

64. PUCCINELLIA Parlatore, Fl. Ital. 1: 366. 1848, nom. cons.

碱茅属 jian mao shu

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Atropis (Trinius) Ruprecht ex Grisebach, nom. rej.; *Poa* sect. *Atropis* Trinius.

Perennial herbs, tufted. Culms erect. Leaf sheaths spread along culms or clustered at base, glabrous; leaf blades linear, often convolute or conduplicate, scabrid or smooth; ligule membranous. Inflorescence a spreading or contracted panicle. Spikelets slightly compressed or cylindrical, disarticulating above glumes and between florets; florets 2–8, imbricate; glumes lanceolate to broadly ovate, unequal, shorter than first floret, papery, apex often scarious, obtuse or acuminate; lower glume small, 1(–3)-veined, upper glume 3-veined; lemmas oblong, lanceolate or ovate, papery, 5-veined, back rounded or slightly keeled, glabrous or pubescent on lower veins, intervein spaces, and base, apex obtuse or slightly acuminate, membranous, ciliate or irregularly finely toothed; palea as long as or slightly shorter than lemma; lodicules 2, often 2-lobed; stamens 3, small. Caryopsis small, narrowly ellipsoid, not sulcate, free from palea and lemma. $x = 7$.

About 200 species: temperate and arctic regions of both hemispheres, usually along shores of saline lakes, also on mountains in the tropics; 50 species (14 endemic) in China.

- 1a. Base of plant with a few very short budlike extravaginal shoots, covered with scales.
 - 2a. Anthers 1.5–2.4 mm; lemmas 2.7–3.5 mm.
 - 3a. Lemma glabrous, rarely base minute pubescent; panicle narrow, branches appressed, sometimes slightly spreading 21. *P. przewalskii*
 - 3b. Lemma base pubescent; panicle more lax; branches spreading after anthesis 22. *P. roshevitsiana*
 - 2b. Anthers 0.7–1.5 mm; lemmas 1.5–3.2 mm.
 - 4a. Lemmas 1.5–2 mm, base minutely hairy; anthers 1–1.2 mm; branches of panicle scabrid 24. *P. koeieana*
 - 4b. Lemmas 2.2–3.2 mm.
 - 5a. Palea keels smooth or with a few spinules on upper part; spikelets usually tinged with purple; panicle spreading after anthesis 23. *P. altaica*
 - 5b. Palea keels scabrid; spikelets usually pale green; panicle very narrow, contracted.
 - 6a. Lemma base shortly hairy; panicle branches scabrid 19. *P. schischkinii*
 - 6b. Lemma base glabrous or subglabrous; panicle branches smooth at least on lower parts 20. *P. kuenlunica*
 - 1b. Base of plant without extravaginal shoots.
 - 7a. Lemmas 1.3–2.4(–2.8) mm.
 - 8a. Anthers 0.3–0.5 mm.
 - 9a. Branches of panicle smooth 48. *P. micrandra*
 - 9b. Branches of panicle scabrid.
 - 10a. Lemma base pubescent 46. *P. hauptiana*
 - 10b. Lemma base glabrous 47. *P. iliensis*
 - 8b. Anthers 0.5–1.7 mm.
 - 11a. Lemma glabrous, rarely with a few hair on callus.
 - 12a. Anthers 0.5–0.8 mm.
 - 13a. Branches of panicle scabrid or smooth only near base.
 - 14a. Ligule 2–3 mm, acuminate; panicle 8–12 cm 44. *P. florida*
 - 14b. Ligule 1–2 mm, obtuse; panicle 5–9 cm 45. *P. leiolepis*
 - 13b. Branches of panicle smooth or only in upper part slightly scabrid.
 - 15a. Lemmas 2.2–2.4 mm; panicle contracted, 1.5–2.5 × ca. 0.5 cm; culms 5–10 mm tall 49. *P. minuta*
 - 15b. Lemmas 1.5–2.1 mm; panicle at first contracted but open at maturity, 3–9 × 1–4 cm; culms 5–20 cm tall 50. *P. himalaica*
 - 12b. Anthers 0.8–1.7 mm.
 - 16a. Panicle 3–5 cm, contracted.
 - 17a. Culms 10–25 cm tall, not rooting from lower nodes; panicle branches 2–4 per node; anthers 1.2–1.5 mm; apex of palea mucronulate 15. *P. degeensis*
 - 17b. Culms 5–10 cm tall, rooting from lower nodes; panicle branches single; anthers 0.8–1.2 mm; apex of palea not mucronulate 16. *P. strictura*
 - 16b. Panicle 4–15 cm, open.
 - 18a. Plants densely tufted, 20–40 cm tall; basal leaves very numerous, conduplicate, 0.3–0.7 mm wide; plants of sandy habitats 13. *P. filifolia*

- 18b. Plants more laxly tufted, 4–15 cm tall; basal leaves less numerous, conduplicate or flat, 1–4 mm wide; plants of non-sandy habitats.
- 19a. Panicle broadly diffuse, 6–15 cm; branches 2–5 per node, scabrid at least in upper part 12. *P. tenuiflora*
- 19b. Panicle less diffuse, 4–10 cm; branches (1 or)2(or 3) per node, smooth.
- 20a. Lemmas 1.5–2.2 mm, usually violaceous 14. *P. tianschanica*
- 20b. Lemmas 2.2–2.5 mm, usually pale pink 29. *P. vachanica*
- 11b. Lemmas somewhat pubescent at base.
- 21a. Lowermost internodes of culms thickened, tuberlike; panicle broad and open 4. *P. diffusa*
- 21b. Lowermost internodes of culms not tuberlike.
- 22a. Anthers 0.5–0.9 mm; branches of panicle scabrid, usually reflexed after anthesis.
- 23a. Spikelets in panicle branches very numerous, usually pale green; mostly ruderal plants, rarely found at up to middle montane zone 42. *P. distans*
- 23b. Spikelets in panicle branches less numerous, usually grayish or pinkish violet tinge; montane plants 43. *P. glauca*
- 22b. Anthers 0.8–2 mm; branches of panicle scabrid or smooth.
- 24a. Plants with numerous thin, erect flowering culms, shorter vegetative shoots absent; ligule of upper cauline leaf 2–3.5 mm, gradually narrowed upward 3. *P. tenuissima*
- 24b. Flowering culms less numerous, thicker, often geniculate; vegetative shoots usually present; ligule of upper cauline leaf 0.7–2 mm, usually rounded.
- 25a. Panicle branches scabrid throughout; spikelets usually grayish violet tinge; culms usually geniculate 2. *P. gigantea*
- 25b. Panicle branches smooth at least near their base; spikelets pale green or purple-tinged.
- 26a. Lemmas 2–2.5 mm; anthers 1.2–1.6 mm; spikelets usually pale green; panicle usually hardly exerted from upper sheath 9. *P. coreensis*
- 26b. Lemmas 1.5–2.2 mm; anthers 0.9–1.3 mm; spikelets usually purple-tinged; panicle usually broadly open and far exerted from upper sheath.
- 27a. Plant of high mountains, 10–30 cm tall; panicle branches 1–2 per node; spikelets intense purple 11. *P. qinghaica*
- 27b. Plant of lower altitudes, 20–50(–60) cm tall; panicle branches 2–5 per node; spikelets usually less intensely purple.
- 28a. Lemma densely pubescent near base; palea keels ciliate on lower part, scabrid on upper part; anthers 1.2–1.5 mm 8. *P. chinampoensis*
- 28b. Lemma glabrous or slightly pubescent near base; palea keels smooth throughout or scaberulous on upper part; anthers 0.8–1.2 mm.
- 29a. Lemmas pubescent near base; palea keels scabrid on upper part 10. *P. manchuriensis*
- 29b. Lemmas glabrous or subglabrous near base; palea keels usually smooth, rarely with 1–3 small teeth 12. *P. tenuiflora*
- 7b. Lemmas 2.5–4 mm.
- 30a. Lemmas glabrous, rarely with a few hairs on the callus.
- 31a. Branches of panicle scabrid or smooth only near base.
- 32a. Anthers 0.3–0.5 mm 39. *P. micranthera*
- 32b. Anthers 1.2–3 mm.
- 33a. Spikelets with 6–9 florets; culms 30–50 cm tall; anthers 1.2–1.7 mm 25. *P. multiflora*
- 33b. Spikelets with 2–5 florets; culms stout, 20–40 cm tall; anthers 1.5–3 mm.
- 34a. Panicle open, 10–20 cm; anthers 2.3–3 mm; lemmas 3.4–4 mm 26. *P. thomsonii*
- 34b. Panicle narrow, 5–10 cm; anthers 1.5–2.2 mm; lemmas 3–3.5 mm 27. *P. stapfiana*
- 31b. Branches of panicle smooth or slightly scabrid only on upper part.
- 35a. Anthers 0.5–1.3 mm.
- 36a. Panicle spreading.
- 37a. Culms erect, 20–40 cm tall, very thin; panicle 8–13 cm; branches very thin; lemmas 2.2–2.8 mm 29. *P. vachanica*
- 37b. Culms usually geniculately ascending, 10–25 cm tall, rather thick; panicle

