

**97. BROMUS** Linnaeus, Sp. Pl. 1: 76. 1753.

雀麦属 que mai shu

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*Bromopsis* (Dumortier) Fourreau; *Ceratochloa* P. Beauvois; *Nevskiella* Kreczetowicz & Vvedensky.

Annuals or perennials. Culms erect, tufted or with rhizomes. Leaf sheaths closed; leaf blades linear, usually flat; ligules membranous. Panicles spreading or contracted, branches scabrid or pubescent, elongated or arched. Spikelets large, with 3 to many florets, upper florets often sterile; rachilla disarticulating above glumes and between florets, scabrid or shortly hairy; glumes unequal or subequal, shorter than spikelet, lanceolate or nearly ovate, (1–)5–7-veined, apex acute or long acuminate or aristiform; floret callus glabrous or both sides thinly hairy; lemmas rounded on back or compressed to keel, 5–9(–11)-veined, herbaceous or nearly leathery, margins often membranous, apex entire or 2-toothed; awn terminal or arising from lemma between teeth slightly under apex, rarely awnless or 3-awned; palea narrow, usually shorter than lemma, keels ciliate or scabrid. Lodicules 2. Stamens 3. Ovary apex with appendage; styles 2, arising from lower front of appendage. Caryopsis oblong, apex hairy, adaxial surface sulcate. Chromosomes large,  $x = 7$ ,  $2n = 14, 28, 42, 56, 70$ .

About 150 species: temperate regions, mainly in the N hemisphere, also on mountains in the tropics; 55 species (eight endemic, at least three introduced) in China.

In addition to the species treated below, *Bromus pubescens* Muhlenberg ex Willdenow (Enum. Pl. 120. 1809) was recorded by Jung et al. (Taiwania 51: 2. 2005) from a roadside at 2400 m in Taiwan (Nantou).

- 1a. Spikelets strongly laterally compressed, lemmas 7–13-veined, keeled (*B.* sect. *Ceratochloa* (P. Beauvois) Grisebach).
  - 2a. Perennial; leaf sheaths retrorsely pubescent; lemmas often hairy, awn 5–7 mm ..... 53. *B. marginatus*
  - 2b. Annual; leaf sheaths glabrous; lemmas mostly glabrous, mucronate or awned.
    - 3a. Lemmas awnless or with mucro, ca. 1 mm; palea 1/2 lemma length ..... 54. *B. catharticus*
    - 3b. Lemmas with ca. 10 mm awn; palea subequal to lemma ..... 55. *B. carinatus*
- 1b. Spikelets slightly laterally compressed to ± cylindrical, lemmas 5–9-veined, rounded on back.
  - 4a. Perennials, tufted or rhizomatous.
    - 5a. Glumes subequal to lower florets; awn stout, recurved, mostly as long as lemma; panicle narrow, branches simple (*B.* sect. *Sinobromus* Keng ex P. C. Keng).
      - 6a. Lower glume 5–8 mm, upper glume 7–12 mm; lemmas 8–10 mm ..... 24. *B. himalaicus*
      - 6b. Lower glume 8–15 mm, upper glume 11–17 mm; lemmas 9–16 mm.
        - 7a. Glumes glabrous.
          - 8a. Culms 50–70 cm tall, nodes 3; lemmas glabrous ..... 26. *B. epilis*
          - 8b. Culms up to 100 m tall, nodes 7–8; lemmas marginally and distally pubescent ..... 27. *B. mairei*
        - 7b. Glumes pubescent.
          - 9a. Panicle branches each with 1–5 spikelets; spikelets 12–20 mm; awn arising near lemma apex ..... 28. *B. sinensis*
          - 9b. Panicle branches each with 1 apical spikelet; spikelets 18–25 mm; awn arising between apical lobes ..... 25. *B. porphyranthos*
    - 5b. Glumes conspicuously shorter than lower florets; awn slender, straight, mostly shorter than lemma; panicle contracted to effuse (*B.* sect. *Bromopsis* Dumortier).
      - 10a. Plants usually more than 1 m tall; lemma with long or short awn.
        - 11a. Plants tufted, without rhizomes or stolons; culms with 6–9 nodes.
          - 12a. Lemma 3–5-veined; rachilla clearly visible from side in mature spikelet.
            - 13a. Rachilla internodes 3–4 mm; lemma 5-veined, ca. 12 mm ..... 1. *B. magnus*
            - 13b. Rachilla internodes 1–2 mm; lemma 3-veined, ca. 10 mm ..... 2. *B. plurinodis*
          - 12b. Lemma often 7-veined; rachilla not visible from side of intact mature spikelet.
            - 14a. Panicles contracted; lemmas 10–12 mm ..... 3. *B. erectus*
            - 14b. Panicles spreading; lemmas 12–15 mm.
              - 15a. Panicle branches 3–5 cm, with 1–3 spikelets ..... 4. *B. pseudoramosus*
              - 15b. Panicle branches up to 20 cm, with 2–9 spikelets ..... 5. *B. ramosus*
        - 11b. Plants rhizomatous; culms often with fewer than 6 nodes.
          - 16a. Plants with long creeping rhizomes.
            - 17a. Panicles spreading ..... 7. *B. pumpellianus*
            - 17b. Panicles narrow.
              - 18a. Panicles racemelike; lemmas glabrous ..... 6. *B. stenostachyus*
              - 18b. Panicles narrowly contracted; lemmas pubescent on veins.

