, keel scabrous, lateral veins distinct, subparallel. Palea persistent, keels arc-shaped, ciliate-scabrous. Stamens 3; anther oblong, blackish purple, ca. 0.5 mm. Caryopsis elliptical, slightly compressed, obscurely striate.

• Waste places. Taiwan.

9. *Eragrostis curvula* (Schrader) Nees, Fl. Afr. Austral. III. 397. 1841.

弯叶画眉草 wan ye hua mei cao

Poa curvula Schrader, Gött. Gel. Anz. 3: 2073. 1821.

Perennial. Culms densely tufted, erect, 80–120 cm tall, 5–6-noded. Leaf sheaths scabrous with retrorse hairs at lower part, glabrous upward, shorter than internodes, long pilose along the summit; leaf blades elongate, involute, attenuate to a fine point, arcuate spreading, scabrous, (5–)10–40 cm × 1–2.5(–3) mm. Panicles open, 12–35 × 6–9 cm; branches solitary or in pairs, ascending, naked at base, at least the lower densely pilose in axils. Spikelets gray-green, (4–)6–11 × 1.5–2 mm, 5–16-flowered. Glumes lanceolate, apex acuminate, 1-veined, lower glume 1.2–1.5 mm, upper glume 1.8–2.5 mm. Lemmas broadly oblong, apex acute or obtuse, veins prominent, lower lemma 2–2.5 mm. Palea subequal to lemma, 2-keeled, persistent or tardily deciduous. Stamens 3; anthers ca. 1.2 mm. Caryopsis ellipsoid to obovoid, dorsally compressed, adaxial surface with a shallow, broad groove or ungrooved, smooth, mostly translucent, light brown, 1–1.7 mm. Fl. and fr. Apr–Sep. $2n = 20, 42, 63, 80$.

Commonly cultivated for ornament. Fujian, Guangxi, Hubei, Jiangsu, Xinjiang, Yunnan [native to Africa].

This species is used for fodder and as an ornamental grass.

10. *Eragrostis pilosissima* Link, Hort. Berol. 1: 189. 1827.

多毛知风草 duo mao zhi feng cao

Eragrostis makinoi Hackel.

Perennial. Culms tufted, erect, slender and rigid, 30–40 cm tall, less than 2 mm in diam. Leaf sheaths densely pilose, usually shorter than internodes but longer than internodes at base; ligules a line of hairs, ca. 0.3 mm; leaf blades usually involute, 5–10 × 0.1–0.2 cm, densely pilose at both surfaces. Panicle lax, 4–10 × 2–5 cm; branch usually solitary, slender, glabrous in axils. Spikelets yellow, oblong, 3–7 × ca. 2 mm, 7–14-flowered. Glumes ovate-oblong, subequal, 1–1.5 mm, apex acute. Lemmas ovate-oblong, apex obtuse, lateral veins faint. Palea slightly shorter than lemma, slightly arc-shaped, along keels ciliolate, persistent or tardily deciduous. Stamens 3; anthers ca. 0.8 mm. Caryopsis furrowed on one side, bluntly triangular in section. Fl. and fr. Aug.

Mountain slopes. Fujian, Guangdong, Hainan, Jiangxi, Taiwan [SE Asia].

11. *Eragrostis pilosiuscula* Ohwi, Bot. Mag. (Tokyo) 55: 279. 1941.

有毛画眉草 you mao hua mei cao

Perennial. Culms tufted. Leaf sheaths tuberculate-pilose; ligules a line of hairs, 0.4–0.5 mm; leaf blades linear, ca. 10 × 0.15 cm, densely covered with long tuberculate hairs on both surfaces. Panicles open, 5–7 cm; branches solitary or in pairs, naked at base. Spikelets usually 7-flowered, ca. 3.5 mm. Glumes

lanceolate, or upper ovate, chartaceous, subequal, ca. 1 mm, 1-veined. Lemmas ca. 1.5 mm, chartaceous, ovate. Palea elliptical, usually equal to lemma, 2-keeled, minutely scabrous along keels. Caryopsis compressed, elliptical in section. Fl. and fr. Aug.

- Open places. Guangdong, Taiwan.

12. *Eragrostis perlaxa* Keng ex P. C. Keng & L. Liu, *Acta Bot. Sin.* 9: 66. 1960.

疏穗画眉草 shu sui hua mei cao

Perennial. Culms tufted, erect and slender, 40–90 cm tall, ca. 1 mm in diam., 2–3-noded. Leaf sheaths glabrous, pilose along the summit; ligules a line of hairs, ca. 0.2 mm; leaf blades involute, adaxial surface pilose, 3–8 × 0.1–0.25 cm. Panicle lax, 7–25 × 0.4–0.9 cm; branch solitary, 4–8 cm, glabrous in axils; branchlet with 2–5 spikelets. Spikelets stramineous or gray-green, filiform or oblong, 0.5–2.5 × ca. 0.3 cm, 6–60-flowered, with pedicel 0.5–1 cm. Glumes 1-veined, lower glume narrowly ovate, apex acuminate, ca. 1.2 mm, upper glume ovate, apex acute, ca. 1.5 mm. Lemmas broadly ovate, apex acute, lateral veins distinct, lower lemma ca. 2 mm. Palea ca. 1.8 mm, persistent, along keels ciliate. Anthers ca. 0.3 mm. Caryopsis ca. 0.6 mm. Fl. Aug.

- Mountain slopes, open ground. Anhui, Fujian, Guangdong, Guangxi, Taiwan.

13. *Eragrostis perennans* Keng, *Sunyatsenia* 3: 16. 1935.

宿根画眉草 su gen hua mei cao

Eragrostis hekouensis B. S. Sun & S. Wang; *E. lincanensis* B. S. Sun & S. Wang; *E. quinquenervis* B. S. Sun & S. Wang; *E. rubida* B. S. Sun & S. Wang.

Perennial. Culms erect and rigid, 50–110 cm tall, 1–3 mm in diam., 2–4-noded. Leaf sheaths pilose along summit; ligule membranous or a line of hairs, 0.15–0.3 mm; leaf blades flat, stiff, 10–45 × 0.3–0.5(–0.7) cm, glabrous or adaxial surface scabrous, rarely villose on both surfaces. Panicle open, 20–35 × 3–6(–13) cm; branches usually solitary, pilose, hispidulous or glabrous in axils. Spikelets purplish yellow, 4–20 × 1.8–3 mm, 5–24-flowered, with pedicel 1–5 mm. Glumes broadly lanceolate, apex acuminate, 1-veined, lower glume 1.6–2 mm, upper glume 1.8–2.3 mm. Lemmas oblong-lanceolate, apex acute; lateral veins greenish and distinct; lowest lemma 2.2–2.5 mm. Palea persistent, ca. 2 mm, along 2 keels ciliate. Anthers ca. 1 mm. Caryopsis obovoid to ellipsoid, terete, somewhat striate, brown, 0.7–0.9 mm. Fl. and fr. summer and autumn.

Mountain slopes, roadsides. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Yunnan, Zhejiang [SE Asia].

14. *Eragrostis nigra* Nees ex Steudel, *Syn. Pl. Glumac.* 1: 267. 1854.

黑穗画眉草 hei sui hua mei cao

Eragrostis atropurpurea Hochstetter ex Steudel; *E. denigrens* B. S. Sun & S. Wang.

Perennial. Culms tufted, erect or slightly geniculate at base, 30–90 × 0.15–0.25 cm, slightly compressed at base, 2–3-

noded. Leaf sheaths along margins long ciliate, white pilose along the summit; ligules 0.1–0.5 mm; leaf blades filiform, flat, 2–25 × 0.3–0.5 cm, glabrous. Panicle open, 10–24 × 3–16 cm; branches solitary or verticillate, slender and twisted, glabrous in axils. Spikelets black or black green, 3–6 × 1–1.5 mm, 3–8-flowered, with pedicel 2–10 mm. Glumes membranous, lanceolate, apex acuminate, lower glume 1-veined, 1.5–2.5 mm; upper glume 1–3-veined, 1.8–2.5 mm. Lemmas ovate-oblong, apex membranous, lower lemma 2–2.2 mm. Palea persistent, slightly shorter than lemma, along 2 keels ciliate, apex obtuse. Stamens 3; anthers ca. 0.6 mm. Caryopsis elliptical, 0.5–1 mm. Fl. and fr. Apr–Sep.

Mountain slopes. Gansu, Guangxi, Guizhou, Henan, Jiangxi, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal, Sri Lanka; SE Asia].

15. *Eragrostis ferruginea* (Thunberg) P. Beauvois, *Ess. Agrostogr.* 71. 1812.

知风草 zhi feng cao

Poa ferruginea Thunberg in Murray, *Syst. Veg.*, ed. 14, 114. 1784; *Eragrostis mairei* Hackel; *E. mairei* var. *eglandis* B. S. Sun & S. Wang.

Perennial. Culms single or tufted, erect or geniculate at base, 30–110 cm tall, 2–4 mm in diam. Leaf sheaths laterally compressed, glabrous but along margins and summit densely pilose, sometimes glandular along main vein; ligules a line of hairs, ca. 1 mm; leaf blades linear-lanceolate, (4–)20–40 × 2–6 mm, glabrous or adaxial surface sparingly covered with silky hairs on basal part. Panicle large and open, 15–40 × 4–15 cm, 1–3-branched at each node, glabrous in axils; branchlet and pedicel usually glandular at middle or above middle. Spikelets oblong, purplish black, gray-green, rarely yellowish green, 5–10 × 2–2.5 mm, (4–)7–12-flowered. Glumes lanceolate, open, 1-veined, apex acuminate, lower glume 1.4–2 mm, upper glume 2–3 mm. Lemma ovate-lanceolate to oblong, 2.4–3 mm, apex obtuse, lower lemma ca. 3 mm. Palea persistent, along keels ciliate. Anthers ca. 1 mm. Caryopsis rectangular-prismatic with a shallow, narrow adaxial groove, laterally compressed, faintly striate, reddish brown, 0.7–1.5 mm. Fl. and fr. Aug–Dec. $2n = 80$.