- 5–10 cm; lemmas 2.7–3.5 mm 34. *P. pauciramea*
- 36b. Panicle contracted and dense.
- 38a. Lemmas 3.2–3.5 mm, palea keels smooth; culms scabrid below inflorescence 32. *P. kashmiriana*
- 38b. Lemmas 2.5–3.2 mm; palea keels with a few teeth; culms smooth throughout 33. *P. nudiflora*
- 35b. Anthers 1.3–2.5 mm.
- 39a. Panicle spreading; branches (1 or)2 per node; leaf blades soft, 1–2 mm wide 35. *P. ladyginii*
- 39b. Panicle contracted and dense.
- 40a. Palea keels ciliate or scabrid; leaf blade soft, smooth, 1.5–2.5 mm wide 36. *P. subspicata*
- 40b. Palea keels glabrous and smooth, rarely with a few teeth; leaf blade 0.2–1.5 mm wide.
- 41a. Culms 5–8 cm tall, 1-noded; panicle 1–2 cm, branches 1 per node ... 28. *P. shuanghuensis*
- 41b. Culms 8–40 cm tall, 2–3-noded; panicle 5–10 cm, branches 1–3 per node.
- 42a. Culms usually erect, 15–30(–40) cm tall; leaf blade 0.5–1.5 mm broad; spikelets 4–5 mm 30. *P. pamirica*
- 42b. Culms geniculate ascending, 8–20 cm tall; leaf blade 0.2–0.5 mm broad; spikelets 5–6 mm 31. *P. ladakhensis*
- 30b. Lemmas somewhat pubescent at base.
- 43a. Panicle branches smooth or in upper part some scabrid.
- 44a. Panicle 1.5–5 cm, contracted and dense; culms 4–15 cm 41. *P. humilis*
- 44b. Panicle 5–10 cm, contracted or open; culms 15–40 cm.
- 45a. Plants of coastal shoals and rocks, marshy meadows; lemma sparsely pubescent along lower part of veins; anthers 0.7–1.2 mm 38. *P. kurilensis*
- 45b. Plants of high mountains (3000 m or higher); lemma densely pubescent near base or anthers 1–1.3 mm.
- 46a. Lemma 2.8–3.5 mm, slightly pubescent near base; anthers 1–1.3 mm 17. *P. roborovskyi*
- 46b. Lemma 3.5–4 mm, densely pubescent near base; anthers 0.8–1.2 mm 18. *P. arjanshanensis*
- 43b. Panicle branches scabrid, rarely almost smooth along lower 1/3.
- 47a. Anthers 0.5–0.9(–1) mm.
- 48a. Culms straight, 30–80(–100) cm tall; panicle 10–20(–30) cm, branches directed obliquely upward; plants of lowlying, usually seaside, habitats, saltmarshes 37. *P. nipponica*
- 48b. Culms usually geniculate, 15–40 cm tall; panicle 5–12(–15) cm, branches usually spreading; plants of montane habitats 40. *P. hackeliana*
- 47b. Anthers 1–1.5(–1.8) mm.
- 49a. Ligule of upper cauline leaf 0.7–1.5(–2) mm, apex rounded; culms 30–50 cm tall, rather thick; leaf blades 1.5–3(–4) mm wide.
- 50a. Lemmas 3–3.5 mm, acuminate 6. *P. jeholensis*
- 50b. Lemmas 2.4–3 mm, obtuse 7. *P. macranthera*
- 49b. Ligule of the upper cauline leaf 1.7–3.5(–4) mm, gradually narrowed upward.
- 51a. Leaf blade 0.5–1.2 mm wide, convolute; plants usually without short vegetative shoots; culms thin and straight 5. *P. dolicholepis*
- 51b. Leaf blade 1.5–4 mm wide, laxly convolute or flat; plants usually with a few short vegetative shoots; culms thick and geniculate 1. *P. poecilantha*

1. *Puccinellia poecilantha* (K. Koch) V. I. Kreczetowicz in Komarov, Fl. URSS 2: 472. 1934.

斑稈碱茅 ban fu jian mao

Festuca poecilantha K. Koch, Linnaea 21: 411. 1848;
Atropis poecilantha (K. Koch) V. I. Kreczetowicz; *A. chilochloa* V. I. Kreczetowicz.

Perennial, tufted, grayish green. Culms 30–50 cm tall, usually geniculate, thick. Ligule 2–3.5 mm; leaf blades subinrolled or conduplicate, 3–6 cm, 1.5–4 mm wide, adaxial surface and margins scabrid. Panicle contracted, but later spreading, 6–12 cm; branches 2–7 cm, scabrid. Spikelets 5–8 mm, florets 5–9; lower glume ca. 1.5 mm, 1-veined, upper glume 1.5–2 mm, inconspicuously 3-veined, apex obtuse and margins ciliate; lem-

mas 2.5–3.5(–4) mm, usually tinged with purple, veins pubescent on lower part, apex acuminate or obtuse; palea keels scabrid; anthers 1.2–2 mm. Fl. May–Jul. $2n = 28$.

Dry grasslands, saline places, saline lake shores; 100–2000 m. Qinghai, Xinjiang [Afghanistan, Kazakhstan, Russia, Turkmenistan, Uzbekistan; SW Asia (Iran)].

Material of this species has been incorrectly named as *Puccinellia festuciformis* (Host) Parlato.

2. *Puccinellia gigantea* (Grossheim) Grossheim, Fl. Kavkaza 1: 114. 1928.

大碱茅 da jian mao

Atropis gigantea Grossheim, Vestn. Tiflissk. Bot. Sada 46:

35. 1919; *A. anisoclada* V. I. Kreczetowicz; *A. sclerodes* V. I. Kreczetowicz; *Puccinellia anisoclada* (V. I. Kreczetowicz) Parsa; *P. sclerodes* (V. I. Kreczetowicz) V. I. Kreczetowicz ex Drobow.

Perennial, loosely tufted, grayish green. Culms erect or geniculately ascending, 50–80(–100) cm tall. Ligule 1–3.5 mm, abaxial surface scabrid; leaf blades flat or inrolled, 5–15 cm, 1.5–4 mm wide, adaxial surface scabrous. Panicle 6–20 cm, contracted, but later spreading; branches 2–6 per node, basal primary branch 4–10 cm, scabrous. Spikelets 4–6 mm, usually purple, florets 3–7; glumes obtuse, lower glume 1.5–2 mm, 1-veined, upper glume 2–2.5 mm, 1–3-veined; lemmas 1.7–2.3(–2.5) mm, veins ± pubescent below, apex triangular-rounded; palea keels scabrid on upper part; anthers 1–1.4 mm. Fl. Jun–Jul. $2n = 14$.

Saline moist meadows, lake banks; 100–2000 m. Qinghai, Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, E Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia (Caucasus, Iran), SE Europe].

3. *Puccinellia tenuissima* (Litvinov ex V. I. Kreczetowicz) Litvinov ex Pavlov, Fl. Kazakhst. 1: 242. 1956.

纤细碱茅 xian xi jian mao

Atropis tenuissima Litvinov ex V. I. Kreczetowicz in Komarov, Fl. URSS 2: 765. 1934.

Perennial, densely tufted. Culms slender, 20–50 cm tall, ca. 0.5 mm in diam. Ligule 1.5–3 mm; leaf blades 4–10 cm, 0.3–1.5 mm wide, narrowly linear, usually convolute, adaxial surface slightly scabrid. Panicle straight or slightly spreading, loose, 5–1.2 cm; branches slender, smooth or slightly scabrid. Spikelets 3–4 mm, florets 3–5; glumes obtuse, lower glume ca. 0.7 mm, upper glume ca. 1.5 mm; lemmas 1.7–2.3 mm, usually purple, pubescent near base, apex obtuse; palea keels ciliate on lower part, scabrid in upper part; anthers 1–1.5 mm. Fl. May–Jul. $2n = 14$.

Low wet places, saline meadows; 100–1500 m. Qinghai, Xinjiang [Kazakhstan, Russia].

4. *Puccinellia diffusa* (V. I. Kreczetowicz) V. I. Kreczetowicz ex Drobow, Fl. Uzbekistan. 1: 253. 1941.

展穗碱茅 zhan sui jian mao

Atropis diffusa V. I. Kreczetowicz in Komarov, Fl. URSS 2: 760. 1934.

Perennial, tufted. Culms 30–50 cm tall, base thickened and tuberlike. Ligule ca. 1.5 mm; leaf blades flat or subinrolled, 4–10 cm, 0.6–1.3 mm wide, adaxial surface scabrous. Panicle effuse, 8–12 cm, branches 2–4 per node, 2–4 cm, slender, lower part smooth and naked, scabrous near spikelets. Spikelets 5–6 mm, florets 3–6; glumes obtuse, lower glume ca. 1.2 mm, upper glume ca. 2 mm; lemmas 2–2.7 mm, purple with yellow margins, base pubescent, apex obtuse; palea keels pubescent near base, scabrid on upper part; anthers 1.2–1.6 mm. Fl. May–Jul.