- 19a. Lemma pubescent along keel and marginal veins to middle or slightly above; awn 1–5 mm ..... 8. *B. sibiricus*  
 19b. Lemma pubescent on marginal veins almost to apex; awn up to 2 mm ..... 14. *B. korotkiji*
- 16b. Plant with short rhizomes.  
 20a. Panicle branches (2–)6–9 per node.  
 21a. Awns 1–1.5 mm; rachilla not visible from side, internodes very short ..... 13. *B. inermis*  
 21b. Awns 5–10 mm; rachilla clearly visible from side, internodes 3–4 mm ..... 12. *B. remotiflorus*
- 20b. Panicle branches 2–5 per node.  
 22a. Leaf blades 3–5 mm wide ..... 9. *B. staintonii*  
 22b. Leaf blades 5–12 mm wide.  
 23a. Lemmas 11–14 mm; anthers 2.5–3 mm ..... 10. *B. benekenii*  
 23b. Lemmas 10–12 mm; anthers 1–1.2 mm ..... 11. *B. ciliatus*
- 10b. Plants less than 1 m tall (if more than 1 m, then lemma awn shorter than 3 mm, sometimes absent).  
 24a. Awns absent or less than 2(–4) mm; plants with long rhizomes.  
 25a. Lemmas glabrous, scabrid near base; anthers 3–4 mm ..... 13. *B. inermis*  
 25b. Lemmas pilose, at least on keel and marginal veins; anthers 5–6 mm ..... 14. *B. korotkiji*
- 24b. Awns more than 2 mm; plants tufted or rhizomatous.  
 26a. Plants with long downwardly extending rhizomes ..... 15. *B. formosanus*  
 26b. Plants tufted or with short rhizomes.  
 27a. Plants loosely tufted, or with short inconspicuous rhizomes.  
 28a. Plants ca. 20 cm tall; panicle contracted, lower branches crowded ..... 20. *B. variegatus*  
 28b. Plants 20–60 cm tall; panicle open, lower branches not crowded, spreading.  
 29a. Plants ca. 60 cm tall, with short rhizomes ..... 21. *B. confinis*  
 29b. Plants ca. 20–50 cm tall, tufted.  
 30a. Awns ca. 3 mm ..... 17. *B. paulsenii*  
 30b. Awns 8–12 mm.  
 31a. Panicle branches each with 2–4 spikelets; spikelets 2–2.5 cm ..... 22. *B. morrisonensis*  
 31b. Panicle branches each with 1 or 2 spikelets; spikelets 3–4 cm ..... 23. *B. nepalensis*
- 27b. Plants densely tufted.  
 32a. Plants 40–90 cm tall.  
 33a. Lower glume 8–10 mm, upper glume 10–12 mm ..... 17. *B. paulsenii*  
 33b. Lower glume 5–6 mm, upper glume 7–8 mm ..... 19. *B. tytholepis*
- 32b. Plants up to 40(–50) cm tall.  
 34a. Awns 6–8 mm ..... 16. *B. riparius*  
 34b. Awns 3–5 mm.  
 35a. Leaf blades ca. 5 mm wide; panicles 10–12 cm ..... 17. *B. paulsenii*  
 35b. Leaf blades 1.5–2 mm wide; panicles 5–9 cm.  
 36a. Panicle branches scabrid, shorter than spikelet; lemmas glabrous, often scabrid ..... 17. *B. paulsenii*  
 36b. Panicle branches slender, flexuous, often longer than spikelets; lemmas pubescent ..... 18. *B. cappadocicus*
- 4b. Annuals.  
 37a. Spikelets broadened upward, wedge-shaped; glumes narrow, lower glume 1(–3)-veined, upper glume 3(–5)-veined.  
 38a. Awn 4–6 times length of lemma; lemma apex minutely 2-toothed (*B. sect. Nevskiella* (Kreczetowicz & Vvedensky) Tournay) ..... 35. *B. gracillimus*  
 38b. Awn 1–3 times length of lemma; lemma apex clearly 2-toothed, teeth 3–7 mm (*B. sect. Genea* Dumortier).  
 39a. Panicle lax, branches spreading or drooping.  
 40a. Panicle much branched, branches longer or shorter than spikelets, pubescent; spikelets 1–8 per branch, secund ..... 29. *B. tectorum*  
 40b. Panicle simple, branches up to 10 cm, with 1 or no branchlets; spikelets sparse, 1 or 2(or 3) per branch ..... 30. *B. sterilis*
- 39b. Panicle contracted, branches erect or ascending, never drooping.  
 41a. Lower glume 15–20 mm; lemmas 20–30 mm, awn 30–40 mm ..... 31. *B. rigidus*  
 41b. Lower glume 6–10 mm; lemmas 10–15 mm, awn 10–20 mm.  
 42a. Panicle lax; branches 2–3 cm, scabrid; culms glabrous below inflorescence; stamens 2 ..... 32. *B. madritensis*  
 42b. Panicle contracted; branches shorter than spikelets, ca. 1 cm, culms pubescent below inflorescence; stamens usually 3.  
 43a. Plants 5–15 cm tall; panicle ca. 5 cm, branches each with 1 or 2 spikelets; lemmas 13–15 × 1–1.5 mm ..... 33. *B. fasciculatus*  
 43b. Plants 30–40 cm tall; panicle ca. 10 cm, branches each with 4 or 5 spikelets; lemmas 10–13 × ca. 2 mm ..... 34. *B. rubens*

