

102. ELYMUS Linnaeus, Sp. Pl. 1: 83. 1753.

披碱草属 pi jian cao shu

Campeiostrachys Drobow; *Clinelymus* (Grisebach) Nevski, nom. superfl.; *Elymus* sect. *Clinelymus* Grisebach; *Goulardia* Husnot; *Roegneria* K. Koch; *Semeiostrachys* Drobow; *Terrellia* Lunell, nom. illeg. superfl.

Plants perennial, usually tufted, usually without, rarely with, rhizomes. Culms usually erect. Leaf sheath of cauline leaves split almost to base; auricles present or absent; leaf blade flat or rolled. Spike erect to nodding. Spikelets 1 or 2(–4) per node, sessile, rarely very shortly pedicellate, appressed to rachis, clearly laterally compressed, usually all similar, with 2–10 or more florets; rachis tough. Glumes opposite or side-by-side, linear-lanceolate to lanceolate-ovate, firmly membranous to leathery, 1–9(–11)-veined, not keeled, apex obtuse to shortly awned; veins ± raised. Lemma lanceolate-oblong, rounded abaxially, 5-veined, ± pubescent, apex obtuse or acute to awned, rarely toothed; veins connivent at apex; awn erect or reflexed. Palea shorter than or equaling lemma, apex retuse, subrounded, or acute. Caryopsis usually adherent to lemma and palea. $x = 7$.

About 170 species: temperate regions of both hemispheres, mainly in Asia; 88 species (62 endemic) in China.

The genus *Roegneria* should be referred to *Elymus* because of their many common characters, e.g., plants usually tufted; spikelets usually all similar, 1 per node; lemma lanceolate-oblong, rounded abaxially, 5-veined, veins connivent at apex.

In addition, two North American species have been recorded as cultivated in China (FRPS 9(3): 10, 66. 1987): *Elymus canadensis* Linnaeus and *E. trachycaulus* (Link) Gould ex Shinners (as *R. pauciflora* (Schweinitz) Hylander).

Löve (Feddes Rept. 95: 447–473. 1984) published several new combinations and *nomina nova* in *Elymus* based on names previously validly published in *Roegneria* by Keng and Chen (Acta Univ. Nankin. Sci. Nat. [J. Nanjing Univ. (Biol.)] 1963(1): 1–92. 1963). However, in all cases, Löve cited the place of publication of the basionym from a later publication by Keng (Fl. III. Pl. Prim. Sin. Gram., ed. 2, 1965). Under Art. 33.3 of the Saint Louis Code, Löve's combinations were not validly published. These errors in citation are not correctable under Art. 33.4 because they are omissions, nor are they correctable under Art. 33.6(a) because conditions for valid publication were not again fulfilled in the 1965 work.

All species of this genus are good forage plants.

- 1a. Spikelets 2 per node (at least at middle nodes), rarely 3 or 4 per node.
 - 2a. Glumes much shorter than lemma.
 - 3a. Lemma awn more than 10 mm.
 - 4a. Leaf blade flat, 10–15 × 0.5–1 cm 7. *E. sibiricus*
 - 4b. Leaf blade flat or ± rolled, 3–10 × 0.2–0.5 cm.
 - 5a. Leaf blade flat, 3–5 mm wide; glume apex with awn 1–4 mm 8. *E. nutans*
 - 5b. Leaf blade ± rolled, ca. 2 mm wide; glume apex mucronate or acuminate 9. *E. atratus*
 - 3b. Lemma awn less than 7 mm.
 - 6a. Leaf blade 1.5–3 mm wide; glumes oblong, 2–3 mm, 3-veined 12. *E. sinosubmuticus*
 - 6b. Leaf blade 3–5 mm wide; glumes ovate-lanceolate, oblong-lanceolate, or narrowly lanceolate, 3–4 mm, 1–3-veined.
 - 7a. Spikelets 13–15 mm, with 4–6 florets; glumes oblong-lanceolate or ovate-lanceolate 10. *E. breviaristatus*
 - 7b. Spikelets 10–12 mm, with 3 or 4 florets; glumes narrowly lanceolate 11. *E. alpinus*
 - 2b. Glumes slightly shorter than or equaling lemma.
 - 8a. Rachis densely hirsute, nodes swollen 6. *E. villifer*
 - 8b. Rachis not densely hirsute, nodes not swollen.
 - 9a. Culms, leaf blade, and spike all farinaceous; glumes and lemma ± purplish punctate; awn purple, pubescent 5. *E. purpuraristatus*
 - 9b. Culms, leaf blade, and spike not farinaceous; glumes and lemma not purplish punctate; awn green, glabrous but scabrous.
 - 10a. Glumes hirsutulous along veins.
 - 11a. Leaf sheath glabrous; spike purplish; glume apex acuminate or with point ca. 1.5 mm 2. *E. barystachyus*
 - 11b. Leaf sheath villous at base; spike green; glume apex usually with awn to 5 mm 4. *E. dahuricus*
 - 10b. Glumes scabrous along veins.
 - 12a. Glume apex acuminate or with awn 1–4 mm; lemma with usually erect awn (3–)5–13 mm.
 - 13a. Culms to 120 cm tall, 4- or 5-noded; leaf blade 10–20 × 0.6–1.4 cm; lemma glabrous, or hirsutulous in distal half 1. *E. tangutorum*
 - 13b. Culms 40–80 cm tall, 2- or 3-noded; leaf blade 5–12 × ca. 0.5 cm; lemma puberulent throughout ... 4. *E. dahuricus*
 - 12b. Glume apex with awn 5–7 mm; lemma with usually reflexed awn 8–20(–40) mm.
 - 14a. Leaf blade 1–1.6 cm wide; spikelets 2 or 3(or 4) per node 3. *E. excelsus*
 - 14b. Leaf blade 0.5–0.9(–1.2) cm wide; spikelets 2 per node, or 1 per node in proximal and distal parts of spike 4. *E. dahuricus*

1b. Spikelets 1 per node.

- 15a. Lemma with long, strongly recurved awn at seed maturity; if lemma awn short or nearly absent, or only slightly curved, then palea shorter than lemma, ciliate along keels, and apex rounded or emarginate.
- 16a. Glumes usually slightly shorter than or equaling first lemma, 5–7-veined.
- 17a. Palea oblong-obovate, much shorter than lemma 14. *E. ciliaris*
- 17b. Palea oblong, slightly shorter than or equaling lemma.
- 18a. Lemma glabrous throughout 20. *E. tibeticus*
- 18b. Lemma scabrous, pubescent, or hispidulous throughout.
- 19a. Glumes with thin margin 15. *E. canaliculatus*
- 19b. Glumes not with thin margin.
- 20a. Lemma abaxially hispidulous or laxly spinulose.
- 21a. Lemma abaxially laxly spinulose, awn 2–2.5 cm; culms 30–50 tall 16. *E. sinoflexuosus*
- 21b. Lemma abaxially hispidulous, awn 2.5–4.5 cm, culms 60–100 cm tall 17. *E. gmelinii*
- 20b. Lemma abaxially smooth and glabrous (at middle), scabrous, puberulent, or pubescent, sometimes spinulose along veins.
- 22a. Lemma abaxially scabrous, puberulent, or pubescent.
- 23a. Lemma abaxially puberulent; culms 25–30 cm tall 18. *E. zhui*
- 23b. Lemma abaxially scabrous or pubescent, margin ciliate; culms 30–90 cm tall 19. *E. formosanus*
- 22b. Lemma abaxially smooth and glabrous at middle, otherwise spinulose along veins or ± puberulent.
- 24a. Leaf blade usually flat, thin; glume apex acuminate 21. *E. nakaii*
- 24b. Leaf blade involute, stiff; glume apex acute or with point 1–5 mm 22. *E. strictus*
- 16b. Glumes much shorter than first lemma, (1–)3–5-veined; if glumes only slightly shorter than first lemma then margin thin, scarious, membranous, or very narrowly hyaline.
- 25a. Glumes slightly shorter than first lemma, margin thin, scarious, membranous, or very narrowly hyaline.
- 26a. Glume margin scarious.
- 27a. Culms 80–150 cm tall 23. *E. caninus*
- 27b. Culms 30–60 cm tall 24. *E. caesifolius*
- 26b. Glume margin thin, membranous, or very narrowly hyaline.
- 28a. Glume margin thin; spikelets pedicellate, pedicel 0.8–9 mm.
- 29a. Spikelet pedicel 0.8–1.5(–2) mm 25. *E. durus*
- 29a. Spikelet pedicel 5–9 mm 13. *E. cacuminis*
- 28b. Glume margin membranous or very narrowly hyaline; spikelets sessile or subsessile.
- 30a. Glume margin very narrowly hyaline.
- 31a. Culms 50–100 cm tall, 3–5-noded; leaf blade flat, 2.5–8 mm wide 26. *E. antiquus*
- 31b. Culms 10–60 cm tall, 2- or 3-noded; leaf blade tightly involute, 1–4 mm wide 27. *E. burchan-buddae*
- 30b. Glume margin membranous.
- 32a. Lemma glabrous throughout.
- 33a. Glume apex with short awn; leaf blade adaxial surface villous 28. *E. serpentinus*
- 33b. Glume apex awnless, usually acute; leaf blade adaxial surface usually scabrous 29. *E. glaberrimus*
- 32b. Lemma puberulent or ± hispidulous.
- 34a. Spikelets with 3 or 4 florets; lemma puberulent 30. *E. pseudocaninus*
- 34b. Spikelets with 4 or 5(or 6) florets; lemma hispidulous distally and near margin 31. *E. sinkiangensis*
- 25b. Glumes much shorter than first lemma, margin herbaceous.
- 35a. Glume apex usually tapering into awn 2–7 mm; palea equaling lemma.
- 36a. Lemma glabrous throughout.
- 37a. Culms 15–20 cm tall; first lemma 7–9 mm; anthers yellow or purple, 1.2–2.5 mm 32. *E. jacquemontii*
- 37b. Culms (15–)40–50 cm tall; first lemma 10–12 mm; anthers black or brown, 2–5 mm.
- 38a. First lemma ca. 10 mm; anthers black, ca. 2 mm 33. *E. aristiglumis*
- 38b. First lemma 11–12 mm; anthers brown, 4–5 mm 34. *E. shouliangiae*
- 36b. Lemma hirsute or hirsutulous throughout, pubescent only at base and margin, or puberulent proximally and hispidulous distally.
- 39a. Lemma pubescent only at base and margin 37. *E. altissimus*
- 39b. Lemma hirsute or hirsutulous throughout, or puberulent proximally and hispidulous distally.
- 40a. Lemma hirsutulous throughout.
- 41a. Culms 1- or 2-noded; spikelets with 2 or 3 florets 33. *E. aristiglumis*
- 41b. Culms 3-noded; spikelets with 4 or 5 florets 35. *E. confusus*
- 40b. Lemma hirsute throughout, or puberulent proximally and hispidulous distally.

- 42a. Lemma hirsute throughout; culms 60–75 cm tall; palea ciliate along keels distally 36. *E. anthosachnoides*
 42b. Lemma puberulent proximally, hispidulous distally; culms 20–45 cm tall; palea
 puberulent between keels distally 39. *E. serotinus*
- 35b. Glume apex acute, mucronate, or with awn less than 2 mm; palea slightly shorter to slightly longer
 than lemma.
- 43a. Palea equaling or slightly longer than lemma; anthers 2.5–3 mm; lemma awn (2.5–)3.5–5.5 cm.
 44a. Leaf blade 1–2 mm wide; palea ciliate along keels 40. *E. retroflexus*
 44b. Leaf blade 2–4 mm wide; palea glabrous along keels 41. *E. leiotropis*
- 43b. Palea slightly shorter than lemma; anthers 1–2 mm; lemma awn 1–3 cm.
 45a. Spike somewhat nitid; lemma glabrous or sparsely puberulent abaxially 42. *E. brevipes*
 45b. Spike not nitid; lemma pubescent, hirsutulous, or scabrous abaxially.
- 46a. Spikelets sessile or very shortly pedicellate, with 1–4(or 5) florets.
 47a. Spikelets usually very shortly pedicellate, with 3 or 4(or 5) florets 43. *E. schrenkianus*
 47b. Spikelets sessile; with 1–3(–5) florets.
 48a. Spikelets with 1–3 florets; culms 70–150 cm tall, 5–7-noded 37. *E. altissimus*
 48b. Spikelets with 2–5 florets; culms 40–80 cm tall, 3- or 4-noded 38. *E. laxinodis*
- 46b. Spikelets usually sessile, with 4–9 florets.
 49a. Lemma hirsute throughout, especially distally and near margin, first lemma
 13–14 mm 36. *E. anthosachnoides*
 49b. Lemma ± hirsutulous or scabrous abaxially, first lemma 9–11 mm.
 50a. Lemma ± hirsutulous abaxially, first lemma ca. 11 mm, awn 3–4 cm; spikelets with
 7–9 florets 44. *E. pulanensis*
 50b. Lemma scabrous abaxially, rarely hirsutulous, first lemma 9–11 mm, awn 1.8–3 cm;
 spikelets with 4–7 florets.
 51a. Spike ± purplish, nodding, 13–15 cm; glumes oblong-lanceolate, apex acute; lemma
 scabrous or hirsutulous abaxially 45. *E. purpurascens*
 51b. Spike usually glaucous green, slender and flexuose, 7–9 cm; glumes linear-lanceolate,
 apex usually acuminate; lemma scabrous abaxially 46. *E. tschimganicus*
- 15b. Lemma with straight awn or awnless; palea slightly shorter to slightly longer than lemma.
 52a. Lemma awn shorter than 7 mm or absent.
 53a. Lemma apex truncate, with 3 teeth 51. *E. tridentatus*
 53b. Lemma ± narrowed toward apex, without teeth.
 54a. Palea equaling or slightly longer than lemma, apex narrowly truncate.
 55a. Lemma ± pilose 47. *E. mutabilis*
 55b. Lemma smooth, glabrous.
 56a. Plants without rhizomes 48. *E. magnaespes*
 56b. Plants ± with rhizomes.
 57a. First lemma ca. 10 mm, callus smooth, glabrous; anthers ca. 3 mm 49. *E. alashanicus*
 57b. First lemma 7.8–9 mm, callus puberulent; anthers 4.5–5 mm 52. *E. elytrigioides*
- 54b. Palea slightly shorter to longer than lemma, apex emarginate, rounded, or subrounded.
 58a. Glumes densely pubescent adaxially 50. *E. jufinshanicus*
 58b. Glumes not as above.
 59a. Palea 2/3–3/4 as long as lemma, subsmooth along keels 53. *E. grandis*
 59b. Palea equaling, subequaling, or longer than lemma, ± ciliate along keels.
 60a. Glumes 4–9-veined; palea slightly shorter to slightly longer than lemma.
 61a. Culms 30–80 cm tall; leaf blade 2–4 mm wide.
 62a. Spikelets 1.4–1.8 cm, with 5 or 6 florets; lemma margin broadly membranous 59. *E. viridulus*
 62b. Spikelets 1–1.4 cm, with 2–4 florets; lemma margin not membranous 60. *E. cheniae*
 61b. Culms usually more than 100 cm tall; leaf blade 5–11 mm wide.
 63a. Spikelets with 3–5 florets; glumes 5–7-veined; culms 100–160 cm tall 61. *E. intramongolicus*
 63b. Spikelets with 5–9 florets; glumes 7–9-veined; culms 50–120 cm tall 62. *E. nevskii*
- 60b. Glumes 3–5-veined; palea equaling lemma.
 64a. Spikelets with 2 or 3 florets 55. *E. kronokensis*
 64b. Spikelets with 3–6 florets.
 65a. Culms ca. 100 cm tall, 4- or 5-noded 54. *E. sylvaticus*
 65b. Culms 20–60 cm tall, 2–4-noded.
 66a. Culms 45–60 cm tall, 2- or 3-noded 56. *E. yushuensis*
 66b. Culms 20–45 cm tall, 2–4-noded.

- 67a. Culms ca. 45 cm tall, usually 4-noded, palea keels wingless and ciliate 57. *E. leianthus*
 67b. Culms 20–25 cm tall, usually 2-noded; palea keels winged and ciliate 58. *E. humilis*
- 52b. Lemma awn more than 7 mm (but 1–35 mm *E. abolinii*).
- 68a. Glumes 5–7(–9)-veined, slightly shorter or longer than lemma.
- 69a. Glumes (especially distal one) longer than lemma.
- 70a. Spike somewhat lax; palea shorter than lemma; anthers 3–7 mm 81. *E. abolinii*
 70b. Spike dense, secund; palea subequaling lemma; anthers 2.5–3 mm.
- 71a. Glume margin membranous; lemma scabrous or appressed setose 82. *E. fedtschenkoi*
 71b. Glume margin not membranous; lemma pubescent 83. *E. platyphyllus*
- 69b. Glumes (especially proximal one) slightly shorter than lemma.
- 72a. Spikelets pedicellate, pedicel 1–2.5 mm 85. *E. magnipodus*
 72b. Spikelets sessile.
- 73a. Lemma ± glabrous abaxially, margin narrowly membranous 84. *E. shandongensis*
 73b. Lemma puberulent, pilose, or ± hirsutulous abaxially, margin not membranous.
- 74a. Lemma margin ciliate 86. *E. pendulinus*
 74b. Lemma margin not ciliate.
- 75a. Glume margin scarious; leaf blade abaxial surface glabrous or scabrous, adaxial surface
 scabrous or pubescent 87. *E. komarovii*
 75b. Glume margin not scarious; leaf blade both surfaces pilose or scabrous 88. *E. tianschanigenus*
- 68b. Glumes (2 or)3–5-veined, at least proximal glume 3-veined, usually much shorter than lemma,
 or if subequaling lemma then apex shortly awned.
- 76a. Glumes always and lemma sometimes with membranous or scarious margin.
- 77a. Glumes and lemma with membranous or scarious margin.
- 78a. Lemma glabrous to hispidulous, margin membranous 63. *E. kamoji*
 78b. Lemma hirsutulous proximally and distally, subglabrous at middle, long ciliate near margin,
 margin broadly scarious 64. *E. hybridus*
- 77b. Glumes with membranous margin; lemma without such margin.
- 79a. Culms 50–60 cm tall, 2- or 3-noded.
- 80a. Glumes 5–6 mm; lemma awn 5–10 mm; anthers black 65. *E. curtiaristatus*
 80b. Glumes 9–12 mm; lemma awn 12–15 mm; anthers yellow 66. *E. scabridulus*
- 79b. Culms 60–100 cm tall, 4–7-noded.
- 81a. Spikelets 3.5–4.5 cm, with 5–10 florets 67. *E. yangiae*
 81b. Spikelets to 2 cm, with 3–9 florets.
- 82a. Spikelets ± pedicellate; glumes oblong-lanceolate; palea scabrous along keels distally 68. *E. dolichatherus*
 82b. Spikelets sessile; glumes narrowly lanceolate; palea ± ciliate along keels.
- 83a. Glumes and lemma usually smooth, glabrous, rarely scabrous along veins 70. *E. calcicola*
 83b. Glumes and lemma hirsute or villous.
- 84a. Glumes lanceolate, subequal, 5–6 mm, 2-veined, hispidulous along veins; lemma
 densely villous abaxially 71. *E. trichospiculus*
 84b. Glumes oblong-lanceolate, hirsute, proximal one 5–6.5 mm, 3- or 4-veined, distal
 one 6.5–7.5 mm, 4- or 5-veined; lemma usually densely pubescent proximally,
 scabrous-ciliate distally 69. *E. tenuispicus*
- 76b. Glumes and lemma without membranous or scarious margin.
- 85a. Lemma ± puberulent abaxially.
- 86a. Spikelets 12–16 mm, with 3–5 florets.
- 87a. Glumes oblong-lanceolate, 7–10 mm; lemma awn 10–18 mm 72. *E. sinicus*
 87b. Glumes lanceolate, 2–5 mm; lemma awn 6–8 mm 74. *E. caianus*
- 86b. Spikelets 9–12 mm, with 2 or 3 florets.
- 88a. Culms usually 2-noded; glume apex acuminate 76. *E. hongyuanensis*
 88b. Culms 5–7-noded; glume apex with awn 1.5–3 mm 75. *E. debilis*
- 85b. Lemma smooth or scabrous abaxially.
- 89a. Lemma callus glabrous or subglabrous 78. *E. angustispiculatus*
 89b. Lemma callus distinctly hirsute.
- 90a. Spikelets with 2 or 3 florets; lemma callus hairs 1–3 mm 73. *E. puberulus*
 90b. Spikelets with 4–8 florets; lemma callus hairs 4–10 mm.
- 91a. Lemma callus hairs 6–10 mm 77. *E. barbicallus*
 91b. Lemma callus hairs 4–6 mm.
- 92a. Leaf blade adaxial surface scabrous; lemma scabrous abaxially 79. *E. hondae*
 92b. Leaf blade adaxial surface pubescent; lemma smooth and glabrous abaxially 80. *E. alienus*

1. *Elymus tangutorum* (Nevski) Handel-Mazzetti, Symb. Sin. 7: 1292. 1936.

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Clinelymus tangutorum Nevski, Bull. Jard. Bot. Acad. Sci. URSS 30: 647. 1932; *Elymus molliusculus* L. B. Cai.

Culms erect or geniculate at base, to 120 cm tall, 4- or 5-noded. Leaf sheath smooth; leaf blade flat, 10–20 × 0.6–1.4 cm, both surfaces scabrous or abaxial surface smooth and adaxial surface pilose. Spike erect, usually dense, 8–15 × 0.8–1 cm; rachis margin ciliate. Spikelets usually 2 per node, green or slightly purplish, 9–15 mm, with 3 or 4 florets. Glumes lanceolate or linear-lanceolate, 7–10 mm, obscurely 5-veined, scabrous or hirsutulous along veins, apex acuminate or with awn 1–3 mm. Lemma lanceolate, glabrous, or hirsutulous distally; first lemma 8–12 mm; awn erect, (3–)5–11 mm. Palea equalling lemma, ciliate along keels, apex narrowly obtuse. Fl. and fr. late summer. 2n = 42.

Mountain slopes, steppes. Gansu, Guizhou, Hubei, Nei Mongol, Ningxia, Qinghai, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, ?Nepal].

Elymus molliusculus is very similar to *E. tangutorum* in culm height and features of leaf blade, spike, spikelets, and lemma. It is therefore treated here in synonymy.

2. *Elymus barystachyus* L. B. Cai, Acta Bot. Boreal.-Occid. Sin. 13: 70. 1993.

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Culms laxly tufted or solitary, usually geniculate at base, 50–80 cm tall, 2.5–4.5 mm in diam., 3–5-noded. Leaf sheath glabrous; ligule ca. 1 mm, membranous; leaf blade 7–22 × 0.4–0.8 cm, both surfaces glabrous. Spike 8–18 × 0.5–0.9 cm; rachis margin ciliate. Spikelets usually 2 per node, or 1 per node proximally and distally in spike, purplish, 10–18 mm, with 4–6 florets. Glumes linear-lanceolate, 7–10 mm, 4–7-veined, hirsutulous along veins, apex acuminate or with point ca. 1.5 mm. Lemma oblong-lanceolate, scabrous proximally, densely pubescent distally and at margin, apex acute or with short awn 1–2 mm; first lemma 7–8 mm. Palea equalling lemma, ciliate along keels, otherwise glabrous. Anthers black or tinged yellowish, ca. 2 mm. Fl. and fr. Jun–Aug.