Dry river banks, sandy gravel, saline grassy places; 100–2000 m. Qinghai, Xinjiang [Kazakhstan, Kyrgyzstan, Uzbekistan].

5. *Puccinellia dolicholepis* (V. I. Kreczetowicz) Pavlov, Fl.

Kazakhst. 1: 242. 1956.

毛稈碱茅 mao fu jian mao

Atropis dolicholepis V. I. Kreczetowicz in Komarov, Fl. URSS 2: 764. 1934.

Perennial, densely tufted. Culms erect, 20–40(–50) cm tall, slender, 1–1.5 mm in diam. Ligule 1.7–3.5 mm; leaf blades usually inrolled, 3–5 cm, 0.3–1.2 mm wide. Panicle loose, 5–12 cm; branches 1–2 cm, ascending and then spreading, scabrid. Spikelets 4–7 mm, usually tinged with purple, florets 2–6; lower glume 1.3–1.6 mm, upper glume 2–2.8 mm, apex subacute; lemmas 2.5–3.5(–4) mm, shortly hairy on lower part of veins, apex acute to acuminate; palea keels pubescent on lower part, scabrid on upper part; anthers 1.4–2.3 mm. Fl. Jun–Jul.

Dry grasslands, sandy saline lake shores and meadows, sandstone slopes; 100–1500 m. Qinghai, Xinjiang [Kazakhstan, Kyrgyzstan, Russia (SW Siberia); SW Asia (Caucasus), SE Europe].

6. *Puccinellia jeholensis* Kitagawa, Rep. First Sci. Exped. Manchoukuo, Sect. IV, 4: 102. 1936.

热河碱茅 re he jian mao

Puccinellia palustris (Seenus) Grossheim subsp. *jeholensis* (Kitagawa) Norlindh.

Perennial, tufted, grayish green. Culms erect or geniculately ascending, 30–60 cm tall, 1–2 mm in diam. Leaf sheaths smooth; ligule 0.5–1.3 mm; leaf blades flat, 6–10 cm, 2–3 mm wide, abaxial surface glabrous, adaxial surface and margins scabrous. Panicle usually spreading, 8–20 × 5–10 cm; branches 2–4 per node, basal primary branch 4–8 cm, upper part scabrid. Spikelets 5–6 mm, florets 4 or 5; rachilla internodes scabrid; lower glume ca. 1.2 mm, 1-veined, apex acuminate, upper glume ca. 1.8 mm, 3-veined, apex obtuse; lemmas 3–3.5 mm, purple, lower 1/4 pubescent, margins membranous, yellow, apex obtuse; palea as long as lemma, keels hairy in lower part, scabrid in upper part; anthers 1.2–2 mm. Fl. Jun–Jul.

Lake shores, shallow sandy slopes, low saline meadows. Hebei, Heilongjiang, Jiangsu, Nei Mongol [Mongolia].

7. *Puccinellia macranthera* (V. I. Kreczetowicz) Norlindh, Fl. Mongol. Steppe 1: 102. 1949.

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Atropis macranthera V. I. Kreczetowicz in Komarov, Fl. URSS 2: 759. 1934; *Puccinellia poaeoides* Keng.

Perennial, tufted, grayish green. Culms 30–50 cm tall, 1–2.5 mm in diam. Leaf sheaths smooth or scabrid; ligule 0.5–1.2 mm, truncate or obtuse; leaf blade flat or inrolled, 3–8 cm, 2–4 mm wide, margins and adaxial surface scabrous. Panicle laxly spreading, 8–20 × 6–12 cm; branches 2–4 per node, basal primary branch 4–8 cm, horizontally spreading or reflexed after anthesis, axis and branches scaberulous, lower part naked. Spikelets 5–6 mm, florets 4–6; rachilla internodes smooth; glumes obtuse, lower glume 1–1.5 mm, upper glume ca. 2 mm; lemmas 2.4–3 mm, base pubescent, margins yellow, apex truncate-triangular; palea keels ciliate; anthers 1.5–2 mm. Fl. Jun–

Jul.

Moist saline places; 100–2000 m. Gansu, Jilin, Liaoning, Nei Mongol, NE Xinjiang [Mongolia, Russia (Siberia)].

8. *Puccinellia chinampoensis* Ohwi, Acta Phytotax. Geobot. 4: 31. 1935.

朝鲜碱茅 chao xian jian mao

Perennial, tufted, grayish green. Culms erect, 30–80 cm tall, ca. 1.5 mm in diam. Leaf sheaths smooth; ligule 1–1.7 mm; leaf blade flat or inrolled, 4–9 cm, 1.5–3 mm wide, adaxial surface scabrid. Panicle loose, 7–15 × 4–8 cm; branches 3–5 per node, 6–8 cm, ascending, spreading or slightly nodding after anthesis, scabrid, lower 1/2 naked. Spikelets 4–6 mm, florets 4–7; lower glume 0.7–1.3 mm, 1-veined, upper glume 1–1.7 mm, 3-veined; lemmas 1.8–2.2 mm, later tinged with purple, hairy near base, apex truncate; palea as long as or slightly longer than lemma, keels sparsely pubescent on lower part, scabrid on upper part; anthers 1.2–1.5 mm. Fl. Jun–Jul.

Saline meadows, sandy seashores. Hebei, Liaoning [Korea].

9. *Puccinellia coreensis* Hackel ex Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 57. 1930.

高丽碱茅 gao li jian mao

?*Puccinellia coreensis* var. *asperifolia* Kitagawa.

Perennial, loosely tufted. Culms 20–60 cm tall, 1.3–2 mm in diam., nodes geniculate. Leaf sheaths loose, uppermost sheath ca. 10 cm, reaching base of inflorescence; ligule 1–2 mm; leaf blades flat or conduplicate, 8–20 cm, 1–3 mm wide, margins and adaxial surface scabrous. Panicle 8–20 × 3–5 cm; branches 2–5 per node, 3–8 cm, smooth, lower part naked, upper part densely spiculate. Spikelets 5–7 mm, florets 5–7; lower glume 1–1.2 mm, upper glume 1.5–2 mm; lemmas 2–2.5 mm, base slightly pubescent, apex obtuse, dentate-ciliate; palea keels scabrous on upper part; anthers 1.1–1.3 mm. Fl. Jun–Aug.

Hills, slopes, wet places along field margins. Jilin, Liaoning [Korea].

This taxon was first described as “*Agrostis distans* var. *coreensis* Hackel ex T. Mori” (Enum. Pl. Corea, 36. 1922), which is a *nomen nudum* and, therefore, was not validly published.

10. *Puccinellia manchuriensis* Ohwi, Acta Phytotax. Geobot. 4: 31. 1935.

柔枝碱茅 rou zhi jian mao

Perennial, tufted. Culms 30–60 cm tall. Leaf sheaths smooth; ligule 1–2 mm; leaf blade inrolled or flat, 10–15 cm, 1.5–3 mm wide, adaxial surface densely scabrous along veins. Panicle 7–15 cm; branches 3–5 per node, 2–4 cm, smooth or scabrous, spikelets many. Spikelets 3–4 mm, florets 3–5; lower glume ca. 0.8 mm, upper glume ca. 1.2 mm; lemmas 1.6–2.2 mm, base pubescent, apex obtuse; palea keels scabrid on upper part; anthers 0.8–1.3 mm. Fl. May–Jul. $2n = 28$.

Riversides, saline meadows, sandy seashores. Beijing, Gansu, Heilongjiang, N Jiangsu, Nei Mongol, Shanxi, Tianjin [Japan, Mongolia, Russia (Far East)].

11. *Puccinellia qinghaica* Tzvelev, Bot. Zhurn. (St. Peters-

burg) 89: 842. 2004.

青海碱茅 qing hai jian mao

Perennial, tufted. Culms erect, 10–30 cm tall. Ligule 0.5–1.5 mm; leaf blades 2–6 cm, 0.5–1.5 mm wide. Panicle usually spreading, 3–8 cm; branches (1 or)2(or 3) per node, 2–5 cm, thin, smooth, lower part naked. Spikelets 3–4 mm, tinged with purple, florets 2–4; glumes obtuse, lower glume 0.5–1 mm, upper glume 1–1.5 mm; lemmas 1.6–2.2 mm, pubescent at base; palea keels scabrid on upper part; anthers 0.8–1.3 mm. Fl. Jun–Jul.

• Alpine riversides, meadows; 2000–3500 m. Qinghai.

12. *Puccinellia tenuiflora* (Grisebach) Scribner & Merrill, Contr. U. S. Natl. Herb. 13: 78. 1910.

星星草 xing xing cao

Atropis tenuiflora Grisebach in Ledebour, Fl. Ross. 4: 389. 1852; *Puccinellia mongolica* (Norlindh) Bubnova; *P. tenuiflora* var. *mongolica* Norlindh.