- 37b. Spikelets narrowed upward, oblong-lanceolate; glumes broad, lower glume 3–5-veined, upper glume 5–9-veined (*B. sect. Bromus*).
- 44a. Lemmas 3-awned ..... 52. *B. danthoniae*
- 44b. Lemmas 1-awned.
- 45a. Spikelets (2–)3–4 cm; lemmas 14–18 mm.
- 46a. Spikelets oblong-lanceolate, ca. 6 mm wide; lemma apex deeply toothed, teeth (1.5–)3–4 mm; panicle open, branches several times longer than spikelets, nodding.
- 47a. Lower glume ca. 10 mm; lemma 15–18 mm, awn 20–25 mm, lower part slightly flattened, twisted, conspicuously recurved ..... 48. *B. oxyodon*
- 47b. Lower glume 5–8 mm; lemma 10–15 mm, awn 8–17 mm, terete, straight, usually erect ..... 49. *B. pectinatus*
- 46b. Spikelets broadly elliptic, ca. 10 mm wide; lemma apex shallowly toothed, teeth 1–2 mm; panicle slightly contracted, branches not longer than spikelets, obliquely ascending.
- 48a. Lemma scabrid; awn 5–10 mm, straight; anthers 2–3 mm; panicle branches on 1 side of axis ..... 50. *B. grossus*
- 48b. Lemma smooth; awn 10–20 mm, conspicuously recurved; panicle branches on all sides on axis ..... 51. *B. lanceolatus*
- 45b. Spikelets (1–)1.5–2.5(–3) cm; lemmas 5–11 mm.
- 49a. Lemma margins inrolled, not covering adjacent florets; rachilla internodes exposed in mature spikelets ..... 36. *B. secalinus*
- 49b. Lemma margins overlapping adjacent florets; rachilla internodes enclosed in mature spikelets.
- 50a. Lemmas 5–7 mm; awn shorter than lemma body, straight; spikelets 1–1.5(–2.5) cm.
- 51a. Lemmas 6–11 mm; anthers 1.5–3 mm; caryopsis enclosed by lemma, not exposed ..... 41. *B. racemosus*
- 51b. Lemmas 5–6 mm; anthers 0.5–1.5 mm; caryopsis longer than lemma, exposed.
- 52a. Culms 30–50 cm tall; leaf blades ca. 10 cm; panicle 5–10 cm; lemmas 5.5–6.5 mm ..... 37. *B. lepidus*
- 52b. Culms ca. 10 cm tall; leaf blades 3–4 cm; panicle ca. 3 cm; lemmas 4–5 mm ..... 38. *B. brachystachys*
- 50b. Lemmas 8–12 mm, awn as long as or longer than lemma body, straight or recurved; spikelets (1.5–)2–3 cm.
- 53a. Lemmas broadly ovate-elliptic, 3–4 mm wide in side view, margins broadly membranous with a conspicuous obtuse angle about halfway between base and apex; panicle subracemose, branches each with 1 or 2 apical spikelets ..... 39. *B. squarrosus*
- 53b. Lemmas elliptic, ca. 2 mm wide in side view, margins without any conspicuous angle; panicle laxly spreading or contracted.
- 54a. Panicle lax, open, 15–25 cm, branches and pedicels longer than spikelets.
- 55a. Anthers ca. 4 mm; palea subequal to lemma; leaf sheaths glabrous ..... 40. *B. arvensis*
- 55b. Anthers 0.5–3 mm; palea conspicuously shorter than lemma; leaf sheaths pubescent.
- 56a. Awns straight; all awns within a spikelet subequal ..... 41. *B. racemosus*
- 56b. Awns curved outward, lower awns within a spikelet shorter than upper awns.
- 57a. Lemma 10–15 mm, apex deeply 2-lobed, acuminate; awn arising 3–4 mm below apex, terete, spreading ..... 49. *B. pectinatus*
- 57b. Lemma 8–10 mm, apex with short, obtuse teeth; awn arising 1–2 mm below apex, base slightly flattened, recurved outward when mature ..... 42. *B. japonicus*
- 54b. Panicle contracted, 3–10 cm, branches and pedicels shorter than spikelets.
- 58a. Lemmas glabrous; awn as long as or slightly longer than lemma body.
- 59a. Panicle ca. 10 cm; lower glume ca. 7 mm, awn straight, arising ca. 1 mm below lemma apex; anthers ca. 1 mm ..... 43. *B. sewerzowii*
- 59b. Panicle 3–7 cm; lower glume 3–4 mm; awn curved downward, arising 1.5–3 mm below lemma apex; anthers 0.3–0.6 mm.
- 60a. Panicle with few spikelets, 1-sided; lemmas 8–10 mm, apical teeth 0.5–1 mm ..... 44. *B. tythanthus*
- 60b. Panicle dense, with many clustered spikelets; lemmas 7–8 mm, apical teeth 1.3–2.5 mm ..... 45. *B. scoparius*
- 58b. Lemmas pubescent; awn slightly shorter than lemma body.
- 61a. Plant 40–80 cm tall; culms pubescent on nodes and below panicle, panicle branches and pedicels pubescent; awns slender, straight ..... 46. *B. hordeaceus*
- 61b. Plant 20–40(–60) cm tall; culms, panicle branches, and pedicels glabrous; awns conspicuously recurved, base slightly flattened, twisted.
- 62a. Spikelets 10–15 mm; lower glume 2/3 as long as upper glume; lemma apex with 2–3 mm teeth; anthers ca. 1 mm ..... 47. *B. intermedius*
- 62b. Spikelets 15–50 mm; glumes subequal; lemma apex with 1–1.5 mm teeth; anthers