- Forests; 2700–3200 m. Qinghai, Sichuan, Xizang.

3. *Elymus excelsus* Turczaninow ex Grisebach in Ledebour, Fl. Ross. 4: 331. 1852.

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Clinelymus excelsus (Turczaninow ex Grisebach) Nevski; *Elymus dahuricus* Turczaninow ex Grisebach subsp. *excelsus* (Turczaninow ex Grisebach) Tzvelev; *E. dahuricus* var. *excelsus* (Turczaninow ex Grisebach) Roshevitz.

Culms robust, ca. 140 cm tall, ca. 6 mm in diam. Leaf sheath glabrous or pubescent at base; leaf blade usually glaucous, flat, 20–30 × 1–1.6 cm, both surfaces scabrous or abaxial surface smooth. Spike erect, robust, 15–22 cm; rachis margin ciliate. Spikelets 2 or 3(or 4) per node, 2–15(–25) mm exclud-

ing awns, with 4 or 5 florets. Glumes narrowly lanceolate, 10–13 mm, 5–7-veined, scabrous along veins, apex with awn ca. 7 mm. Lemma scabrous, glabrous or pubescent distally and at margin; first lemma 8–12 mm; awn reflexed, 15–20(–40) mm, scabrous. Palea slightly shorter than lemma, ciliate along keels, slightly pubescent between keels. Fl. and fr. Jul–Aug. 2n = 42*.

Scrub, meadows, riverside sands, pebbles and rocks up to lower mountain slopes. Gansu, Hebei, Heilongjiang, Henan, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan [Japan, Korea, Mongolia, Russia].

4. *Elymus dahuricus* Turczaninow ex Grisebach in Ledebour, Fl. Ross. 4: 331. 1852.

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Culms erect or geniculate at base, 40–140 cm tall, 2–4-noded. Leaf sheath glabrous, or densely pilose at base; leaf blade ± glaucous, flat, rarely rolled, 5–25 × 0.5–1(–1.2) cm, abaxial surface smooth, adaxial surface smooth or scabrous. Spike erect, somewhat dense, 14–18 × 0.5–1 cm; rachis margin ciliate. Spikelets green or purplish green, usually stramineous at maturity, (1 or)2 per node, 9–15 mm, with 2–5 florets. Glumes lanceolate or linear-lanceolate, 7–10 mm, 3–5-veined, scabrous or scabrous-hirsutulous along veins, apex acuminate or with awn to 5 mm. Lemma lanceolate, puberulent, pubescent, or densely hirsutulous throughout; first lemma 7–9 mm; awn straight or recurved, 2–20 mm. Palea equalling lemma, ciliate along keels, ± pubescent between keels, apex narrowly truncate. Fl. and fr. Jun–Aug.

Forest glades, scrub, mountain slopes, valleys, meadows, pebbles, sometimes roadsides and field margins; ca. 2600 m. Hebei, Heilongjiang, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, Russia, Turkmenistan, Uzbekistan; SW Asia].

Four varieties occur in China. In addition, *Elymus dahuricus* var. *brevisetus* Ohwi (J. Jap. Bot. 19: 168. 1943) was described from N Shanxi (Ningwu), but no specimens have been seen by the authors.

- 1a. Culms slender, 40–80 cm tall; first lemma 7–8 mm 4c. var. *cylindricus*
- 1b. Culms more robust, 80–140 cm tall; first lemma 8–9 mm.
 - 2a. Lemma awn 2–5 mm 4d. var. *xiningensis*
 - 2b. Lemma awn 10–20 mm.
 - 3a. Leaf sheath glabrous; glumes scabrous along veins 4a. var. *dahuricus*
 - 3b. Leaf sheath densely pilose at base; glumes usually scabrous-hirsutulous along veins 4b. var. *violens*

4a. *Elymus dahuricus* var. *dahuricus*

披碱草(原变种) pi jian cao (yuan bian zhong)

Clinelymus dahuricus (Turczaninow ex Grisebach) Nevski.

Culms more robust, 80–140 cm tall. Leaf sheath glabrous. Glumes scabrous along veins. First lemma ca. 9 mm; awn 10–20 mm. Fl. and fr. Jun–Aug. 2n = 28, 42*.

Forest glades, scrub, meadows, pebbles, sometimes roadsides and field margins. Hebei, Henan, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang [Bhutan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, Russia, Turkmenistan, Uzbekistan; SW Asia].

4b. *Elymus dahuricus* var. *violeus* C. P. Wang & H. L. Yang, Bull. Bot. Res., Harbin 4(4): 86. 1984.

青紫披碱草 qing zi pi jian cao

Culms more robust, 80–140 cm tall. Leaf sheath densely pilose at base. Glumes usually scabrous-hirsutulous along veins. First lemma 8–9 mm; awn 10–18 mm.

- Mountain slopes, valleys. Nei Mongol, Qinghai.

4c. *Elymus dahuricus* var. *cylindricus* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 7: 152. 1884.

圆柱披碱草 yuan zhu pi jian cao

Clinelymus cylindricus (Franchet) Honda; *Elymus beijingensis* B. S. Sun, nom. illeg. superfl.; *E. cylindricus* (Franchet) Honda (1930), not Pohl (1809); *E. dahuricus* subsp. *cylindricus* (Franchet) N. R. Cui; *E. franchetii* Kitagawa.

Culms slender, 40–80 cm tall. Leaf sheath glabrous. Glumes scabrous along veins. First lemma 7–8 mm; awn 6–13 mm. Fl. and fr. later summer. $2n = 42^*$.

- Mountain slopes, roadsides. Hebei, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Yunnan.

4d. *Elymus dahuricus* var. *xiningensis* (L. B. Cai) S. L. Chen, Novon 7: 228. 1997.

西宁披碱草 xi ning pi jian cao

Elymus xiningensis L. B. Cai, Acta Bot. Boreal.-Occid. Sin. 13: 71. 1993.

Culms more robust, 80–110 cm tall. Leaf sheath glabrous. Glumes scabrous along veins. First lemma ca. 8 mm; awn 2–5 mm. Fl. and fr. late summer.

- Mountain slopes; ca. 2600 m. Qinghai.

5. *Elymus purpuraristatus* C. P. Wang & H. L. Yang, Bull. Bot. Res., Harbin 4(4): 83. 1984.

紫芒披碱草 zi mang pi jian cao

Culms robust, to 160 cm tall, together with leaf blade and spike usually farinaceous throughout. Leaf sheath glabrous; leaf blade usually rolled, 15–25 × 0.25–0.4 cm, abaxial surface smooth, adaxial surface scabrous. Spike erect or slightly curved, slender, usually dense, 8–15 cm; rachis margin ciliolate. Spikelets 2 per node, purplish green, 10–12 mm, with 2 or 3 florets. Glumes lanceolate or linear-lanceolate, 7–10 mm, 3-veined, ± purplish punctate, scabrous, hispidulous along veins, apex mucronate. Lemma oblong-lanceolate, purplish punctate throughout, pubescent; first lemma 6–9 mm; awn purple, 7–15 mm, pubescent. Palea equaling or subequaling lemma, ciliolate along keels. Fl. and fr. late summer.

- Mountain slopes, valleys. Nei Mongol.

In the protologue, the specific epithet was misspelled “*purpuraristus*” on p. 83, presumably as a typographical error. In the illustration caption on p. 90 it was correctly spelled “*purpuraristatus*.”

6. *Elymus villifer* C. P. Wang & H. L. Yang, Bull. Bot. Res., Harbin 4(4): 84. 1984.

毛披碱草 mao pi jian cao

Culms erect, 60–75 cm tall. Leaf sheath densely villous; leaf blade flat or slightly rolled, 9–15 × 0.3–0.6 cm, villous throughout. Spike slightly curved, 9–12 cm; rachis with swollen nodes, densely hirsute throughout, margin narrowly winged. Spikelets usually 2 per node, or 1 per node at apex and base of spike, 6–10 mm, with 2 or 3 florets. Glumes narrowly lanceolate, 4.5–7.5 mm, 3- or 4-veined, hirsutulous along veins, margin narrowly membranous, apex acuminate or with awn 1.5–2.5 mm. Lemma oblong-lanceolate, scabrous or hispidulous distally; first lemma 7–11 mm. Palea equaling lemma, ciliolate along keels, pubescent between keels. Fl. and fr. late summer.

- Swales of mountain valleys. Nei Mongol.

7. *Elymus sibiricus* Linnaeus, Sp. Pl. 1: 83. 1753.

老芒麦 lao mang mai

Clinelymus sibiricus (Linnaeus) Nevski; *C. yubaridakensis* Honda; *Elymus sibiricus* var. *brachstachys* Keng; *E. sibiricus* var. *gracilis* L. B. Cai; *E. sibiricus* var. *erectiusculus* L. B. Cai; *E. yubaridakensis* (Honda) Ohwi; *Hordeum sibiricum* (Linnaeus) Schenck (1907), not Link ex Steudel (1840), nor Roshevitz (1929); *Triticum arktasianum* F. Hermann.

Culms usually erect, sometimes slightly decumbent at base, 60–90 cm tall. Leaf sheath glabrous; leaf blade flat, 10–15 × 0.5–1 cm, glabrous or adaxial surface slightly pubescent. Spike pendulous, lax, 15–20 cm; rachis margin scabrous, ciliolate. Spikelets glaucous or purplish glaucous, usually 2 per node, with (3 or)4 or 5 florets. Glumes narrowly lanceolate, 4–5 mm, 3–5-veined, glabrous, scabrous along veins, apex acuminate or with awn ca. 4 mm. Lemma lanceolate, 5-veined, obscurely so at base, scabrous or puberulent; first lemma 8–11 mm; awn 15–20 mm. Palea equaling lemma, ciliolate along keels, puberulent between keels. Fl. and fr. Jun–Aug. $2n = 28^*$, 42^* .

Forest glades, scrub, swales, sands and pebbles in river valleys; 1500–4900 m. Gansu, Hebei, Heilongjiang, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [India, Japan, Korea, Mongolia, Nepal, Russia].

8. *Elymus nutans* Grisebach, Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ. 3: 72. 1868.

重穗披碱草 chong sui pi jian cao

Culms erect or geniculate at base, (13–)50–70 cm tall. Leaf sheath puberulent at base; leaf blade flat, 6–8 × 0.3–0.5 cm, abaxial surface scabrous or smooth, adaxial surface pilose. Spike pendulous, flexuose, somewhat dense, 5–12 cm; rachis margin scabrous, ciliolate. Spikelets usually 2 per node (at least at middle nodes), subsessile or very shortly pedicellate, green,

purplish when mature, 9–15 mm, with 2(or 3) glumes and 2–4 florets. Glumes oblong, subequal, 4–5 mm, 3- or 4(or 5)-veined, scabrous along veins, apex with awn 1–4 mm. Lemma narrowly lanceolate, puberulent; first lemma (6–)10 mm; awn (3–)

12–20 mm, divergently scabrous. Palea equaling lemma, ciliate along keels, puberulent between keels. Fl. and fr. Jul–Aug.

Mountain slopes, grasslands, riverside sands and pebbles; 2800–3400 m. Gansu, Hebei, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India, Japan, Mongolia, Nepal; C and SW Asia].

- 1a. Culms 50–70 cm tall; spikelets with 2 glumes; glumes 3- or 4-veined; first lemma awn 12–20 mm 8a. var. *nutans*
- 1b. Culms 13–20 cm tall; spikelets often with 3 glumes; glumes 5-veined; first lemma awn 3–9 mm 8b. var. *triglumis*

8a. *Elymus nutans* var. *nutans*

重穗披碱草(原变种) chong sui pi jian cao (yuan bian zhong)

Clinelymus nutans (Grisebach) Nevski.

Culms 50–70 cm tall. Spikelets with 2 glumes. Glumes 3- or 4-veined. First lemma ca. 10 mm; awn 12–20 mm. Fl. and fr. Jul–Aug. $2n = 42^*$.

Mountain slopes, grasslands, riverside sands and pebbles. Gansu, Hebei, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India, Japan, Mongolia, Nepal; C and SW Asia].

This variety is a good forage grass.

8b. *Elymus nutans* var. *triglumis* (Q. B. Zhang) G. Zhu & S. L. Chen, *comb. et stat. nov.*

三颖披碱草 san ying pi jian cao

Basionym: *Elymus triglumis* Q. B. Zhang, Acta Bot. Yunnan. 13: 21. 1991.

Culms 13–20 cm tall. Spikelets often with 3 glumes. Glumes 5-veined. First lemma 6–9 mm; awn 3–9 mm. Fl. Jul–Aug.

• Mountain grasslands; 2800–3400 m. Xinjiang (Tian Shan).

9. *Elymus atratus* (Nevski) Handel-Mazzetti, Symb. Sin. 7: 1922. 1936.

黑紫披碱草 hei zi pi jian cao

Clinelymus atratus Nevski, Bull. Jard. Bot. Acad. Sci. URSS 30: 644. 1932.

Culms erect or geniculate at base, somewhat slender, 40–60 cm tall. Leaf sheath smooth, glabrous; leaf blade ± rolled, 3–10(–19) × ca. 0.2 cm, both surfaces glabrous, or pubescent at base. Spikelets usually 2 per node, purplish black when mature, 8–10 mm, with 2 or 3 florets, usually 1 or 2 florets fertile. Glumes narrowly oblong or lanceolate, subequal, 2–4 mm, 1–3-veined, scabrous along midvein, apex mucronate or acuminate; lateral veins obscure. Lemma lanceolate, hirsutulous through-

out; first lemma 7–8 mm; awn usually reflexed, 10–17 mm, scabrous. Palea equaling lemma, ciliate along keels. Fl. and fr. late summer. $2n = 42^*$.

• Steppes. Gansu, Qinghai, Sichuan, Xinjiang, Xizang.

10. *Elymus breviaristatus* Keng ex P. C. Keng, Bull. Bot. Res., Harbin 4(3): 191. 1984.

短芒披碱草 duan mang pi jian cao

Elymus yilianus S. L. Chen, nom. illeg. superfl.

Culms laxly tufted, erect or geniculate at base, ca. 70 cm tall. Leaf sheath smooth; leaf blade flat, 4–12 × 0.3–0.5 cm, scabrous or abaxial surface smooth. Spike pendulous, lax, slender, 10–15 cm; rachis margin scabrous or ciliate. Spikelets 2 per node, glaucous or purplish glaucous, 13–15 mm, with 4–6 florets. Glumes oblong-lanceolate or ovate-lanceolate, 3–4 mm, 1–3-veined, scabrous along veins, apex usually pointed. Lemma lanceolate, puberulent throughout or glabrous at middle part; first lemma 8–9 mm, apex with awn (1–)2–5 mm. Palea equaling lemma, ciliate along keels, puberulent between keels, apex narrowed. Fl. and fr. summer. $2n = 42^*$.

• Mountain slopes. Ningxia, Qinghai, Sichuan, Xinjiang.

“*Elymus brachyaristatus*” (Löve, Feddes Repert. 95: 449. 1984) was not validly published because it was given as a *nomen novum* based on “*Clinelymus breviaristatus*” (Keng, Fl. III. Pl. Prim. Sin. Gram. 423. 1959), which was itself not validly published because no Latin description was provided (Saint Louis Code, Art. 36.1). Moreover, Löve’s supposed blocking name, *E. breviaristatus* (Hitchcock) Á. Löve (loc. cit. 471. Oct 1984), is in fact an illegitimate later homonym (Art. 53.1) because *E. breviaristatus* Keng ex P. C. Keng had already been validly published in July 1984.

11. *Elymus alpinus* L. B. Cai, Acta Biol. Plateau Sin. 14: 8. 1999.

高原披碱草 gao yuan pi jian cao

Culms erect, 25–35 cm tall, usually 5-noded. Leaf sheath usually longer than internode, glabrous; ligule ca. 0.3 mm, apex usually truncate; leaf blade flat or slightly involute, 6–10 × 0.3–0.5 cm, both surfaces glabrous, margin ciliate. Spike erect or slightly flexuose, 4–6 × ca. 0.9 cm; rachis glabrous, but margin ciliate; internodes 2–3 mm. Spikelets (1 or)2 per node, green, 10–12 mm, with 3 or 4 florets; rachilla densely puberulent. Glumes narrowly lanceolate, subequal, 3–4 mm, 1–3-veined, scabrous along midvein, apex acuminate. Lemma lanceolate, abaxially pubescent; first lemma 7–8 mm; awn slender, 3–7 mm. Palea slightly longer than lemma, ciliate along keels distally, puberulent between keels. Anthers blackish, ca. 1.5 mm. Ovary pubescent at apex. Fl. Jul.

• Meadows; ca. 3200 m. Qinghai (Gonghe, Ulan).

12. *Elymus sinosubmuticus* S. L. Chen, *nom. nov.*

无芒披碱草 wu mang pi jian cao

Replaced synonym: *Elymus submuticus* Keng ex P. C. Keng, Bull. Bot. Res., Harbin 4(3): 192. 1984, not *Elymus submuticus* (Hooker) Smyth, Trans. Kansas Acad. Sci. 25: 99. 1913.

Culms erect or geniculate at base, slender, 25–45 cm tall, 2-noded, smooth. Leaf sheath shorter than internode, smooth; ligule very short; leaf blade flat or rolled, 3–6 × 0.15–0.3 cm, abaxial surface smooth, adaxial surface scabrous. Spike lax, curved, 3.5–7.5 cm. Spikelets 2 per node, or 1 per node distally in spike, subsessile or with pedicel ca. 1 mm, purplish, (7–)9–13 mm, with (1 or)2 or 3(or 4) florets, densely puberulent. Glumes oblong, subequal, 2–3 mm, 3-veined, scabrous along raised midvein, apex acute or acuminate. Lemma lanceolate, ± puberulent; first lemma 7–8 mm; awn less than 2 mm. Palea equaling lemma, ciliate along keels, apex narrowly obtuse. Anthers ca. 1.7 mm. Fl. and fr. late summer. $2n = 42^*$.

- Mountain slopes. Sichuan.

13. *Elymus cacuminis* B. Rong Lu & B. Salomon, Nordic J. Bot. 13: 355. 1993 [*“cacuminus”*].

峰峦披碱草 feng luan pi jian cao

Roegneria cacuminis (B. Rong Lu & B. Salomon) L. B. Cai.

Culms tufted at base, erect or geniculately ascending, 25–57 cm tall, (2 or)3(or 4)-noded, glabrous, or sparsely scabrous below spike. Leaf sheath grayish or purplish, usually hairy at base, smooth distally; ligule to 0.5 mm; auricles pale green, brown, or purple; leaf blade light green to purplish, linear, tightly involute or with involute margin, rarely flat, 2–15 × 0.1–0.6 cm, abaxial surface scabrous, adaxial surface ± pubescent. Spike strongly nodding at flowering, secund or distichous, dense or lax, 4–13 × 0.8–1.2 cm; rachis scabrous on back and margin. Spikelets 1 per node, green or purple, 25–40 × 2.5–4.5 mm, with 3–6 florets; pedicel 5–9 mm. Glumes ovate or narrowly lanceolate, glabrous abaxially, scabrous along veins, margin thin, apex mucronate; proximal glume 2–6 × 0.5–1.4 mm, (1 or)2–5-veined; distal glume (2.5–)3–9 × 0.8–1.5 mm, 3–5(–7)-veined. Lemma narrowly lanceolate-elliptic, 8–11 × 1.2–2 mm, scabrous to sparsely pubescent abaxially; callus narrow ± setulose; awn strongly curved at maturity, 1.5–3 cm. Palea slightly shorter than lemma, glabrous to sparsely pubescent adaxially, ciliate along keels. Anthers yellow or purple, 1.3–2 mm. Fl. and fr. Jul–Sep. $2n = 28^*$.

Dry scrub, stony mountain slopes, rocky river banks, streams in valleys; 4300–5000 m. Sichuan, Xizang [India (Sikkim), Nepal].

14. *Elymus ciliaris* (Trinius ex Bunge) Tzvelev, Novosti Sist. Vyssh. Rast. 9: 61. 1972.

纤毛披碱草 xian mao pi jian cao

Culms solitary or tufted, usually geniculate at base, sometimes erect, 40–130 cm tall, 1–5 mm in diam. Leaf sheath glabrous, or pilose at base; leaf blade flat, 9–25 × 0.3–1 cm, glabrous to scabrous, pilose or pubescent, or densely so. Spike erect or nodding, 10–22 cm; rachis scabrous, margin hispid. Spikelets 1(or 2) per node, green, 10–22 mm excluding awns, with 5–12 florets. Glumes oblong-lanceolate or elliptic-lanceolate, proximal one 6–11 mm, distal one 7–13 mm, 5–7-veined, scabrous, ciliate, or white hirsute along veins and margin, apex acute, acuminate, or pointed. Lemma oblong-lanceolate or ob-

long, scabrous to hispid or both, margin shortly ciliate to long ciliate, apex pointed or awned; first lemma 7–12 mm; awn often reflexed, 1–30 mm. Palea oblong-ovate, much shorter than lemma, scabrous or ciliate along keels distally, apex truncate. Fl. and fr. May–Jul.

Mountain slopes, moist meadows, roadsides; 1200–1600 m. Anhui, Fujian, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Japan, Korea, Mongolia, Russia].

- 1a. Leaf blade glabrous to scabrous.
 - 2a. Lemma scabrous abaxially, margin ciliate; palea scabrous along keels distally 14c. var. *hackelianus*
 - 2b. Lemma hispid abaxially, margin long ciliate; palea ciliate along keels distally.
 - 3a. Lemma apex with awn 10–30 mm 14a. var. *ciliaris*
 - 3b. Lemma apex pointed or with awn 1–3(–7) mm 14b. var. *submuticus*
- 1b. Leaf blade pubescent or pilose to densely so.
 - 4a. Glumes elliptic-lanceolate, ciliate along veins and margin, apex pointed; leaf blade densely pilose on both surfaces 14f. var. *lasiophyllus*
 - 4b. Glumes oblong-lanceolate, scabrous or white hirsute along veins and margin, apex acute or acuminate; leaf blade densely pubescent on both surfaces and margin, or pubescent on both surfaces and white pilose along veins and margin.
 - 5a. Glumes scabrous along veins and margin; lemma scabrous or hispidulous abaxially, margin shortly ciliate, first lemma 9–12 mm; culms 4–5 mm in diam.; leaf blade densely pubescent on both surfaces and margin 14d. var. *amurensis*
 - 5b. Glumes white hirsute along veins and margin; lemma punctate-scabrous and densely hispid throughout, first lemma 7–9.5 mm; culms 1–2 mm in diam.; leaf blade pubescent on both surfaces, white pilose along veins and margin 14e. var. *hirtiflorus*

14a. *Elymus ciliaris* var. *ciliaris*

纤毛披碱草(原变种) xian mao pi jian cao (yuan bian zhong)

Triticum ciliare Trinius ex Bunge, Enum. Pl. China Bor. 72. 1833; *Agropyron ciliare* (Trinius ex Bunge) Franchet; *A. ciliare* var. *integrum* Keng; *A. integrum* (Keng) Keng; *A. semicostatum* (Nees ex Steudel) Nees ex Boissier var. *ciliare* (Trinius ex Bunge) Hackel; *Brachypodium ciliare* (Trinius ex Bunge) Maximowicz; *Roegneria ciliaris* (Trinius ex Bunge) Nevski; *R. ciliaris* f. *eriocaulis* Kitagawa.