Perennial, tufted. Culms erect, often geniculate, 30–70 cm tall, 1–2 mm in diam., terminal node in lower 1/3. Leaf sheaths glabrous; ligule 0.7–1.5 mm, obtuse; leaf blade conduplicate or slightly inrolled, 2–8 cm, 1–3 mm wide, adaxial surface scabrid. Panicle loose, 6–15 cm; branches 2–5 per node, slender, horizontally spreading, scabrid or smooth, lower part naked. Spikelets 2.5–3.5 mm, usually tinged purple, florets 2–4; lower glume ca. 0.6 mm, 1-veined, upper glume ca. 1.2 mm, 3-veined, apex subobtuse; lemmas 1.5–2.2 mm, glabrous or subglabrous, apex obtuse; palea keels smooth or with a few small teeth; anthers 0.8–1.4 mm. Fl. Jun–Jul. $2n = 14, 56$.

Saline wet grasslands, stable sandy beaches, saline meadows; 500–4000 m. Anhui, Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, Shanxi, Xinjiang [Japan, Kazakhstan, Mongolia, Russia (Siberia); SW Asia (Iran)].

13. *Puccinellia filifolia* (Trinius) Tzvelev, Novosti Sist. Vyssh. Rast. 1964: 18.1964.

线叶碱茅 xian ye jian mao

Colpodium filifolium Trinius, Mém. Acad. Imp. Sci. Saint-Petersbourg, Sér. 6, Sci. Math., Seconde Pt. Sci. Nat. 4, 2(1): 70. 1836.

Perennial, densely tufted, tillers very numerous. Culms erect, 20–30 cm tall, 0.7–1.5 mm in diam. Ligule 0.6–2 mm; leaf blades conduplicate, setaceous, 2–5 cm, 0.3–1 mm wide. Panicle spreading, 3–8 cm; branches 2 or 3 per node, 2–6 cm, thin, smooth. Spikelets 2.5–4 mm, usually tinged with purple; florets 2–4; glumes obtuse, lower glume 0.5–1 mm, upper glume 1–1.5 mm; lemmas 1.6–2 mm, glabrous or subglabrous; palea keels smooth; anthers 0.9–1.1 mm. Fl. May–Jun.

Sandy saline places; near sea level to 500 m. Nei Mongol (near Chailar) [Mongolia].

14. *Puccinellia tianschanica* (Tzvelev) Ikonnikov, Opred. Viss. Rast. Baskirsk. ASSR 80. 1979.

天山碱茅 tian shan jian mao

Puccinellia tenuiflora (Grisebach) Scribner & Merrill

subsp. *tianschanica* Tzvelev, Novosti Syst. Vyssh. Rast. 8: 79. 1971; *P. gyirongensis* L. Liu.

Perennial, tufted. Culms erect, 10–30 cm tall, 1–1.6 mm in diam., nodes slightly geniculate. Ligule 0.7–1.5 mm; leaf blade 2–6 cm, 0.5–2 mm wide. Panicle 3–10 × 1.5–3 cm; branches mostly 1–3 per node, 3–5 cm, thin, smooth, lower part naked, upper part with a few spikelets. Spikelets 2.5–4 mm, usually tinged with purple, rarely yellowish brown, florets 2–4; lower glume 0.5–1 mm, upper glume 1.3–1.8 mm; lemmas 1.5–2.3 mm, glabrous, apex obtuse-truncate; palea keels smooth; anthers 0.8–1.2 mm. Fl. Jun–Aug.

Dry grasslands, dampish grassy places; 1500–3500 m. Qinghai, Xinjiang, Xizang [Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan].

15. *Puccinellia degeensis* L. Liu, Vasc. Pl. Hengduan Mts. 2: 2199. 1994.

德格碱茅 de ge jian mao

Perennial, densely tufted. Culms obliquely ascending, 15–20 cm tall, 1–1.5 mm in diam. Leaf sheaths glabrous, uppermost enclosing base of panicle; ligule ca. 1 mm, truncate; leaf blades flat or conduplicate, 3–5 cm, (1–)2–3 mm wide, margins scabrid. Panicle narrow, 3–4 × ca. 3 cm; branches 2–4 per node, 1–2 cm, smooth. Spikelets 3–4 mm, florets 2 or 3; lower glume 0.6–1 mm, veinless or sometimes 1-veined, upper glume 1–1.5 mm, 1–3-veined; lemmas 2–2.5 mm, glabrous, margins ca. 0.3 mm wide, yellow, membranous, apex obtuse; palea keels smooth, apex 2-toothed and mucronate, mucros ca. 0.2 mm; anthers 1.2–1.5 mm. Fl. Jun–Jul.

• Alpine riversides, marshes, meadows; ca. 3600 m. NW Sichuan.

16. *Puccinellia strictura* L. Liu, Fl. Reipubl. Popularis Sin. 9(2): 405. 2002.

竖碱茅 shu jian mao

Perennial, tufted. Culms many, rooting from lower nodes, 5–10 cm tall. Leaf sheaths smooth, uppermost reaching lower part of panicle; ligule 1–1.5 mm; leaf blade convolute, 2–3 cm, 1–2 mm wide. Panicle dense, spikelet-like, 3–5 × ca. 0.5 cm, green; branches single, ca. 1 cm, smooth, spikelets 4 or 5. Spikelets 4–4.5 mm, florets 4; lower glume 1.2–1.5 mm, apex acuminate, upper glume ca. 2 mm, apex acuminate; lemmas 2–2.2 mm, glabrous, apex acuminate; palea keels smooth; anthers 0.8–1.2 mm. Fl. Jul–Aug.

• Moist places in alpine ravines; ca. 3900 m. Xizang.

17. *Puccinellia roborovskyi* Tzvelev, Rast. Tsentr. Azii 4: 157. 1968.

疏穗碱茅 shu sui jian mao

Perennial, tufted. Culms 20–40 cm tall. Leaf sheaths smooth; ligule 1–2.5 mm; leaf blade inrolled, 3–8 cm, 1–2 mm wide. Panicle 5–10 cm; branches paired, 3–5 cm, with axillary pad, spreading after anthesis, smooth or slightly scabrid, lower part naked, upper part with 1–3 spikelets. Spikelets 6–7 mm, tinged with purple, florets 3–5; glumes acuminate, lower glume ca. 1.5 mm, upper glume ca. 2 mm; lemmas lanceolate, 2.8–3.5 mm, base pubescent along veins, margins membranous, yellow, apex acuminate; palea keels scabrid; anthers 0.7–1.3 mm. Fl.

Jul–Aug.

• Sandy lake shores, river valleys, moist saline grassy places; 3000–4600 m. Qinghai, Xizang.

18. *Puccinellia arjinshanensis* D. F. Cui, Fl. Xinjiang. 6: 119. 1996.

阿尔金山碱茅 a er jin shan jian mao

Perennial, tufted. Culms erect, 20–30 cm tall, ca. 1 mm in diam. Leaf sheaths smooth; ligule ca. 2 mm, semi-rounded; leaf blade conduplicate or inrolled, hard, 3–7 cm, 1–1.5 mm wide, margins scabrous, adaxial surface scabrous along veins. Panicle 5–10 × ca. 4 cm; branches 1 or 2 per node, smooth, apex sparsely scabrous. Spikelets 4–7 mm, florets 3–5; lower glume 2–2.5 mm, 1-veined, upper glume ca. 3 mm; lemmas 3.5–4 mm, veins inconspicuous, base and between veins densely pubescent, margins broadly membranous; palea keels ciliate on lower half, scabrous on upper half; anthers 0.8–1.2 mm. Fl. Jul–Aug.

• Gully banks on slopes; 3000–3500 m. Xinjiang.

19. *Puccinellia schischkinii* Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 57. 1955.

斯碱茅 si jian mao

Perennial, tufted, intravaginal and a few short extravaginal shoots present. Culms erect or ascending, 20–40 cm tall, 1–2 mm in diam., soft. Ligule 1–2 mm, rounded or acuminate; leaf blades inrolled or flat, hard, 4–5 cm, 1–2 mm in diam., abaxial surface glabrous, grayish green, adaxial surface scabrid. Panicle very narrow, 10–20 cm, pale green; branches 1–3 cm, straight, scabrid, spiculate to base. Spikelets 5–7 mm, florets 5–7; glumes lanceolate, slightly keeled, upper keel scabrous, apex acuminate, lower glume 1.5–1.8 mm, 1-veined, upper glume 2–2.5 mm, 3-veined; lemmas 2.2–3.2 mm, base sparsely shortly hairy, midvein scabrid toward apex, apex acute; palea keels ciliate on lower part, scabrous on upper part; anthers 0.7–1.2 mm. Fl. Jun–Jul.

Mountain saline meadows, marshes, lowland gravel beaches, grassy places along saline lake shores; (600–)3000–4300 m. Nei Mongol, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia (Siberia), Tajikistan].

Some authors have incorrectly named material of this species as *Puccinellia roshevitsiana*.