Mountain slopes, roadsides. Anhui, Beijing, Fujian, Guizhou, Henan, Hubei, Shaanxi, Shandong, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India (Sikkim), Japan, Korea, Laos, Nepal, Vietnam].

The name "*Eragrostis ferruginea* var. *yunnanensis* Keng" (Claves *Gen. Sp. Gram. Prim. Sin.* 178. 1957) was not validly published because no Latin description was provided.

16. *Eragrostis cumingii* Steudel, *Syn. Pl. Glumac.* 1: 266. 1854.

珠芽画眉草 zhu ya hua mei cao

Eragrostis bulbifera Steudel; *E. reflexa* Hackel.

Annual to perennial. Culms erect, tufted, slender, usually with scaly buds at base, glabrous, 20–70 cm tall, 1–1.5 mm in diam., 3–4-noded. Leaf sheaths compressed at base, glabrous, long pilose along summit; ligules 0.1–0.3 mm, fimbriate; leaf blades involute, 5–19 × 0.1–0.2 cm, glabrous on both surfaces, but long pilose at base of adaxial surface. Panicle open, 8–30 ×

4–8 cm; branches solitary, naked at lower part, glabrous in axils. Spikelets yellowish green or gray-green, narrowly oblong, 5–20 × 2–2.5 mm, 8–40-flowered, pedicels without glands. Glumes chartaceous, deltoid-oblong, easily falling off when mature, lower glume 1-veined, ca. 1 mm, upper glume 1–3-veined, ca. 1.3 mm. Lemmas broadly ovate, lateral veins nearly parallel, lower lemma ca. 2 mm. Palea chartaceous, oblanceolate, persistent or tardily deciduous, strongly 2-keeled, along keels ciliate. Anthers ca. 0.2 mm. Caryopsis elliptical, terete to laterally flattened, 0.8–1 mm. Fl. and fr. Sep–Oct.

Roadsides, fields. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Jiangsu, Taiwan, Yunnan, Zhejiang [Japan; SE Asia, Australia].

17. *Eragrostis duricaulis* B. S. Sun & S. Wang, J. Yunnan Univ. 20: 354. 1998.

针仓画眉草 zhen cang hua mei cao

Perennial. Culms erect, tufted, with scaly buds at base, glabrous, 60–80 cm tall, 1–1.2 mm in diam., 3–5-noded. Leaf sheaths dark brown, compressed near base, mostly glabrous and pilose at summit; ligules 0.1–0.3 mm, ciliate; leaf blades filiform, flat or folded, 5–20 × 0.1–0.3 cm, glabrous below and tuberculate pilose above. Panicle open, 12–22 × 4–10 cm; branches 1 or 2 per node, naked at lower part, ascending up to 6 cm, glabrous in axils. Spikelets plumbeous or yellowish, narrowly elliptical, 4–9 × 1.5–2 mm, 6–16-flowered, pedicels without glands, 1–3 mm. Glumes membranous, easily falling off when mature, lower glumes 1-veined, ca. 1.2 mm, upper glumes 1-veined, ca. 1.8 mm, scabrous on keel. Lemmas broadly ovate, apex acuminate, lower lemma ca. 2 mm, deciduous. Palea persistent, ca. 1.6 mm, apex obtuse. Stamens 3; anthers 0.3–0.4 mm. Caryopsis brown, elliptical to roundish (spherical), 0.5–0.6 mm. Fl. and fr. Apr–Oct.

• Reservoir dams; ca. 1100 m. Yunnan (Zhenkang).

18. *Eragrostis hainanensis* L. C. Chia, Fl. Hainan. 4: 539. 1977.

海南画眉草 hai nan hua mei cao

Perennial, usually stoloniferous. Culms rigid, erect or geniculate at base, 35–45 cm tall, ca. 2 mm in diam., 4–7-noded. Leaf sheaths glabrous and smooth, long pilose along summit; ligules scarious, ca. 0.2 mm, margin ciliate; leaf blades linear involute, stiff, 4–8 × ca. 0.3 cm, adaxial surface long pilose. Panicle open, 9–13 × 4–6 cm; branches solitary, lax, ascending, naked at base, usually glabrous in axils. Spikelets greenish or purplish green, oblong, 7–15 × ca. 2 mm, 10–44-flowered; rachilla persistent. Glumes membranous, ovate 1-veined, lower glume ca. 1 mm, upper glume ca. 1.2 mm. Lemmas broadly ovate, apex slightly obtuse, veins prominent, lower lemma ca. 1.6 mm. Palea slightly shorter than lemma, along 2 keels ciliate, tardily deciduous. Stamens 3; anthers yellow, ca. 3 mm. Fl. and fr. autumn.

• Open grasslands. Hainan.

19. *Eragrostis pilosa* (Linnaeus) P. Beauvois, Ess. Agrostogr. 71. 1812.

画眉草 hua mei cao

Poa pilosa Linnaeus, Sp. Pl. 1: 68. 1753.

Annual. Culms tufted, erect or geniculate at base, 15–60 cm tall, 1.5–2.5 mm in diam., 4-noded, smooth. Leaf sheaths pilose at summit, compressed, margin submembranous; ligules a line of hairs; leaf blades flat or involute, 6–20 × 0.2–0.3 cm, glabrous. Panicle 10–25 × 3.5–14 cm; branches solitary to verticillate, pilose in axils, usually ascending, pedicels as long or longer than spikelets. Spikelets 3–10 × 1–1.5 mm, 4–14-flowered. Glumes membranous, lanceolate, apex acuminate, lower glume without vein, 0.4–0.9 mm, upper glume 1-veined, 0.7–1.3 mm. Lemmas ovate, apex acute, lower lemma ca. 1.8 mm. Palea ca. 1.5 mm, along keels persistent or tardily deciduous ciliate. Stamens 3; anthers 0.1–0.3 mm. Caryopsis oblong, ca. 0.8 mm. Fl. and fr. Aug–Nov. $2n = 40, 60$.

Open grasslands. Anhui, Beijing, Fujian, Guizhou, Hainan, Heilongjiang, Henan, Hubei, Nei Mongol, Ningxia, Shaanxi, Shandong, Taiwan, Xizang, Yunnan, Zhejiang [SE Asia; Africa, Australia, S Europe; introduced in America].

This species is very widely distributed in tropical and warm regions of the Old World. It is a forage grass with medicinal uses.

20. *Eragrostis multicaulis* Steudel, Syn. Pl. Glumac. 1: 426. 1854.

多秆画眉草 duo gan hua mei cao

Eragrostis niwahokori Honda; *E. pilosa* (Linnaeus) P. Beauvois var. *imberbis* Franchet; *E. pulchra* S. C. Sun & H. Q. Wang.

Annual. Culms tufted, erect or ascending, geniculate at base. Leaf sheaths glabrous at summit or with a few short hairs, compressed; ligules a line of hairs, 0.2–0.1 mm; leaf blades usually flat, 3–9 cm × 0.5–2.5 mm, glabrous. Panicle open, 4.5–9 × 1.5–3 cm; branches solitary or in pairs but base branches nearly whorled, glabrous in axils; pedicels usually shorter than spikelets. Spikelets dark green, 2.5–4.5 mm, 3–10-flowered. Glumes membranous, falling off at maturity, lower glume narrow, veins obscure, ca. 0.6 mm, upper glume oblong-ovate, 1-veined, ca. 1 mm. Lemmas membranous, semi-ovate in side vein, ca. 1.5 mm, middle vein keeled, falling off at maturity. Palea membranous, ca. 1 mm, apex blunt, along 2 keels ciliate, persistent or tardily falling off at maturity. Stamens 3; anthers ca. 0.2 mm. Caryopsis ca. 0.8 mm, striate. Fl. and fr. late summer. $2n = 40$.

Roadsides, waste fields, especially common in flower pots. Taiwan, Yunnan [India, Japan; SE Asia].

21. *Eragrostis autumnalis* Keng, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 10: 178. 1936.

秋画眉草 qiu hua mei cao

Annual. Culms single or tufted, 15–45 cm tall, 1–2.5 mm in diam., 3–4-noded. Leaf sheaths compressed, glabrous, along summit with long deciduous hairs; ligules a line of hairs; leaf blades usually involute or plicate, 6–12 × 0.2–0.3 cm. Panicle 6–15 × 3–5 cm; branches solitary, clustered, or verticillate, glabrous in axils. Spikelets gray-green, 3–5 × ca. 2 mm, 3–10 florets, with pedicels 1–5 mm. Glumes 1-veined, lower glume ca. 1.5 mm, upper glume ca. 2 mm. Lemma broadly ovate, apex acute, lower lemma ca. 2 mm. Palea ca. 1.5 mm, 2-keeled, along keels ciliate, persistent or tardily deciduous. Stamens 3;

anthers ca. 0.5 mm. Caryopsis red-brown, ca. 1 mm. Fl. and fr. Jul–Nov.

• Grasslands, roadsides. Anhui, Fujian, Guizhou, Hebei, Henan, Jiangsu, Jiangxi, Shandong, Zhejiang.