Leaf blade glabrous but margin scabrous. Glumes elliptic-lanceolate, apex pointed, usually with teeth below point. Lemma hispid abaxially, margin long ciliate; first lemma 8–9 mm; awn 10–30 mm. Palea ciliolate along keels distally. Fl. and fr. May–Jul. $2n = 28^*$.

Mountain slopes, moist meadows, roadsides. Almost throughout China [Japan, Korea, Mongolia, Russia].

14b. *Elymus ciliaris* var. *submuticus* (Honda) S. L. Chen, Novon 7: 228. 1997.

短芒纤毛草 duan mang xian mao cao

Agropyron ciliare var. *submuticum* Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3(1): 27. 1930; *A. ciliare* f. *submuticum* (Honda) Ohwi; *Roegneria ciliaris* var. *submutica* (Honda) Keng.

Leaf blade usually glabrous. Lemma hispid abaxially, margin long ciliate, apex pointed or with awn 1–3(–7) mm. Palea ciliolate along keels distally. Fl. and fr. May–Jul. $2n = 28$.

Mountain slopes, moist meadows, roadsides. Anhui, Hebei, Shaanxi, Shandong, Zhejiang [Japan].

14c. *Elymus ciliaris* var. *hackelianus* (Honda) G. Zhu & S. L. Chen, **comb. nov.**

日本纤毛草 ri ben xian mao cao

Basionym: *Agropyron japonicum* Honda var. *hackelianum* Honda, Bot. Mag. (Tokyo) 41: 385. 1927; *A. ciliare* var. *hackelianum* (Honda) Ohwi; *A. ciliare* f. *japonense* (Honda) Ohwi; *A. ciliare* var. *hondae* Keng, nom. illeg. superfl.; *A. ciliare* var. *pauperum* Keng; *A. hackelianum* (Honda) Beetle; *A. hackelianum* var. *japonicum* Beetle, nom. illeg. superfl.; *A. japonense* Honda; *A. japonense* var. *hackelianum* (Honda) Honda; *A. japonicum* Honda (1927), not (Miquel) P. Candargy (1901); *Elymus ciliaris* var. *japonensis* (Honda) S. L. Chen; *E. ciliaris* subsp. *japonicus* Á. Löve; *E. racemifer* var. *japonensis* (Honda) Osada; *Roegneria ciliaris* var. *hackeliana* (Honda) L. B. Cai; *R. ciliaris* var. *japonensis* (Honda) C. Yen et al.; *R. hackeliana* (Honda) Nakai; *R. japonensis* (Honda) Keng; *R. japonensis* var. *hackeliana* (Honda) Keng; *R. japonica* B. S. Sun, nom. illeg. superfl.

Leaf blade abaxial surface glabrous, adaxial surface and margin scabrous. Glumes elliptic-lanceolate, apex acute or pointed. Lemma scabrous abaxially, margin ciliolate; first lemma 8–8.5 mm; awn 5–25 mm. Palea scabrous along keels distally. Fl. and fr. May–Jul. $2n = 28^*$.

Mountain slopes, roadsides. Anhui, Beijing, Fujian, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Japan, Korea].

When *Agropyron japonicum* and *A. japonicum* var. *hackelianum* are regarded as taxonomic synonyms and treated at varietal rank under *Elymus ciliaris*, the correct name under Art. 11.4 of the Saint Louis Code is the new combination *E. ciliaris* var. *hackelianus*. The earliest legitimate name at varietal rank is *A. japonicum* var. *hackelianum*, not the autonym, “*A. japonicum* var. *japonicum*,” which was not validly published under Art. 27.2. Even though *A. japonicum* Honda is a later homonym and therefore illegitimate, *A. japonicum* var. *hackelianum* is legitimate under Art. 55.2.

14d. *Elymus ciliaris* var. *amurensis* (Drobow) S. L. Chen, Novon 7: 228. 1997.

阿麦纤毛草 a mai xian mao cao

Agropyron amurense Drobow, Trudy Bot. Muz. Imp. Akad. Nauk 12: 50. 1914; *A. ciliare* subsp. *amurense* (Drobow) T. Koyama; *A. ciliare* var. *pilosum* (Korshinsky) Honda; *Elymus ciliaris* subsp. *amurensis* (Drobow) Tzvelev; *Roegneria amurensis* (Drobow) Nevski; *R. ciliaris* var. *pilosa* (Korshinsky) Ohwi; *Triticum ciliare* f. *pilosum* Korshinsky.

Culms 4–5 mm in diam. Leaf blade both surfaces and margin densely pubescent. Glumes oblong-lanceolate, scabrous along veins and margin, apex acute or acuminate. Lemma scabrous or hispidulous abaxially, margin shortly ciliolate; first lemma 9–12 mm; awn 20–25 mm. Fl. and fr. Jun–Jul.

Mountain slopes. Heilongjiang, Nei Mongol [Japan, Korea, Mongolia, Russia].

14e. *Elymus ciliaris* var. *hirtiflorus* (C. P. Wang & H. L. Yang) S. L. Chen, Novon 7: 228. 1997.

毛花纤毛草 mao hua xian mao cao

Roegneria hirtiflora C. P. Wang & H. L. Yang, Bull. Bot. Res., Harbin 4(4): 86. 1984; *Elymus sinohirtiflorus* S. L. Chen; *R. amurensis* var. *hirtiflora* (C. P. Wang & H. L. Yang) L. B. Cai.

Culms 1–2 mm in diam. Leaf blade both surfaces pubescent, white pilose along veins and margin. Glumes oblong-lanceolate, white hirsute along veins and margin, apex acuminate. Lemma punctate-scabrous and densely hispid throughout; first lemma 7–9.5 mm; awn 16–25 mm. Palea laxly ciliolate along keels. Fl. and fr. Jun–Jul.

• Mountain slopes; ca. 1200 m. Nei Mongol.

14f. *Elymus ciliaris* var. *lasiophyllus* (Kitagawa) S. L. Chen, **comb. nov.**

毛叶纤毛草 mao ye xian mao cao

Basionym: *Agropyron ciliare* var. *lasiophyllum* Kitagawa in Nakai et al., Rep. First Sci. Exped. Manchoukuo, Sect. IV, 4: 60, 98. 1936; *Roegneria ciliaris* var. *lasiophylla* (Kitagawa) Kitagawa.

Leaf blade both surfaces densely pilose. Glumes elliptic-lanceolate, ciliate along veins and margin, apex pointed. Lemma hispid abaxially, margin long ciliate; awn 10–25 mm. Fl. and fr. May–Jul.

• Mountain slopes, moist meadows, roadsides; 1500–1600 m. Gansu, Hebei, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi.

15. *Elymus canaliculatus* (Nevski) Tzvelev, Rast. Tsentr. Azii 4: 220. 1968.

沟槽披碱草 gou cao pi jian cao

Agropyron canaliculatum Nevski, Izv. Bot. Sada Akad. Nauk SSSR 30: 509. 1932; *Elymus longearistatus* (Boissier) Tzvelev subsp. *canaliculatus* (Nevski) Tzvelev; *Roegneria ca-*

naliculata (Nevski) Ohwi; *R. longearistata* (Boissier) Drobow var. *canaliculata* (Nevski) L. B. Cai.

Culms erect or geniculately ascending, slender to stout, 30–70 cm tall, 3- or 4(or 5)-noded, glabrous. Leaf sheath glabrous, or sparsely scabrous or grayish purplish hairy at base; ligule 0.2–0.6 mm; auricles pale green or purple, 0.4–0.7 mm; leaf blade green to dark green, involute, 6–20 × 0.1–0.4 cm, abaxial surface glabrous but margin scabrous, adaxial surface scabrous to pilose. Spike strongly nodding at flowering, distichous, lax, 6–20 × 0.6–1.5 cm; rachis scabrous. Spikelets 1 per node, light green to purple, 40–70 × 4–7 mm, with 4–7(–9) developed florets. Glumes narrowly lanceolate-elliptic, proximal one 3–9 × 0.7–1.8 mm excluding awn, distal one 4–10 × 1–2 mm excluding awn, 5–7-veined, scabrous abaxially, margin thin or hyaline, apex mucronate or tapering into a short awn to 5 mm. Lemma narrowly lanceolate-elliptic, 8–12 × 1–2 mm, pubescent abaxially; callus narrow, pointed, setulose or densely so; awn strongly curved, stout, 2.5–5 cm at maturity. Palea narrowly lanceolate-elliptic, slightly shorter than or equaling body of lemma, glabrous adaxially, ciliate along keels. Anthers yellow or purple, 4–5 mm. Fl. and fr. summer. $2n = 28^*$.

Mountain slopes, rocks, valleys; middle to upper mountain belts. Xizang [Pakistan, Russia (Alai, Pamirs), Tajikistan].

16. *Elymus sinoflexuosus* (L. B. Cai) S. L. Chen & G. Zhu, *Novon* 12: 428. 2002.

弯曲披碱草 wan qu pi jian cao

Roegneria flexuosa L. B. Cai, *Acta Phytotax. Sin.* 34: 330. 1996, not *Elymus flexuosus* Tausch (1837).

Plants with short rhizomes. Culms erect, 30–50 cm tall, 1.5–2.5 mm in diam., 3- or 4-noded, glabrous. Leaf sheath glabrous; ligule ca. 1 mm, membranous, apex truncate; leaf blade involute, 4–14 × 0.2–0.3 cm, adaxial surface scabrous or pubescent. Spike slightly nodding, lax, 10–16 cm; rachis flexuose, margin spinose; internodes 12–16 mm. Spikelets 1 per node, 15–20 mm excluding awns, with 6 or 7 florets; rachilla usually puberulent. Glumes oblong-lanceolate, proximal one 5–6 mm, distal one 7–8 mm, 5–7-veined, glabrous, apex acute or pungent. Lemma lanceolate, abaxially laxly spinulose; first lemma 9–10 mm; awn curved, 20–25 mm, scabrous. Palea slightly shorter than or equaling lemma, spinose along keels, glabrous between keels, apex truncate. Anthers yellow, 1.5–2 mm. Fl. and fr. Jul–Aug.

• Mountain slopes; 1700–3500 m. Gansu (Zhangye), Xinjiang (Taxkorgan).

17. *Elymus gmelinii* (Ledebour) Tzvelev, *Rast. Tsentr. Azii* 4: 216. 1968.

真穗披碱草 zhen sui pi jian cao

Culms laxly tufted, slender, 60–100 cm tall, 1.5–3 mm in diam. at base. Leaf sheath smooth, glabrous, but retrorsely pubescent at base; leaf blade flat or involute, 9–20(–26) × 0.2–0.8 cm, abaxial surface glabrous, adaxial surface scabrous or puberulent. Spike erect or nodding, usually secund, 9–15 cm. Spikelets 1 per node, yellowish green or tinged purplish, 15–25 mm, with (3–)5–7 florets. Glumes oblong-lanceolate or lan-

ceolate, subequal and 10–15 mm or proximal one 6–11 mm and distal one 9–12 mm, 5–7-veined, scabrous along veins, apex acute or acuminate. Lemma lanceolate, hispidulous throughout; first lemma 10–12 mm; awn divaricate, 2.5–4.5 cm. Palea equaling or subequaling lemma, hispid along keels, apex sub- obtuse or emarginate. Anthers 2.5–3.5 mm. Fl. and fr. Jun–Aug.

Forest margins, mountain slopes, roadsides; 600–2600 m. Gansu, Hebei, Heilongjiang, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Xinjiang, Yunnan [Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Russia, Turkmenistan, Uzbekistan].

- 1a. Culms 60–80 cm tall, 1.5–2 mm in diam. at base; glumes unequal: proximal one 6–11 mm, distal one 9–12 mm 17a. var. *gmelinii*
 1b. Culms 75–100 cm tall, up to 3 mm in diam. at base; glumes subequal, 10–15 mm 17b. var. *macrathenus*

17a. *Elymus gmelinii* var. *gmelinii*

真穗披碱草(原变种) zhen sui pi jian cao (yuan bian zhong)

Triticum caninum Linnaeus var. *gmelinii* Ledebour, *Fl. Altaic.* 1: 118. 1829 [“*gmelini*”]; *Agropyron caninum* (Linnaeus) P. Beauvois var. *gmelinii* (Ledebour) Pease & A. H. Moore; *A. gmelinii* (Ledebour) Scribner & J. G. Smith (1897), not (Trinius) P. Candargy (1901); *A. turczaninowii* Drobow; *A. turczaninowii* var. *tenuisetum* Ohwi; *Elymus gmelinii* subsp. *tenuisetus* (Ohwi) Á. Löve; *Roegneria gmelinii* (Ledebour) Kitagawa; *R. turczaninowii* (Drobow) Nevski; *R. turczaninowii* var. *pohuashanensis* Keng; *R. turczaninowii* var. *tenuiseta* (Ohwi) H. L. Yang & C. P. Wang; *Semeiostachys turczaninowii* (Drobow) Drobow.

Culms 60–80 cm tall, 1.5–2 mm in diam. at base. Glumes unequal: proximal one 6–11 mm, distal one 9–12 mm. Lemma awn 2–4 cm. Fl. and fr. Jun–Jul. $2n = 28$.

Forest margins, mountain slopes, roadsides; 1300–2300 m. Gansu, Hebei, Heilongjiang, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Xinjiang [Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Russia, Turkmenistan, Uzbekistan].

17b. *Elymus gmelinii* var. *macrathenus* (Ohwi) S. L. Chen & G. Zhu, *Novon* 12: 426. 2002.

大芒披碱草 da mang pi jian cao

Agropyron turczaninowii var. *macrathenum* Ohwi, *Acta Phytotax. Geobot.* 10: 98. 1941; *Roegneria gmelinii* var. *macrathera* (Ohwi) Kitagawa; *R. macrathera* (Ohwi) L. B. Cai; *R. turczaninowii* var. *macrathera* (Ohwi) H. L. Yang & C. P. Wang.

Culms 75–100 cm tall, ca. 3 mm in diam. at base. Glumes subequal, 10–15 mm. Lemma awn 3–4.5 cm. Fl. and fr. Jul–Aug.

• Mountain slopes, roadsides; 600–2600 m. Nei Mongol, Xinjiang.

18. *Elymus zhui* S. L. Chen, *nom. nov.*

小株披碱草 xiao zhu pi jian cao

Replaced synonym: *Roegneria minor* Keng, *Acta Univ.*

Nankin. Sci. Nat. 1963(1): 71. 1963, not *Elymus minor* (J. G. Smith) M. E. Jones, Contr. W. Bot. 14: 20. 1912.

Culms erect or slightly procumbent at base, 25–30 cm tall, ca. 4-noded. Leaf sheath glabrous, or pubescent at base; ligule ca. 0.5 mm or obsolete; leaf blade green, involute or flat, 8–10(–15) × 0.2–0.4 cm, abaxial surface pilose, adaxial surface densely pilose. Spike erect, 8–9 cm. Spikelets 1 per node, green, with (2 or)3–5 florets. Glumes oblong-lanceolate, proximal one 5–7 mm, distal one 6–8 mm, 5- or 6-veined, scabrous along veins, apex acute, sometimes with a tooth just below apex. Lemma lanceolate, puberulent throughout; first lemma ca. 8.5 mm; awn reflexed, ca. 1.2 cm. Palea subequaling lemma, rigidly ciliate along keels, puberulent between keels distally, apex subrounded. Fl. and fr. Jul–Aug.

• Mountain slopes; ca. 1600 m. Guizhou, Hebei, Nei Mongol, Ningxia, Qinghai, Shanxi.

The epithet of this *nomen novum* honors the late Dr. Guanghua Zhu, co-author of the present account of *Triticeae*.

Löve (Feddes Repert. 95: 458. 1984) did not validly publish the combination "*Elymus minor*," which would have been a later homonym; see the note following the genus description above.

19. *Elymus formosanus* (Honda) Á. Löve, Feddes Repert. 95: 449. 1984.

台湾披碱草 tai wan pi jian cao

Culms erect, 30–90 cm tall. Leaf sheath glabrous, or pubescent at base; leaf blade ca. 20 × 0.2–0.6 cm, both surfaces glabrous or scabrous. Spike slightly nodding, 10–20 cm. Spikelets 1 per node, lax, ca. 20 mm, with 5–7 florets. Glumes lanceolate, proximal one ca. 5 mm, distal one 7–9 mm, 5–7-veined, apex acute; veins robust, scabrous. Lemma oblong-lanceolate, ca. 8 mm, abaxially rounded and scabrous or pubescent, margin ciliate; callus broad, rounded; awn recurved, 1–3.5 cm, rigid. Palea subequaling lemma, ciliate along keels, apex subrounded or slightly emarginate. Caryopsis ca. 3 mm. Fl. and fr. Jun–Jul. $2n = 28^*$.

• Mountain slopes. Taiwan.

- 1a. Culms 60–90 cm tall; leaf sheath glabrous, leaf blade 0.4–0.6 cm wide; spike 15–20 cm; lemma awn 2–3.5 cm 19a. var. *formosanus*
1b. Culms 30–50 cm tall; leaf sheath usually pubescent at base; leaf blade 0.2–0.4 cm wide; spike 10–12 cm; lemma awn 1–2 cm 19b. var. *pubigerus*

19a. *Elymus formosanus* var. *formosanus*

台湾披碱草(原变种) tai wan pi jian cao (yuan bian zhong)

Agropyron formosanum Honda, Bot. Mag. (Tokyo) 41: 385. 1927; *Roegneria formosana* (Honda) Ohwi; *R. formosana* var. *longearistata* Keng.

Culms 60–90 cm tall. Leaf sheath glabrous; leaf blade 0.4–0.6 cm. Spike 15–20 cm. Lemma awn 2–3.5 cm. Fl. and fr. Jun–Jul.

• Mountain slopes. Taiwan.

19b. *Elymus formosanus* var. *pubigerus* (Keng) S. L. Chen, Novon 7: 228. 1997.

毛鞘台湾草 mao qiao tai wan cao

Roegneria formosana var. *pubigera* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 60. 1963.

Culms 30–50 cm tall. Leaf sheath usually pubescent at base; leaf blade 0.2–0.4 cm wide. Spike 10–12 cm. Lemma with awn 1–2 cm. Fl. and fr. Jun–Jul.

• Mountain slopes. Taiwan.

20. *Elymus tibeticus* (Melderis) G. Singh, Taxon 32: 640. 1983.

西藏披碱草 xi zang pi jian cao

Agropyron tibeticum Melderis in Bor, Grasses Burma, Ceylon, India, Pakistan, 696. 1960; *Roegneria tibetica* (Melderis) H. L. Yang.

Culms laxly tufted, 70–100 cm tall, 3- or 4-noded, smooth and glabrous, or nodes pubescent. Leaf sheath densely hispidulous proximally, glabrous distally; leaf blade green, flat, 12–16 × 0.3–0.6 cm, abaxial surface and near margin scabrous, adaxial surface pilose. Spike suberect or ± nodding, usually dense, or lax proximally, 10–16 cm. Spikelets 1 per node, green, 10–16 mm excluding awns, with (3 or)4 or 5 florets. Glumes oblong-lanceolate, proximal one 7–8.5 mm, distal one 8.5–10 mm, 5–7-veined, scabrous along veins, margin narrowly hyaline-membranous, apex acuminate or with awn to 6 mm. Lemma narrowly lanceolate, 8–10 mm, glabrous abaxially, apex hispidulous; awn straight or slightly curved, 1–1.7 cm. Palea narrowly lanceolate, subequaling lemma, hispidulous distally abaxially, ciliate along keels, apex emarginate or truncate-obtuse. Anthers yellow, 2–2.3 mm. Fl. and fr. Jul–Aug. $2n = 28^*$.

Forests, mountain slopes, valleys, roadsides; ca. 2500 m. Xizang, Yunnan [Bhutan].

21. *Elymus nakaii* (Kitagawa) S. L. Chen, *comb. nov.*

吉林披碱草 ji lin pi jian cao

Basionym: *Roegneria nakaii* Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 5(5): 151. 1941.

Culms erect, slightly decumbent at base, ca. 100 cm tall, ± puberulent at nodes. Leaf sheath glabrous, or retrorsely pubescent proximally; leaf blade flat, 11–20 × 0.4–0.7 cm, thin, abaxial surface glabrous, adaxial surface pilose. Spike erect, 10–13 cm. Spikelets 1 per node, ± secund, dense, with ca. 5 florets. Glumes lanceolate, proximal one 9–10 mm including point, distal one 9.5–11.5 mm including point, (3–)5(–7)-veined, scabrous along veins, margin glabrous, apex acuminate. Lemma hirsutulous near base and margin and along veins, otherwise glabrous; first lemma ca. 10 mm; awn reflexed, 18–22 mm. Palea subequaling lemma, rigidly ciliate along keels, between keels glabrous proximally and puberulent distally, apex emarginate, truncate, or subrounded. Fl. and fr. Jul–Aug. $2n = 28^*$.

Meadows, mountain slopes. Hebei, Jilin, Nei Mongol, Ningxia [N Korea].

Löve (Feddes Repert. 95: 454. 1984) did not previously validly

publish the combination *Elymus nakaii* because the place of valid publication of the basionym was not cited (Saint Louis Code, Art. 33.3). Instead, *Roegneria nakaii* was cited from Kitagawa (J. Jap. Bot. 17: 236. 1941), where the name was not validly published because no Latin description was provided (Art. 36.1).

22. *Elymus strictus* (Keng) S. L. Chen, *comb. nov.*

肃草 *su cao*

Basionym: *Roegneria stricta* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 68. 1963.

Culms erect or slightly geniculate at base, 50–100 cm tall, glabrous throughout. Leaf sheath glabrous; leaf blade glaucous or farinose, involute, (3.5–)8–16 × (0.1–)0.4–0.8 cm, stiff, abaxial surface glabrous, adaxial surface pubescent. Spike erect, (3.5–)10–18(–26) cm. Spikelets 1 per node, glaucous, or purplish at maturity, (8–)15–20 mm, with (3–)5–8(–14) florets. Glumes: proximal one 5–8(–11) mm, distal one 6–13 mm, (3–)5–7-veined, apex acute or with mucro 1–5 mm; veins usually robust, scabrous. Lemma smooth and glabrous abaxially, or only so at middle and then otherwise ± puberulent, or hirsute along veins and on callus; first lemma (7–)9–10 mm; awn suberect, slightly recurved, (7–)14–22 mm, scabrous. Palea equaling lemma, ciliolate along keels distally, between keels puberulent distally or glabrous, apex emarginate or truncate. Anthers usually yellow, 1–2 mm. Fl. and fr. Jul–Oct. $2n = 28^*$.

• Mountain slopes, valleys, meadows, roadsides; 1300–4000 m. Gansu, Guizhou, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

Löve (Feddes Repert. 95: 458. 1984) did not previously validly publish the combination *Elymus strictus*; see the note following the genus description above. Because of this, Chen and Zhu (Novon 12: 428. 2002) did not previously validly publish *E. strictus* var. *crassus* (Saint Louis Code, Art. 43.1).

- 1a. Palea between keels puberulent distally 22a. var. *strictus*
- 1b. Palea between keels glabrous 22b. var. *crassus*

22a. *Elymus strictus* var. *strictus*

肃草(原变种) *su cao* (*yuan bian zhong*)

Elymus gmelinii (Ledebour) Tzvelev subsp. *strictus* (Keng) K. B. Jensen; *Roegneria stricta* Keng; *R. stricta* f. *major* Keng; *R. varia* Keng.

Lemma glabrous at middle abaxially, otherwise ± puberulent. Palea between keels puberulent distally.