20. *Puccinellia kuenlunica* Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 62. 1955.

昆仑碱茅 kun lun jian mao

Perennial, densely tufted, intravaginal and extravaginal tillering shoots present. Culms erect, 20–30 cm tall. Uppermost leaf sheath very long; ligule ca. 2 mm; leaf blade 3–8 cm, 1–2.5 mm wide, margins and adaxial surface scabrid. Panicle very narrow, 8–18 cm; branches short, appressed or slightly spreading after anthesis, smooth or sparsely scabrous along upper part. Spikelets ca. 4–6 mm, florets 3–5; glumes ovate-lanceolate, lower glume 1–1.5 mm, 1-veined, upper glume 1.5–2 mm, 3-veined; lemmas ovate-lanceolate, 2.5–3.2 mm, base glabrous or subglabrous, apex acuminate; palea keels smooth on lower part,

scabrous on upper part; anthers 0.7–1.2 mm. Fl. Jun–Jul.

• Deserts, dry grasslands; 2000–3000 m. Gansu, Qinghai, SE Xinjiang, Xizang.

21. *Puccinellia przewalskii* Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 63. 1955.

勃氏碱茅 bo shi jian mao

Perennial, loosely tufted, intravaginal and a few short extravaginal shoots present. Culms erect or ascending from a geniculate base, 25–40 cm tall. Leaf sheaths smooth; ligule 2–3 mm; leaf blade flat or inrolled, hard, grayish green, 5–10 cm, 2–3 mm wide, adaxial surface scabrid. Panicle narrow, 8–15 cm; branches ca. 5 cm, appressed or sometimes spreading, scabrid or smooth in lower part. Spikelets 5–7 mm, slightly tinged with purple, florets 5–7; glumes obtuse or subacuminate, lower glume ca. 1.5 mm, upper glume 2–2.5 mm; lemmas 3.2–3.5 mm, lower part glabrous, rarely base minutely pubescent, apex acuminate or narrowly rounded; palea keels smooth in lower part, shortly ciliate in upper part; anthers 1.5–2.4 mm. Fl. Jun–Jul.

• Moist saline places on sandstone, river banks. Gansu, Qinghai.

22. *Puccinellia roshevitsiana* (Schischkin) V. I. Kreczetowicz ex Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 60. 1955.

西域碱茅 xi yu jian mao

Atropis roshevitsiana Schischkin, Sist. Zametki Mater. Gerb. Tomsk. Univ. 1929(3): 1. 1929.

Perennial, tufted, grayish green. Culms erect, 30–60 cm tall, hard, grayish green. Ligule ca. 1.5 mm; leaf blades recurved, straight, 5–10 cm, 2–4 mm wide, margins scabrid. Panicle 8–15 cm; branches 3–5 per node, 2–6 cm, scabrid, spreading after anthesis. Spikelets linear-lanceolate, 5–8 mm, florets 5–6; glumes obtuse, lower glume ca. 1.5 mm, upper glume ca. 2.5 mm; lemmas 2.7–3.5 mm, marginal veins pubescent at base, apex scarious; palea keels scabrid in upper half; anthers 1.5–2 mm. Fl. Jun–Jul.

Low saline deserts, gravel flats in river valleys; ca. 500 m. Xinjiang [Kazakhstan].

23. *Puccinellia altaica* Tzvelev, Rast. Tsent. Azii 4: 152. 1968.

阿尔泰碱茅 a er tai jian mao

Puccinellia dolicholepis var. *paradoxa* Sergievskaja.

Perennial, loosely or densely tufted, intravaginal and a few extravaginal shoots present. Culms erect, 20–30 cm tall. Ligule ca. 1 mm; leaf blades 3–8 cm, ca. 1 mm wide. Panicle contracted or slightly loose, 5–14 × 2–4 cm; branches paired, lower part naked, smooth. Spikelets 3.5–4.5 mm, florets 3–5; lower glume 1–1.2 mm, apex acuminate, upper glume 1.5–2 mm, apex acuminate; lemmas 2.3–2.8(–3) mm, violet, glabrous or slightly hairy near base, apex acuminate; palea keels smooth or with a few spinules in upper 1/3; anthers 1.2–1.5 mm. Fl. Jul–Aug. $2n = 14$.

Flat sandy river banks, saline meadows, grassland on slopes; 1000–2500 m. NE Xinjiang [Mongolia, Russia (Siberia)].

24. *Puccinellia koeieana* Melderis, Biol. Skr. 14(4): 72. 1965.

科氏碱茅 ke shi jian mao

Perennial, loosely or densely tufted; intravaginal and extravaginal shoots present. Culms erect or geniculately ascending, 15–30 cm tall. Leaf blades flat or ± inrolled, 2–5 cm, ca. 2 mm wide, grayish green, adaxial surface scabrid along veins. Panicle contracted, later spreading, 7–8 × ca. 5 cm; branches paired at lower nodes, 2–3 cm, slender, scabrid, reflexed after anthesis. Spikelets 4.5–5 mm, often tinged with purple, florets 4–7; glumes broadly lanceolate or ovate, lower glume ca. 1 mm, 1-veined, upper glume ca. 1.5 mm, 1–3-veined, apex acute or subobtuse; lemmas 1.5–2 mm, purple, glabrous or base minutely hairy, apex obtuse, mucronate; anthers 1–1.2 mm. Fl. May–Jul.

Alpine moist saline places; 2000–3000 m. Xizang [Afghanistan; SW Asia (Iran)].

25. *Puccinellia multiflora* L. Liu, Fl. Xizang. 5: 123. 1987.

多花碱茅 duo hua jian mao

Perennial, loosely tufted. Culms geniculate at base, 30–50 cm tall, soft. Terminal sheath enclosing lower part of inflorescence; ligule 1–2.5 mm; leaf blade soft, 5–10 × 0.2–0.3 cm, margins and adaxial surface scabrid. Panicle spreading, ca. 15 × 4 cm; branches 2 or 3 per node, basal primary branch 5–8 cm, scabrid, lower 1/2 naked, upper 1/2 with 2–4 spikelets. Spikelets 8–11 mm, tinged purplish brown, florets 6–9; glumes obtuse; lower glume ca. 1.5 mm, upper glume 2–2.5 mm; lemmas 2.8–3.5 mm; palea scabrid on upper part of keels; anthers 1.2–1.5 mm. Fl. Jun–Jul.

• Sandy saline lake shores, alluvial fans; 2900–4200 m. Qinghai, W Xizang.

26. *Puccinellia thomsonii* (Stapf) R. R. Stewart, Brittonia 5: 418. 1945.

长穗碱茅 chang sui jian mao

Glyceria thomsonii Stapf in J. D. Hooker, Fl. Brit. India 7: 347. 1896 [“1897”]; *Atropis thomsonii* (Stapf) Pampanini.

Perennial, densely tufted. Culms stout, 20–40 cm tall, 1.5–3 mm in diam., 3–5-noded, nodes often geniculate. Leaf sheaths loose, terminal sheath ca. 10 cm, often enclosing base of inflorescence; ligule ca. 3 mm, broadly ovate; leaf blade flat or conduplicate or inrolled, 6–18 cm, 1–3 mm wide, margins and adaxial surface scabrid. Panicle spreading, 12–20 × 2–3 cm; branches paired, 3–5 cm, obliquely ascending, scabrid, lower part naked. Spikelets 5–9 mm, florets 3–5; glumes oblong, apex acuminate, lower glume 1.8–2.5(–3) mm, upper glume 2.2–3.2 mm; lemma 3.5–4(–4.5) mm, glabrous, keeled toward apex, apex acuminate; palea keels smooth on lower part, scabrid upward; anthers 2–2.6 mm. Fl. Jun–Jul.

Open basins; 4000–5200 m. Xizang [Pakistan].

27. *Puccinellia stapfiana* R. R. Stewart, Brittonia 5: 418. 1945.

藏北碱茅 zang bei jian mao

Glyceria poaeoides Stapf in J. D. Hooker, Fl. Brit. India 7: 348. 1896 [“1897”], not *Puccinellia poaeoides* Keng (1938).

Perennial, tufted. Culms erect or obliquely ascending, 20–40 cm tall. Leaf sheaths dense at culm base, terminal sheath reaching panicle; ligule ca. 1 mm; leaf blades conduplicate, 3–10 cm, 1–2.5 mm wide, margins and adaxial surface scabrid. Panicle narrow, 5–10 × ca. 1.5 cm; branches 2 or 3 per node, obliquely ascending, scabrid, 2–3 cm, lower part naked, upper part with 2–4 spikelets. Spikelets 5–6 mm, tinged with purple at maturity, florets 2–4; glume apex obtuse or acuminate, lower glume 2–2.2 mm, upper glume 2.5–2.8 mm; lemmas 3–3.5(–4) mm, glabrous, margins ciliate, finely toothed, apex obtuse; palea keels smooth or upper part scabrid, anthers 1.5–2.2 mm. Fl. Jun–Jul.