Eragrostis autumnalis is very similar to *E. pilosa* and can be separated from that species by its longer, 1-veined lower glumes (ca. 1.5 mm vs. 0.4–0.9 mm), longer upper glumes (ca. 2 mm vs. 0.7–1.3 mm), and longer lemmas (ca. 2 mm vs. 1.8 mm).

22. *Eragrostis cilianensis* (Allioni) Vignolo-Lutati ex Janchen, Mitt. Naturwiss. Vereins Univ. Wien, n.s., 5: 110. 1907.

大画眉草 da hua mei cao

Poa cilianensis Allioni, Fl. Pedem. 2: 246. 1785; *Eragrostis major* Host; *E. megastachya* (Koeler) Link; *Poa megastachya* Koeler.

Annual. Culms rather robust, 30–90 cm tall, 3–5 mm in diam., erect or geniculate at base, 3–5-noded, a line of glands below each node. Leaf sheaths with glands along veins, along summit with tubercle hairs; ligules a line of hairs, ca. 0.5 mm; leaf blades flat, glabrous, 6–20 × 0.2–0.6 cm, along midvein and margin glandular. Panicle oblong or pyramidal, 5–20 cm; branch usually solitary, ascending; branchlet glandular. Spikelets dark green, gray-green or yellowish white, compressed, oblong or ovate-oblong, 5–20 × 2–3 mm, 10–40-flowered. Glumes subequal or lower glume slightly shorter, 1-veined, upper glume 1–3-veined, along middle vein glandular. Lemmas chartaceous, broadly ovate-oblong, conspicuously 3-veined, along middle vein glandular, lower lemma 2.2–2.8 mm. Palea persistent; oblanceolate, apex rounded, 1.2–1.6 mm, along keels ciliolate. Stamens 3; anthers ca. 0.5 mm. Caryopsis oblong, ca. 0.5 mm in diam. Fl. and fr. Jul–Oct. $2n = 40$.

Waste places, fields, cultivated ground. Anhui, Beijing, Fujian, Guizhou, Hainan, Heilongjiang, Henan, Hubei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Taiwan, Xinjiang, Yunnan, Zhejiang [tropical and subtropical regions of the world].

23. *Eragrostis minor* Host, Icon. Descr. Gram. Austriac. 4: 15. 1809.

小画眉草 xiao hua mei cao

Poa eragrostis Linnaeus, Sp. Pl. 1: 68. 1753; *Eragrostis minor* var. *minima* B. S. Sun & S. Wang; *E. poaeoides* P. Beauvois, nom illeg. superfl.

Annual. Culms slender, tufted, erect or geniculate at base, (5–)15–50(–80) cm tall, 1–2 mm in diam., 3–4-noded, below each node usually a line of glands. Leaf sheaths usually shorter than internodes, along summit and margin with long silky hairs, along veins glandular especially in middle vein or tuberculate hispidulous; ligules a line of hairs; leaf blades flat or involute, 3–15 × 0.2–0.4 cm, adaxial surface scabrous and pilose, abaxial surface glabrous, along middle vein and margins with glands in row. Panicle open, 6–15 × 3–6 cm; branch solitary, ascending or spreading. Spikelets green or dark green, oblong, 3–8 × 1.5–2 mm, 3–16-flowered, with glandular pedicels 3–6 mm. Glumes chartaceous, lanceolate, 1-veined, glandular along veins, lower glume ca. 1.6 mm, upper glume ca. 1.8 mm. Lemma ovate, apex obtuse, lateral veins nearly parallel, midrib glandular, low-

er lemma 1.5–2 mm. Palea subequal to its lemma, persistent, 2-keeled, along keels ciliolate or scabrous. Stamens 2 or 3; anthers 0.2–0.3 mm. Caryopsis red-brown, oblong or globose, ca. 0.5 mm in diam. Fl. and fr. Jul–Sep. $2n = 40$.

Mountain slopes, grasslands, roadsides. Anhui, Beijing, Fujian, Guizhou, Heilongjiang, Henan, Hubei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [tropical, subtropical, and temperate regions of the world].

24. *Eragrostis suaveolens* A. K. Becker ex Claus, Beitr. Pflanzenk. Russ. Reiches 8: 266. 1851.

香画眉草 xiang hua mei cao

Annual. Culms slender, caespitose, decumbent at base, smooth and glabrous, 20–60 cm tall. Leaf sheaths glabrous, along veins with many glands, pilose along summit; ligules a ring of hairs; blades linear, flat, glabrous, with many glands. Panicle lax; branches slender, solitary or 2(–3) per node, glabrous in axils. Spikelet rather pale, 4–11 × 1.5–2(–2.5) mm, (5–)10–20-flowered. Glumes slightly shorter than florets, lower glume shorter than upper glume. Lemmas broadly ovate, eglandular along keel, lower lemma 1.5–2 mm. Palea slightly shorter than its lemma, curved, along keels ciliate, persistent. Stamens 3; anthers 0.2–0.3 mm. Fl. and fr. Jun–Sep.

Roadsides, streams, fields. Xinjiang [Kazakhstan; E Europe].

25. *Eragrostis unioides* (Retzius) Nees ex Steudel, Syn. Pl. Glumac. 1: 264. 1854.

牛虱草 niu shi cao

Poa unioides Retzius, Observ. Bot. 5: 19. 1788; *Eragrostis amabilis* (Linnaeus) Wight & Arnold ex Nees; *E. formosana* Hayata; *P. amabilis* Linnaeus.

Annual or perennial. Culms erect or geniculate at base, 20–60 cm tall, 2–3 mm in diam., 3–5-noded. Leaf sheaths glabrous and smooth, long pilose along the summit; ligules membranous, ca. 0.8 mm; leaf blades sublanceolate, flat, 2–20 × 0.3–0.6 cm, adaxial surface long pilose, abaxial surface smooth, apex acuminate. Panicle open, oblong, 5–20 × 3–5 cm; branch solitary, glabrous in axils. Spikelets purplish red at maturity, oblong, 5–10 × 2–4 mm, with pedicel 0.2–1 cm, 10–20-flowered; florets closely imbricate; rachilla persistent, lower glume 1.5–2 mm, upper glume 2–2.5 mm. Lemmas broadly ovate, veins prominent, apex acute, the lower lemma ca. 2 mm. Palea slightly shorter than the lemma, 2-keeled, very narrowly winged and ciliolate, falling off together with its lemma at maturity. Stamens 2; anthers purple, 0.2–0.5 mm. Caryopsis compressed, ellipsoidal, ca. 0.8 mm. Fl. and fr. Aug–Oct.

Mountain slopes, grasslands, roadsides. Fujian, Hainan, Jiangxi, Taiwan, Yunnan [W Africa, tropical Asia].

26. *Eragrostis montana* Balansa, J. Bot. (Morot) 4: 168. 1890.

山地画眉草 shan di hua mei cao

Eragrostis malayana Stapf.

Short-lived perennial. Culms erect or geniculate at base, new tufts at nodes but not rooting, up to 60 cm tall, ca. 2 mm in diam. Leaf sheaths lightly keeled, glabrous, pilose at collar; leaf blades 3.5–11.5 cm × 0.5–1.25(–3) mm, glabrous except for

sparse long hairs near ligule; ligule ca. 0.2 mm, ciliolate. Panicle lax to contracted, 4–10 × 0.5–5 cm; branches solitary, lowermost 1.2–3 cm, erect or spreading, bare in lower 1/5–1/3, scaberulous, branchlets appressed, main axils often pilose; pedicels 0.5–3 mm, shorter than spikelet. Spikelets 2.8–5(–7) × 1.5–2.3 mm, greenish yellow tinged light purple, florets 12–18, closely overlapping, disarticulating from base upward; rachilla persistent; glumes unequal, lower glume 0.5–1 mm, upper glume 0.75–1.4 mm, both acute; lemmas 1.1–1.5 mm, lateral veins faint, apex subacute. Palea persistent, keels ciliolate. Stamens 3; anthers 0.2–0.4 mm. Caryopsis slightly compressed, ellipsoidal, 0.5–0.6 mm. Fr. Nov.

About 1200 m. Yunnan [Cambodia, Indonesia, Malaysia, Myanmar, Thailand, S Vietnam].

This species is reported from Yunnan, but the authors have not seen any specimens.

27. *Eragrostis ciliata* (Roxburgh) Nees, Fl. Bras. Enum. Pl. 2: 512. 1829.

纤毛画眉草 xian mao hua mei cao

Poa ciliata Roxburgh, Fl. Ind. 1: 336. 1820; *Eragrostis alopecuroides* Balansa; *E. brevispica* Keng.

Perennial. Culms tufted, erect, rigid, 30–90 cm tall, ca. 2 mm in diam., many-noded, a line of glands below node. Leaf sheaths glabrous and smooth, long pilose along summit; ligules a line of hairs; leaf blades flat, lanceolate, 4–17 × 0.3–0.5 cm, glabrous. Panicle dense, cylindrical, 1.5–7 × 0.5–1.5 cm, densely hirsute in axils of basal branch. Spikelets compressed, 4–6 × ca. 3 mm, 7–13-flowered; rachilla slender, disarticulated between florets from top to the base at maturity. Glumes membranous lanceolate, pubescent on back, ciliate along margin, apex mucronate; lower glume ca. 1.8 mm, upper glume 1.8–2 mm. Lemmas membranous, pubescent on back, ciliolate along the margins below, apex short pointed, lower lemma 1.8–2.5 mm. Palea slightly shorter than lemma, margin ciliate, along 2 keels long ciliate, the cilia 0.8–1.6 mm. Stamens 2; anthers ca. 0.4 mm. Caryopsis red brown, ovate, ca. 0.5 mm. Fl. and fr. winter.