• Mountain slopes, valleys, meadows, roadsides; 1300–2200 m. Gansu, Guizhou, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

22b. *Elymus strictus* var. *crassus* (L. B. Cai) S. L. Chen, *comb. et stat. nov.*

粗壮肃草 *cu zhuang su cao*

Basionym: *Roegneria crassa* L. B. Cai, Acta Phytotax. Sin. 34: 332. 1996.

Lemma glabrous abaxially or hirsute along veins and on callus. Palea between keels glabrous. Fl. and fr. Jul–Aug.

• Mountain slopes; 1800–4000 m. Ningxia, Qinghai.

23. *Elymus caninus* (Linnaeus) Linnaeus, Fl. Suec., ed. 2, 39. 1755.

犬草 *quan cao*

Triticum caninum Linnaeus, Sp. Pl. 1: 86. 1753; *Agropyron caninum* (Linnaeus) P. Beauvois; *Braconotia canina* (Linnaeus) Fourreau; *B. elymoides* Godron, nom. illeg. superfl.; *Elytrigia canina* (Linnaeus) Drobow; *Gouardia canina* (Linnaeus) Husnot; *Roegneria canina* (Linnaeus) Nevski; *Zeia canina* (Linnaeus) Lunell.

Culms laxly tufted, 80–150 cm tall, smooth. Leaf sheath glabrous; leaf blade green or glaucous green, broadly linear, flat, 12–20 × 0.5–1.1 cm, thin, glabrous or adaxial surface scabrous to scattered pilose. Spike nodding, somewhat dense, 10–20 cm. Spikelets 1 per node, green, rarely greenish purple, 10–15 mm excluding awns, with 2–5 florets. Glumes lanceolate, abruptly narrowed distally, 3–5-veined with broad secondary veins, scabrous, margin scarious; proximal glume 0.6–1 cm, awn ca. 2 mm; distal glume 0.7–1.1 cm, awn 2–4 mm. Lemma smooth, 0.9–1.1 cm; awn divergent, 1.5–1.8 cm. Palea apex truncate. Anthers 2.5–2.8 cm. Fl. and fr. Jun–Aug. $2n = 28$.

Forests, forest glades, scrub, mountain slopes; 1300–2000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan; SW Asia, Europe].

24. *Elymus caesifolius* Á. Löve ex S. L. Chen, *nom. nov.*

马格草 *ma ge cao*

Replaced synonym: *Roegneria glaucifolia* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 57. 1963, not *Elymus glaucifolius* Willdenow, Enum. Pl. 131. 1809.

Culms tufted, erect, 30–60 cm tall, 2- or 3-noded, glabrous. Leaf sheath glabrous or pilose at base; leaf blade glaucous, involute, (2–)6–16 × (0.1–)0.3–0.5 cm, stiff, abaxial surface smooth, glabrous, adaxial surface and margin scabrous. Spike erect, 6–15 cm. Spikelets 1 per node, 13–15 mm excluding awns, with 3–5 florets. Glumes oblong-lanceolate, proximal one 4–7 mm, distal one 6–8 mm, both 3-veined or distal one 5-veined, margin scarious, apex acute or acuminate. Lemma oblong-lanceolate, scabrous abaxially, scabrous or hirsutulous along veins; first lemma 9–11 mm; awn reflexed, 15–30 mm, scabrous. Palea slightly shorter than or subequaling lemma, abaxially hirsutulous in distal half, ciliolate along keels, apex truncate. Fl. and fr. late summer. $2n = 42^*$.

• Mountain slopes. Xizang.

Löve (Feddes Repert. 95: 448. 1984) did not previously validly publish the name *Elymus caesifolius*; see the note following the genus description above.

25. *Elymus durus* (Keng) S. L. Chen, *comb. nov.*

岷山披碱草 *min shan pi jian cao*

Basionym: *Brachypodium durum* Keng, Sunyatsenia 6: 54. 1941; *Elymus sclerus* Á. Löve, nom. illeg. superfl.; *Roegneria dura* (Keng) Keng; *R. dura* var. *variiglumis* Keng; *R. tschimganica* (Drobow) Nevski var. *variiglumis* (Keng) L. B. Cai.

Culms solitary or tufted, usually geniculate or with swollen nodes at base, 55–80 cm tall; nodes glaucous or purplish green, glabrous. Leaf sheath sometimes retrorsely pubescent; leaf blade flat or involute, 6–20(–25) × 0.1–0.45 cm, stiff, abaxial surface smooth or puberulent, adaxial surface scabrous or laxly puberulent. Spike nodding, 5–11 cm. Spikelets 1 per node, green or purplish green, 1.6–2.2 cm, with (3 or)4–7 florets; pedicel 0.8–1.5(–2) mm, glabrous or puberulent. Glumes lanceolate, scabrous along veins, margin thin, apex acute, acuminate, or pointed; proximal glume 3–4(–7) mm, 1–5-veined; distal glume 5–9 mm, 3–5-veined. Lemma lanceolate, hispidulous or scabrous; first lemma ca. 11 mm; awn reflexed, 1.5–2.8 cm, scabrous. Palea subequaling lemma, ciliate along keels, puberulent between keels. Anthers black, ca. 1.5 mm. Fl. and fr. late summer. $2n = 28^*$.

• Mountain meadows; 3700–4200 m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan.

Löve (Feddes Repert. 95: 448. 1984) published *Elymus scleris* as a *nomen novum* for *Brachypodium durum*, but the supposed blocking name, "*Elymus durus* Hedw. ex Steud., 1854" (Steudel, Nomencl. Bot., ed. 2, 1: 550, 551. 1840), was merely cited as a synonym by Steudel and was therefore not validly published under Art. 34.1(c) of the Saint Louis Code. Under Art. 11.4, the correct name in *Elymus* at specific rank is *E. durus*. Löve's name was therefore nomenclaturally superfluous when published and is illegitimate under Art. 52.1.

26. *Elymus antiquus* (Nevski) Tzvelev, Rast. Tsentr. Azii 4: 220. 1968.

小颖披碱草 xiao ying pi jian cao

Agropyron antiquum Nevski, Izv. Bot. Sada Akad. Nauk SSSR 30: 515. 1932; *A. microlepis* Melderis; *Elymus microlepis* (Melderis) Melderis; *Roegneria antiqua* (Nevski) B. S. Sun; *R. parvigluma* Keng.

Culms tufted at base, slender, 50–100 cm tall, 3–5-noded, glabrous or scabrous below spike. Leaf sheath smooth or scabrous to sparsely hairy, margin sometimes ciliate; ligule 0.2–0.5 mm; leaf blade flat, 6–15 × 0.25–0.8 cm, both surfaces scabrous or pubescent. Spike ± nodding at flowering, distichous, 7.5–21 cm; rachis glabrous or ± scabrous on back and margin. Spikelets 1 per node, sessile, green or purplish, 20–40 × 2–6 mm, with 3–7(–9) developed florets. Glumes oblong, lanceolate, or subovate, scabrous abaxially or only along veins, margin narrowly hyaline, apex mucronate; proximal glume 1.5–3 × 0.5–1.2 mm, 2- or 3-veined; distal glume 3–5.5 × 0.6–1.5 mm, 3–5-veined. Lemma lanceolate, 8–11.5 × 1.2–1.8 mm, glabrous, pubescent, or densely so abaxially; awn straight or slightly curved, 1–2 mm at maturity; callus setulose to densely so. Palea slightly shorter than lemma, scabrous-pubescent to pubescent adaxially, ciliate along keels distally, apex obtuse. Anthers yellow or purple, 2–3 mm. Fl. and fr. Jun–Jul. $2n = 28^*$.

Mountain slopes and valleys, river banks; 2300–3800 m. Qinghai, Sichuan, Xizang, Yunnan [Nepal].

27. *Elymus burchan-buddae* (Nevski) Tzvelev, Rast. Tsentr. Azii 4: 220. 1968.

短颖披碱草 duan ying pi jian cao

Agropyron burchan-buddae Nevski, Izv. Bot. Sada Akad. Nauk SSSR 30: 514. 1932; *A. nutans* Keng; *Elymus breviglumis* (Keng) Á. Löve ex D. F. Cui; *E. pseudonutans* Á. Löve; *Roegneria breviglumis* Keng; *R. burchan-buddae* (Nevski) B. S. Sun; *R. nutans* (Keng) Keng.

Culms tufted at base, erect or geniculately ascending, 10–60 cm tall, 2- or 3-noded, glabrous or sparsely scabrous below spike. Leaf sheath smooth or sparsely scabrous; ligule 0.2–0.3(–0.5) mm; leaf blade light green to green, sometimes glaucous, tightly involute or with involute margin, 2–10(–18) × 0.1–0.4 cm, both surfaces glabrous, scabrous, or nearly hairy. Spike slightly distichous, rarely secund, 4–11 × 1–1.5 cm; rachis scabrous on back and margin. Spikelets 1 per node, sessile or subsessile, glaucous, (10–)14–35 × 3–6 mm, with 2–5(–7) florets. Glumes lanceolate or lanceolate-ovate, scabrous along veins and sometimes abaxially, margin sometimes very narrowly hyaline, apex acute or mucronate; proximal glume 1.5–5 × 0.5–2 mm, (2 or)3(or 4)-veined; distal glume 3–5(–7.5) × 0.6–2 mm, 3–5-veined. Lemma narrowly lanceolate-elliptic, 7–10 × 1.3–2 mm, scabrous to pubescent abaxially; callus narrow, pointed, setulose or densely so; awn strongly curved at maturity, 1–3 cm. Palea shorter than or equaling body of lemma, glabrous to scabrous adaxially, ciliate along keels distally, apex rounded or obtuse. Anthers yellow to dark purple or black, 1–2 mm. Fl. and fr. Jul–Aug. $2n = 28^*$.

Forest margins, mountain slopes, lands along rivers, river banks; 3000–5500 m. Gansu, Nei Mongol, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [N India, ?Nepal].

28. *Elymus serpentinus* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 427. 2002.

蜿轴披碱草 wan zhou pi jian cao

Roegneria serpentina L. B. Cai, Acta Phytotax. Sin. 35: 167. 1997.

Culms erect, 40–60 cm tall, 1–2 mm in diam., usually 4-noded, glabrous. Leaf sheath shorter than internode, glabrous; ligule ca. 0.4 mm, membranous, apex truncate; leaf blade flat, 4–15 × 0.3–0.4 cm, abaxial surface glabrous, adaxial surface villous. Spike pendulous, lax, 7–11 cm; rachis flexuose, slender, scabrous on back, margin ciliate; internodes 7–12 mm. Spikelets 1 per node, green, 13–16 mm excluding awns, with 4–6 florets; rachilla puberulent. Glumes oblong-lanceolate, 4- or 5-veined, scabrous along veins, margin narrowly membranous, apex dentate on one or both sides; proximal glume 5–6 mm, awn 3–4 mm; distal glume 6–7 mm, awn 4–6 mm. Lemma lanceolate, smooth and glabrous abaxially, scabrous along veins; first lemma 9–10 mm; awn distinctly recurved, 14–18 mm. Palea distinctly shorter than lemma, softly ciliate along keels, puberulent between keels, apex emarginate. Anthers yellow, ca. 3 mm. Ovary puberulent at apex. Fl. and fr. Jul.

• River banks; ca. 2000 m. Hebei (Yuxian).

29. *Elymus glaberrimus* (Keng & S. L. Chen) S. L. Chen, Bull. Nanjing Bot. Gard. 1987: 9. 1988.

光穗披碱草 guang sui pi jian cao

Plants without rhizome, when culms tufted, or with short

rhizome. Culms erect, glaucous, ca. 80 cm tall. Leaf sheath smooth and glabrous, or puberulent at base; leaf blade glaucous, flat, or involute when dry, 8–15 × (0.1–)0.3–0.4 cm, stiff, abaxial surface smooth, glabrous, adaxial surface scabrous. Spike erect, 5–12 cm, with 6–11 spikelets. Spikelets 1 per node, greenish, stramineous when old; rachilla smooth and glabrous, or puberulent. Glumes lucid, oblong-lanceolate, glabrous, margin membranous, apex acute with a tooth on one side; proximal glume 4–6 mm, 3-veined; distal glume 5.5–7.5 mm, 3–5-veined. Lemma oblong-lanceolate, smooth and glabrous throughout; first lemma ca. 9 mm; awn recurved, 3–20 mm, scabrous. Palea equaling lemma, smooth and glabrous abaxially distally or scabrous proximally, ciliate along keels, apex emarginate or truncate. Fl. and fr. Aug–Sep. $2n = 28^*$.

• Meadows, mountain steppes, rocky slopes; 1400–2300 m. Qinghai, Xinjiang.

- 1a. Lemma awn 10–20 mm; plants without rhizome 29a. var. *glaberrimus*
- 1b. Lemma awn 3–5 mm; plants usually with short rhizome 29b. var. *breviaristus*

29a. *Elymus glaberrimus* var. *glaberrimus*

光穗披碱草(原变种) *guang sui pi jian cao* (yuan bian zhong)

Roegneria glaberrima Keng & S. L. Chen, Acta Univ. Nankin. Sci. Nat. 1963(1): 72. 1963.

Plants without rhizome. Lemma awn 10–20 mm. Fl. and fr. Aug–Sep.

• Rocky slopes; 1400–2300 m. Qinghai, Xinjiang.

29b. *Elymus glaberrimus* var. *breviaristus* S. L. Chen ex D. F. Cui, Bull. Bot. Res., Harbin 10(3): 29. 1990.

短芒光穗披碱草 *duan mang guang sui pi jian cao*

Roegneria breviarista (S. L. Chen ex D. F. Cui) L. B. Cai; *R. glaberrima* var. *breviarista* (S. L. Chen ex D. F. Cui) L. B. Cai.

Plants usually with short rhizome. Lemma awn 3–5 mm. Fl. and fr. late summer.

• Meadows, mountain steppes; 1600–1700 m. Xinjiang.

30. *Elymus pseudocanicus* G. Zhu & S. L. Chen, nom. nov.

阿尔泰披碱草 *a er tai pi jian cao*

Replaced synonym: *Elymus altaicus* D. F. Cui, Bull. Bot. Res., Harbin 10(3): 28. 1990, not *Elymus altaicus* A. Sprengel, Tent. Suppl. 5. 1828; *Roegneria altaica* L. B. Cai.

Culms erect, 50–75 cm tall, 3-noded, glabrous; nodes ± purplish. Leaf sheath purplish when young, yellowish brown when older, smooth, glabrous; ligule ca. 1 mm, membranous; leaf blade usually involute, 10–18 × 0.2–0.35 cm, abaxial surface smooth, adaxial surface scabrous. Spike dense, 8–9 cm; rachis smooth, margin ciliate; internodes 7–9 mm. Spikelets 1 per node, purplish, subunilateral, 13–15 mm, with 3 or 4 florets; rachilla puberulent; internodes 2–3 mm. Glumes broadly lanceolate, subequal, 9–11 mm, 5-veined, margin broadly mem-

branous, apex awnless. Lemma purplish, lanceolate, puberulent; first lemma 10–12 mm; callus puberulent; awn purplish, recurved, robust, 14–18 mm. Palea slightly shorter than or subequaling lemma, ciliate along keels distally. Anthers yellow, ca. 2.5 mm. Fl. and fr. Jun–Aug.

• Forest understories along river valleys, mountain slopes. Xinjiang.

31. *Elymus sinkiangensis* D. F. Cui, Bull. Bot. Res., Harbin 10(3): 26. 1990.

新疆披碱草 *xin jiang pi jian cao*

Roegneria sinkiangensis (D. F. Cui) L. B. Cai.

Culms 60–80 cm tall, 2- or 3-noded. Leaf sheath smooth, glabrous, but retrorsely pubescent at base; ligule ca. 0.3 mm; leaf blade flat, 5–30 × 0.3–0.5 cm, abaxial surface smooth, glabrous, adaxial surface long pilose, margin ciliate. Spike erect, dense, 7–10 cm; rachis subglabrous, margin ciliate; internodes 4–7 mm. Spikelets 1 per node, 13–15(–18) mm, with 4 or 5(or 6) florets. Glumes lanceolate, 3–5-veined, hispidulous along veins, margin membranous, apex acuminate or with awn ca. 2 mm; proximal glume 9–10 mm including awn; distal glume 10–12 mm including awn. Lemma lanceolate, hispidulous distally and near margin; first lemma 10–12 mm; awn recurved, 20–35 mm, scabrous. Palea equaling lemma, ciliate along keels. Anthers yellow, 1.5–2 mm. Fl. and fr. Jul–Sep.

• Forest margins, mountain steppes; 1800–2100 m. Xinjiang.

32. *Elymus jacquemontii* (J. D. Hooker) Tzvelev, Rast. Tsentr. Azii 4: 221. 1968.

低株披碱草 *di zhu pi jian cao*

Agropyron jacquemontii J. D. Hooker, Fl. Brit. India 7: 369. 1896 [“1897”]; *Anthosachne jacquemontii* (J. D. Hooker) Nevski; *Roegneria jacquemontii* (J. D. Hooker) Nevski.

Culms slender, 15–20 cm tall, 2- or 3(or 4)-noded. Leaf blade green or light green, glaucous, involute, 2–4(–7) × 0.1–0.2 cm, abaxial surface glabrous, adaxial surface scabrous or ± pubescent. Spike 4–11 × 0.8–2 cm, with 4 or 5 spikelets; rachis slender, 8–15 mm, glabrous. Spikelets 1 per node, sessile, 12–18 mm, with 4–7 florets. Glumes 4.5–7 mm, 5-veined, glabrous, margin hyaline, apex with short awn 1–3(–5) mm. Lemma lanceolate, glabrous throughout; first lemma 7–9 mm; awn strongly curved, 20–50(–60) mm. Palea equaling lemma, ciliate along keels, apex obtuse. Anthers yellow or purple, 1.2–2.5 mm. Fl. and fr. late summer. $2n = 28^*$.

• Stony mountain slopes, alluvial soils, between rocks, usually growing together with *Elymus burchan-buddae* and *E. nutans*; ca. 3900 m. Xinjiang, Xizang.

33. *Elymus aristiglumis* (Keng & S. L. Chen) S. L. Chen, Bull. Nanjing Bot. Gard. 1987: 9. 1988.

芒颖披碱草 *mang ying pi jian cao*

Culms solitary or tufted, erect, (15–)40–50 cm tall, 1- or 2-noded, glabrous. Leaf sheath glabrous; leaf blade flat, ± so, or involute, 6–8(–11) × to 0.5 cm, glabrous, scabrous, or densely

hispidulous. Spike nodding, 6–8 cm excluding awns; rachis margin scabrous; internodes 3–10 mm. Spikelets 1 per node, purple, 12–15 mm excluding awns, with 2 or 3 florets; pedicel 0.5–1 mm, scabrous. Glumes narrowly lanceolate, subsymmetric, 1–3-veined, scabrous or smooth, apex with awn 3–7 mm; proximal glume 3–4 mm; distal glume 3–5 mm. Lemma oblong, smooth and glabrous or hirsutulous; first lemma ca. 10 mm; awn reflexed, 20–40 mm. Palea equaling lemma, hirsutulous throughout, ciliolate along keels. Anthers black, ca. 2 mm. Fl. and fr. late summer. $2n = 28^*$, 42^* .

• Mountain slopes, river banks; 1500–5200 m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang.

- 1a. Leaf blade involute, less than 0.2 cm wide, both surfaces densely hispidulous 33b. var. *hirsutus*
- 1b. Leaf blade flat or ± so, 0.4–0.5 cm wide, glabrous or scabrous.
 - 2a. Lemma ± hirsutulous throughout except callus glabrous, awn 20–30 mm 33a. var. *aristiglumis*
 - 2b. Lemma smooth, glabrous, awn to 40 mm 33c. var. *leianthus*

33a. Elymus aristiglumis var. aristiglumis

芒颖披碱草(原变种) mang ying pi jian cao (yuan bian zhong)

Roegneria aristiglumis Keng & S. L. Chen, Acta Univ. Nankin. Sci. Nat. 1963(1): 55. 1963.

Leaf blade flat, 0.4–0.5 cm wide, glabrous or scabrous. Lemma ± hirsutulous throughout except callus glabrous; awn 20–30 mm. Fl. and fr. late summer.

• Mountain slopes; 1500–3000 m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang.

33b. Elymus aristiglumis var. hirsutus (H. L. Yang) S. L. Chen, Novon 7: 227. 1997.

毛芒颖草 mao mang ying cao

Roegneria aristiglumis var. *hirsuta* H. L. Yang, Acta Phytotax. Sin. 18: 253. 1980.

Leaf blade involute, less than 0.2 cm wide, both surfaces densely hispidulous. Lemma hirsutulous throughout; awn 20–30 mm. Fl. and fr. late summer.

• Mountain slopes; 4400–4500 m. Xizang.

33c. Elymus aristiglumis var. leianthus (H. L. Yang) S. L. Chen, Novon 7: 227. 1997.

平滑披碱草 ping hua pi jian cao

Roegneria aristiglumis var. *leiantha* H. L. Yang, Acta Phytotax. Sin. 18: 253. 1980.

Leaf blade ± flat, 0.4–0.5 cm wide, glabrous or scabrous. Lemma smooth, glabrous; awn to 40 mm. Fl. and fr. late summer.

• Mountain slopes, river banks; 4900–5200 m. Xizang.

34. Elymus shouliangiae (L. B. Cai) G. Zhu, Novon 12: 427. 2002.

守良披碱草 shou liang pi jian cao

Roegneria shouliangiae L. B. Cai, Acta Phytotax. Sin. 35: 161. 1997.

Culms erect, 60–70 cm tall, 2–3 mm in diam., ca. 4-noded. Leaf sheath glabrous; ligule ca. 0.3 mm, apex truncate; leaf blade flat, 9–17 × 0.3–0.6 cm, rigid, both surfaces glabrous or adaxial surface scabrous. Spike lax, 16–19 cm; rachis glabrous, but margin scabrous; internodes 15–23 mm. Spikelets 1 per node, 2.6–3.2 cm excluding awns, with 8–10 florets; rachilla internodes puberulent. Glumes lanceolate, glabrous; proximal glume 7–8 mm, 3- or 4-veined, apex acuminate; distal glume 8–9 mm, 5–7-veined, apex with awn 2–5 mm. Lemma lanceolate, smooth, glabrous; first lemma 11–12 mm; awn recurved, robust, 3.5–4 cm. Palea subequaling lemma, scabrous or spinescent along keels, glabrous between keels, apex truncate. Anthers brown, 4–5 mm. Ovary obovate, apex pubescent. Fl. and fr. Jul.

• River banks; ca. 2800 m. Xizang (Gyirong)

35. Elymus confusus (Roshevitz) Tzvelev var. *breviaristatus* (Keng) S. L. Chen, Novon 7: 228. 1997.

紊草 wen cao

Roegneria confusa (Roshevitz) Nevski var. *breviaristata* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 52. 1963; *R. confusa* subsp. *breviaristata* (Keng) N. R. Cui.

Culms 30–70 cm tall, 3-noded. Leaf sheath glabrous, but retrorsely pilose at base; leaf blade green, usually involute, 3–7.4 × ca. 0.4 cm, abaxial surface glabrous, adaxial surface scabrous. Spike erect, ca. 10 cm. Spikelets yellowish, green, or purplish green, 10–15 mm excluding awns, with 4 or 5 florets. Glumes narrowly lanceolate, 3-veined or distal glume 5-veined, scabrous along veins, apex long acuminate or distal glume with short awn; proximal glume 4–6 mm; distal glume 6–8 mm. Lemma laxly hirsutulous abaxially; first lemma 9–11 mm; awn reflexed, 13–15 mm, scabrous. Palea equaling lemma, ciliolate along keels distally, apex usually truncate. Fl. and fr. Jul–Aug. $2n = 42^*$.