Alpine grassy places, saline sandy lake shores, marshy meadows; 4000–4800 m. NW Xizang [India, Pakistan].

28. *Puccinellia shuanghuensis* L. Liu, Fl. Xizang. 5: 125. 1987.

双湖碱茅 shuang hu jian mao

Perennial, densely tufted. Culms slender, 5–8 cm tall, 1-noded at base. Leaf sheaths clustered at culm base; ligule ca. 1 mm, triangular; leaf blades soft, 2–3 cm, ca. 1 mm wide, adaxial surface scabrid. Panicle 1–2 × ca. 1 cm, with ca. 10 spikelets; branches 1 per node, 0.7–1 cm, spreading, smooth, spikelets 1–3; pedicels thickened at apex. Spikelets ca. 4 mm, florets 2 or 3; glumes narrowly acuminate, lower glume 1.2–1.5 mm, upper glume ca. 2 mm; lemmas 2.8–3 mm, glabrous, apex acuminate; palea shorter than lemma, keels smooth; anthers ca. 1.5 mm. Fl. Jun–Jul.

- Saline grassland on mountain slopes; 4500–5100 m. Xizang.

29. *Puccinellia vachanica* Ovczinnikov & Czukavina, Fl. Tadzisk. SSR 1: 505. 1957.

文昌碱茅 wen chang jian mao

Puccinellia pamirica (Roshevitz) V. I. Kreczetowicz ex Ovczinnikov & Czukavina subsp. *vachanica* (Ovczinnikov & Czukavina) Tzvelev.

Perennial, tufted. Culms erect, 20–40 cm tall, slender. Ligule 1–2 mm; leaf blade conduplicate or inrolled 3–5 cm, 0.5–1.5 mm wide. Panicle usually spreading, 5–10 cm; branches 1–3 per node, slender, smooth or upper parts sparsely scabrid. Spikelets 3–5 mm, usually slightly purple tinged, florets 3 or 4; lower glume 1–1.5 mm, upper glume 2–2.5 mm; lemmas 2.2–2.8 mm, glabrous; palea keels smooth or sparsely scabrid on upper part; anthers 0.9–1.1 mm. Fl. Jun–Aug. $2n = 28$.

Lake shores, saline meadows; 2500–3500 m. Qinghai, S Xinjiang, W Xizang [Tajikistan].

30. *Puccinellia pamirica* (Roshevitz) V. I. Kreczetowicz ex Ovczinnikov & Czukavina, Fl. Tadzisk. SSR 1: 224. 1957.

帕米尔碱茅 pa mi er jian mao

Atropis distans (Jacquin) Grisebach f. *pamirica* Roshevitz, Trudy Glavn. Bot. Sada 38: 121. 1924; *A. pamirica* V. I.

Kreczetowicz.

Perennial, tufted. Culms usually erect, rarely geniculate ascending, 15–40 cm tall. Leaf sheaths mostly clustered at plant base; ligule ca. 1 mm; leaf blades conduplicate or inrolled, 3–4 cm, 0.5–1.5 mm wide, margins and adaxial surface scabrid. Panicle mostly contracted, or spreading after anthesis, 5–10 cm; branches 2–4 cm, ascending, smooth. Spikelets 4–5 mm, purple tinged, florets 3 or 4; lower glume 1.5–1.8 mm, apex shortly acuminate, upper glume 2–2.5 mm, inconspicuously 3-veined, apex shortly acuminate; lemmas 2.5–3.5 mm, glabrous, with a raised keel, margins membranous, apex acute or acuminate, finely toothed; palea keels smooth or sparsely scabrid; anthers 1.3–1.8 mm. Fl. and fr. Jul. $2n = 14, 28$.

Lake shores, stony depressions; 3200–4800 m. Qinghai, Xinjiang, NW Xizang [Afghanistan, Kyrgyzstan, Tajikistan, Uzbekistan].

31. *Puccinellia ladakhensis* (H. Hartmann) Dickoré, Stapfia 39: 182. 1995.

拉达克碱茅 la da ke jian mao

Poa ladakhensis H. Hartmann, Candollea 39: 510. 1984.

Perennial, loosely tufted, old basal sheaths lacerate to fibrous. Culms geniculate ascending, 8–20 cm tall, 3- or 4-noded. Ligule ca. 1 mm; leaf blades 2–5 cm, 0.2–0.5 mm wide. Panicle contracted, 5–10 × 1–2 cm; branches 2–3(–5) cm, lower 1/2 naked, smooth. Spikelets 5–6 mm, purple tinged, florets 3 or 4; lower glume 1.5–1.8 mm, upper glume ca. 2.5 mm; lemmas 3.2–3.5 mm, glabrous, keeled toward apex, apex acuminate; palea keels glabrous, apex mucronate; anthers 1.2–1.6 mm. Fl. May–Jul.

Saline shores of rivers and lakes. Xizang [Kashmir, Nepal].

32. *Puccinellia kashmiriana* Bor, Kew Bull. [8] 1953: 270. 1953.

克什米尔碱茅 ke shi mi er jian mao

Perennial, densely tufted. Culms 10–15 cm tall, scabrid below inflorescence. Leaf sheaths clustered at plant base; ligule ca. 1.5 mm; leaf blades short, linear, basal blades flat, soft, ca. 5 cm, upper blades conduplicate, ca. 2 cm, 1–1.5 mm wide, adaxial surface and margins scabrid. Panicle very narrow, 3–4 × ca. 0.5 cm; branches 2 per node, ca. 1.5 cm, ascending, smooth, lower part naked, upper part with 1 or 2 spikelets. Spikelets ca. 5 mm, tinged with purple, florets 3–5; lower glume 1.2–1.5 mm, 1-veined, upper glume 2–2.5 mm, 3-veined; lemmas 3–3.5 mm, glabrous, apex acute or mucronate; palea keels smooth; anthers 0.6–0.8 mm. Fl. Jul–Aug.

Gravelly places in open alpine valleys; 4000–5100 m. Xinjiang, Xizang [Afghanistan, NW India, Kashmir, Pakistan].

33. *Puccinellia nudiflora* (Hackel) Tzvelev, Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Uzbeksk. SSR 17: 75. 1962.

裸花碱茅 luo hua jian mao

Poa nudiflora Hackel, Oesterr. Bot. Z. 52: 453. 1902.

Perennial, tufted. Culms geniculate at base, 7–20 cm tall.

Leaf sheaths smooth, uppermost often reaching inflorescence base; ligule ca. 1 mm; leaf blade conduplicate or inrolled, 1–4 cm, 1–2 mm wide, adaxial surface scabrid. Panicle dense, 4–6 cm; branches 2–4 cm, smooth, upper part with 2–4 spikelets. Spikelets 4–5.5 mm, florets 3 or 4; lower glume 1–1.2 mm, upper glume ca. 1.5 mm; lemmas 2.5–3 mm, glabrous, upper part keeled, apex obtuse; palea keels with a few teeth; anthers 0.6–0.8 mm. Fl. Jun–Jul.

Meadows on gravelly lake shores, saline beaches, alpine marshes, along ravine edges, valleys; 2400–4900 m. Qinghai, Xinjiang, Xizang [Kyrgyzstan, Tajikistan].

34. *Puccinellia pauciramea* (Hackel) V. I. Kreczetowicz ex Ovczinnikov & Czukavina, Fl. Tadziksk. SSR 1: 227. 1957.

少枝碱茅 shao zhi jian mao

Atropis distans (Jacquin) Grisebach f. *pauciramea* Hackel, Trudy Imp. S.-Peterburgsk. Bot. Sada 21: 442. 1903; *A. pauciramea* (Hackel) V. I. Kreczetowicz.

Perennial, tufted. Culms geniculately ascending, 15–30 cm tall, with many tillering shoots, 5–10 cm tall. Ligule 1–3 mm; leaf blades conduplicate or inrolled, 4–10 cm, 1–2 mm wide, margins and adaxial surface scabrid. Panicle broadly open, 4–7 cm; branches 2 per node, smooth, spikelets 1–3 at branch tips. Spikelets 5–6 mm, florets 2–4; glumes with apex obtuse or acuminate, lower glume 1.2–1.5 mm, upper glume 1.8–2 mm; lemmas 2.5–3.5 mm, purple with golden yellow membranous margins, glabrous, keeled, apex obtusely triangular; palea keels smooth or with 1–2 teeth; anthers 0.6–1.3 mm. Fl. Jun–Jul. $2n = 28$.

Lake banks, sand dunes, gravel of river valleys, alluvial fans, saline soils in mountainous areas; 3000–5000 m. Qinghai, Xinjiang, Xizang [Afghanistan, Kyrgyzstan, Mongolia, Tajikistan, Uzbekistan].

35. *Puccinellia ladyginii* Ivanova ex Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 65. 1955.