1–1.5 mm ..... 39. *B. squarrosus***1. *Bromus magnus*** Keng, Sunyatsenia 6: 53. 1941.

## 大雀麦 da que mai

Perennial. Culms 1–1.2 m tall, loosely tufted, (3–)6–8-noded. Leaf sheaths pubescent; leaf blades 20–30 cm × 6–8 mm, adaxial surface pubescent, scabrid; ligule 3–4 mm, apex lacerate. Panicle spreading, ca. 30 cm, slightly nodding; branches 2 per node, up to 15 cm. Spikelets ca. 25 × 5–6 mm, florets 5–7(–9); rachilla internodes 3–4 mm, shortly hairy, laterally visible and conspicuously exposed; glumes narrow, margins membranous, lower glume 7–8 mm, 1-veined, upper glume 9–11 mm, 3-veined; lemmas narrow, ca. 12 × ca. 1 mm in side view, 5-veined, intermediate veins inconspicuous, proximally sparsely scabrid, awned from apex; awn 4(–7) mm, slender, straight. Anthers ca. 3 mm. Fl. and fr. Jul–Aug.

• *Picea* forest margins, gravel thickets, river banks, meadows; 2300–3800 m. Gansu, Qinghai, Sichuan, Xizang.

**2. *Bromus plurinodis*** Keng, Fl. Tsinling. 1(1): 439. 1976.

## 多节雀麦 duo jie que mai

Perennial. Culms erect, up to 1 m tall, ca. 5 mm in diam., glabrous, 7–9-noded. Leaf sheaths longer than internodes, scabrid, persistent when dry; brown membranous; leaf blades 20–30 cm × 6–8 mm, adaxial surface pubescent, margins scabrid; ligule 2–4 mm. Panicle 20–30 cm; branches 2–4 per node, obliquely ascending, up to 15 cm, scabrid. Spikelets 15–20 × ca. 2 mm, florets 5–7; rachilla internodes 2–2.5 mm, shortly hairy, laterally visible; glumes narrow, margins membranous, lower glume ca. 5 mm, 1-veined, apex acuminate, upper glume 6–9 mm, 3-veined, apex long acuminate; lemmas narrow, ca. 10 × ca. 1 mm in side view, 3-veined, keel scabrid, lower margins and veins proximally minutely hairy, pubescent throughout, awned from apex; awn 10(–14) mm, slender, straight; palea 6–7 mm, keels thinly ciliate. Anthers ca. 2 mm. Fl. and fr. Jun–Aug.