• Meadows. Ningxia, Xinjiang.

Elymus confusus var. *confusus* is distributed in Mongolia and Russia, but has not yet been recorded from China. It differs from var. *breviaristatus* in having the awn of the first lemma about twice as long as the lemma body and in its chromosome number of $2n = 28$.

36. Elymus anthosachnoides (Keng) Á. Löve ex B. Rong Lu, Nordic J. Bot. 15: 24. 1995.

假花鳞草 jia hua lin cao

Culms solitary or tufted, 60–75 cm tall, 1.5–2.5 mm in diam., 4–6-noded. Leaf sheath glabrous; leaf blade flat, 11–25 × 0.35–0.7 cm, both surfaces villous or adaxial surface pilose or glabrous. Spike pendulous, 8–16 cm. Spikelets 1 per node, yellowish.

lowish green or tinged purplish, 24–30 mm excluding awns, with 5–7 florets; rachilla villous; internodes ca. 3 mm. Glumes lanceolate, 3–5(–7)-veined, scabrous along veins, apex acute; proximal glume 5–7.5 mm; distal glume 7–9 mm. Lemma lanceolate, hirsute throughout, especially distally and near margin, or glabrous or scabrous; first lemma 13–14 mm; awn reflexed, robust, 20–35 mm. Palea slightly shorter than or equaling lemma, ciliolate along keels distally. Anthers reddish brown, 1–2 mm. Fl. and fr. Jul–Aug.

• Mountain slopes; 2700–4000 m. Qinghai, Sichuan, Xizang, Yunnan.

Löve (Feddes Repert. 95: 459. 1984) did not previously validly publish the combination *Elymus anthosachnoides*; see the note following the genus description above.

- 1a. Spike 8–9 cm; lemma hirsute throughout 36a. var. *anthosachnoides*
1b. Spike 10–16 cm; lemma glabrous or scabrous 36b. var. *scabrilemmatus*

36a. *Elymus anthosachnoides* var. *anthosachnoides*

假花鳞草(原变种) jia hua lin cao (yuan bian zhong)

Roegneria anthosachnoides Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 65. 1963.

Spike 8–9 cm. Lemma hirsute throughout. Fl. and fr. Jul–Aug. $2n = 28^*$.

• Mountain slopes; ca. 4000 m. Sichuan, Yunnan.

36b. *Elymus anthosachnoides* var. *scabrilemmatus* (L. B. Cai) S. L. Chen, comb. nov.

糙稈花鳞草 cao fu hua lin cao

Basionym: *Roegneria anthosachnoides* var. *scabrilemmata* L. B. Cai, Acta Phytotax. Sin. 35: 165. 1997.

Spike 10–16 cm. Lemma glabrous or scabrous. Fl. and fr. Jul–Aug.

• Mountain slopes; 2700–3600 m. Qinghai, Sichuan.

37. *Elymus altissimus* (Keng) Á. Löve ex B. Rong Lu, Nordic J. Bot. 15: 24. 1995.

高株披碱草 gao zhu pi jian cao

Roegneria altissima Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 53. 1963.

Culms tufted, erect, slightly geniculate, 70–150 cm, rigid, 5–7-noded. Leaf blade glaucous green, 7–25(–40) × 0.6–1 cm, abaxial surface glabrous, adaxial surface laxly puberulent, margin scabrous. Spike erect or slightly curved, 15–18 cm. Spikelets 1 per node, ca. 11 mm, with 1–3 florets. Glumes greenish or slightly purplish, oblong, 5–6 mm, thick, 5–7-veined or proximal glume 3-veined, apex acuminate. Lemma yellowish green or slightly purplish, oblong-lanceolate, pubescent only at base and at margin; first lemma ca. 10 mm; awn slightly reflexed, robust, 10–20 mm. Palea slightly shorter than lemma, apex emarginate or subrounded. Fl. and fr. Jun–Sep. $2n = 28^*$.

• Forests, meadows; 1700–3400 m. Qinghai, Sichuan, Xinjiang, Yunnan.

Löve (Feddes Repert. 95: 448. 1984) did not previously validly publish the combination *Elymus altissimus*; see the note following the genus description above.

38. *Elymus laxinodis* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 427. 2002.

稀节披碱草 xi jie pi jian cao

Roegneria laxinodis L. B. Cai, Guihaia 16: 199. 1996.

Culms erect or geniculate at base, 40–80 cm tall, 1–1.5 mm in diam., 3- or 4-noded, pubescent below spike and at nodes. Leaf sheath puberulent or scabrous; ligule ca. 0.5 mm, membranous, apex truncate; leaf blade flat, 10–16 × 0.4–0.6 cm, abaxial surface scabrous or ciliate along veins, adaxial surface villous. Spike erect or slightly curved, lax, 8–11 cm; rachis slender, puberulent; internodes 13–20(–28) mm. Spikelets narrow, 15–18 mm, with 2–5 florets. Glumes lanceolate, 3–5-veined, sparsely spinose along veins and at margin, apex pungent; proximal glume 3–4 mm; distal glume 4–5 mm. Lemma narrowly lanceolate, abaxially puberulent; first lemma 9–10 mm; awn curved, 1.2–1.6 cm. Palea slightly shorter than lemma, scabrous along keels, puberulent between keels, apex truncate or obtuse. Anthers yellow, 2–2.5 mm. Caryopsis lanceolate, 6–7 mm. Fl. and fr. Aug–Sep.

• Mountain slopes; 3500–4000 m. Qinghai (Yushu), Sichuan (Kangding).

39. *Elymus serotinus* (Keng) Á. Löve ex B. Rong Lu, Nordic J. Bot. 15: 21. 1995.

秋披碱草 qiu pi jian cao

Roegneria serotina Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 50. 1963.

Culms laxly tufted, erect, or decumbent or geniculate at base, 20–45 cm tall. Leaf sheath puberulent or margin ciliate at base; leaf blade involute, 9–11(–20) × 0.1–0.2 cm, both surfaces smooth and glabrous or adaxial surface scabrous. Spike curved and nodding, 6–10 cm, with 5–11 spikelets. Spikelets 1 per node, yellowish brown or purplish green, 12–13(–22) mm excluding awns, with 3–6(or 7) florets. Glumes oblong-lanceolate, 3–5-veined, laxly puberulent, scabrous along veins, apex acute or acuminate; proximal glume 5–6 mm; distal glume 7–8 mm; awn usually 2–5 mm. Lemma oblong-lanceolate, puberulent proximally, hispidulous distally; first lemma ca. 10 mm; awn reflexed, 2.5–3 cm, scabrous. Palea equaling lemma, puberulent between keels distally. Fl. and fr. late summer. $2n = 28^*$.

• Mountain slopes. Henan, Qinghai, Shaanxi.

Löve (Feddes Repert. 95: 467. 1984) did not previously validly publish the combination *Elymus serotinus*; see the note following the genus description above.

40. *Elymus retroflexus* B. Rong Lu & B. Salomon, Nordic J. Bot. 13: 355. 1993.

反折披碱草 fan zhe pi jian cao

Roegneria retroflexa (B. Rong Lu & B. Salomon) L. B. Cai.

Culms 55–75 cm tall, 3- or 4-noded, glabrous. Leaf sheath smooth; ligule 0.4–0.5 mm, apex lacerate; auricles 1–1.2 × 0.1–0.2 mm; leaf blade narrowly linear, 4–10 × 0.1–0.2 cm, scabrous. Spike nodding, lax, 6.5–12 × 0.5–1 cm; rachis smooth. Spikelets 1 per node, 4–6.5 × 2–5 mm, with 3–5 florets; rachilla pilose, 2.5–3 mm. Glumes narrowly elliptic, subequal, small, scabrous along veins, margin membranous, apex acute or mucronate; proximal glume (1.5–)2–5 × 0.5–1 mm, (2 or)3-veined; distal glume (3–)5–7.5 × 0.8–1.3 mm, 3–5-veined. Lemma narrowly lanceolate, 9–12 × 1–1.5 mm excluding awn; awn bent when mature, 3.5–5.5 cm. Palea narrowly lanceolate, 8–9 × 0.9–1.2 mm, ciliate along keels, apex truncate, hairy. Anthers yellow, 2.5–3 mm. Fl. and fr. Jul–Sep. $2n = 28^*$.

• Dry to moist mountain slopes and meadows usually with shrubs and *Betula* trees; 3900–4300 m. Xizang.

41. *Elymus leiotropis* (Keng) S. L. Chen, **comb. nov.**

光脊披碱草 guang ji pi jian cao

Basionym: *Roegneria leiotropis* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 58. 1963.

Culms tufted, erect but geniculate at base, 60–90 cm tall, 3-noded. Leaf sheath glabrous; ligule ca. 0.2 mm, apex truncate; leaf blade flat or slightly involute, 7–17 × 0.2–0.4 cm, abaxial surface smooth, adaxial surface scabrous. Spike curved or nodding, 10–15 cm. Spikelets 1 per node, purplish green, 15–20 mm, with 4 or 5 florets. Glumes oblong-lanceolate, 3–5-veined, apex acute or acuminate; proximal glume 5–7 mm; distal glume 6–8 mm. Lemma lanceolate, hirsutulous throughout; first lemma 10–13 mm; awn reflexed, robust, 25–40 mm. Palea slightly shorter than lemma, distally scabrous, smooth along keels, apex truncate or emarginate. Fl. and fr. late summer.

• Mountain slopes. Yunnan.

Löve (Feddes Repert. 95: 449. 1984) did not previously validly publish the combination *Elymus leiotropis*; see the note following the genus description above.

42. *Elymus brevipes* (Keng) S. L. Chen, **comb. nov.**

短柄披碱草 duan bing pi jian cao

Basionym: *Roegneria brevipes* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 49. 1963; *R. breviglumis* Keng var. *brevipes* (Keng) L. B. Cai.

Culms solitary or tufted, erect, 30–60 cm tall. Leaf blade involute when dry, rigid, abaxial surface smooth, adaxial surface scabrous. Spike curved or nodding, branched at base, 7–11 cm excluding awns; rachis slender. Spikelets 1 per node, purplish green, ± nitid, 14–22 × 4–7 mm; pedicel 0.5–2 mm. Glumes lanceolate, distinctly 3-veined or distal glume 4-veined, scabrous, apex acute or acuminate; proximal glume 1.5–3 mm; distal glume 3–4.5 mm. Lemma lanceolate, scabrous or subglabrous; first lemma 9–10 mm; awn reflexed, 2.5–3 cm, scabrous. Palea 8–9 mm, puberulent abaxially, ciliate along distal

1/3 of keels, apex truncate. Anthers yellow, 1.5–2.5 mm. Fl. and fr. late summer. $2n = 28^*$.

• Open rocky mountains. Gansu, Qinghai, Sichuan, Xinjiang, Xizang, ?Yunnan.

Löve (Feddes Repert. 95: 467. 1984) did not previously validly publish the combination *Elymus brevipes*; see the note following the genus description above.

A record of the C Asian and W Himalayan *Elymus schugnanicus* (Nevski) Tzvelev (Novosti Sist. Vyssh. Rast. 9: 62. 1972; *Agropyron schugnanicum* Nevski, Bull. Jard. Bot. Acad. Sci. URSS 30: 512. 1932) from Yunnan (Fl. Yunnan. 9: 419–420. 2003, as *Roegneria schugnanica* (Nevski) Nevski) may be referable to *E. brevipes*. Lu (Nordic J. Bot. 15: 13–15. 1995) treated the two taxa as conspecific. Alternatively, it may be referable to *E. tschimganicus*.

43. *Elymus schrenkianus* (Fischer & C. A. Meyer) Tzvelev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 20: 428. 1960.

扭轴披碱草 niu zhou pi jian cao

Triticum schrenkianum Fischer & C. A. Meyer, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 3: 305. 1845; *Agropyron schrenkianum* (Fischer & C. A. Meyer) P. Candargy; *Campeiostrachys schrenkiana* (Fischer & C. A. Meyer) Drobow; *Roegneria schrenkiana* (Fischer & C. A. Meyer) Nevski.

Culms robust, 30–90 cm tall. Sheath of lower leaves retrorsely pubescent; leaf blade flat, 5–8 × 0.3–0.6 cm, scabrous or sometimes pubescent. Spike nodding, ± secund, dense, 5–11 cm; internodes 3–8 mm. Spikelets 1 per node, usually very shortly pedicellate, purplish green, with 3 or 4 (or 5) florets. Glumes linear-lanceolate, 3-veined; proximal glume 4–4.5 mm, awn 2–3.5 mm; distal glume 4.5–5.5 mm, awn ca. 5 mm. Lemma lanceolate, very scabrous; first lemma ca. 11 mm; awn divaricate, 15–22 mm. Palea subequaling or equaling lemma, hispid along keels, apex subobtusely. Anthers 1.5–1.8 mm. Fl. and fr. Jun–Jul. $2n = 42^*$.

Glades, mountain slopes, dry river meadows. Qinghai, Xinjiang, Xizang [Bhutan, India (Sikkim), Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Russia, Turkmenistan, Uzbekistan].

44. *Elymus pulanensis* (H. L. Yang) S. L. Chen, Bull. Nanjing Bot. Gard. 1987: 9. 1988 [“*pulanensis*”].

普兰披碱草 pu lan pi jian cao

Roegneria pulanensis H. L. Yang, Acta Phytotax. Sin. 18: 253. 1980; *R. jacquemontii* (J. D. Hooker) Nevski var. *pulanensis* (H. L. Yang) L. B. Cai.

Culms laxly tufted, 30–50 cm tall, 3- or 4-noded. Leaf blade flat or involute, 7–10 × 0.15–0.3 cm, both surfaces glabrous or laxly villous. Spike curved, 8–10 cm, with 5–8 spikelets; rachis smooth, glabrous; internodes 14–20 mm. Spikelets 1 per node, 22–26 mm, with 7–9 florets. Glumes oblong-lanceolate, 3–5-veined, smooth, glabrous, margin membranous; proximal glume 4.5–5 mm, awn (1–)1.5–5 mm; distal glume 5–7 mm, awn to 7 mm. Lemma lanceolate, ± laxly hirsutulous

abaxially; first lemma ca. 11 mm; awn reflexed, 30–40 mm. Palea equaling lemma, shortly ciliate along keels distally. Fl. and fr. late summer.

- River banks; ca. 3600 m. Xizang, Yunnan.

45. *Elymus purpurascens* (Keng) S. L. Chen, comb. nov.

紫穗披碱草 *zi sui pi jian cao*

Basionym: *Roegneria purpurascens* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 56. 1963.

Culms laxly tufted, erect or slightly decumbent at base, 60–90 cm tall, rigid. Leaf sheath smooth, glabrous; leaf blade involute, 11–22 × 0.3–0.6 cm, stiff, abaxial surface glabrous, adaxial surface scabrous or pubescent, margin scabrous. Spike nodding, 13–15 cm, with 8–13 spikelets. Spikelets 1 per node, purplish in part, 1.5–2.3 cm excluding awns, with 4–7 florets. Glumes oblong-lanceolate, 5–8 mm, 5-veined, scabrous, apex acute; proximal glume sometimes shorter and 3-veined. Lemma lanceolate, scabrous or hirsutulous abaxially; first lemma 9–11 mm; awn reflexed, purplish, robust, 18–28 mm, scabrous. Palea subequaling lemma, shortly ciliate along keels distally, puberulent between keels. Fl. and fr. Jun–Jul. $2n = 28^*$, 42^* .

- Mountain slopes. Gansu, Nei Mongol, Ningxia, Qinghai, Yunnan.

Löve (Feddes Repert. 95: 448. 1984) did not previously validly publish the combination *Elymus purpurascens*; see the note following the genus description above.

46. *Elymus tschimganicus* (Drobow) Tzvelev, Rast. Tsentr. Azii 4: 221. 1968 [*“czimganicus”*].

云山披碱草 *yun shan pi jian cao*

Culms erect, usually geniculate at base, 25–60 cm tall, smooth, glabrous. Leaf sheath glabrous throughout, or pubescent proximally; leaf blade glaucous green, subinvolute, 0.15–0.3 cm wide, both surfaces glabrous or adaxial surface slightly hairy. Spike flexuose, slender, 7–9 cm. Spikelets 1 per node, pale glaucous green, rarely very slightly tinged purple, with 5–7 florets. Glumes linear-lanceolate, 4–8 mm, 1/4–1/2 as long as basal florets in spikelet, (3–)5-veined, scabrous along veins, apex usually acuminate, occasionally shortly awned. Lemma lanceolate, 9–10 mm, scabrous; callus shortly setose on sides, or smooth and glabrous; awn reflexed, 20–30 mm. Palea subequaling lemma, apex slightly emarginate or obtuse. Anthers 2–2.5 mm. Fl. and fr. Jun–Jul.

Mountain slopes, high mountain meadows; ca. 3500 m. Qinghai, Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan].

See the comment under *Elymus brevipes* (species no. 42).

- 1a. Lemma callus shortly setose on sides; leaf sheath glabrous, or pubescent proximally 46a. var. *tschimganicus*
- 1b. Lemma callus smooth, glabrous; leaf sheath glabrous throughout 46b. var. *glabrispiculus*

46a. *Elymus tschimganicus* var. *tschimganicus*

云山披碱草(原变种) *yun shan pi jian cao (yuan bian zhong)*

Agropyron tschimganicum Drobow in Vvedensky et al., Key Fl. Tashkent 1: 40. 1923; *Roegneria tschimganica* (Drobow) Nevski.

Leaf sheath glabrous, or pubescent proximally. Lemma callus shortly setose on sides. Fl. and fr. Jun–Jul. $2n = 42^*$.

High mountain meadows. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan].

“*Agropyron czimganicum*,” “*Elymus czimganicus*,” and “*Roegneria czimganica*” are merely orthographical variants.

46b. *Elymus tschimganicus* var. *glabrispiculus* D. F. Cui, Bull. Bot. Res., Harbin 10(3): 30. 1990.

光稈披碱草 *guang fu pi jian cao*

Roegneria glabrispicula (D. F. Cui) L. B. Cai; *R. tschimganica* var. *glabrispicula* (D. F. Cui) L. B. Cai.

Leaf sheath glabrous throughout. Lemma callus smooth, glabrous. Fl. and fr. summer.

- Mountain slopes; ca. 3500 m. Xinjiang.

47. *Elymus mutabilis* (Drobow) Tzvelev, Rast. Tsentr. Azii 4: 217. 1968.

狭颖披碱草 *xia ying pi jian cao*

Plants ± with rhizome, or if without rhizome then culms tufted. Culms erect, 60–120 cm tall. Leaf blade flat, 10–20 × 0.4–0.7 cm, glabrous. Spike usually dense, 6–20 × 0.4–0.7 cm; rachis margin ciliate; internodes 9–15 mm. Spikelets 1 per node, green, purple, glaucous, or purplish glaucous, 10–20 mm, with 2–5 florets; very shortly pedicellate. Glumes lanceolate or broadly so, 7–13 × 1.5–2 mm, 5-veined, scabrous or hispid, margin sometimes broadly membranous, apex acuminate to awned; awn (when present) 1–2 mm. Lemma narrowly elliptic, 8–9 mm, scabrous, ± pilose, or pubescent throughout; awn 1–7 mm. Palea equaling or subequaling lemma, margin ciliate, apex emarginate, truncate, or obtuse. Anthers 2–3 mm. Fl. and fr. Jun–Sep. $2n = 28^*$.

Sparse forests, forest margins and glades, among shrubs, mountain slopes, meadows, pebbles; 1200–2400 m. Xinjiang [Mongolia, Russia; C and SW Asia, Europe].

This species is a good forage grass.

- 1a. Plants without rhizome (culms tufted); spikelets usually glaucous or purplish glaucous 47c. var. *praecaespitosus*
- 1b. Plants ± with rhizome; spikelets purple or green.
 - 2a. Spikelets usually purple; glumes lanceolate; lemma ± pilose, awn 2–5 mm 47a. var. *mutabilis*
 - 2b. Spikelets usually green; glumes broadly lanceolate; lemma pubescent throughout, awn 1–2 mm 47b. var. *nemoralis*

47a. *Elymus mutabilis* var. *mutabilis*

狭颖披碱草(原变种) xia ying pi jian cao (yuan bian zhong)

Agropyron mutabile Drobow, Trudy Bot. Muz. Imp. Akad. Nauk 16: 88. 1916; *A. angustiglume* Nevski; *Goulandia mutabilis* (Drobow) Ikonnikov; *Roegneria angustiglumis* (Nevski) Nevski; *R. mutabilis* (Drobow) Hylander.

Plants ± with rhizome. Spikelets usually purple. Glumes lanceolate. Lemma ± pilose; awn 2–5 mm. Fl. and fr. Jul–Aug.

Sparse forests, forest glades, among shrubs, mountain slopes, meadows, pebbles; 1300–2400 m. Xinjiang [Mongolia, Russia; SW Asia, Europe].

47b. *Elymus mutabilis* var. *nemoralis* S. L. Chen ex D. F. Cui, Bull. Bot. Res., Harbin 10(3): 29. 1990.

林缘披碱草 lin yuan pi jian cao

Roegneria mutabilis var. *nemoralis* (D. F. Cui) L. B. Cai.

Plants with rhizome. Spikelets usually green. Glumes broadly lanceolate. Lemma pubescent throughout; awn 1–2 mm.

• Forest glades, mountain slopes; 1800–1900 m. Xinjiang.

47c. *Elymus mutabilis* var. *praecaesпитosus* (Nevski) S. L. Chen, Novon 7: 229. 1997.

密丛披碱草 mi cong pi jian cao

Agropyron praecaesпитosum Nevski, Izv. Glavn. Bot. Sada SSSR 29: 541. 1930; *Elymus praecaesпитosus* (Nevski) Tzvelev; *E. mutabilis* subsp. *praecaesпитosus* (Nevski) Tzvelev; *Goulandia praecaesпитosa* (Nevski) Ikonnikov; *Roegneria praecaesпитosa* (Nevski) Nevski.

Plants without rhizome. Culms tufted. Spikelets usually glaucous or purplish glaucous. Fl. and fr. Jun–Sep.

Forest margins, mountain slopes; 1200–2400 m. Xinjiang [Mongolia, Russia].

48. *Elymus magnicaespes* D. F. Cui, Bull. Bot. Res., Harbin 10(3): 25. 1990.

大丛披碱草 da cong pi jian cao

Roegneria magnicaespes (D. F. Cui) L. B. Cai.

Plants without rhizome. Culms tufted, erect, 50–70 cm tall, 2-noded. Leaf sheath glabrous, usually fibrous and broken at base; ligule ca. 5 mm, membranous, apex truncate; leaf blade setaceous, involute, 6–15 × 0.15–0.25 cm, stiff, abaxial surface glabrous, adaxial surface scabrous. Spike erect, slender, 8–12 cm; rachis scabrous, margin ciliate; internodes ca. 10 mm. Spikelets 1 per node, 11–18 × 2–3 mm, with 4–6 florets; rachilla densely puberulent; internodes ca. 1.5 mm. Glumes oblong-lanceolate, 4- or 5-veined, margin membranous, apex acuminate or pointed; proximal glume 3–6 mm, distal glume 6–9 mm. Lemma oblong-lanceolate, smooth, glabrous, apex acuminate; first lemma ca. 10 mm. Palea equaling lemma, narrowed toward subtruncate apex, ciliate along keels. Anthers ca. 3 mm. Fl. and fr. Jul–Aug. $2n = 28^*$.