布达尔碱茅 bu da er jian mao

Perennial, loosely tufted. Culms erect, 20–30 cm tall, 2- or 3-noded. Leaf sheaths smooth; ligule 1–2 mm; leaf blade flat, 5–8 cm, 1.5–2.2 mm wide, smooth or adaxial surface scabrid. Panicle open, 5–8 × 3–5 cm; branches 2 per node, 3–4 cm, lower part naked, branchlets and spikelets in upper half, smooth or rarely slightly scabrid. Spikelets ca. 6 mm, tinged purplish red, florets 4–6; glumes ovate-lanceolate, lower glume 1.5–2 mm, 1-veined, upper glume 2–2.5 mm, 3-veined, apex obtuse or slightly acuminate; lemmas 2.5–3.4 mm, glabrous, apex obtuse; palea keels smooth or sparsely scabrid in upper part; anthers 1.3–2 mm. Fl. Jun–Aug.

- Alpine sandy river beaches; 3500–4500(–5000) m. Qinghai.

36. *Puccinellia subspicata* V. I. Kreczetowicz ex Ovczinnikov & Czukavina, Fl. Tadziksk. SSR 1: 226. 1957.

穗序碱茅 sui xu jian mao

Atropis subspicata V. I. Kreczetowicz in Komarov, Fl. URSS 2: 760. 1934; *Poa gorbunovii* Ovczinnikov.

Perennial, loosely tufted. Culms 5–25(–30) cm tall, soft. Leaf blades flat or conduplicate, soft, 3–10 cm, 1.5–2.5 mm wide, smooth. Panicle cylindrical, contracted or spreading, 2–5 cm; branches 1–2 cm, smooth, lower part naked, spikelets 1–3 at branch tips. Spikelets 5–8 mm, usually purple tinged, florets 3–7; glumes ovate, apex subobtusely, lower glume 1–1.5 mm, upper glume 2–2.5 mm; lemmas elliptic, 2.7–4.5 mm, usually purple tinged, glabrous, keeled, apex acute; palea keels scabrid; anthers 1.5–2.5 mm. Fl. Jun–Jul. $2n = 14$.

Wet alpine meadows. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan].

37. *Puccinellia nipponica* Ohwi, Bot. Mag. (Tokyo) 45: 379. 1931.

日本碱茅 ri ben jian mao

Perennial, tufted. Culms erect, 30–100 cm tall. Uppermost leaf sheath long, usually enclosing base of inflorescence; ligule 2–3 mm; leaf blades soft, 10–20 cm, 1–3 mm wide. Panicle 10–20(–30) cm; branches 3–5 per node, erect and appressed to axis, spiculate to base, scabrid. Spikelets 4–6 mm, pale green, florets 3 or 4; glumes lanceolate, lower glume 2–2.5 mm, 1-veined, upper glume ca. 3 mm, 3-veined; lemmas 2.5–3.5 mm, base pubescent, apex acuminate; anthers 0.7–0.8 mm. Fl. Jun–Jul. $2n = 28$.

Sandstone seashores, saline grassy places. Liaoning, Nei Mongol [Japan, Korea, Russia (Far East)].

38. *Puccinellia kurilensis* (Takeda) Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 59. 1930.

千岛碱茅 qian dao jian mao

Atropis kurilensis Takeda, J. Linn. Soc., Bot. 42: 497. 1914; *Puccinellia kamschatica* Holmberg var. *sublaevis* Holmberg; ?*P. pumila* (Vasey) Hitchcock; ?*P. adpressa* Ohwi.

Perennial, loosely tufted. Culms erect, 10–40 cm tall, uppermost node at about middle of culm. Ligule 1.5–3 mm; leaf blade flat, thin, 6–10 cm, 2–3 mm wide, adaxial surface scabrid. Panicle contracted, 5–15 cm, lower part often enclosed in uppermost leaf sheath; branches 2–6 cm, spreading at maturity, smooth or upper part slightly scabrid. Spikelets 6–8 mm, florets 4–7(–9); lower glume 1.5–3 mm, upper glume 2–3.5 mm; lemmas 2.7–3.5(–4) mm, green, margins later golden, veins conspicuously raised, sparsely pubescent along lower part of veins, apex acuminate; palea keels scabrid upward; anthers 0.7–1.2 mm. $2n = 42, 56$.

Seashores, gravel meadows. Heilongjiang, Liaoning [Japan, Korea, Russia (Far East); North America].

39. *Puccinellia micranthera* D. F. Cui, Fl. Xinjiang. 6: 600. 1996 [“*microanthera*”].

小药碱茅 xiao yao jian mao

Perennial, tufted. Culms erect, 25–40 cm tall, 2–3-noded, terminal node at lower 1/3. Leaf sheaths smooth; ligule 1.5–2 mm, obtuse; leaf blades flat, 3–8 cm, 1.5–3 mm wide, scabrid. Panicle large, effuse, 12–20 × 5–7 cm; branches many per node, 5–10 cm, scabrid; pedicels 5–8 mm, scabrid. Spikelets 4–

7 mm, florets 3–6; glumes with broadly membranous margins, lower glume 1–1.5 mm, 1-veined, upper glume ca. 2 mm; lemmas 3–4 mm, glabrous, apex acuminate; palea keels scabrid on upper part; anthers 0.3–0.5 mm. Fl. Jun–Jul.

- Gully slopes, marshy meadows; 1300–2000 m. Xinjiang, Xizang.

40. *Puccinellia hackeliana* (V. I. Kreczetowicz) V. I. Kreczetowicz ex Drobow, Fl. Uzbekistan. 1: 250. 1941.

高山碱茅 gao shan jian mao

Atropis hackeliana V. I. Kreczetowicz in Komarov, Fl. URSS 2: 762. 1934.

Perennial, densely tufted, grayish green. Culms 15–45 cm tall, nodes geniculate. Ligule 1–2.5 mm; leaf blades conduplicate or flat, 1–3 cm, 1–1.5 mm wide, adaxial surface and margin scabrid. Panicle 5–15 cm; branches 2–5 per node, scabrid. Spikelets 4–6(–8) mm, florets 3–6, purple; glumes ovate, apex obtuse, lower glume 1.5–2 mm, upper glume 2–2.5 mm; lemmas 2.5–3 mm, base pubescent, apex triangular-rounded; palea keels pubescent in lower part, scabrid in upper part; anthers 0.7–1 mm. Fl. 7–8. $2n = 28, 42$.

Alpine desert grasslands, saline meadows, gravel slopes, field borders, lake banks; 1600–4000 m. Qinghai, Xinjiang, Xizang, [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan].

41. *Puccinellia humilis* (Litvinov ex V. I. Kreczetowicz) Bor, Nytt Mag. Bot. 1: 19. 1952.

矮碱茅 ai jian mao

Atropis humilis Litvinov ex V. I. Kreczetowicz in Komarov, Fl. URSS 2: 759. 1932; *Puccinellia hackeliana* subsp. *humilis* (Litvinov ex V. I. Kreczetowicz) Tzvelev.

Perennial, densely tufted, grayish green. Culms erect, 4–15 cm tall. Leaf blades conduplicate or inrolled, 1–3 cm, ca. 1 mm wide, smooth. Panicle dense, spike-like, 2–5 × 0.5–1 cm; branches smooth, spikelets 1–3. Spikelets 6–7 mm, florets 3–6; lower glume ca. 2.2 mm, upper glume 2.5–3 mm; lemmas 2.5–3.5 mm, violet, base shortly hairy, apex subobtuse; palea keels scabrid on upper part; anthers 0.7–1.2 mm. Fl. Jun–Jul.

Alpine grassy slopes; 3000–4200 m. Xinjiang, Xizang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Uzbekistan].

42. *Puccinellia distans* (Jacquin) Parlato, Fl. Ital. 1: 367. 1848.

碱茅 jian mao

Poa distans Jacquin, Observ. Bot 1: 42. 1764; *Atropis distans* (Jacquin) Grisebach; *Puccinellia filiformis* Keng.

Perennial, tufted, pale green. Culms erect or geniculate, 20–40(–60) cm tall, ca. 1–2 mm in diam. Ligule 1–2 mm, truncate or toothed; leaf blade flat or conduplicate, 2–10 cm, 1–2 mm wide, abaxial surface scabrid. Panicle open, 5–15 × 5–6 cm; branches 2–6 per node, horizontally spreading or reflexed, lower part naked, scabrid. Spikelets 4–6 mm, florets 3–7; glumes obtuse, lower glume 1–1.5 mm, 1-veined, upper glume 1.5–2 mm, 3-veined; lemmas 1.8–2.2 mm, base pubescent,

apex truncate or rounded; palea keels scabrid; anthers 0.5–0.8 mm. Fl. May–Jul. $2n = 28, 42$.

Saline moist grassy places, field banks, river valleys, lowland saline abandoned meadows; 100–2000 m. Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Xinjiang [Japan, Kashmir, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Pakistan, Russia; Tajikistan, Turkmenistan, Uzbekistan; NW Africa, SW Asia, Europe, North America].

43. *Puccinellia glauca* (Regel) V. I. Kreczetowicz in Komarov, Fl. URSS 2: 484. 1934.