Thickets. Hainan [India, Myanmar, Sri Lanka, Vietnam].

28. *Eragrostis ciliaris* (Linnaeus) R. Brown in Tuckey, Narr. Exped. Zaire 478. 1818.

毛画眉草 mao hua mei cao

Poa ciliaris Linnaeus, Syst. Nat., ed. 10, 2: 875. 1759; *Cynodon ciliaris* (Linnaeus) Raspail; *Megastachya ciliaris* (Linnaeus) P. Beauvois; *Poa amboinica* Linnaeus.

Annual. Culms slender, tufted, 10–70 cm tall. Leaf sheaths with long silky hairs; ligules a line of ca. 0.4 mm hairs; leaf blades ca. 15 × 0.3 cm, adaxial surface with silky hairs. Panicle purplish, contracted, spikelike. Spikelets ca. 2 mm, many-flowered. Glumes chartaceous, deltoid-lanceolate, 1-veined, apex pointed, lower glume slightly shorter than upper glume, upper glume ca. 1 mm. Lemmas chartaceous, 0.8–1.3 mm, midrib of back with short glandular hairs, glabrous to scabrous along the margins, apex mucronate. Palea oblanceolate, chartaceous, equal to lemma, along 2 keels ciliate, cilia longer than the width

of the palea. Caryopsis ca. 0.3 mm, the embryo 1/2 the length of the caryopsis. Fl. and fr. in autumn. $2n = 20, 40$.

Dry places. Taiwan [tropical and subtropical regions of the world].

Eragrostis ciliaris is often confused with *E. ciliata*, but the latter species is a perennial with lemmas 2–2.5 mm, membranous, and pubescent abaxially and the palea slightly shorter than the lemma.

29. *Eragrostis collina* Trinius, Mém. Acad. Imp. Sci. St.-Petersbourg, Sér. 6, Sci. Math. 1: 413. 1831.

戈壁画眉草 ge bi hua mei cao

Aira arundinacea Linnaeus; *Eragrostis arundinacea* (Linnaeus) Roshevitz (1934), not Jedwabnick (1924).

Perennial with rhizomes. Culms glaucous, erect, caespitose, rigid, robust, glabrous, 30–100 cm tall. Leaf sheaths glabrous, with long soft hairs along summit; ligules a ring of hairs; blades linear, flat or involute, glabrous, margins scabrous, 2–6 mm broad. Panicle ca. 25 × 12 cm; branches ascending, loose, smooth, 1–2(–3) per node. Spikelets dark green, usually gathered at tip, 1.8–3.5 mm, 2–5-flowered; rachilla articulating at maturity. Glumes unequal, shorter than florets. Lemma ca. 2 mm, apex obtuse. Caryopsis nearly rounded, ca. 1 mm in diam. Fl. and fr. Jun–Sep.

Mountain slopes, streams; 500–1000 m. N Xinjiang [Kazakhstan, Russia; SW Asia (Caucasus, Iran, Turkey)].

30. *Eragrostis tenella* (Linnaeus) P. Beauvois ex Roemer & Schultes, Syst. Veg. 2: 576. 1817.

鲫鱼草 ji yu cao

Poa tenella Linnaeus, Sp. Pl. 1: 69. 1753.

Annual. Culms slender, 15–60 cm tall, erect or geniculate at base, 3–4-noded. Leaf sheaths shorter than internodes, pilose along margin and summit; ligules a line of short hairs; leaf blades flat, 2–10 × 0.3–0.5 cm, adaxial surface scabrous, abaxial surface glabrous and smooth. Panicle open; branches solitary or clustered, long pilose in axils, branchlet and pedicels glandular. Spikelets ovate or oblong-ovate, ca. 2 mm, 4–10-flowered; rachilla disarticulated between florets from above downward at maturity. Glumes membranous, 1-veined, lower glume ca. 0.8 mm, upper glume ca. 1 mm, falling off when mature. Lemmas broadly ovate, apex obtuse, lower lemma ca. 1 mm. Palea persistent or tardily deciduous, long ciliate along keels, hairs rigidly spreading at maturity. Stamens 3; anthers ca. 0.3 mm. Caryopsis red, ovoid, ca. 0.5 mm. Fl. and fr. Apr–Aug. $2n = 20$.

Moist places. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hubei, Shandong, Taiwan, Xizang, Yunnan [Old World tropics].

31. *Eragrostis alta* Keng, Lingnan Sci. J. 16: 1. 1937.

高画眉草 gao hua mei cao

Annual. Culms erect, 120–150 cm tall, ca. 5 mm in diam., striate. Leaf sheaths loose, glabrous distinctly striate; ligules ca. 1 mm, ciliolate along margin; leaf blades greenish, 20–45 × 0.3–0.5 cm, adaxial surface smooth, abaxial surface scabrous. Panicle contracted 20–40 × ca. 3 cm; branches solitary or in

pairs, ascending glabrous in axils. Spikelets yellowish green, glabrous, 2–3 × 0.8–1 mm, 5–9-flowered; rachilla disarticulating between florets from top downward at maturity; pedicels straight or curved, eglandular. Glumes ovate, membranous, subequal, ca. 0.7 mm, 1-veined, apex obtuse. Lemmas apex obtuse or slightly acute, lower lemma ca. 1 mm. Palea along 2 keels glabrous or slightly ciliolate. Stamens 2; anthers 0.3–0.4 mm. Fl. and fr. spring and early summer.

- Forests, moist places. Hainan.

32. *Eragrostis japonica* (Thunberg) Trinius, Mém. Acad. Imp. Sci. St.-Pétersbourg, Sér. 6, Sci. Math. 1: 405. 1831.

乱草 luan cao

Poa japonica Thunberg in Murray, Syst. Veg., ed. 14, 114. 1784.

Annual. Culms erect, or geniculate at base, 30–100 cm

tall, 1.5–2.5 mm in diam., 3–4-noded. Leaf sheaths usually loose, longer than internodes, glabrous; ligules scarious, ca. 0.5 mm, fimbriate at apex, pubescent on back; leaf blades flat, 3–25 × 0.3–0.5 cm, smooth and glabrous. Panicle elongated, 6–34 × 1.5–6 cm; branches slender, clustered or verticillate, glabrous in axils. Spikelets usually purplish at maturity, ovate, 1–2 mm, 4–8-flowered; rachilla distarticulating between florets from top downward at maturity. Glumes chartaceous, ovate-lanceolate, subequal, 0.6–0.8 mm, 1-veined, apex obtuse. Lemmas chartaceous, broadly elliptical, distinctly 3-veined, apex obtuse, lower lemma ca. 1 mm. Palea subequal to lemma, along 2 keels ciliolate. Stamens 2; anthers ca. 0.2 mm. Caryopsis reddish-brown, ovoid, 0.4–0.5 mm. Fl. and fr. Jun–Nov.

Fields, roadsides, stream banks. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Jiangsu, Jiangxi, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam].

132. ERAGROSTIELLA Bor, Indian Forester 66: 269. 1940.

细画眉草属 xi hua mei cao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Perennials, compactly tufted. Culms slender, rigidly erect, unbranched. Leaf blades mainly basal, filiform; ligule membranous with ciliate fringe. Inflorescence a single subsecund spike-like raceme with sessile or subsessile, biseriate spikelets. Spikelets laterally compressed with many tightly imbricate florets, narrow, often linear-oblong, lemmas disarticulating at maturity leaving the persistent rachilla and paleas, but sometimes the upper part shed as a whole; glumes shorter than lemmas, subequal or upper slightly longer, 1–3-veined; lemmas ovate or lanceolate, cartilaginous, 3-veined, glabrous, keeled along midvein, acute or obtuse; palea keels usually narrowly winged, wing margins usually ciliolate. Grain ellipsoid.

Six species: E Africa through India to SE Asia and N Australia; one species (endemic) in China.

This homogeneous and easily recognized genus of rather small grasses is split from *Eragrostis* on the basis of its single terminal raceme.

1. *Eragrostiella lolioides* (Handel-Mazzetti) P. C. Keng, Acta Bot. Sin. 9: 51. 1960.

细画眉草 xi hua mei cao

Eragrostis lolioides Handel-Mazzetti, Symb. Sin. 7: 1282. 1936.

Culms 20–50 cm tall, ca. 0.7 mm in diam., 1-noded. Leaf sheaths yellowish brown, glabrous, becoming fibrous at base; leaf blades stiff, involute, 4–11 × 0.1–0.15 cm, adaxial surface and margins scabrid, apex acuminate; ligule 0.5–0.8 mm. Raceme 10–27 cm, loosely spiculate and tipped with a spikelet, spikelets 5–7 mm apart. Spikelets ovate-oblong, stramineous at

maturity, 5–8 × 3–4 mm, florets 5–12 in middle part of raceme; glumes narrowly lanceolate, papery with membranous margins, 1-veined, acuminate; lower glume 2–2.5 mm; upper glume 2.5–3 mm; lemmas broadly ovate, lowest 2.8–3 mm, glabrous, obtuse; palea membranous, broadly ovate, ca. 2 mm, keels very narrowly winged, ciliolate. Anthers 3, ca. 0.6 mm. Fl. and fr. autumn and winter.

- Hill slopes, roadsides; 1400–2000 m. Yunnan.

Eragrostiella lolioides is similar to *E. nardoides* (Trinius) Bor, from Bhutan, Nepal, and the Indian Himalayas, but the latter species has more closely set spikelets with smaller lemmas (1.6–2 mm).