• Steppes; ca. 2100 m. Xinjiang.

49. *Elymus alashanicus* (Keng) S. L. Chen, Bull. Bot. Res., Harbin 14: 142. 1994.

阿拉善披碱草 a la shan pi jian cao

Roegneria alashanica Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 73. 1963.

Plants ± with rhizome. Culms laxly tufted, 40–60 cm tall, rigid, 3-noded. Leaf sheath usually fibrous and broken at base; leaf blade setaceous, involute, 5–8(–12) × 0.2–0.3 cm, stiff, both surfaces pubescent or abaxial surface smooth and glabrous. Spike erect, slender, 5–10 cm. Spikelets 1 per node, yellowish, 12–15 × 2–3 mm, with 3–6 florets, glabrous; rachilla glabrous. Glumes oblong-lanceolate, 3-veined, margin membranous, apex acute, rarely obtuse; proximal glume 5–6 mm; distal glume 7–9 mm. Lemma lanceolate, smooth, obscurely 5-veined, margin narrowly membranous, apex acute to pointed; callus smooth, glabrous; first lemma ca. 10 mm. Palea subequaling or slightly longer than lemma, apex truncate. Anthers ca. 3 mm. Fl. and fr. late summer.

• Mountain slopes; ca. 1800 m. Gansu, Nei Mongol, Ningxia, Xinjiang.

50. *Elymus jufinshanicus* (C. P. Wang & H. L. Yang) S. L. Chen, Novon 7: 228. 1997.

九峰山披碱草 jiu feng shan pi jian cao

Roegneria alashanica Keng var. *jufinshanica* C. P. Wang & H. L. Yang, Bull. Bot. Res., Harbin 4(4): 87. 1984; *R. jufinshanica* (C. P. Wang & H. L. Yang) L. B. Cai.

Culms laxly tufted, usually geniculate at base, 70–90 cm tall. Leaf sheath usually longer than internode, glabrous; ligule 0.5–1 mm, apex truncate; leaf blade linear, usually involute, 8–18 × 0.1–0.15 cm, abaxial surface usually glabrous, adaxial surface usually villous. Spike erect, 12–15 cm; rachis subglabrous on back, margin ciliate. Spikelets 1 per node, yellowish, 13–18 × 2–3 mm, with 3 or 4 florets; rachilla densely pubescent. Glumes oblong-lanceolate, 3–5-veined, densely pubescent adaxially, apex acuminate; proximal glume 9–11 mm; distal glume 11–12 mm. Lemma lanceolate, subglabrous; first lemma ca. 11 mm; awn ca. 5 mm. Palea shorter than lemma. Anthers yellow, 1.5–2 mm. Fl. and fr. late summer.

• Mountain slopes; ca. 2200 m. Nei Mongol.

51. *Elymus tridentatus* (C. Yen & J. L. Yang) S. L. Chen, Novon 7: 229. 1997.

三齿披碱草 san chi pi jian cao

Roegneria tridentata C. Yen & J. L. Yang, Novon 4: 310. 1994.

Culms tufted, erect or slightly procumbent geniculate at base, 40–65 cm tall, 1.5–2 mm in diam., 2- or 3-noded, smooth, glabrous. Leaf sheath glabrous; ligule ca. 0.5 mm, scarious, apex truncate; leaf blade involute or subinvolute, 5–7 × ca. 0.2 cm, abaxial surface glabrous, adaxial surface pubescent. Spike erect, 5–11.5 × ca. 0.5 cm, with 6–14 spikelets; rachis usually

glabrous. Spikelets 1 per node, purple or greenish purple, 10–13 × ca. 2 mm, with 4 or 5 florets; rachilla internodes 1.5–2 mm, appressed puberulent. Glumes oblong or oblong-elliptic, slightly oblique, unequal, prominently 3(–5)-veined, glabrous, sometimes sparsely shortly spinulose along veins, apex rounded-obtuse, rarely acute; proximal glume 4–5 mm; distal glume 5–6.5 mm. Lemma oblong-lanceolate, (7–)8–9 mm, appressed white pubescent proximally and laterally, apex truncate and 3-toothed, teeth 0.5–1 mm; callus obtuse, puberulent along sides. Palea shorter to longer than lemma, scabrous between keels, setulose-ciliate on distal 1/3–1/2 of keels, apex truncate. Anthers black, ca. 2 mm. $2n = 42^*$.

- Rocky slopes, roadsides; ca. 3700–3800 m. Qinghai.

52. *Elymus elytrigoides* (C. Yen & J. L. Yang) S. L. Chen, **comb. nov.**

昌都披碱草 chang du pi jian cao

Basionym: *Roegneria elytrigoides* C. Yen & J. L. Yang, Acta Bot. Yunnan. 6: 75. 1984; *Pseudoroegneria elytrigoides* (C. Yen & J. L. Yang) B. Rong Lu; *R. alashanica* Keng var. *elytrigoides* (C. Yen & J. L. Yang) L. B. Cai.

Plants with rhizome. Culms laxly tufted, erect, 60–75 cm tall, 1–1.2 mm in diam., 2–4(–6)-noded, glabrous. Leaf sheath shorter than internode, glabrous, fibrous and broken at base; ligule ca. 0.5 mm, membranous, apex truncate; leaf blade green, flat or involute, (7–)10–15 × 0.15–0.33 cm, stiff. Spike linear, straight, (5–)8–16 cm, with 5–12 spikelets; rachis glabrous; internodes 8–15 mm, or to 20 mm at base of spike. Spikelets 1 per node, 12–15 mm, with 5 or 6 florets; rachilla glabrous or puberulent; internodes 1.5–1.8 mm. Glumes oblong-lanceolate, herbaceous, glabrous, margin membranous, apex obtuse or acute, unilaterally dentate; proximal glume 3.5–6.5 mm, 3- or 4-veined; distal glume 5–8.5 mm, 4- or 5-veined. Lemma oblong-lanceolate, 5-veined, glabrous, apex obtuse or with point ca. 0.5 mm; first lemma 7.8–9 mm; callus obtuse, puberulent. Palea equaling or slightly longer than lemma, abaxially glabrous, ciliate along keels distally, apex truncate. Anthers yellow or pale brown, 4.5–5 mm. Caryopsis dark purple, oblong, ca. 5.5 × 1.5 mm, apex densely white hispidulous. Fl. and fr. Jul–Aug. $2n = 28^*$.

- Mountain rocks among *Caragana*, river banks; ca. 3200 m. Xizang (Qamdo).

53. *Elymus grandis* (Keng) S. L. Chen, **comb. nov.**

大披碱草 da pi jian cao

Basionym: *Roegneria grandis* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 45. 1963.

Plants with short, underground rhizomes. Culms solitary or tufted, 80–100 cm tall, stiff, 5- or 6-noded. Leaf blade 20–30 × ca. 1 cm, subleathery, both surfaces smooth or adaxial surface scabrous. Spike erect, slender, lax, 20–25 cm; rachis scabrous. Spikelets 1 per node, 20–30 mm, with ca. 12 florets. Glumes oblong-lanceolate, 10–15 mm, 5–7-veined, smooth or scabrous, margin ± membranous. Lemma white pilose, apex pointed; first lemma ca. 15 mm including apical point ca. 1 mm. Palea 2/3–

3/4 as long as lemma, subsmooth along keels, apex truncate or subrounded. Fl. and fr. Jul–Aug. $2n = 28^*$.

- Mountain slopes. Henan, Shaanxi.

Löve (Feddes Repert. 95: 458. 1984) did not previously validly publish the combination *Elymus grandis*; see the note following the genus description above.

54. *Elymus sylvaticus* (Keng & S. L. Chen) S. L. Chen, Bull. Nanjing Bot. Gard. 1987: 9. 1988.

林地披碱草 lin di pi jian cao

Roegneria sylvatica Keng & S. L. Chen, Acta Univ. Nankin. Sci. Nat. 1963(1): 36. 1963.

Culms laxly tufted, erect or slightly decumbent at base, ca. 100 cm tall. 4- or 5-noded. Leaf sheath smooth, glabrous; leaf blade flat, 13–25 × 0.6–0.9 cm, soft, glabrous. Spike rather dense, 7.5–8.5 cm. Spikelets 1 per node, 12–14 mm, with 3 florets. Glumes lanceolate, 8–10 mm, 3–5-veined, scabrous, margin narrowly membranous, apex acute, pointed, or with awn 1–2 mm. Lemma hirsutulous, margin narrowly membranous, apex narrowed with short awn 1–3 mm, sometimes with a tooth below apex; first lemma 9–11 mm. Palea subequaling lemma, densely ciliate along keels distally, puberulent between keels, apex emarginate. Fl. and fr. summer.

- Forests; 1800–3300 m. Qinghai, Xinjiang.

55. *Elymus kronokensis* (Komarov) Tzvelev, Rast. Tsentr. Azii 4: 216. 1968.

少花披碱草 shao hua pi jian cao

Agropyron kronokense Komarov, Repert. Spec. Nov. Regni Veg. 13: 87. 1914; *A. boreale* (Turczaninow) Drobow; *Elymus borealis* (Turczaninow) D. F. Cui (1996, “*borealus*”), not Scribner (1900); *E. kronokensis* subsp. *borealis* (Turczaninow) Tzvelev; *Roegneria borealis* (Turczaninow) Nevski; *R. kronokensis* (Komarov) Tzvelev; *Triticum boreale* Turczaninow.

Culms erect, slender, (20–)30–60 cm tall, smooth, glabrous. Leaf blade flat, 5–9 × 0.15–0.25 cm, abaxial surface glabrous but scabrous, adaxial surface pilose. Spike erect, dense, 4–12 cm; rachis densely hirsute; Spikelets 1 per node, purple or purplish green, 9–10 mm, with 2(or 3) florets. Glumes lanceolate or broadly so, 4–6(–7) × 1.5–2.5 mm, 3–5-veined, glabrous, or scabrous along veins, margin purple or purplish membranous, apex obtusely dentate or with awn 1(–3) mm. Lemma lanceolate, 7–8(–9) mm, smooth, glabrous; awn 2–4(–5) mm. Palea equaling lemma, ciliate along keels, apex emarginate. Fl. and fr. Jun–Aug. $2n = 28$.

Meadows in alpine zones and river valleys; 1600–1800 m. Xinjiang [Mongolia, Russia].

56. *Elymus yushuensis* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 428. 2002.

玉树披碱草 yu shu pi jian cao

Roegneria yushuensis L. B. Cai, Bull. Bot. Res., Harbin 14: 338. 1994.

Culms erect, 45–60 cm tall, 1–2 mm in diam., 2- or 3-noded, glabrous. Leaf sheath glabrous; ligule very short, apex truncate; leaf blade usually involute, 5–9 cm, abaxial surface glabrous, adaxial surface and margin pilose. Spike lax, 6–11 cm; rachis slender, glabrous; internodes 7–18 mm, or to 30 mm at base of spike. Spikelets 1 per node, usually purplish, 12–20 mm, with 4–6 florets; rachilla pubescent. Glumes lanceolate, 3–5-veined, glabrous, apex pungent; proximal glume 4–5 mm; distal glume 6–7 mm. Lemma oblong-lanceolate, abaxially spinose; first lemma 8–9 mm; awn 2–4 mm. Palea slightly shorter than or equaling lemma, ciliolate along keels distally, apex truncate. Caryopsis yellowish, apex pubescent. Fl. and fr. Aug–Sep.

- Roadsides; 3500–4000 m. S Qinghai.

57. *Elymus leianthus* (Keng) S. L. Chen, *Novon* 7: 229. 1997.

光花披碱草 *guang hua pi jian cao*

Roegneria leiantha Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 42. 1963; *Kengyilia leiantha* (Keng) L. B. Cai.

Culms usually geniculate at base, ca. 45 cm tall, usually 4-noded. Leaf sheath smooth, glabrous; leaf blade flat or inflexed, 6–11 × 0.2–0.4 cm, smooth and glabrous or adaxial surface scabrous. Spike ± curved, ca. 12 cm; rachis margin ciliolate. Spikelets 1 per node, 12–14 mm excluding awns, with 3 or 4 florets. Glumes narrowly oblong, subequal, 5–8 mm including awn, 3–5-veined, scabrous along veins, apex acuminate or with awn 1–2 mm. Lemma oblong-lanceolate, 5-veined, glabrous but scabrous along veins, margin membranous; first lemma 9–10 mm; callus subglabrous; awn 4–5 mm. Palea equaling lemma, wingless and ciliolate along keels, apex obtuse or emarginate. Anthers yellow, 2–3 mm. Fl. and fr. late summer.

- Mountain slopes; 2300–2400 m. Qinghai, Yunnan.

58. *Elymus humilis* (Keng & S. L. Chen) S. L. Chen, *Bull. Nanjing Bot. Gard.* 1987: 9. 1988.

矮披碱草 *ai pi jian cao*

Roegneria humilis Keng & S. L. Chen, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 40. 1963.

Culms laxly tufted, 20–25 cm tall, usually 2-noded, smooth, glabrous. Leaf sheath smooth, glabrous, brown and fibrous at base when old; leaf blade usually involute, 2.5–5.5 (–10.5) × 0.1–0.4 cm, abaxial surface puberulent, adaxial surface pubescent. Spike slightly secund, 4.5–7 cm; rachis glabrous or puberulent, margin ciliate. Spikelets 1(or 2) per node, 8–13 mm excluding awns, with 3–5 florets; rachilla densely strigose. Glumes lanceolate, asymmetric, 2–5-veined, margin purplish membranous, apex acuminate to purplish pointed; proximal glume 7–10 mm including awn 1–3 mm; distal glume 8–11 mm including awn ca. 3 mm. Lemma lanceolate, distally scabrous, especially along veins, margin purplish membranous; first lemma 8–9 mm; callus with hairs 0.2–0.5 mm; awn erect, purplish, 2–5 mm. Palea equaling lemma, winged along keels, ciliate along wings, puberulent between keels, apex emarginate. Anthers purplish when young, ca. 2 mm. Fl. and fr. late summer.

- Roadsides. Qinghai, Xinjiang.

59. *Elymus viridulus* (Keng & S. L. Chen) S. L. Chen, *Bull. Nanjing Bot. Gard.* 1987: 9. 1988.

绿穗披碱草 *lü sui pi jian cao*

Roegneria viridula Keng & S. L. Chen, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 39. 1963.

Culms erect, ca. 80 cm tall, rigid, 4-noded, smooth, glabrous. Leaf sheath retrorsely pubescent proximally, glabrous distally; leaf blade linear, flat or involute, 10–15 × 0.2–0.4 cm, abaxial surface smooth, glabrous, adaxial surface scabrous and pilose at base. Spike ± nodding, 7.5–9.5 cm; rachis glabrous but margin ciliate. Spikelets 1 per node, 14–18 mm, with 5 or 6 florets. Glumes green, lucid, broadly lanceolate, suboblique, subequal, 8–12 mm including awn 1–2 mm, 4–6(–7)-veined, nearly keeled along midvein, glabrous, margin broadly membranous. Lemma greenish, oblong-lanceolate, glabrous but scabrous distally and near margin, margin broadly membranous; first lemma ca. 10 mm; awn 2–6 mm. Palea slightly shorter than or subequaling lemma, both surfaces puberulent, hispid-ciliolate along keels distally, apex slightly emarginate or truncate. Anthers yellow, ca. 4 mm. Fl. and fr. late summer. $2n = 28^*$.

- Mountain slopes. Xinjiang.

60. *Elymus cheniae* (L. B. Cai) G. Zhu, *Novon* 12: 426. 2002.

陈氏披碱草 *chen shi pi jian cao*

Roegneria cheniae L. B. Cai, *Acta Phytotax. Sin.* 34: 333. 1996.

Culms erect or geniculate at base, 30–60 cm tall, 1.5–2.5 mm in diam., 3- or 4-noded, glabrous. Leaf sheath glabrous; ligule ca. 0.5 mm, membranous, apex truncate; leaf blade flat or involute at margin, 3–10 × 0.2–0.4 cm, both surfaces usually glabrous. Spike erect, 5–13 × ca. 0.4 cm; rachis glabrous, but margin ciliolate; internodes 5–7 mm. Spikelets green or purplish green, 10–14 mm, with 2–4 florets; rachilla puberulent. Glumes lanceolate or oblong-lanceolate, usually subequal, 7–11 mm, 4–6-veined, glabrous, margin membranous, apex pungent or mucronate. Lemma lanceolate, abaxially spinose; first lemma 8–10 mm; awn 1–3 mm. Palea slightly shorter or longer than lemma, ciliolate along keels, glabrous between keels. Anthers yellow, 1.5–2 mm. Caryopsis oblong, ca. 6 mm. Fl. and fr. Aug.

- Thickets; 2300–2600 m. Xinjiang (Xinyuan, Zhaosu).

61. *Elymus intramongolicus* (Shan Chen & W. Gao) S. L. Chen, *Bull. Nanjing Bot. Gard.* 1987: 9. 1988.

内蒙披碱草 *nei meng pi jian cao*

Roegneria intramongolica Shan Chen & W. Gao, *Acta Phytotax. Sin.* 17(4): 93. 1979.

Culms laxly tufted, erect, 100–160 cm tall, ca. 5 mm in diam., 4- or 5-noded, smooth, glabrous. Leaf sheath glabrous; ligule lacerate, apex obtuse; leaf blade flat, 15–25 × 0.5–1 cm, abaxial surface hirsutulous along veins, adaxial surface pubescent. Spike erect, 9–15 cm; rachis margin shortly ciliate; in-

ternodes 5–10 mm. Spikelets 1 per node, green or purplish green, 11–13.5(–18.5) mm, with 3–5 florets. Glumes linear-lanceolate, 5–7-veined, densely hirsutulous abaxially, margin submembranous, apex acuminate or with awn 1–1.5 mm; proximal glume 9–10 mm; distal glume 10–11 mm. Lemma lanceolate, puberulent abaxially, apex unequally 1-toothed on each side; first lemma 11–12.5 mm; awn 1–2.5 mm. Palea shorter than lemma, puberulent abaxially, ciliolate along keels. Fl. and fr. Jul–Aug.

- Forest margins, meadows. Nei Mongol.

62. *Elymus nevskii* Tzvelev, Spisok Rast. Gerb. Fl. SSSR Bot. Inst. Vsesoyuzn. Akad. Nauk 18: 29. 1970.

齿披碱草 chi pi jian cao

Agropyron ugamicum Drobow in Vvedensky et al., Key Fl. Tashkent 1: 40. 1923, not *Elymus ugamicus* Drobow (loc. cit. 44. 1923); *E. dentatus* (J. D. Hooker) Tzvelev subsp. *ugamicus* (Drobow) Tzvelev; *E. gmelinii* (Ledebour) Tzvelev subsp. *ugamicus* (Drobow) Á. Löve; *Gouardia ugamica* (Drobow) Ikonnikov; *Roegneria ugamica* (Drobow) Nevski; *Semeiostachys ugamica* (Drobow) Drobow.

Culms geniculate at base, robust, 50–120 cm tall. Leaf sheath glabrous or proximally pilose; leaf blade flat, 0.7–1.1 cm wide, both surfaces pilose and scabrous or abaxial surface glabrous. Spike erect, secund, dense; rachis margin scabrous. Spikelets 1 per node, greenish or tinged purplish, 20–30 mm, with 5–9 florets. Glumes broadly lanceolate, subequal, 12–15 × 2.5–4 mm, prominently (5–)7–9-veined, scabrous, margin hyaline, apex acuminate, often 1-toothed. Lemma lanceolate, 11–13 mm, hirsute, scabrous; awn moderately stout, 1–5(–7) mm. Palea subequaling lemma, 10–12 mm, hispid along keels, apex rounded-obtuse. Anthers 2.5–3 mm. Fl. and fr. Jul–Aug. $2n = 28$.

Mountain slopes, valleys. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan].

This species has been treated as conspecific with *Elymus dentatus* (J. D. Hooker) Tzvelev (Spisok Rast. Gerb. Fl. SSSR Bot. Inst. Vsesoyuzn. Akad. Nauk 18: 29. 1970; *Agropyron dentatum* J. D. Hooker, Fl. Brit. India 7: 370. 1896 [“1897”]; *Roegneria dentata* (J. D. Hooker) Nevski; *Semeiostachys dentata* (J. D. Hooker) Drobow), which is regarded here as endemic to Kashmir and Pakistan. If the two species are united then the name *E. dentatus* has priority.

63. *Elymus kamoji* (Ohwi) S. L. Chen, Bull. Nanjing Bot. Gard. 1987: 9. 1988.

柯孟披碱草 ke meng pi jian cao

Culms laxly tufted, erect or geniculate at base, (30–)50–100 cm tall. Leaf sheath usually glabrous but margin usually ciliate; ligule ca. 0.5 mm, apex truncate; leaf blade flat or involute, 5–40 × (0.1–)0.3–13 cm, glabrous, scabrous. Spike nodding, rarely erect, (2.5–)7–20 cm; rachis internodes 8–16(–25) mm. Spikelets 1 per node, green or purplish green, (10–)13–25 mm excluding awns, with (3–)5–8 florets; rachilla puberulent; internodes (1.5–)2–2.5 mm. Glumes ovate-lanceolate to oblong-lanceolate, 3–5(–7)-veined, margin broadly scarios, apex with awn 2–7 mm, more rarely acute and awnless; proximal

glume 4–8 mm; distal glume 5–9 mm. Lemma lanceolate, glabrous to hispidulous, margin membranous; first lemma 8–11 mm; callus puberulent to hispidulous; awn erect or slightly reflexed, 18–40 mm. Palea slightly shorter than or equaling lemma, margin distinctly winged, apex subrounded or obtuse. Fl. and fr. May–Jul.

Forest margins, mountain slopes, roadsides; 100–2300 m. Anhui, Fujian, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Nei Mongol, Qinghai, Shaanxi, Shandong, Sichuan, Xinjiang, Xizang, Yunnan, Zhejiang [Japan, Korea, Russia (Far East)].

Some authors consider *Elymus tsukushiensis* Honda (Bot. Mag. (Tokyo) 1: 391. 1936), described from Japan, to be conspecific with *E. kamoji*, described from China, in which case the name *E. tsukushiensis* would have priority.

Two varieties occur in China. In addition, *Elymus kamoji* var. *intermedius* S. L. Chen & Y. X. Jin (Bull. Nanjing Bot. Gard. 1987: 10. 1988) perhaps also merits recognition. It is characterized by having different leaf epidermis, glumes with an awn ca. 4 mm, and lemmas with a robust, straight, rough awn.

- 1a. Culms 50–100 cm tall; spikelets 13–25 mm, with 5–8 florets; glume apex usually awned 63a. var. *kamoji*
- 1b. Culms 30–45 cm tall; spikelets 10–13 mm, with 3–5 florets; glume apex usually acute 63b. var. *macerrimus*

63a. *Elymus kamoji* var. *kamoji*

柯孟披碱草(原变种) ke meng pi jian cao (yuan bian zhong)

Agropyron kamoji Ohwi, Acta Phytotax. Geobot. 11: 179. 1942; *A. semicostatum* (Nees ex Steudel) Nees ex Boissier var. *transiens* Hackel; *A. tsukushiense* (Honda) Ohwi var. *transiens* (Hackel) Ohwi; *Elymus tsukushiensis* Honda var. *transiens* (Hackel) Osada; *Roegneria kamoji* (Ohwi) Keng & S. L. Chen; *R. tsukushiensis* (Honda) B. Rong Lu et al. var. *transiens* (Hackel) B. Rong Lu et al.