灰绿碱茅 hui lü jian mao

Atropis distans (Jacquin) Grisebach var. *glauca* Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 7: 623. 1881; *A. glauca* (Regel) V. I. Kreczetowicz.

Perennial, tufted, grayish green. Culms 20–50 cm tall. Leaf blades flat or conduplicate, 5–15 cm, 1.5–2.5 mm wide. Panicle open, 6–15 cm; branches 2 or 3 per node, 3–8 cm, scabrid, tips with a few spikelets, nodding at maturity. Spikelets 5–6 mm, florets 3–5; lower glume ca. 1.5 mm, upper glume 1.8–2 mm, apex obtuse; lemmas obovate, 1.8–2.4 mm, base pubescent, veins inconspicuous, apex rounded; palea keels scabrid-ciliolate; anthers 0.5–0.8 mm. Fl. Jun–Aug. $2n = 42$.

Mountainous areas, river valleys, sandy places, fields. Qinghai, Sichuan, Xinjiang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan].

44. *Puccinellia florida* D. F. Cui, Fl. Xinjiang. 6: 600. 1996.

玫瑰花碱茅 jiu hua jian mao

Perennials, tufted. Culms erect, 15–40 cm tall. Leaf sheaths smooth, uppermost sheath reaching lower part of panicle; ligule 2–3 mm, acuminate; leaf blades flat or conduplicate, 3–6 cm, 1.2–3 mm wide, margins and adaxial surface scabrid. Panicle contracted, 8–12 × 2–3 cm, branches 2–5 per node, axis and branches scaberulous. Spikelets 6–7 mm, green or slightly tinged with purple, florets 6–9; lower glume 1–1.5 mm, 1-veined, upper glume 1.5–2 mm, 3-veined; lemma 2–2.2 mm, glabrous or subglabrous, upper keel spinulose, margins broadly membranous, apex obtuse or almost truncate; palea keels conspicuously spinulose on upper half; anthers 0.5–0.7 mm. Fl. May–Jul.

- River beaches; ca. 1100 m. Xinjiang.

45. *Puccinellia leiolepis* L. Liu, Fl. Xizang. 5: 126. 1987.

光稃碱茅 guang fu jian mao

Perennial. Culms erect or base creeping, 15–20 cm tall, much branched. Leaf sheaths broad, loose, uppermost sheath enclosing panicle base; ligule 1–1.5 mm, obtuse; leaf blades flat or conduplicate, 2–5 cm, 1–2 mm wide. Panicle 5–8 × ca. 1 cm; branches 2–4 per node, scabrid, base naked. Spikelets 4–6 mm, florets 5–7; lower glume ca. 1 mm, 1-veined, apex obtuse, upper glume ca. 1.5 mm, 3-veined; lemmas 2–2.3 mm, glabrous, apex obtuse; palea keels scabrid, anthers 0.6–0.8 mm. Fl. Jun–Jul.

- Wet ravines, saline places, alpine meadows; 3000–4500 m. Xizang, Qinghai, Sichuan.

46. *Puccinellia hauptiana* (Trinius ex V. I. Kreczetowicz) Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 1: 255. 1937.

鹤甫碱茅 he fu jian mao

Atropis hauptiana Trinius ex V. I. Kreczetowicz in Komarov, Fl. URSS 2: 763. 1934; *Puccinellia kobayashii* Ohwi.

Perennial, loosely tufted, grayish green. Culms 15–60 cm tall, 1–2 mm in diam. Ligule 1–1.5 mm; leaf blades flat or conduplicate, 2–6 cm, 1–2 mm wide, margins and adaxial surface scabrid. Panicle open, 6–20 cm; branches 3–8 cm, horizontally spreading or reflexed, scabrid. Spikelets 4–5 mm, florets 5–8; glumes ovate, lower glume 0.7–1 mm, upper glume 1.2–1.5 mm; lemmas 1.6–1.8 mm, green, rarely purple tinged, base pubescent, apex broadly obtuse; palea keels ciliate-scabrid; anthers 0.3–0.5 mm, Fl. Jun–Jul. $2n = 28$.

River banks, marshy lake shores, ditch banks in fields, low wet saline flats and sandy places in river valleys; 100–3000 m. Anhui, Gansu, Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang [Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; E Europe, North America].

47. *Puccinellia iliensis* (V. I. Kreczetowicz) Sergievskaja in Krylov, Fl. Zapadnoi Sibiri 12: 3116. 1961.

伊犁碱茅 yi li jian mao

Atropis iliensis V. I. Kreczetowicz in Komarov, Fl. URSS 2: 763. 1934.

Perennial, densely tufted, grayish green. Culms (5–)10–25(–30) cm tall. Ligule ca. 1 mm; leaf blades thin, 1–6 cm, 0.5–2 mm wide. Panicle open or contracted, 5–8 cm; branches 2–4 per node, slender, scabrid, spikelets 3–5 on upper part. Spikelets 2.5–3 mm, green, later tinged purplish red, florets 2–4(–5); glumes obtuse, lower glume ca. 0.5 mm, upper glume ca. 1 mm; lemmas 1.4–1.6 mm, glabrous, apex rounded; palea keels thinly scabrid on upper part; anthers 0.3–0.5 mm. Fl. Jun–Jul.

Sandy beaches in river valleys, damp grassy places; 600–2000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Uzbekistan].

Tzvelev initially treated this species as a synonym of *Puccinellia hauptiana*, but he now believes that it is best treated as a distinct species.

48. *Puccinellia micrandra* (Keng) Keng & S. L. Chen, Bull. Bot. Res., Harbin 14(2): 140. 1994.

微药碱茅 wei yao jian mao

Puccinellia distans (L.) Parl. var. *micrandra* Keng, Sunyatsenia 6: 58. 1941.

Perennial, loosely tufted, grayish green. Culms geniculate-ly ascending, 10–20 cm tall, ca. 1 mm in diam. Ligule ca. 1 mm, truncate or triangular; leaf blades short, 2–4 cm, 1–2 mm wide, margins and adaxial surface scabrid. Panicle open, 5–8 × up to 5 cm wide; branches 2 per node, 2–4 cm, lower part naked, smooth; pedicels ca. 0.5 mm, scabrid. Spikelets ca. 2.5 mm, pale yellow, later tinged with purple, florets 2 or 3; lower glume 0.6–1 mm, upper glume ca. 1.2 mm, 3-veined; lemmas ca. 1.5 mm, callus shortly hairy, apex truncate; palea keels smooth; anthers 0.3–0.5 mm. Fl. Jun–Jul.

• Watersides, meadows; 1000–3100 m. Gansu, Hebei, Heilongjiang, N Jiangsu, Nei Mongol, Shanxi.

Tzvelev initially treated this species as a synonym of *Puccinellia hauptiana*, but he now believes that it is best treated as a distinct species.

49. *Puccinellia minuta* Bor, Nytt Mag. Bot. 1: 19. 1952.

侏碱茅 zhu jian mao

?*Puccinellia platyglumis* L. Liu.

Perennial, small, densely tufted. Culms 3–8 cm tall, glabrous. Leaf sheaths clustered at base; ligule ca. 1 mm; leaf blades conduplicate or inrolled, 1–2 cm, 0.6–1.2 mm wide, margins scabrid. Panicle contracted to spikelike, erect, ca. 2 × 0.5 cm; branches 2 or 3 per node, ca. 0.5 cm, ascending, smooth; spikelets ca. 3.5 mm, purple tinged, florets 2 or 3; glumes keeled, shortly acuminate, lower glume ca. 0.8 mm, upper glume ca. 1.2 mm, 1-veined; lemmas lanceolate, 2.2–2.3(–2.4) mm, glabrous, apex slightly acuminate; anthers 0.6–0.8 mm. Fl. Jun–Jul.

Alpine sandy lake shores, saline meadows; 4000–5100 m. Qinghai, Xizang [Pakistan].

50. *Puccinellia himalaica* Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 66. 1955.

喜马拉雅碱茅 xi ma la ya jian mao

Perennial, tufted. Culms 5–20 cm tall. Leaf sheaths smooth; ligule 0.7–1.8 mm; leaf blade conduplicate or inrolled, 3–4 cm, 0.7–2 mm wide, glabrous or adaxial surface scabrid. Panicle contracted at first, open at maturity, 3–9 × 1–4 cm; branches 2–5 per node, 1–6 cm, slender, ascending, smooth. Spikelets 2.4–3.5 mm, pale green, becoming purple, florets 2–4; glumes with conspicuous midrib, apex acuminate, lower glume 0.9–1.5 mm, 1-veined, upper glume 1.2–1.9 mm, 3-veined; lemmas 1.5–2.1 mm, glabrous, apex obtusely acuminate, sometimes midrib extended into mucro; palea keels smooth or scabrid toward apex; anthers 0.5–0.7 mm. Fl. Jun–Jul.

Open grassy places, marshy sandy places on lake and river shores, meadows, along ditches, moist lake ravines; 3000–5000 m. Xinjiang, W Xizang [Afghanistan, India, Pakistan; SW Asia (Iran)].