133. HARPACHNE A. Richard, Tent. Fl. Abyss. 2: 431. 1850.

镰稈草属 lian fu cao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Perennials. Culms tufted. Leaf blades linear or convolute; ligule a line of hairs. Inflorescence a single, cylindrical “bottle-brush” raceme, the spikelets on slender pedicels, reflexing, hanging from rachis. Spikelets strongly laterally compressed, florets several to many, often increasing in size up the spikelet, spikelet falling entire together with the pungent or hooked pedicel; glumes narrowly oblong, shorter than lemmas, 1-veined; lemmas lanceolate, papery with membranous margins, 3-veined, glabrous, strongly keeled, acute to setaceously acuminate; palea much shorter than lemma, gibbous, keels winged. Caryopsis laterally compressed, obliquely elliptic.

Three species: two in tropical Africa, the other endemic to SW China.

1. *Harpachne harpachnoides* (Hackel) B. S. Sun & S. Wang, Fl. Yunnan. 9: 456. 2003.

镰稈草 lian fu cao

Eragrostis harpachnoides Hackel, Oesterr. Bot. Z. 52: 306. 1902.

Culms 15–30 cm tall, ca. 1 mm in diam., 3–4-noded. Leaf sheaths pilose along margins and at mouth, otherwise glabrous; leaf blades stiff, narrowly linear or involute, 2–9 × 0.1–0.2 cm, glabrous, apex acute; ligule ca. 0.5 mm. Inflorescence 3–7 × ca. 1.5 cm; rachis pilose; pedicels 1.5–3 mm. Spikelets narrowly oblong to elliptic-oblong, 4–8 × 1.5–2.5 mm, florets 4–8, imbricate, slightly decreasing in length toward spikelet apex; glumes linear-oblong, keel scabrid; lower glume 1–1.5 mm, truncate; upper glume 2–2.5 mm, obtuse; lemmas lanceolate with straight keel, lowest ca. 2.5 mm, minutely puberulous, apex abruptly acute to apiculate; palea keels winged, wing margins ciliate, apex obtuse. Anthers 0.5–1 mm. Fl. and fr. Jun–Nov.

• Open places. Sichuan, Yunnan.

The other two species of *Harpachne* occur in tropical Africa and have longer spikelets (8–20 mm). The common *H. schimperii* A. Richard is clearly distinguished from *H. harpachnoides* by its wedge-shaped spikelets, in which the lemmas increase in length upward with acuminate-aristate tips.

134. *DESMOSTACHYA* (Stapf) Stapf in Dyer, Fl. Cap. 7: 316. 1898.

羽穗草属 yu sui cao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Eragrostis sect. *Desmostachya* Stapf in J. D. Hooker, Fl. Brit. India 7: 324. 1896 [“1897”].

Perennials, rhizomatous. Leaf blades linear or inrolled; ligule a line of hairs. Inflorescence a narrow spike-like panicle composed of numerous, short, 1-sided racemes of sessile, closely imbricate, biseriate spikelets on a long central axis. Spikelets falling entire, strongly laterally compressed, florets several to many; glumes shorter than lemmas, unequal, membranous, 1-veined, lightly keeled, acute; lemmas papery to leathery, 3-veined with lateral veins evanescent upward, glabrous, keeled, acute; palea equal to or slightly shorter than lemma. Caryopsis ovoid, trigonous.

One species: from N Africa through SW Asia and India to China and continental SE Asia.

This genus is closely related to *Eragrostis*, differing mainly by its inflorescence structure.

1. *Desmostachya bipinnata* (Linnaeus) Stapf in Dyer, Fl. Cap. 7: 632. 1900.

羽穗草 yu sui cao

Briza bipinnata Linnaeus, Syst. Nat., ed. 10, 2: 875. 1759; *Eragrostis cynosuroides* (Retzius) P. Beauvois; *Poa cynosuroides* Retzius.

Coarse perennial forming large leafy tussocks, also with widely spreading scaly rhizomes. Culms rigid, branched at base and covered with leathery yellowish sheaths, 80–100 cm tall, ca. 7 mm in diam. Leaf sheaths glabrous; leaf blades flat or inrolled, tough, 18–30 × 0.4–1 cm, adaxial surface and margins

scabrid, abaxial surface rather smooth, apex long acuminate; ligule ca. 0.3 mm. Inflorescence 20–60 × 2–3 cm; racemes ascending or spreading, crowded or spaced, 0.5–3.5 cm; main axis and rachis hispidulous. Spikelets elliptic or elliptic-oblong, 2–10 mm, stramineous or purplish, florets 3–10; glumes ovate-lanceolate; lower glume 0.7–1.5 mm; upper glume 1.1–2 mm; lemmas ovate-lanceolate, 1.8–2.7 mm; palea keels scabrid. Fl. and fr. summer.

Arid regions with water table near surface. Hainan [Cambodia, India, Myanmar, Pakistan, Thailand, Vietnam; N and NE Africa, SW Asia, Australia (Cocos Islands)].

This is a tough grass of arid regions, useful as a soil binder.

135. *DACTYLOCTENIUM* Willdenow, Enum. Pl. 2: 1029. 1809.

龙爪茅属 long zhao mao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Annuals or perennials. Culms tufted, sometimes stoloniferous, compressed. Leaf blades linear, flat or loosely folded; ligule membranous, often ciliate. Inflorescence of paired or digitate spike-like racemes; racemes linear to narrowly oblong, spikelets sessile, biseriate, closely imbricate, the uppermost abortive, rachis terminating in a bare pointed extension. Spikelets elliptic to ovate, laterally compressed, florets several, disarticulating above glumes but not usually between florets; glumes shorter than lemmas, keeled, 1-veined; lower glume smaller, sharply acute; upper glume with a stout oblique awn from just below the broadly rounded emarginate tip; lemmas membranous, 3-veined, glabrous, strongly keeled, acute to shortly awned and often recurved at the apex; palea keels sometimes winged. Grain angular, ornamented, enclosed within a free hyaline pericarp which ruptures at maturity. $x = 9, 10$.

Thirteen species: mainly from Africa to India, one species widespread; one species in China.

This genus can easily be recognized by its digitate, spike-like racemes, each terminating in a bare point.

1. *Dactyloctenium aegyptium* (Linnaeus) Willdenow, Enum. Pl. 2: 1029. 1809 [*"aegyptiacus"*].

龙爪茅 long zhao mao

Cynosurus aegyptius Linnaeus, Sp. Pl. 1: 72. 1753; *Chloris mucronata* Michaux; *Eleusine aegyptia* (Linnaeus) Desfontaines; *E. pectinata* Moench, nom. illeg. superfl.

Annual. Culms slender to moderately robust, geniculately ascending to shortly stoloniferous and mat-forming, infrequently erect, 15–60 cm tall. Leaf sheaths with ciliate margin; leaf blades flat, 5–20 × 0.2–0.6 cm, tuberculate-pilose on both surfaces, apex acute or acuminate; ligule membranous, 1–2 mm, margin ciliate. Inflorescence digitate, racemes 2–9, linear to narrowly oblong, often radiating horizontally. Spikelets broadly ovate, 3–4.5 mm, florets 3–4; lower glume narrowly lanceolate,

keel thick, hispidulous; upper glume elliptic to narrowly obovate, keel smooth, extended into a stout scabrid awn 1/2–2 times length of glume body; lemmas ovate, 2.6–4 mm, keel gibbous, hispidulous above middle, often extended into a stout cusp; palea equal to lemma, keels winged, wings ciliolate, tip 2-toothed. Grain ca. 1 mm, broadly obtriangular, transversely rugose. Fl. and fr. May–Oct. $2n = 20, 36, 40, 48$.

Disturbed weedy places, especially on sandy soils. Fujian, Guangdong, Guizhou, Hainan, Sichuan, Taiwan, Yunnan, Zhejiang [tropical and warm-temperate regions of the Old World; introduced to America and Europe].

Willdenow misspelled the specific epithet as *"aegyptiacus,"* but this is simply an orthographical error, and does not affect the valid publication of the combination.

This is a widely distributed, annual weed.

136. *ACRACHNE* Wight & Arnott ex Chiovenda, Annuario Reale Ist. Bot. Roma 8: 361. 1908.

尖稈草属 jian fu cao shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Annuals. Culms single or tufted. Leaf blades linear, thin, flat; ligule membranous with ciliate fringe. Inflorescence composed of racemes arranged digitately or in whorls along a central axis; racemes with imbricate, subsessile spikelets on a slender flattened rachis, terminal spikelet abortive. Spikelets laterally compressed, florets 6–20, lemmas falling at maturity from below upward leaving the paleas on the persistent rachilla, but often spikelet falling wholly or in part when only a few lemmas have been shed; glumes shorter than lemmas, 1-veined, keeled; lemmas firmly membranous, 3-veined, glabrous, strongly keeled, entire or bidentate, tipped with a stout awn-point. Grain ellipsoid, ornamented, deeply sulcate on hilar side, enclosed within a free hyaline pericarp which ruptures at maturity.

Three species: Old World tropics; one species in China.

1. *Acrachne racemosa* (B. Heyne ex Roemer & Schultes) Ohwi, Bull. Tokyo Sci. Mus. 18: 1. 1947.

尖稈草 jian fu cao

Eleusine racemosa B. Heyne ex Roemer & Schultes, Syst. Veg. 2: 583. 1817; *Acrachne verticillata* (Roxburgh) Wight & Arnott ex Chiovenda; *Eleusine verticillata* Roxburgh; *Leptochloa racemosa* (B. Heyne ex Roemer & Schultes) Kunth; *Sclerodactylon micrandrum* P. C. Keng & L. Liu.