• Thickets, meadows, ditch banks, grassy places on rocky slopes; 2000–3600 m. Gansu, Ningxia, Gansu, Qinghai, Shaanxi, Sichuan, SE Xizang, Yunnan.

**3. *Bromus erectus*** Hudson, Fl. Angl. 39. 1762.

## 直立雀麦 zhi li que mai

*Bromopsis erecta* (Hudson) Fourreau; *Festuca erecta* (Hudson) Wallroth; *Forasaccus erectus* (Hudson) Bubani; *Schedonorus erectus* (Hudson) Gaudin ex Roemer & Schultes; *Zerna erecta* (Hudson) Panzer.

Perennial. Culms erect, densely tufted, 40–100 cm tall, slender or stout. Leaf sheaths glabrous or scattered pubescent; leaf blades 20–35 cm, lower leaves inrolled, 2–3 mm wide, upper leaf blades flat, 2–3 mm wide, glabrous or scattered pubescent, apex acuminate; ligule ca. 2 mm. Panicle erect, 10–20 cm, contracted; branches obliquely ascending, each bearing 1–4 spikelets; pedicels as long as or shorter than spikelets. Spikelets lanceolate-oblong, ca. 15–25(–30) mm, florets 5–12; rachilla internodes ca. 2.5 mm; lower glume 7–12 mm, 1–3-veined,

upper glume 8–14 mm, 3-veined; lemmas 10–12 mm, glabrous or sometimes hairy, 7-veined, margins inrolled when mature; awn (1–)2–6 mm, slender, straight; palea slightly shorter than lemma. Anthers 4–7 mm. Fl. May–Jul.  $2n = 28, 56, 70$ .

River valleys, plains, wet grassy places on dry river beds; ca. 4600 m. Xizang [Europe].

**4. *Bromus pseudoramosus*** Keng ex P. C. Keng, Acta Bot. Yunnan. 4: 347. 1982.

## 假枝雀麦 jia zhi que mai

Perennial. Culms loosely tufted, erect, 70–120 cm tall, 2–3 mm in diam., glabrous, 5–8-noded. Leaf sheaths glabrous or with sparse hairs, upper sheaths with leaf auricles; leaf blades 20–45 cm × 4–9 mm, abaxial surface and margins scabrid, adaxial surface pubescent; ligule ca. 1.5 mm. Panicle spreading, 20–30 cm, nodding; branches 2 per node, 3–5 cm, scabrid, slender, curved, each bearing 1–3 spikelets. Spikelets 20–25 × 6–10 mm, tinged with purple, florets 6–10; rachilla internodes ca. 2 mm, minutely hairy, laterally visible; lower glume ca. 8–10 mm, 1-veined, upper glume 11–13 mm, 3-veined, margins pubescent, not membranous, apex acuminate-mucronate; lemmas lanceolate, 12–15 × 1.5–2 mm in side view, inconspicuously 7-veined, margins pubescent, awned from apex; awn 4(–9) mm, slender, straight; palea slightly shorter than lemma and narrow, keels ciliate. Anthers ca. 2 mm.

• Alpine meadows; ca. 3600 m. Xizang, NW Yunnan.

No material has been seen of *Bromus pseudoramosus* var. *sedgioides* B. S. Sun & H. Peng (Guihaia 13: 224. 1993), described from Guizhou (Hezhang).

**5. *Bromus ramosus*** Hudson, Fl. Angl. 40. 1762.

## 类雀麦 lei que mai

*Bromopsis ramosa* (Hudson) Holub; *Bromus asper* Murray; *Forasaccus asper* (Murray) Bubani; *Zerna aspera* (Murray) Panzer; *Z. ramosa* (Hudson) Lindman.

Perennial. Culms loosely tufted, erect, 60–150 cm tall, ca. 6 mm in diam., 7–8-noded; densely and shortly pubescent. Leaf sheaths pubescent with reflexed 1–2 mm hairs, narrow auricles present at mouth; leaf blades soft, 10–40 cm × 7–15 mm, scattered pubescent; ligule ca. 2 mm, glabrous. Panicle 15–40 cm, broad, loosely nodding; branches 2 per node, up to 20 cm, each bearing 2–9 spikelets, lowermost branches with ciliate bracts at base. Spikelets elliptic-oblong, 20–30 × 4–6 mm, florets 4–10; lower glume subulate, 6–8 mm, 1-veined, upper glume lanceolate, 9–11 mm, 3-veined, apex mucronate or shortly awned; lemmas lanceolate, 10–13 mm, 7-veined, veins and margins pubescent; awn 5–8 mm, straight; palea conspicuously shorter than lemma, keels minutely ciliate. Anthers 2–3 mm. Fl. and fr. Jun–Aug.  $x = 21; 2n = 42$ .