Culms 50–100 cm tall. Spikelets 13–25 mm, with 5–8 florets. Glume apex usually awned. Fl. and fr. May–Jul. $2n = 42$.

Forest margins, mountain slopes, roadsides; 100–2300 m. Anhui, Fujian, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Nei Mongol, Qinghai, Shaanxi, Shandong, Xinjiang, Xizang, Yunnan, Zhejiang [Japan, Korea, Russia (Far East)].

63b. *Elymus kamoji* var. *macerrimus* (Keng) G. Zhu, Novon 12: 426. 2002.

细瘦披碱草 xi shou pi jian cao

Roegneria kamoji var. *macerrima* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 17. 1963; *R. kamoji* subsp. *macerrima* (Keng) N. R. Cui; *R. macerrima* (Keng) L. B. Cai.

Culms 30–45 cm tall. Spikelets 10–13 mm, with 3–5 florets. Glume apex usually acute. Fl. and fr. May–Jul.

- Roadsides. Guangxi, Sichuan.

64. *Elymus hybridus* (Keng) S. L. Chen, **comb. nov.**

杂交披碱草 za jiao pi jian cao

Basionym: *Roegneria hybrida* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 18. 1963; *R. tsukushiensis* (Honda) B. Rong Lu et al. var. *hybrida* (Keng) L. B. Cai.

Culms erect or decumbent at base, ca. 90 cm tall. Leaf sheath brown or purplish; leaf blade flat, 15–25 × (0.25–)0.5–0.8 cm. Spike nodding, ca. 27 cm. Spikelets 1 per node, green, 17–20 mm excluding awns, with 6–8 florets. Glumes oblong-lanceolate, scabrous along veins, margin membranous, apex acuminate or with awn 1–2.5 mm; proximal glume 6–8 mm, 3–5-veined; distal glume 8–9 mm, 5–7-veined. Lemma oblong-lanceolate, proximal and distal parts hirsutulous but middle part subsmooth, long ciliate near margin, margin broadly scarious; awn erect or reflexed, 20–30 mm, scabrous. Palea slightly shorter than or equaling lemma, winged along keels, ciliolate along distal 3/4 of wings, apex obtuse. Ovary apex with yellowish, hard hairs. Fl. and fr. May–Jul.

- Mountain slopes. Jiangsu (Nanjing).

Chen (Bull. Nanjing Bot. Gard. 1987: 9. 1988) did not previously validly publish the combination *Elymus hybridus* because the place of valid publication of the basionym was not cited (Saint Louis Code, Art. 33.3). Instead, *Roegneria hybrida* was cited from Keng (Fl. Ill. Pl. Prim. Sin. Gram. 352. 1959), where the name was not validly published because no Latin description was provided (Art. 36.1).

65. *Elymus curtiaristatus* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 426. 2002.

缩芒披碱草 suo mang pi jian cao

Roegneria curtiaristata L. B. Cai, Guihaia 16: 200. 1996.

Culms erect, 40–65 cm tall, 1–2 mm in diam., usually 3-noded, scabrous. Leaf sheath usually glabrous but retrorsely villous on basal leaves; ligule very short, apex truncate; leaf blade involute, 4–10 × 0.2–0.3 cm, both surfaces glabrous or adaxial surface sparsely villous. Spike erect or slightly curved, 9–12 cm; rachis glabrous, but margin spinose; internodes 7–12 mm. Spikelets purplish, narrow, 13–19 mm excluding awns, with 5–7 florets; rachilla puberulent. Glumes lanceolate or oblong-lanceolate, subequal, 5–6 mm, 3–5-veined, scabrous along veins, margin narrowly membranous. Lemma lanceolate, abaxially glabrous but scabrous distally and at margin; first lemma 9–10 mm; callus pubescent; awn straight, 5–10 mm. Palea slightly longer than lemma, ciliate along keels distally, scabrous between keels, apex truncate or obtuse. Anthers black, 2.3–3.2 mm. Fl. and fr. Aug.

- Mountain slopes; ca. 3400 m. Xizang (Qamdo).

66. *Elymus scabridulus* (Ohwi) Tzvelev, Rast. Tsentr. Azii 4: 218. 1968.

粗糙披碱草 cu cao pi jian cao

Agropyron scabridulum Ohwi, J. Jap. Bot. 19: 166. 1943; *Elymus semicostatus* (Nees ex Steudel) Melderis subsp. *scabridulus* (Ohwi) Á. Löve; *Roegneria scabridula* (Ohwi) Melderis.

Culms 50–60 cm tall, 2- or 3-noded, pubescent at nodes. Leaf sheath glabrous or retrorsely puberulent in innovation shoot; leaf blade involute, 7–15(–20) × ca. 0.3 cm, both surfaces ± scabrous. Spike erect, 8–10 cm; rachis compressed,

margin with setiform hairs. Spikelets 1 per node, usually secund, dense, ca. 12 mm, with 5 or 6 florets. Glumes lanceolate, 3–5-veined, scabrous along veins, margin membranous, apex acuminate or pointed, usually with a tooth on one side; proximal glume 9–10 mm; distal glume 11–12 mm. Lemma lanceolate, scabrous; first lemma 7–8 mm; awn erect or slightly reflexed, purplish, slender, 12–15 mm. Palea linear-oblong, equaling lemma, setiform ciliate along keels, apex obtuse. Anthers yellow, oblong, ca. 1.5 mm. Fl. and fr. late summer.

- Forest margins, mountain slopes. Nei Mongol.

67. *Elymus yangiae* B. Rong Lu, Willdenowia 22: 129. 1992 [“*yangii*”].

杨氏披碱草 yang shi pi jian cao

Roegneria yangiae (B. Rong Lu) L. B. Cai, Acta Phytotax. Sin. 35: 158. 1997.

Culms erect or nodding at apex, 60–100(–110) cm tall, 4–7-noded, uppermost internode 23–35 cm. Leaf sheath scabrous; ligule 0.3–0.6 mm, apex lacerate; auricles 1.2–2 × 0.5–0.8 mm; leaf blade narrowly linear, 5–25 × 0.3–0.4 cm, both surfaces scabrous, margin ciliate. Spike nodding, 10–15 × 0.5–0.8 cm; rachis margin scabrous. Spikelets 1 per node, 35–45 mm including awns, with 5–10 florets; rachilla pilose, 1.7–2.1 mm. Glumes lanceolate, scabrous along veins, margin membranous, apex mucronate or acute; proximal glume 2–4.5 × 0.2–0.7 mm, (1 or)2- or 3-veined; distal glume 3–3.5 × 0.4–0.9 mm, 2- or 3(–5)-veined. Lemma narrowly lanceolate, 7–10 mm, sparsely pubescent to densely pilose; awn usually straight, 12–32 mm. Palea narrowly lanceolate, 8–10 mm, pubescent, ciliate along keels, apex pointed, 2-cleft. Anthers yellow, 3.5–4.2 mm. Fl. and fr. summer. $2n = 28^*$.

- Among bushes, stony mountain slopes; 3000–4200 m. Xizang.

68. *Elymus dolichatherus* (Keng) S. L. Chen, **comb. nov.**

长芒披碱草 chang mang pi jian cao

Basionym: *Roegneria dolichathera* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 19. 1963; *R. dolichathera* var. *glabrifolia* Keng.

Culms erect, usually glaucous, 60–90 cm tall, 4- or 5-noded. Leaf blade flat or involute, 10–20 × 0.3–0.7 cm, abaxial surface smooth, glabrous, adaxial surface scabrous or densely pubescent. Spike erect, ± curved, or nodding, 10–15 (–17) cm; rachis ± puberulent. Spikelets 1 per node, ± pedicellate, green or purplish green, 12–20 mm excluding awns, with 3–6 florets. Glumes oblong-lanceolate, subequal, 6–8 mm excluding awn, 3–5-veined, scabrous along veins, margin membranous, apex acuminate or awned. Lemma with teeth just below apex; awn erect or slightly reflexed, slender, (10–)15–30 mm. Palea slightly shorter than lemma, scabrous along keels distally. Fl. and fr. Jun–Jul. $2n = 28^*$.

- Forests, mountain slopes; 2300–3700 m. Ningxia, Qinghai, Sichuan, Yunnan.

Löve (Feddes Repert. 95: 453. 1984) did not previously validly publish the combination *Elymus dolichatherus*; see the note following the genus description above.

69. *Elymus tenuispicus* (J. L. Yang & Y. H. Zhou) S. L. Chen, *Novon* 7: 229. 1997.

柔穗披碱草 *rou sui pi jian cao*

Roegneria tenuispica J. L. Yang & Y. H. Zhou, *Novon* 4: 307. 1994.

Culms laxly tufted, erect, 35–75 cm tall, 0.5–1 mm in diam., 4- or 5-noded, glabrous but puberulent at nodes. Leaf sheath equaling or longer than internode, villous, persistent basal part often lacerate, fibrous; ligule ca. 0.5 mm, hyaline-membranous, apex truncate; leaf blade green, flat or involute, 15–20 × 0.3–0.4 cm, abaxial surface scabrous, adaxial surface villous. Spike erect or slightly nodding, 9.2–10.5 cm excluding awns; rachis glabrous, but margin hispid-ciliate; nodes densely pubescent. Spikelets 1 per node, 13–16 mm, with 4–9 florets; rachilla puberulent. Glumes oblong-lanceolate, herbaceous, hirsute, margin membranous, apex acuminate with mucro 0.5–1 mm; proximal glume 5–6.5 mm, 3- or 4-veined; distal glume 6.5–7.5 mm, 4- or 5-veined. Lemma oblong-lanceolate, proximally densely pubescent, distally scabrous-ciliate; first lemma 7.5–8 mm; callus obtuse, densely puberulent, laterally with hairs 0.6–0.8 mm; awn erect, 10–20 mm. Palea shorter than or subequaling lemma, ciliate along distal 1/2–3/4 of keels, pubescent between keels, apex rounded-obtuse. Anthers yellow, 2–2.5 mm. Caryopsis brown, oblong, ca. 5.5 × 1.5 mm, densely white hispidulous. Fl. and fr. Jul–Aug. $2n = 28^*$.

- Roadsides; ca. 3600 m. Xizang.

70. *Elymus calcicola* (Keng) S. L. Chen, **comb. nov.**

钙生披碱草 *gai sheng pi jian cao*

Basionym: *Roegneria calcicola* Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 21. 1963.

Culms slender, ca. 100 cm tall, ca. 5-noded. Leaf blade glaucous green, flat, 10–20 × 0.4–0.5 cm, thick, abaxial surface glabrous, or puberulent along veins, adaxial surface pubescent. Spike ± curved, 12–20 cm. Spikelets 1 per node, 12–17 mm excluding awns, with 3–6 florets. Glumes narrowly lanceolate, usually asymmetric, smooth, or scabrous along veins, margin membranous, apex acuminate; proximal glume 5–8 mm; distal glume 6–10 mm. Lemma glabrous, scabrous, or hirsutulous; first lemma 9–11 mm; awn erect, slender, 15–25 mm, scabrous. Palea equaling or slightly longer than lemma, abaxially puberulent, ciliate throughout length of keels, apex narrowed, obtuse, usually slightly 2-lobed. Fl. and fr. Jun–Jul.

- Steep slopes by rivers, moist and calcareous soils; 1600–2000 m. Guizhou, Sichuan, Yunnan.

Löve (*Feddes Repert.* 95: 453. 1984) did not previously validly publish the combination *Elymus calcicola*; see the note following the genus description above.

71. *Elymus trichospiculus* (L. B. Cai) S. L. Chen & G. Zhu, *Novon* 12: 428. 2002 [*“trichospicula”*].

毛穗披碱草 *mao sui pi jian cao*

Roegneria trichospicula L. B. Cai, *Bull. Bot. Res., Harbin* 14: 340. 1994.

Culms erect or slightly geniculate at base, 90–110 cm tall, 1.5–2.5 mm in diam., 4- or 5-noded, usually glabrous but puberulent below spike. Leaf sheath usually villous proximally; ligule ca. 0.5 mm; leaf blade 6–16 × 0.2–0.45 cm, both (especially adaxial) surfaces pilose. Spike lax, 8–12 cm; rachis puberulent on back, margin spinescent. Spikelets 1 per node, 12–18 mm, with 3–5 florets; rachilla hispidulous; internodes 1.5–2.5 mm. Glumes lanceolate, subequal, 5–6 mm, 3-veined, hispidulous along veins, apex acuminate or pointed; point less than 2 mm. Lemma oblong-lanceolate, 5-veined, abaxially densely villous, apex with straight awn 6–12 mm; first lemma 9–10 mm. Palea equaling lemma, ciliate along keels distally, glabrous between keels, apex truncate. Anthers yellow, ca. 2 mm. Fl. and fr. Aug.

- Forest margins; 3500–4400 m. S Qinghai.

72. *Elymus sinicus* (Keng) S. L. Chen, *Novon* 7: 229. 1997.

中华披碱草 *zhong hua pi jian cao*

Plants laxly tufted or with very short rhizome. Culms erect or geniculate at base, 60–90 cm tall, glabrous throughout. Leaf sheath glabrous; leaf blade involute, 6–22 × (0.1–)0.3–0.7 cm, stiff, abaxial surface glabrous, adaxial surface pilose. Spike erect, 8–13 cm. Spikelets 1 per node, 13–15 mm, with 4 or 5 florets. Glumes oblong-lanceolate, usually oblique, 3–5-veined, apex acute or with awn 1–3 mm; proximal glume 7–8 mm; distal glume 8–10 mm. Lemma oblong-lanceolate, laxly puberulent abaxially; first lemma ca. 9 mm; callus with hairs 0.1–0.4 mm; awn erect or slightly recurved, 10–18 mm. Palea equaling lemma, apex emarginate or truncate, setiform ciliate along keels distally, puberulent between keels distally. Fl. and fr. Jul–Aug.

- Forest margins, mountain slopes, valleys, roadsides; 800–3800 m. Gansu, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Yunnan.

- 1a. Leaf blade (0.1–)0.3–0.4 cm wide; spike 8–10 cm; glume apex acute, awnless 72a. var. *sinicus*
- 1b. Leaf blade ca. 0.7 cm wide; spike 12–13 cm; glume apex with awn 1–3 mm 72b. var. *medius*

72a. *Elymus sinicus* var. *sinicus*

中华披碱草(原变种) *zhong hua pi jian cao* (*yuan bian zhong*)

Roegneria sinica Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 33. 1963; *R. sinica* var. *angustifolia* C. P. Wang & H. L. Yang.

Leaf blade 6–12 × (0.1–)0.3–0.4 cm. Spike 8–10 cm. Spikelets 13–14 mm, with 4 or 5 florets. Glume apex acute, awnless. Fl. and fr. Jul–Aug. $2n = 28^*$.

- Forest margins, mountain slopes, valleys, roadsides; 2100–3000 m. Gansu, Nei Mongol, Qinghai, Shanxi, Sichuan.

72b. *Elymus sinicus* var. *medius* (Keng) S. L. Chen & G. Zhu, *Novon* 12: 427. 2002.

中间披碱草 *zhong jian pi jian cao*

Roegneria sinica var. *media* Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 35. 1963; *R. media* (Keng) L. B. Cai.

Leaf blade 7–22 × ca. 0.7 cm. Spike 12–13 cm. Spikelets ca. 15 mm, with 5 florets. Glume apex with awn 1–3 mm. Fl. Jul.

• Mountain slopes, roadsides; 800–3800 m. Gansu, Henan, Nei Mongol, Ningxia, Shaanxi, Shanxi, Xinjiang.

73. *Elymus puberulus* (Keng) S. L. Chen, comb. nov.

微毛披碱草 wei mao pi jian cao

Basionym: *Roegneria puberula* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 20. 1963.

Culms laxly tufted, erect or geniculate at base, ca. 60 cm tall. Leaf sheath glabrous but pilose or pubescent at base; leaf blade flat, dark green abaxially, glaucous adaxially, 15–22 × 0.5–0.7 cm, abaxial surface glabrous, adaxial surface pubescent. Spike nodding or curved, 8–11 cm. Spikelets 1 per node, green, ca. 12 mm excluding awns, with 2 or 3 florets; pedicel absent or 0.5–0.7 mm, puberulent. Glumes oblong-lanceolate, 3–5-veined, apex acute or acuminate; proximal glume 4.5–6 mm; distal glume 5.5–7 mm. Lemma lanceolate, scabrous or smooth and glabrous; first lemma 8.5–9 mm; callus with hairs 1–3 mm; awn erect, slender, 17–23 mm. Palea slightly shorter than lemma, along keels subsmooth or ciliolate only near apex, apex emarginate or subrounded. Anthers yellowish brown, ca. 1.4 mm. Ovary apex hirsute. Fl. and fr. summer.

• Mountain slopes. Chongqing (Nanchuan).

Löve (Feddes Repert. 95: 453. 1984) did not previously validly publish the combination *Elymus puberulus*; see the note following the genus description above.

74. *Elymus caianus* S. L. Chen & G. Zhu, Novon 12: 425. 2002.

纤瘦披碱草 xian shou pi jian cao

Roegneria gracilis L. B. Cai, Acta Phytotax. Sin. 34: 328. 1996, not *Elymus gracilis* Philippi (1864).

Plants with short rhizome. Culms erect, ca. 70 cm tall, 1.2–2 mm in diam., 3- or 4-noded. Leaf sheath usually shorter than internode, glabrous; ligule very short, apex truncate; leaf blade flat or margin involute, 2–6 × 0.2–0.3 cm, abaxial surface often glabrous, adaxial surface scabrous or also sparsely pubescent. Spike slightly nodding, lax, 10–12 cm; rachis slender, margin spinose; internodes 5–12 mm. Spikelets purplish, 12–16 mm excluding awns, with 3 or 4 florets; rachilla puberulent; internodes 2–2.5 mm. Glumes lanceolate, 3-veined, scabrous along veins, apex acuminate; proximal glume 2–3 mm; distal glume 4–5 mm. Lemma narrowly lanceolate, usually spinose above middle and near margin; first lemma 8–10 mm; awn 6–8 mm. Palea slightly shorter than or equaling lemma, spinose along keels, glabrous between keels, apex truncate or obtuse. Anthers yellow, ca. 1 mm. Ovary obovate, apex pubescent. Fl. and fr. autumn. $2n = 28^*$.

• Stream banks; ca. 4000 m. Xizang (Gongbo'gyamda).

75. *Elymus debilis* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 426. 2002.

柔弱披碱草 rou ruo pi jian cao

Roegneria debilis L. B. Cai, Acta Phytotax. Sin. 34: 327. 1996.

Culms slender, 50–60 cm tall, 1–2 mm in diam., 5–7-noded, scabrous; nodes with short, soft hairs. Leaf sheath glabrous; ligule ca. 0.3 mm, apex truncate; leaf blade flat, 7–15 × 0.3–0.5 cm, abaxial surface usually glabrous, adaxial surface scabrous or laxly villous. Spike usually nodding, 6–11 × 0.5–0.7 cm; rachis margin spinose; internodes 4–5 mm. Spikelets green, ca. 9 mm excluding awns, with 2 or 3 florets. Glumes narrowly lanceolate, 2.5–4 mm, subequal or proximal one shorter, 2- or 3-veined, scabrous, or spinose along veins, apex awned; awn 1.5–3 mm. Lemma lanceolate, 5-veined, abaxially scabrous or spinose, apex awned; first lemma 7–8 mm; awn flexuose, slender, 7–10 mm. Palea slightly longer than lemma, spinose along keels, scabrous between keels, apex truncate. Anthers yellow, ca. 1 mm. Caryopsis oblong. Fl. and fr. Jul–Aug.

• Forests; 2300–3400 m. Gansu (Sunan), Qinghai (Tongde).

76. *Elymus hongyuanensis* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 426. 2002.

红原披碱草 hong yuan pi jian cao

Roegneria hongyuanensis L. B. Cai, Acta Phytotax. Sin. 35: 157. 1997.

Culms erect or geniculate below, 50–70 cm tall, 1.3–2.5 mm in diam., usually 2-noded. Leaf sheath glabrous; ligule very short, apex truncate; leaf blade flat or margin involute, 7–10 × 0.15–0.3 cm, abaxial surface subglabrous, adaxial surface laxly villous. Spike pendulous, lax, 7–10 cm; rachis glabrous but margin scabrous; internodes 5–12 mm. Spikelets 1 per node, green, 10–12 mm excluding awns, with 2 or 3 florets. Glumes lanceolate, ca. 3-veined, glabrous or scabrous along veins, apex acute; proximal glume 3–4 mm; distal glume 4–6 mm. Lemma lanceolate, abaxially sparsely setose; first lemma 8–9 mm; awn straight, 6–11 mm. Palea subequaling lemma, ciliolate along keels, sparsely setose between keels, apex subtruncate to subrounded. Anthers black, ca. 2 mm. Caryopsis oblong, 4–5 mm, apex pubescent. Fl. and fr. summer.

• Meadows; ca. 3400 m. Sichuan (Hongyuan).

77. *Elymus barbicallus* (Ohwi) S. L. Chen, Bull. Nanjing Bot. Gard. 1987: 9. 1988.

毛盘草 mao pan cao

Culms laxly tufted, 40–100 cm tall, 4- or 5-noded, glabrous, or puberulent below nodes; nodes glabrous or white pilose. Leaf sheath glabrous or outer margin ciliate; leaf blade 15–30 × 0.3–0.8 cm, both surfaces glabrous or scabrous, or abaxial surface scabrous and adaxial surface pilose. Spike erect or slightly nodding, 18–22 cm. Spikelets 1 per node, green, 15–25 mm excluding awns, with 5–8 florets. Glumes lanceolate or oblong-lanceolate, apex acute or acuminate; proximal glume 7–14 mm, 3–5-veined; distal glume 8–14.5 mm, 5–7-veined. Lemma 8–13 mm, glabrous only abaxially, but scabrous near base, margin, and along veins; callus with hairs 6–10 mm; awn straight, 20–30 mm. Palea slightly shorter than to equaling

lemma, ciliolate along keels distally, hispidulous between keels distally, apex emarginate or rounded. Anthers yellowish. Ovary hirsute. Fl. and fr. May–Jul. $2n = 28^*$.

• Forest margins, mountain slopes, valleys, river banks; 1300–1700 m. Hebei, Nei Mongol, Ningxia, Qinghai, Shanxi.

- 1a. Culms puberulent below nodes, nodes white pilose; leaf sheath outer margin ciliate; glumes 10–14.5 mm; lemma 12–13 mm 77c. var. *pubinodis*
- 1b. Culms, nodes, and leaf sheaths glabrous; glumes 7–12 mm; lemma 8–10 mm.
- 2a. Leaf blade 0.6–0.8 cm wide, both surfaces glabrous or scabrous; palea equaling lemma 77a. var. *barbicallus*
- 2b. Leaf blade 0.3–0.7 cm wide, abaxial surface scabrous, adaxial surface pilose; palea slightly shorter than lemma 77b. var. *pubifolius*

77a. *Elymus barbicallus* var. *barbicallus*

毛盘草(原变种) mao pan cao (yuan bian zhong)

Agropyron barbicallum Ohwi, Acta Phytotax. Geobot. 11: 257. 1942; *Roegneria barbicalla* (Ohwi) Keng & S. L. Chen; *R. barbicalla* var. *brevisetata* Keng.