Culms tufted, erect or geniculately ascending, 8–50 cm tall. Leaf sheaths glabrous, compressed; leaf blades narrowly lanceolate, 7–20 × 0.3–1 cm, soft, adaxial surface tuberculate-pilose at base, tapering to a setaceous apex. Inflorescence subdigitate or racemes arranged along a central axis up to 15 cm; racemes mainly grouped in pseudo-whorls or pairs, 4–12 cm,

ascending. Spikelets densely imbricate, oblong with serrate outline, 6–10 mm, florets 6–20, stramineous at maturity; glumes papery-membranous; lower glume narrowly oblong, 1.2–3 mm, apex acute, mucronate; upper glume lanceolate, 1.5–3 mm, acuminate, awn-pointed; lemmas broadly ovate, 2–3 mm, keel scabrid, shallowly concave above middle and excurrent into a stout 0.5–1 mm awn-point, lateral veins also fractionally excurrent. Grain blackish, rugose, surface finely granular. Fl. and fr. autumn. $2n = 36$.

Field margins, river banks; 300–900 m. Hainan, Yunnan [Afghanistan, India, Indonesia, Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam; Africa, SW Asia (S Arabia), N Australia, Pacific Islands; introduced in the West Indies].

This species is a good forage grass.

137. *ELEUSINE* Gaertner, Fruct. Sem. Pl. 1: 7. 1788.

稈属 can shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Annuals or tussocky perennials. Culms compressed. Leaf sheaths strongly keeled; leaf blades linear, usually folded; ligule membranous, usually with a ciliate fringe. Inflorescence of digitate or subdigitate spikelike racemes clustered at the top of the culm; racemes with closely imbricate, biserial spikelets, terminating in a fertile spikelet. Spikelets laterally compressed, florets several, disarticulating between the florets (except the cultivated species *E. coracana*); glumes shorter than lemmas, persistent, 1–3(–7)-veined, keeled, awnless; lemmas membranous, 3-veined, glabrous, strongly keeled, keel thickened with 1–3 closely spaced additional veins, obtuse or acute. Grain ellipsoid to subglobose, trigonous in section, ornamented, pericarp free. $x = 9$. Fl. and fr. Jul–Sep.

Nine species: mostly in E and NE tropical Africa, one species a pantropical weed and one cultivated as a cereal; two species (one introduced) in China.

Eleusine, *Acrachne*, and *Dactyloctenium* form a group of closely related genera, remarkable for their unusual, ornamented grains enclosed within a free pericarp, which is easily removed when soaked in a drop of water.

- 1a. Racemes slender, 3–5 mm broad, straight; spikelets disarticulating at maturity; grain oblong or ovate, not exposed when ripe 1. *E. indica*
 1b. Racemes stout, 8–15 mm broad, incurved; spikelets not disarticulating at maturity; grain globose, exposed in the gaping floret when ripe 2. *E. coracana*

1. *Eleusine indica* (Linnaeus) Gaertner, *Fruct. Sem. Pl.* 1: 8. 1788.

牛筋草 niu jin cao

Cynosurus indicus Linnaeus, *Sp. Pl.* 1: 72. 1753.

Annual. Culms tufted, erect or geniculate at base, 10–90 cm tall. Leaf sheaths glabrous or tuberculate-pilose; leaf blades flat or folded, 10–15 × 0.3–0.5 cm, glabrous or adaxial surface tuberculate-pilose; ligule ca. 1 mm, membranous, at most sparsely ciliolate. Inflorescence digitate, racemes (1–)2–7, linear, ascending, 3–10 × 0.3–0.5 cm, one raceme often set below the rest. Spikelets elliptic, 4–7 mm, florets 3–9; glumes lanceolate, scabrid along keel; lower glume 1-veined, 1.5–2 mm; upper glume with small additional veins in the thickened keel, 2–3 mm; lemmas ovate, 2–4 mm, keel with small additional veins, acute; palea keels winged. Grain blackish, oblong or ovate, obliquely striate with fine close lines running vertically between the striae. Fl. and fr. Jun–Oct. $2n = 18$.

Disturbed places, roadsides. Anhui, Beijing, Fujian, Guangdong, Guizhou, Hainan, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Shandong, Shanghai, Sichuan, Taiwan, Tianjin, Xizang, Yunnan, Zhejiang [tropics and subtropics].

This pantropical, annual weed is a forage grass and is used for Chinese medicine.

2. *Eleusine coracana* (Linnaeus) Gaertner, *Fruct. Sem. Pl.* 1: 8. 1788.

穆 can

Cynosurus coracanus Linnaeus, *Syst. Nat.*, ed. 10, 2: 875. 1759 [“*coracan*”].

Annual. Culms tufted, robust, erect or ascending, usually branched, 50–120 cm tall. Leaf sheaths glabrous; leaf blades flat, 30–60 × 0.6–1.2 cm, pilose or glabrous; ligule 1–2 mm. Inflorescence subdigitate, racemes 5–20, stout, often incurved at maturity, 5–10 × 0.8–1.5 cm, hairy at base. Spikelets very closely imbricate, ovate, 5–9 mm, florets 6–9, not disarticulating at maturity; glumes lanceolate-oblong, scabrid along the winged keel; lower glume 3-veined, 1.5–3 mm; upper glume with additional veins in keel, 1.8–5 mm; lemmas triangular-ovate, 2.2–4.7 mm, keel 3-veined, scabrid and narrowly winged, subacute; palea narrowly ovate, keels scabrid, winged. Grain yellowish brown, globose, finely striate-punctate. Fl. and fr. May–Sep. $2n = 36$.

Cultivated cereal crop. Anhui, Fujian, Guangdong, Guizhou, Hainan, Henan, Hubei, Jiangxi, Ningxia, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [widely cultivated in tropical and subtropical regions of the Old World].

This species is used for cereal, forage, papermaking, and soil-retention.

138. *SPOROBOLUS* R. Brown, *Prodr.* 169. 1810.

鼠尾粟属 shu wei su shu

Wu Zhenlan (吴珍兰); Sylvia M. Phillips

Annuals or perennials, tufted or sometimes with creeping rhizomes or stolons. Leaf blades flat or rolled, linear to narrowly lanceolate; ligule a line of hairs. Inflorescence an open or contracted panicle, rarely spikelike. Spikelets with 1 floret, subterete, not compressed or keeled, glabrous; rachilla disarticulating above glumes; glumes usually shorter than lemma, unequal, membranous, deciduous or persistent, 1-veined or veinless, apex obtuse, acute or acuminate; lemma elliptic to narrowly ovate, thinly membranous, 1–3-veined, glabrous, rounded on back, awnless; palea equaling or shorter than lemma, depressed between veins and often splitting lengthways as grain grows. Stamens 2–3. Grain globose to ellipsoid, rounded or truncate, pericarp free, commonly swelling when wet and expelling the grain, which often adheres to spikelet apex. $x = 9, 12$.

About 160 species: tropics and subtropics, extending into warm-temperate regions; eight species (one introduced) in China.

Most species of this genus in China are fodder plants. The culms are used for weaving.

A specimen (*H. Y. Liang 64044*, US) collected from sandy soil near the seashore of Hainan appears to be *Sporobolus gloeocladus* Cope (Kew Bull. 47: 656. 1992), from SW Asia, and is presumably an introduction.

- 1a. Annual.
 2a. Panicle linear, spikelike; lower margins of leaf blades pectinate with long tubercle-based bristles 1. *S. piliferus*
 2b. Panicle ovate, open; lower margins of leaf blades not pectinate.
 3a. Panicle branches whorled; spikelets 1–1.4 mm 2. *S. coromandelianus*
 3b. Panicle branches not whorled; spikelets 0.8–1 mm 3. *S. tenuissimus*

1b. Perennial.

- 4a. Lower glume 2/3–4/5 spikelet length; upper glume as long as the spikelet; leaf blades involute to acicular, 3–11 cm.
 5a. Plant with long tough rhizomes; leaf blades stiff, pungent; panicle gray-green, dense, branches appressed 4. *S. virginicus*
 5b. Plant tufted; leaf blades linear-acicular; panicle purplish, slightly lax, branches slightly spreading 5. *S. hancei*
 4b. Lower glume less than 1/2 spikelet length; upper glume 1/2–2/3 spikelet length; leaf blades linear, 15–50 cm.
 6a. Lowermost panicle branches whorled, glandular *S. gloeocladus* (see note above)
 6b. Lowermost panicle branches not whorled.
 7a. Panicle linear, dense, branches often appressed 6. *S. fertilis*
 7b. Panicle effuse or laxly contracted, branches spreading.
 8a. Panicle contracted, up to 5 cm wide, spikelets crowded; stamens usually 2 7. *S. diandrus*
 8b. Panicle up to 20 cm wide, spikelets scattered; stamens 3 8. *S. wallichii*

1. *Sporobolus piliferus* (Trinius) Kunth, Enum. Pl. 1:211. 1833.

毛鼠尾粟 mao shu wei su

Vilfa pilifera Trinius, Gram. Unifl. Sesquifl. 157. 1824;
Agrostis japonica Steudel; *Sporobolus japonicus* (Steudel)
 Maximowicz ex Rendle.