Thickets in forested areas, roadsides, grassy places; 2900–3500 m. Xizang (Yadong) [Kashmir, Pakistan; N Africa, SW Asia, Europe].

*Bromus ramosus* is closely related to *B. benekenii*, but they hybridize only very rarely.

**6. Bromus stenostachyus** Boissier, Fl. Orient. 5: 643. 1884.

窄序雀麦 zhai xu que mai

*Bromopsis stenostachya* (Boissier) Holub; *Zerna stenostachya* (Boissier) Nevski.

Perennial, with slender creeping rhizomes, base covered by dry leaf sheaths. Culm base decumbent, later erect, up to 100 cm tall, slender. Leaf sheaths pubescent to hispid, with auricles at mouth; leaf blades linear-acuminate, grayish green, ca. 15 cm × 2–3 mm, both surfaces very shortly pubescent, margins scabrid. Panicle 11–18 cm, racemelike; branches short, each bearing 1 spikelet. Spikelets oblong or cuneate, 20–25 mm, later lax, florets 7–9; lower glume 6–8 mm, 3-veined, upper glume 9–12 mm, 3-veined, glabrous, apex acuminate; lemmas oblong, 10–16 mm, 5–9-veined, glabrous, shiny, apex acuminate, emarginate; awn 3–4 mm; palea shorter than lemma, keels ciliate. Anthers 4–5 mm. Fl. May–Jul.

High-elevation slopes; 3000–4200 m. Xinjiang [Afghanistan, Pakistan; SW Asia (Iran)].

**7. Bromus pumpellianus** Scribner, Bull. Torrey Bot. Club 15: 9. 1888.

紧穗雀麦 jin sui que mai

*Bromopsis pumpelliana* (Scribner) Holub; *Bromus inermis* (Leysser) Holub subsp. *pumpellianus* (Scribner) Wagnon; *B. uralensis* Govoruchin; *Zerna pumpelliana* (Scribner) Tzvelev.

Perennial, with creeping stolons. Culms erect, 60–120 cm tall, 4–6-noded, with dense, reflexed hairs. Leaf sheaths glabrous or sparsely reflexed pubescent; leaf blades ca. 15 cm × 6–7 mm, adaxial surface sparsely pubescent, abaxial surface and margin scabrid; ligule ca. 1 mm, apex erose. Panicle spreading, ca. 20 cm; branches 2–4 per node, 2–6 cm, each bearing 1 or 2 spikelets. Spikelets 25–40 × 5–8 mm wide, florets 9–13; rachilla internodes 2–2.5 mm, pubescent or spinulose; lower glume 7–9 mm, 1-veined, upper glume 9–11 mm, 3-veined, margins membranous, apex acuminate; lemmas lanceolate, 10–14 × ca. 1.5 mm in side view, 7-veined, intermediate and marginal veins short or inconspicuous, margins membranous, keel and margins often proximally stiffly pubescent, hairs 1–2 mm, awned from apex; awn 2–5 mm; palea slightly shorter than lemma, keels stiffly ciliate. Anthers 4–6 mm. Fl. and fr. Jun–Aug.  $2n = 28$ .

Mid-mountain meadows, thickets, grassy areas in river valleys; 1000–2500 m. Heilongjiang, Nei Mongol, Shanxi [Russia; W North America].

The stiff hairs of the spikelets are the only consistent and easily interpreted character by which this species can be separated from *Bromus inermis*. However, this is generally not a very reliable character in *Bromus*.

This species has been incorrectly named *Bromus richardsonii* Link by some authors.

**8. Bromus sibiricus** Drobow, Trudy Bot. Muz. Imp. Akad. Nauk 12: 229. 1914.

西伯利亚雀麦 xi bo li ya que mai

*Bromus inermis* Leysser var. *sibiricus* (Drobow) Krylov.

Perennial, with creeping stolons, base brown, covered by dry leaf sheaths. Plants 20–100 cm tall, nodes pubescent. Leaf sheaths smooth, glabrous; leaf blades flat, ca. 15 cm, scabrid, glabrous or scattered pubescent; ligule ca. 0.5 mm. Panicle 8–15(–20) cm, erect, narrow, contracted, sometimes nodding; branches shorter than spikelets, each bearing 1 or 2 spikelets. Spikelets narrowly oblong, 15–25 mm, purple, florets 4–8; rachilla thinly hairy; glumes glabrous, lower glume 6–8 mm, 1- or 3-veined, upper glume 7–10 mm, 3-veined; lemmas lanceolate, 10–12 mm, 5–7-veined, marginal veins densely pubescent to middle or slightly above, midrib and intermediate veins pubescent or scabrid; awn 1–5 mm; palea shorter than lemma, keels ciliate. Anthers 2–4 mm. Fl. and fr. Jun–Aug.