Culms 70–100 cm tall, glabrous; nodes glabrous. Leaf sheath glabrous; leaf blade 15–20 × 0.6–0.8 cm, both surfaces glabrous or scabrous. Proximal glume 7–8 mm; distal glume 8–9 mm. Lemma 8–10 mm. Palea equaling lemma. Fl. and fr. Jun–Jul.

• Forest margins, mountain slopes, river banks. Hebei, Nei Mongol.

77b. *Elymus barbicallus* var. *pubifolius* (Keng) S. L. Chen, Novon 7: 227. 1997.

毛叶毛盘草 mao ye mao pan cao

Roegneria barbicalla var. *pubifolia* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 25. 1963.

Culms ca. 50 cm tall, glabrous; nodes glabrous. Leaf sheath glabrous; leaf blade 15–20 × 0.3–0.7 cm, abaxial surface scabrous, adaxial surface pilose. Glumes 7–12 mm. Lemma ca. 10 mm. Palea slightly shorter than lemma. Fl. and fr. May–Jul.

• Mountain slopes; 1300–1700 m. Hebei, Shanxi.

77c. *Elymus barbicallus* var. *pubinodis* (Keng) S. L. Chen, Novon 7: 227. 1997.

毛节毛盘草 mao jie mao pan cao

Roegneria barbicalla var. *pubinodis* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 24. 1963.

Culms 40–50 cm tall, puberulent below nodes; nodes white pilose. Leaf sheath outer margin ciliate; leaf blade 16–30 × 0.4–0.7 cm, both surfaces glabrous or adaxial surface scabrous. Proximal glume 10–14 mm; distal glume 12–14.5 mm. Lemma 12–13 mm. Fl. and fr. May–Jul.

• Mountain slopes, valleys. Hebei, Nei Mongol.

78. *Elymus angustispiculatus* S. L. Chen & G. Zhu, Novon 12: 425. 2002.

狭穗披碱草 xia sui pi jian cao

Roegneria angusta L. B. Cai, Acta Phytotax. Sin. 34: 332. 1996, not *Elymus angustus* Trinius (1829).

Culms erect or slightly geniculate at base, 80–100 cm tall, 2–2.5 mm in diam., ca. 4-noded. Leaf sheath margin ciliate; ligule ca. 0.6 mm, papery, apex truncate; leaf blade flat, 8–15 × 0.4–0.6 cm, both surfaces glabrous or adaxial surface scabrous. Spike erect or slightly curved, 16–20 × ca. 0.6 cm; rachis scabrous on back, margin ciliate. Spikelets 1 per node, narrow, 16–26 mm, with 4–6 florets. Glumes lanceolate, subequal, 8–10 mm, 3-veined, scabrous along veins, apex with mucro 1–2 mm. Lemma narrowly lanceolate, abaxially glabrous; first lemma 10–12 mm; callus glabrous or slightly pilose; awn straight, 20–25 mm, scabrous. Palea subequaling lemma, ciliolate along keels distally, glabrous between keels. Anthers yellow, 2–2.7 mm. Fl. and fr. Jul–Aug.

• Mountain slopes; ca. 2500 m. Qinghai (Xunhua).

79. *Elymus hondae* (Kitagawa) S. L. Chen, Bull. Nanjing Bot. Gard. 1987: 9. 1988 [“*hondai*”].

本田披碱草 ben tian pi jian cao

Roegneria hondae Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 6(4): 118. 1942 [“*hondai*”]; *R. hondae* var. *fascinata* Keng.

Culms 70–100 cm tall, glabrous. Leaf sheath glabrous, or retrorsely pilose at base of innovation shoot; leaf blade 13–20 × 0.3–0.9 cm, abaxial surface smooth, subglabrous, adaxial surface scabrous, hispid along veins. Spike lax, 15–20 cm. Spikelets 1 per node, purplish green, ca. 16 mm excluding awns, with ca. 5 florets. Glumes lanceolate, scabrous along veins, apex acuminate or pointed; proximal glume 7–10 mm, 3–5-veined; distal glume 8.5–11 mm, 4–6-veined. Lemma scabrous, with a tooth below apex on one or both sides; first lemma ca. 10 mm; callus with hairs ca. 5 mm; awn straight, 15–25 mm. Palea slightly shorter than lemma, ciliate along keels distally, puberulent between keels distally, apex obtuse or emarginate. Fl. and fr. Jul–Aug. $2n = 28^*$.

• Mountain slopes. Hebei, Henan, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi.

80. *Elymus alienus* (Keng) S. L. Chen, Novon 7: 227. 1997 [“*aliena*”].

涑源披碱草 lai yuan pi jian cao

Roegneria aliena Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 31. 1963; *R. barbicalla* (Ohwi) Keng & S. L. Chen var. *foliosa* (Keng) L. B. Cai; *R. foliosa* Keng.

Plants usually with short, underground rhizomes. Culms laxly tufted, (30–)60–90 cm tall, 3- or 4(–6)-noded. Leaf sheath glabrous or retrorsely pubescent; leaf blade flat, 12–20 × 0.4–0.9 cm, abaxial surface glabrous, adaxial surface pubescent.

Spike erect or slightly curved, 7–15 cm. Spikelets 1 per node, green or purplish green, 14–17 mm excluding awns, with 4–6 florets; rachilla puberulent; internodes 1–2.5 mm. Glumes oblong-lanceolate, 3–5(or 6)-veined, smooth or scabrous along veins, apex acute or acuminate; proximal glume 7–8 mm; distal glume 8–10 mm. Lemma lanceolate, smooth and glabrous abaxially, but scabrous or puberulent along veins and near margin; first lemma 9–10 mm; callus with hairs 0.4–0.6 mm; awn straight or slightly reflexed, 10–25 mm. Palea slightly shorter than lemma, ciliate along keels distally, apex obtuse. Anthers ca. 2.5 mm. Fl. and fr. Jun–Aug.

- Moist valleys, roadsides; ca. 1100 m. Hebei, Henan, Nei Mongol, Shanxi.

The names *Roegneria aliena* and *R. foliosa* have equal priority, but in *Elymus* only *E. alienus* is validly published. Chen (Bull. Nanjing Bot. Gard. 1987: 9. 1988) did not validly publish the combination "*E. foliosus*" because the place of valid publication of the basionym was not cited (Saint Louis Code, Art. 33.3). Instead, *R. foliosa* was cited from Keng (Fl. Ill. Pl. Prim. Sin. Gram. 366. 1959), where the name was not validly published because no Latin description was provided (Art. 36.1).

81. *Elymus abolinii* (Drobow) Tzvelev, Rast. Tsentr. Azii 4: 214. 1968.

异芒披碱草 yi mang pi jian cao

Culms erect, 80–115 cm tall. Leaf blade flat, 0.4–0.7 cm wide, glabrous, scabrous, or adaxial surface pilose along veins. Spike erect or nodding, 10–20 cm; rachis with short bristles. Spikelets 1 per node, somewhat remote, green or slightly tinged, 15–30 mm, with 4–11 florets; rachilla appressed pilose. Glumes lustrous green, lanceolate or linear-lanceolate, subequal, 11–16 × 2–3 mm, 5–9-veined, very scabrous, margin scarious, apex acuminate, often asymmetric and 1-toothed. Lemma lanceolate, 9–13 mm, scabrous-hairy, apex 1-toothed; awn sometimes recurved, 3–35 mm or reduced to a cusp ca. 1 mm. Palea shorter than lemma, apex truncate or subobtusate. Anthers 3–7 mm. Fl. and fr. Jun–Sep. $2n = 28$.

Mountain slopes, river banks; ca. 1300–2700 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Turkmenistan, Uzbekistan].

- 1a. Lemma awn 3–8 mm or reduced to a cusp ca. 1 mm.
 - 2a. Spikelets with 5–7 florets; glumes lanceolate, 5–7-veined; palea apex subobtusate 81a. var. *abolinii*
 - 2b. Spikelets with 4 or 5 florets; glumes linear-lanceolate, 6–9-veined; palea apex truncate 81b. var. *nudiusculus*
- 1b. Lemma awn 15–35 mm.
 - 3a. Spikelets 15–25 mm, with 5–7 florets 81c. var. *divaricans*
 - 3b. Spikelets 25–30 mm, with 7–11 florets 81d. var. *pluriflorus*

81a. *Elymus abolinii* var. *abolinii*

异芒披碱草(原变种) yi mang pi jian cao (yuan bian zhong)

Agropyron abolinii Drobow, Repert. Spec. Nov. Regni Veg. 21: 42. 1925 [*"abolini"*]; *Gouardia abolinii* (Drobow)

Ikonnikov; *Roegneria abolinii* (Drobow) Nevski.

Spikelets 15–25 mm, with 5–7 florets. Glumes lanceolate, 5–7-veined. Lemma awn 3–5 mm or reduced to a cusp ca. 1 mm. Palea apex subobtusate.

Mountain slopes; ca. 2700 m. Xinjiang [Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan].

81b. *Elymus abolinii* var. *nudiusculus* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 425. 2002.

裸穗异芒草 luo sui yi mang cao

Roegneria nudiuscula L. B. Cai, Acta Phytotax. Sin. 35: 171. 1997.

Spikelets 15–20 mm, with 4 or 5 florets. Glumes linear-lanceolate, 6–9-veined. Lemma awn 3–8 mm. Palea apex truncate.

- River banks; 1500–2000 m. Xinjiang.

81c. *Elymus abolinii* var. *divaricans* (Nevski) Tzvelev, Rast. Tsentr. Azii 4: 214. 1968.

曲芒异芒草 qu mang yi mang cao

Roegneria abolinii var. *divaricans* Nevski, Trudy Sredne-Aziatsk. Gosud. Univ., Ser. 8b, Bot. 17: 68. 1934.

Spikelets 15–25 mm, with 5–7 florets. Lemma awn 15–35 mm. Fl. and fr. Jun–Sep.

Grassy mountain slopes; 1300–1900 m. Xinjiang [Mongolia, Russia].

81d. *Elymus abolinii* var. *pluriflorus* D. F. Cui, Bull. Bot. Res., Harbin 10(3): 30. 1990.

多花异芒草 duo hua yi mang cao

Roegneria abolinii var. *pluriflora* (D. F. Cui) L. B. Cai.

Spikelets 25–30 mm, with 7–11 florets. Lemma awn 15–22 mm. Fl. and fr. Jun–Sep.

- Grassy mountain slopes. Xinjiang.

82. *Elymus fedtschenkoi* Tzvelev, Novosti Sist. Vyssh. Rast. 10: 21. 1973.

光鞘披碱草 guang qiao pi jian cao

Agropyron curvatum Nevski, Izv. Bot. Sada Akad. Nauk SSSR 30: 629. 1932; *Elymus curvatus* (Nevski) D. F. Cui (1996), not Piper (1903); *Roegneria curvata* (Nevski) Nevski; *R. fedtschenkoi* (Tzvelev) N. R. Cui, nom. superfl.

Culms erect or slightly geniculate at base, robust, 50–100 cm tall. Leaf sheath smooth, glabrous, rarely pilose at base; leaf blade 0.5–1.2 cm wide, glabrous, scabrous, or adaxial surface laxly pilose. Spike erect or slightly curved, often somewhat secund, dense, 7–16 cm. Spikelets 1 per node, subsessile, green or greenish tawny-purple, 15.5–25 mm excluding awns, with 5 or 6 florets. Glumes broadly lanceolate, 11–18 × 2.3–3.5 mm, 5–7-veined, margin membranous, apex acuminate, pointed, sometimes with a tooth. Lemma lanceolate, 10–14 mm, scabrous or appressed setose; awn reflexed, 25–37 mm. Palea lan-

ceolate, 9–13 mm, hispid along keels, apex subobtusely. Anthers 2.5–3 mm. Fl. and fr. Jun–Jul. $2n = 28^*$.

Mountain meadows. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Turkmenistan, Uzbekistan].

83. *Elymus platyphyllus* (Keng) Á. Löve ex D. F. Cui in N. R. Cui, Fl. Xinjiang. 6: 192. 1996.

宽叶披碱草 kuan ye pi jian cao

Roegneria platyphylla Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 35. 1963.

Culms erect, 60–100 cm tall. Leaf sheath smooth, glabrous; leaf blade flat, 5–18 × 0.5–1.2 cm, rigid, abaxial surface glabrous, but scabrous along veins, adaxial surface pilose. Spike erect, usually secund, dense, 8–13 cm. Spikelets 1 per node, greenish, 18–24 mm excluding awns, with 6 or 7 florets. Glumes lanceolate, 5–7(–9)-veined, scabrous or hispidulous along veins, apex pointed; proximal glume 10–12 mm; distal glume 11–15 mm. Lemma lanceolate, pubescent throughout; first lemma 10–12 mm; awn erect, 7–14 mm. Palea subequaling lemma, puberulent abaxially, setiform ciliate along keels distally, apex emarginate or truncate. Anthers ca. 3 mm. Ovary hirsute. Fl. and fr. late summer.

- Meadows. Xinjiang.

Löve (Feddes Repert. 95: 456. 1984) did not previously validly publish the combination *Elymus platyphyllus*; see the note following the genus description above.

84. *Elymus shandongensis* B. Salomon, Willdenowia 19: 449. 1990.

山东披碱草 shan dong pi jian cao

Roegneria shandongensis (B. Salomon) J. L. Yang et al.

Culms laxly tufted, erect or slightly decumbent at base, 60–90 cm tall. Leaf sheath usually glabrous; ligule ca. 6.5 mm; leaf blade flat or involute at margin, 10–25 × 0.4–0.8 cm, both surfaces scabrous or adaxial surface smooth. Spike erect or slightly curved, 8–20 cm. Spikelets 1 per node, 13–19 mm excluding awns, with 5–8 florets. Glumes oblong-lanceolate, 5–7-veined, apex acute or pointed; veins robust, scabrous; proximal glume 5–7 mm; distal glume 7–9 mm. Lemma oblong-lanceolate, subglabrous abaxially, margin membranous; first lemma 9–10 mm; callus pubescent along lateral side; awn erect, (12–) 20–30 mm, scabrous. Palea subequaling lemma, wingless and shortly setiform ciliate along keels. Fl. and fr. Jul–Aug. $2n = 28^*$.

- Mountain slopes, roadsides. Anhui, Guizhou, Henan, Hubei, Jiangsu, Shaanxi, Shandong, Taiwan, Zhejiang.

This species has long been misclassified by some taxonomists in China as *Elymus ×mayebaranus* (Honda) S. L. Chen (*Agropyron ×mayebaranum* Honda; *Roegneria ×mayebarana* (Honda) Ohwi ex Keng & S. L. Chen). The true *E. ×mayebaranus* is found only in Japan; it is a highly sterile natural hybrid between the hexaploid ($2n = 42$) parents *E. humidus* (Ohwi & Sakamoto) Á. Löve (*A. humidum* Ohwi & Sakamoto) and *E. tsukushiensis* Honda.

85. *Elymus magnipodus* (L. B. Cai) S. L. Chen & G. Zhu, Novon 12: 427. 2002.

大柄披碱草 da bing pi jian cao

Roegneria magnipoda L. B. Cai, Acta Phytotax. Sin. 35: 164. 1997.

Culms erect, 20–35 cm tall, 1–2.5 mm in diam., 2-noded, smooth, glabrous. Leaf sheath usually longer than internode except on upper leaves, glabrous; ligule very short, papery; leaf blade involute, 4–7 × 0.15–0.25 cm, both surfaces glabrous or adaxial surface scabrous. Spike erect, lax, 6–9 cm; rachis glabrous; internodes 10–20(–28) mm. Spikelets 1 per node, yellowish green, 15–25 mm excluding awns, with 6–8 florets; pedicel 1–2.5 mm. Glumes subequal, 4.5–7 mm, 4–7-veined, abaxially glabrous, apex acute. Lemma lanceolate, abaxially smooth, glabrous; first lemma 9–10 mm; awn erect or slightly recurved, 9–15 mm. Palea slightly shorter than or equaling lemma, ciliolate along keels, apex truncate or subrounded. Anthers black, 2–3 mm. Ovary obovate, apex pubescent. Fl. and fr. Jun–Jul.

- River banks; ca. 3100 m. Qinghai (Golmud).

86. *Elymus pendulinus* (Nevski) Tzvelev, Rast. Tsentr. Azii 4: 218. 1968.

缘毛披碱草 yuan mao pi jian cao

Culms 60–110 cm tall, glabrous throughout, or puberulent or pubescent at nodes, sometimes also densely retrorsely pubescent in upper part (exserted from leaf sheath). Leaf sheath glabrous, or retrorsely pubescent at least at base; leaf blade flat, 10–25 × 0.3–0.9 cm, glabrous, scabrous, or adaxial surface pilose. Spike slightly nodding, 12–25 cm. Spikelets 1 per node, green or purplish at base, 15–25 mm excluding awns, with 4–9 florets. Glumes lanceolate or oblong-lanceolate, 3–7-veined, sometimes scabrous along veins, margin sometimes laxly ciliolate, apex acute or pointed; proximal glume 7–9 mm; distal glume 7–10 mm. Lemma lanceolate or oblong-lanceolate, scabrous abaxially, pilose distally, laxly hirsutulous near apex, or hirsutulous throughout, margin ciliate distally; first lemma 8–11 mm; awn erect or slightly reflexed, slender, 15–30 mm. Palea slightly shorter than or subequaling lemma, ciliolate along keels distally, pubescent between keels. Anthers ca. 2 mm. Fl. and fr. May–Jul. $2n = 28^*$.

Forests, mountain slopes, valleys, meadows, along rivers; 100–2400 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan [Japan, Korea, Mongolia, Russia].

- 1a. Culms glabrous throughout (rarely pubescent at nodes) 86a. subsp. *pendulinus*
- 1b. Culms puberulent or densely pubescent, at least at nodes.
 - 2a. Culms puberulent at nodes; leaf sheath glabrous; spikelets with 6–9 florets 86b. subsp. *multiculmis*
 - 2b. Culms densely retrorsely pubescent in upper part (exserted from leaf sheath) and at nodes; leaf sheath retrorsely pubescent, especially proximally; spikelets with

4 or 5 florets 86c. subsp. *pubicaulis*

86a. *Elymus pendulinus* subsp. *pendulinus*

缘毛披碱草(原亚种) yuan mao pi jian cao (yuan ya zhong)

Roegneria pendulina Nevski in Komarov, Fl. URSS 2: 616. 1934; *Agropyron caninum* (Linnaeus) P. Beauvois var. *amurense* (Korshinsky) Korshinsky; *Triticum caninum* Linnæus f. *amurense* Korshinsky.

Culms glabrous throughout, rarely pubescent at nodes. Leaf sheath usually retrorsely pubescent at base. Spikelets with 4–8 florets. Fl. and fr. May–Jul. $2n = 28^*$.

Forests, mountain slopes, valleys, along rivers. Gansu, Hebei, Heilongjiang, Liaoning, Nei Mongol, Shaanxi, Shanxi, Sichuan [Japan, Korea, Mongolia, Russia].

86b. *Elymus pendulinus* subsp. *multiculmis* (Kitagawa) Á. Löve, Feddes Repert. 95: 459. 1984.

多秆缘毛草 duo gan yuan mao cao

Roegneria multiculmis Kitagawa, J. Jap. Bot. 17: 235. 1941; *R. multiculmis* var. *pubiflora* Keng.

Culms puberulent at nodes. Leaf sheath glabrous. Spikelets with 6–9 florets. Fl. and fr. Jun–Jul. $2n = 28^*$.

• Mountain slopes; 1100–1200 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Nei Mongol, Qinghai, Shaanxi, Shanxi.

86c. *Elymus pendulinus* subsp. *pubicaulis* (Keng) S. L. Chen, comb. et stat. nov.

毛秆披碱草 mao gan pi jian cao

Basionym: *Roegneria pubicaulis* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 30. 1963; *R. pendulina* f. *pubinodis* (Keng) Kitagawa; *R. pendulina* var. *pubinodis* Keng.

Culms densely retrorsely pubescent in upper part (exserted from leaf sheath) and at nodes. Leaf sheath retrorsely pubescent, especially proximally. Spikelets with 4 or 5 florets. Fl. and fr. Jun–Jul. $2n = 28^*$.

• Meadows, damp places; 100–2400 m. Gansu, Liaoning, Nei Mongol, Shaanxi, Yunnan.

Löve (Feddes Repert. 95: 459. 1984) did not previously validly publish the combination *Elymus pendulinus* subsp. *pubicaulis*; see the note following the genus description above.

87. *Elymus komarovii* (Nevski) Tzvelev, Rast. Tsent. Azii 4: 216. 1968.

偏穗披碱草 pian sui pi jian cao

Agropyron komarovii Nevski, Izv. Bot. Sada Akad. Nauk SSSR 30: 620. 1932 [“*komarovi*”]; *Elymus uralensis* (Nevski) Tzvelev subsp. *komarovii* (Nevski) Tzvelev; *Roegneria komarovii* (Nevski) Nevski.

Culms erect or geniculate at base, 50–75 cm tall. Leaf sheath smooth and glabrous, or pubescent at base; leaf blade flat, 8–21 × 0.4–0.8 cm, abaxial surface glabrous but scabrous, adaxial surface scabrous or pubescent. Spike erect, usually secund, dense, 8.5–15 cm; rachis margin scabrous. Spikelets 1 per

node, green or purplish green, 13–25 mm excluding awns, with 3–5 florets. Glumes lanceolate, subequal, 8–10 mm, 5–7-veined, margin scarios, apex asymmetric, awned; awn 2–7 mm, scabrous. Lemma lanceolate, 10–12 mm, puberulent; awn erect, 8–15 mm, scabrous. Palea subequalling lemma,

ciliate along keels, apex emarginate or obtuse. Anthers ca. 2 mm. Fl. and fr. summer. $2n = 28^*$.

Steppes, near villages; 1800–2900 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Turkmenistan, Uzbekistan].

88. *Elymus tianschanigenus* Czerepanov, Sosud. Rast. SSSR, 351. 1981.

天山披碱草 tian shan pi jian cao

Agropyron tianschanicum Drobow in Vvedensky et al., Key Fl. Tashkent 1: 40. 1923; *Elymus tianschanicus* (Drobow) Nevski (1934), not Drobow (1923); *E. uralensis* (Nevski) Tzvelev subsp. *tianschanicus* (Drobow) Tzvelev; *Roegneria tianschanica* (Drobow) Nevski; *Semeiostachys tianschanica* (Drobow) Drobow.

Culms erect, 50–100 cm tall, smooth, glabrous. Leaf sheath smooth, glabrous; leaf blade flat, 10–18 × 0.5–1 cm, both surfaces scabrous and pilose or abaxial surface scattered pilose. Spike erect or slightly nodding, subsecund, dense, 7–17.5 cm. Spikelets 1 per node, purplish green, 2–3 mm excluding awns, with 3–5(–7) florets. Glumes broadly lanceolate, slightly asymmetric, subequal, 9–12 mm, 5–7-veined, scabrous, apex acute or mucronate, sometimes with a tooth. Lemma lanceolate, 9–12 mm, pilose; awn straight, (4–)7–16 mm. Palea equaling or slightly longer than lemma, ciliate along keels, apex slightly emarginate or subobtuse. Anthers ca. 2.5 mm. Fl. and fr. summer. $2n = 28$.

Slopes in river valleys, meadows; 2700–3000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan].