Annual. Culms tufted, slender, usually geniculate at base, 5–25 cm tall, branched. Leaf sheaths with long tubercle-based cilia; leaf blades narrowly lanceolate, flat or margins rolled when dry, 1.5–7 × 0.1–0.4 cm, thinly pilose on both surfaces, margins pectinate with long tubercle-based bristles especially near blade base; ligule ca. 0.5 mm. Panicle linear, spikelike, 1.5–8 × 0.3–0.7 cm; branches subverticillate, short, erect, mostly unbranched, spotted with small glands. Spikelets narrowly lanceolate-oblong, 2.4–3 mm, purplish brown; glumes acuminate; lower glume lanceolate, 1/2 spikelet length, veinless; upper glume oblong, as long as spikelet; lemma oblong, equaling upper glume, 1-veined or obscurely 3-veined, acute; palea equaling or shorter than lemma, broader, obtuse, easily splitting longitudinally. Anthers 3, ca. 0.5 mm. Grain red-brown, elliptic, 0.8–1.4 mm, slightly laterally compressed, apex rounded. Fl. and fr. Apr–Sep. $2n = 36, 40$.

Open situations on moist ground, fields. Anhui, Jiangxi, Zhejiang [Bhutan, India, Japan, Korea, Malaysia, Nepal, Philippines; Africa].

2. *Sporobolus coromandelianus* (Retzius) Kunth, Révis. Gramin. 1: 68. 1829.

卡鲁满德鼠尾粟 ka lu man de shu wei su

Agrostis coromandeliana Retzius, Observ. Bot. 4: 19. 1786.

Annual. Culms loosely tufted, slender, ascending, 10–35 cm tall, branched. Leaf blades linear, flat, 3–10 × 0.2–0.5 cm, scaberulous, often with long scattered bristles, margins thickened, scabrid, sometimes with a few bristles but not pectinate, apex acute; ligule 0.4–1 mm. Panicle ovate, 2–7 cm; lowest primary branches whorled, succeeding branches subwhorled, lower 1/3–1/2 bare, a linear glandular patch on bare portion, spikelets borne on short 2–4-spiculate branchlets or directly on primary branches. Spikelets gray, narrowly elliptic, 1–1.7 mm, usually scaberulous; lower glume ovate, 0.2–0.4 mm, veinless, obtuse; upper glume elliptic, as long as spikelet, 1-veined, acute; lemma elliptic, slightly shorter than upper glume, 1-veined,

acute. Anthers 3, 0.2–0.4 mm. Grain obovate, 0.7–0.8 mm, apex rounded. $2n = 24, 36$.

Dry meadows with scattered trees; ca. 1000 m. Yunnan [Afghanistan, India, Indonesia (Java), Myanmar, New Guinea, Pakistan, Sri Lanka, Thailand; Africa, SW Asia; introduced in Australia].

3. *Sporobolus tenuissimus* (Martius ex Schrank) Kuntze, Revis. Gen. Pl. 3: 369. 1898.

热带鼠尾粟 re dai shu wei su

Panicum tenuissimum Martius ex Schrank, Denkschr. Königl.-Baier. Bot. Ges. Regensburg 2: 26. 1822.

Annual, delicate. Culms tufted, weak, 20–100 cm tall. Leaf sheaths glabrous; leaf blades linear, flat or folded, 5–20 × 0.2–0.5 cm, glabrous; ligule 0.2–0.3 mm. Panicle narrowly oblong, open, diffuse, 10–40 × 2–6 cm; lowest primary branches single or paired, branches capillary, lower 1/2 bare, secondary branches spreading. Spikelets gray or purplish, 0.8–1 mm, gaping at maturity; lower glume oblong, 0.1–0.4 mm, truncate-erose; upper glume ovate-oblong, 0.3–0.5 mm, subacute; lemma ovate, as long as spikelet, acute to obtuse. Anthers 3, 0.1–0.3 mm. Grain obovate. 0.4–0.7 mm, truncate. $2n = 12$.

Disturbed or cultivated places at low elevations, introduced. S Taiwan [native to tropical America; now widely adventive in warm parts of the world].

4. *Sporobolus virginicus* (Linnaeus) Kunth, Révis. Gramin. 1: 67. 1829.

盐地鼠尾粟 yan di shu wei su

Agrostis virginica Linnaeus, Sp. Pl. 1: 63. 1753; *Vilfa virginica* (Linnaeus) P. Beauvois.

Perennial with long, tough, yellowish rhizomes. Culms erect or decumbent, often fastigiate branched in upper part, 15–30 cm tall, 1–2 mm thick. Leaf sheaths tightly overlapping, loosely pubescent at mouth; leaf blades glaucous, stiff, distichous, flat at first, soon involute, 3–10 × 0.1–0.3 cm, adaxial surface scabrid, abaxial surface smooth, apex pungent; ligule ca. 0.2 mm. Panicle linear, spikelike, 3–10 × 0.4–1 cm; branches 0.5–1.5 cm, erect, appressed to rachis. Spikelets gray-green or greenish yellow, fusiform, 2.3–2.7 mm; glumes acute; lower glume lanceolate, 2/3–4/5 spikelet length, 1-veined; upper glume

narrowly ovate, as long as spikelet, 1-veined; lemma broadly lanceolate, subequal to upper glume, midvein distinct, lateral veins obscure, obtuse; palea equaling lemma. Anthers 3, 1–1.5 mm. Grain subglobose, ca. 0.7 mm. Fl. and fr. Jun–Sep. $2n = 18$.

Sandy seashores, often below high tide mark. Fujian, Guangdong, Hainan, Taiwan, Zhejiang [India, Indonesia, Japan (Ryukyu Islands), Malaysia, Philippines, Sri Lanka, Thailand, Vietnam; tropics and subtropics].

This species is a good sand binder. It is widespread on seashores and in inland, saline places in warm parts of both the Old and New Worlds.

5. *Sporobolus hancei* Rendle, J. Linn. Soc., Bot. 36: 387. 1904.

广州鼠尾粟 *guang zhou shu wei su*

Perennial. Culms tufted slender, erect, 10–50 cm tall, unbranched. Leaf sheaths laxly overlapping, glabrous or loosely ciliate at mouth; leaf blades narrowly linear and flat near ligule becoming involute toward apex, or acicular throughout, 3–12 cm \times 0.5–2 mm, adaxial surface puberulous, abaxial surface glabrous; ligule very shortly hairy or obscure. Panicle laxly contracted to open, 4–12 \times 0.5–1(–3) cm; branches verticillate or paired, 0.7–2 cm, suberect to spreading, spiculate to base; pedicels short, smooth or scabridulous. Spikelets glistening, thinly membranous, pale purplish, lanceolate, 2–2.5 mm; glumes slightly unequal; lower glume lanceolate, 2/3–3/4 spikelet length, veinless, apex acute or obtuse; upper glume ovate, as long as spikelet, 1-veined, acute; lemma ovate, as long as spikelet, 1-veined, acute; palea subequaling lemma. Anthers 3, 0.8–1 mm. Grain red-brown, elliptic-oblong, laterally compressed, ca. 1.5 mm. Fl. Mar–May.

Grassy hillsides, dry places on poor soil. Fujian, Guangdong, Guangxi, Hainan, Jiangsu, Taiwan [Japan (Ryukyu Islands)].

6. *Sporobolus fertilis* (Steudel) Clayton, Kew Bull. 19: 291. 1965.

鼠尾粟 *shu wei su*

Agrostis fertilis Steudel, Syn. Pl. Glumac. 1: 170. 1854; *Sporobolus elongatus* R. Brown var. *purpureosuffusus* Ohwi; *S. fertilis* (Steudel) Clayton var. *purpureosuffusus* (Ohwi) P. C. Keng & X. S. Shen; *S. indicus* (Linnaeus) R. Brown subsp. *purpureosuffusus* (Ohwi) T. Koyama; *S. indicus* var. *major* (Buse) Baaijens; *S. indicus* var. *purpureosuffusus* (Ohwi) T. Koyama.

Perennial. Culms densely tufted, erect, rigid, 25–100(–120) cm tall. Leaf sheaths glabrous but margin ciliate, basal sheaths papery, lightly keeled; leaf blades linear, flat or involute, 15–50(–65) \times 0.2–0.5 cm, glabrous or adaxial surface thinly pilose, tapering to a long filiform apex; ligule ca. 0.5 mm. Panicle linear, contracted to spikelike, often interrupted especially at base, 7–45 \times 0.5–1.5 cm; branches 1–2.5(–5) cm, erect and appressed to main axis, or looser and narrowly ascending, densely spiculate throughout. Spikelets grayish or yellowish green, 1.7–2 mm; lower glume oblong, ca. 0.5 mm, veinless, apex truncate-erose; upper glume oblong-elliptic, 1/2–2/3 spike-

let length, 1-veined, \pm acute; lemma ovate, as long as spikelet, indistinctly 1(–3)-veined, acute. Anthers 3, 0.8–1 mm. Grain red-brown, obovate-elliptic, 0.9–1.2 mm, distinctly shorter than its lemma and palea, these gaping widely beyond its top, apex truncate. Fl. and fr. Mar–Dec. $2n = 36, 48, 54$.

Roadsides, field margins, grassy places on hill slopes, moist ground of mountain valleys. Anhui, Fujian, Gansu, Guangdong, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam; occasionally introduced elsewhere].

This common and variable, perennial weed is distinguished by its contracted panicle and short glumes. The spikelets are frequently infected by a black smut fungus.

7. *Sporobolus diandrus* (Retzius) P. Beauvois, Ess. Agrostogr. 26. 1812.

双蕊鼠尾粟 *shuang rui shu wei su*

Agrostis diandra Retzius, Observ. Bot. 5: 19. 1788 [“1789”]; *A. elongata* var. *flaccida* Roth ex Roemer & Schultes; *Sporobolus indicus* var. *flaccidus* (Roth ex Roemer & Schultes) Veldkamp; *Vilfa diandra* (Retzius) Trinius; *V. retzii* Steudel, nom. illeg. superfl.