Plains, grassy places; 500–1000 m. Hebei, Heilongjiang, Nei Mongol [Mongolia, Russia (Siberia); Europe].

It is difficult to distinguish *Bromus sibiricus* from *B. inermis*, and the former species could well be merely a dwarf form of the latter.

**9. Bromus staintonii** Melderis in H. Hara et al., Enum. Fl. Pl. Nepal 1: 125. 1978.

大序雀麦 da xu que mai

Perennial, with short rhizomes. Culms tufted, ca. 1 m tall. Leaf sheaths pubescent or with reflexed hairs, scabrid along veins, mouth with auricles; leaf blades soft, ca. 20 cm × 3–5 mm, abaxial surface and margins scabrid, adaxial surface pubescent; ligule ca. 1 mm, abaxial surface hairy. Panicle spreading, ca. 25 cm; branches 2–5 per node, up to 12 cm, scabrid, each bearing 2 or 3 spikelets. Spikelets ca. 20 mm, florets 7–9; rachilla internodes 3–4 mm, shortly hairy; glumes scabrid, margins membranous, lower glume 6–7 mm, 1-veined, upper glume 8–10 mm, 3-veined, apex long acuminate to aristiform; lemmas narrow, 10–12 mm, 5–7-veined, pubescent; awn 4–11 mm, not recurved, scabrid; palea subequal to lemma, keels shortly stiffly ciliate. Anthers ca. 3 mm. Fl. and fr. Jun–Aug.

Grassy slopes; 2700–3200 m. S Xizang [Bhutan, N India, Kashmir, Nepal].

**10. Bromus benekenii** (Lange) Trimen, J. Bot. 10: 333. 1872 [“*benekeni*”].

密丛雀麦 mi cong que mai

*Schedonorus benekenii* Lange, Fl. Dan. 48: 5. 1871; *Bromus asper* Murray var. *benekenii* (Lange) Syme; *B. ramosus* Hudson var. *benekenii* (Lange) Ascherson & Graebner.

Perennial, rhizomes crowded. Culms densely tufted, 50–120 cm tall, erect, minutely hairy. Leaf sheaths densely pubescent with reflexed hairs or upper part glabrous; leaf blades flat, 10–25 cm × 5–12 mm, scattered pubescent, margins densely hairy. Panicle spreading, 12–20 × 10–15 cm, 1-sided, apex nodding; branches elongate, slender, bearing 1–4 spikelets, lowermost branches with basal non-ciliate bracts. Spikelets lanceolate-acuminate, 15–30 mm, florets 5–9; glumes scabrid, lower glume linear-lanceolate, 7–8 mm, 1-veined, upper glume oblong-lanceolate, 9–11 mm, 3-veined; lemmas narrowly lanceolate, 11–14 mm, pubescent; awn 5–8 mm, straight; palea conspicuously shorter than lemma. Anthers 2.5–3 mm. Fl. Jun–Jul.  $2n = 28$ .

Forest margins, thickets, upland meadows, river valley grasslands.

Xinjiang [Kazakhstan, Russia; SW Asia, Europe].

**11. Bromus ciliatus** Linnaeus, Sp. Pl. 1: 76. 1753.

加拿大雀麦 jia na da que mai

*Bromopsis canadensis* (Michaux) Holub; *Bromus canadensis* Michaux; *B. yezoensis* Ohwi; *Zerna yezoensis* (Ohwi) Sugimoto.

Perennial, with short rhizomes. Culms 70–120 cm tall, pubescent with reflexed hairs, 6-noded. Leaf sheaths pubescent; leaf blades 2–3 cm × 6–10 mm, glabrous or sparsely pilose on adaxial surface; ligule ca. 1 mm. Panicle broadly ovoid, nodding, 15–25 cm; branches 2 or 3 per node, curved, each bearing 1–3 spikelets. Spikelets 15–20 mm, green with membranous yellowish brown apex, florets 6 or 7; rachilla 1–2 cm, sparsely pubescent; glumes scabrid on keel, lower glume 6–7 mm, 1-veined, upper glume narrow, 8–9 mm, 3-veined; lemmas 10–12 mm, 5–7-veined, pilose near margins in lower half and along lower 1/3 of midrib, back glabrous, apex obtuse or bilobed, awned from between teeth; awn 2–6 mm, erect; palea 8–9 mm, keels ciliate. Anthers 1–1.5 mm. Fl. and fr. Jul–Sep.  $2n = 14$ .