Perennial. Culms tufted, erect, 30–90 cm tall. Leaf sheaths glabrous but margin ciliate; leaf blades linear, usually involute, 5–30 \times 0.2–0.3 cm, glabrous on both surfaces or adaxial surface distinctly pilose at base, tapering to a long filiform apex; ligule 0.2–0.3 mm. Panicle contracted or rather loose, 7–35 \times 1.5–3.5 cm; branches 1.5–9 cm, ascending or obliquely spreading, loosely spiculate, often lower 1/3 bare. Spikelets silvery grayish or yellowish green, 1.4–1.7 mm; lower glume oblong, ca. 0.5 mm, veinless, truncate or obtuse; upper glume oblong-ovate, 1/2–2/3 spikelet length, obscurely 1-veined, acute or obtuse-erose; lemma ovate-oblong, as long as spikelet, indistinctly 1(–3)-veined, acute to obtuse. Anthers 2(–3), 0.5–0.8 mm. Grain obovate to oblong, 0.6–0.9 mm, apex truncate. Fl. and fr. May–Aug. $2n = 24$.

Dry hill slopes, grassy fields, roadsides, beaches. Fujian, Guangdong, Guangxi, Guizhou, Sichuan, Taiwan, Yunnan [Bhutan, India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand; Australia].

Sporobolus diandrus and *S. fertilis* are elements of the polymorphic, pantropical species complex of *S. indicus* (Linnaeus) R. Brown. This complex includes a range of intergrading taxa encompassing chromosome numbers from $2n = 18$ to $2n = 54$. Due to the small differences between these taxa and the frequency of intermediates, they are sometimes regarded as varieties of a broadly defined *S. indicus*.

8. *Sporobolus wallichii* Munro ex Trimen, J. Bot. 27: 171. 1889.

瓦丽鼠尾粟 *wa li shu wei su*

Perennial. Culms tufted, erect or slightly geniculate, 90–120 cm tall. Leaf sheaths glabrous but margins ciliate upward; leaf blades linear, flat, up to 45 \times 0.8 cm, glabrous, smooth or scaberulous, especially on adaxial surface, tapering to a long filiform apex; ligule ca. 0.5 mm. Panicle effuse, up to 45 \times 20 cm; branches up to 10 cm, widely spreading with scattered spikelets. Spikelets grayish green, ca. 2 mm; lower glume ellip-

tic-oblong, 0.5–0.75 mm, veinless, emarginate; upper glume elliptic, ca. 1/2 spikelet length, veinless, subobtusate; lemma lanceolate, as long as spikelet, very indistinctly veined, acuminate. Anthers 3, 0.8–1 mm. Grain obovate, ca. 1 mm, apex truncate. $2n = 24$.

Moist meadows; 400–1200 m. Yunnan [India, Myanmar, Sri Lanka, Thailand].

This is a robust species with a large, effuse panicle and short-glumed spikelets.

139. *CRYPISIS* Aiton, Hort. Kew. 1: 48. 1789, nom. cons.

隐花草属 yin hua cao shu

Lu Shenglian (卢生莲); Sylvia M. Phillips

Heleochoa Host ex Roemer.

Annuals, low growing. Culms ascending or prostrate, much branched. Leaf blades short, linear to lanceolate, flat or involute; ligule a line of hairs. Inflorescence a very dense panicle, spicate and cylindrical, or ovoid to capitate and then usually subtended by 1 or 2 inflated spathe-like leaf sheaths with a reduced blade. Spikelets with 1 floret, strongly laterally compressed, disarticulating below the floret or rarely falling entire; glumes narrow, slightly shorter than lemmas, unequal to subequal, membranous, 1-veined, scabrid or ciliate along keel, acute or with a short awn-point; lemma lanceolate, membranous, 1-veined, awnless; palea similar to lemma, 1–2-veined, splitting at maturity. Lodicules absent. Stamens 2–3. Grain ellipsoid, pericarp free and sometimes swelling when wet.

Nine to twelve species: centered on the Mediterranean region and SW Asia, but extending to C Africa and from Europe to China; introduced elsewhere; two species in China.

Crypsis species occur mainly on periodically wet, often saline soils in semi-arid areas.

- 1a. Inflorescence longer than wide; blade of uppermost leaf clearly demarcated from its sheath; palea 2-veined; stamens 3 1. *C. schoenoides*
 1b. Inflorescence as wide as or wider than long; blade of uppermost leaf continuous with its sheath; palea 1-veined; stamens 2 2. *C. aculeata*

1. *Crypsis schoenoides* (Linnaeus) Lamarck, Tabl. Encycl. 1: 166. 1791.

蔺状隐花草 lin zhuang yin hua cao

Phleum schoenoides Linnaeus, Sp. Pl. 1: 60. 1753; *Heleochoa schoenoides* (Linnaeus) Host.

Culms tufted, prostrate or ascending, 5–20 cm or more tall, 3–5-noded, glabrous. Leaf sheaths loose and enlarged, smooth, glabrous, shorter than internodes; leaf blades demarcated from sheath, involute, 2–10 × 0.1–0.4 cm, adaxial surface puberulent or pilose, abaxial surface glabrous or pilose, apex acicular. Inflorescence often subtended by enlarged uppermost sheath, ellipsoid or ovoid, 1–3 × 0.5–1 cm, rachis distinct. Spikelets greenish or purple, 3–4 mm; glumes unequal, slightly shorter than lemma, ciliate on keel; lower glume 2.2–2.5 mm; upper glume 2.5–2.8 mm; lemma 3–3.6 mm, keel ciliolate, acute; palea slightly shorter than or equaling lemma, 2-veined. Anthers 3, 0.8–1 mm. Grain elliptic, 1–1.5 mm. Fl. and fr. Jun–Sep. $2n = 16, 18, 36$.

Sandy soils, grassy roadsides. Anhui, Hebei, Henan, Jiangsu, Nei Mongol, Ningxia, Shandong, Shanxi, Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, S Europe, Mediterranean region; introduced in North America and isolated records elsewhere].

Crypsis vaginiflora (Forsskål) Opiz is a very similar species found from Africa to India. It occurs in Kashmir and is to be expected in Xizang. It differs by its hairy leaf sheath margins and collar, subequal glumes as long as the lemma, and shorter anthers (0.6–0.7 mm).

Crypsis turkestanica Eig, from C Asia and also reported from

Xinjiang, has ovoid panicles usually clearly longer than wide and supported by 2 terminal leaf sheaths, a palea with 1 or 2 inconspicuous veins, 2 or 3 stamens, and anthers 0.6–1.3 mm long.

2. *Crypsis aculeata* (Linnaeus) Aiton, Hort. Kew. 1: 48. 1789.

隐花草 yin hua cao

Schoenus aculeatus Linnaeus, Sp. Pl. 1: 42. 1753.

Culms prostrate or ascendent, glabrous, 5–40 cm tall. Leaf sheaths loose and enlarged, shorter than internodes; leaf blades continuous with sheath, linear-lanceolate, flat or conduplicate, 2–8 × 0.1–0.5 cm, adaxial surface scabridulous, abaxial surface smooth, margins involute, apex acicular. Inflorescence subtended by enlarged inflated uppermost sheaths, capitate to ovoid, as wide or wider than long, 0.4–0.9 × 0.8–1.3 cm, rachis obsolete. Spikelets yellowish, 3.5–4.5 mm; glumes unequal, scabrid or ciliate on keel, obtuse; lower glume linear, 2.5–3 mm; upper glume lanceolate, 3–3.5 mm; lemma longer than glumes, 3.5–4.5 mm, acute; palea equaling or slightly longer than lemma, 1-veined or vein obsolete. Anthers 2, 1–1.3 mm. Grain oblong or obovoid, ca. 2 mm. Fl. and fr. May–Sep. $2n = 16, 18, 54$.

River banks, ditches, other damp places on saline and alkaline soils. Anhui, Gansu, Hebei, Henan, Jiangsu, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Xinjiang, Yunnan [Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan; SW Asia, C Europe, Mediterranean region; introduced in S Africa].

This species is an indicator of saline and alkaline soils and is a good fodder plant.

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

乱子草属 luan zi cao shu

Wu Zhenlan (吴珍兰); Paul M. Peterson

Perennial, usually with creeping scaly rhizomes. Culms erect, ascending or decumbent at base. Leaf blades linear to narrowly lanceolate; ligule membranous, sometimes minutely ciliate. 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* (Poir.) 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].

23. Tribe CYNODONTEAE

虎尾草族 hu wei cao zu

Sun Bixing (孙必兴 Sun Bi-sin), Chen Shouliang (陈守良), Wu Zhenlan (吴珍兰); Sylvia M. Phillips

Annual or perennial herbs. Leaf blades linear to ovate; ligule a short membrane with ciliate or ciliolate margin. Inflorescence composed of racemes; racemes solitary, digitate or scattered along an axis, tough, unilateral (bilateral and axis fragile in *Lepturus*), persistent, or sometimes racemes very short, contracted into a cylindrical spikelike inflorescence and falling entire from main axis, or spikelets borne directly on main axis. Spikelets with 1 fertile floret, with or without additional sterile florets, disarticulating above glumes but not between florets or falling entire; glumes herbaceous, 1–3-veined (5–12-veined in *Lepturus*), shorter than floret or exceeding and enclosing it, sometimes lower glume absent; lemma membranous to leathery, keeled or rounded, 1–3-veined, lateral veins near margins and often ciliate, apex entire or 2–3(–5)-lobed, awned or awnless. Caryopsis sometimes with free pericarp. Leaf anatomy: Kranz PS type; microhairs short and stout. $x = 9, 10$.