Mid-elevation mountains, low-elevation wet forested places, meadows. Nei Mongol [Japan, Mongolia, Russia (Far East); North America].

**12. Bromus remotiflorus** (Steudel) Ohwi, Acta Phytotax. Geobot. 4: 58. 1935.

疏花雀麦 shu hua que mai

*Festuca remotiflora* Steudel, Syn. Pl. Glumac. 1: 315. 1854; *Bromus pauciflorus* (Thunberg) Hackel (1899), not Schumacher (1801); *F. pauciflora* Thunberg.

Perennial, with short rhizomes. Culms 60–120 cm tall, 6- or 7-noded, nodes pubescent. Leaf sheaths densely retrorsely pubescent; leaf blades 20–40 cm × 4–8 mm, adaxial surface pubescent; ligule 1–2 mm. Panicle large, lax, 20–30 cm; branches 2–6 per node, long, slender, scabrid, nodding when mature, spikelets few. Spikelets (15–)20–25(–40) × 3–4 mm, florets 5–10; rachilla internodes 3–4 mm, clearly laterally visible; glumes narrowly lanceolate, lower glume 5–7 mm, 1-veined, upper glume 8–12 mm, 3-veined, apex acuminate to mucronate; lemmas narrowly lanceolate, 10–12(–15) × ca. 1.2 mm in side view, 7-veined, glabrous, margins membranous, apex acuminate; awn 5–10 mm; palea narrow, shorter than lemma, keels thinly ciliate. Anthers 2–3 mm. Caryopsis 8–10 mm. Fl. and fr. Jun–Jul.  $2n = 14$ .

Slopes, forest margins, roadsides, riverside grassy places; 1800–3200(–4100) m. Anhui, Fujian, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Japan, Korea].

**13. Bromus inermis** Leysser, Fl. Halens. 16. 1761.

无芒雀麦 wu mang que mai

*Bromopsis inermis* (Leysser) Holub; *Bromus pskemensis* Pavlov; *Zerna inermis* (Leysser) Lindman.

Perennial, with spreading rhizomes. Culms loosely tufted, erect, 50–120 cm tall, glabrous or retrorsely hairy below nodes. Leaf sheaths glabrous or shortly hairy; leaf blades flat, 20–30 cm × 4–8 mm, both surfaces and margins scabrid, glabrous or margins sparsely ciliate, apex acuminate, ligule 1–2 mm. Panicle dense at first, spreading after anthesis, 10–20 cm; branches 3–5 per node, up to 10 cm, scabrid, each bearing 2–6 spikelets. Spikelets 15–25 mm, florets 6–12; rachilla internodes 2–3 mm, spinulose; glumes lanceolate, margins membranous, lower glume 4–7 mm, 1-veined, upper glume 6–10 mm, 3-veined; lemmas oblong-lanceolate, 8–12 mm, 5–7-veined, glabrous, base scabrid, apex obtuse or emarginate; awn up to 3–4 mm, or awnless; palea shorter than lemma, keels ciliate. Anthers 3–4 mm. Fl. and fr. Jul–Sep.  $2n = 14, 28, 56$ .

Gullies on slopes, roadsides, river banks, dominant species of mountain meadows; 1000–3500 m. Gansu, Guizhou, Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Japan, Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Uzbekistan; SW Asia (Caucasus), Europe].

This species has been spread worldwide through seed production for pasture and fodder.

**14. Bromus korotkiji** Drobow, Trudy Bot. Muz. Imp. Akad. Nauk 12: 238. 1914.

甘蒙雀麦 gan meng que mai

*Bromopsis korotkiji* (Drobow) Holub; *B. pumpelliana* (Scribner) Holub subsp. *korotkiji* (Drobow) Tzvelev; *B. pumpelliana* var. *ircutensis* (Komarov) Tzvelev; *Bromus ircutensis* Komarov; *Zerna korotkiji* (Drobow) Nevski.

Perennial, with long, creeping rhizome; old basal sheaths lacerate to fibrous. Culms erect, 70–90 cm tall, stout, hard, densely retrorsely pubescent below nodes and in inflorescence. Leaf sheaths longer than internodes, densely pubescent to glabrous; leaf blades hard, 15–30 cm × 3–6 mm, adaxial surface pubescent; ligule brown, ca. 1 mm, hard. Panicle erect, narrow, 7–15 cm; branches 2–5 per node, erect, ca. 1–2(–5) cm, shortly hairy, each bearing 1 or 2 spikelets. Spikelet 1.5–3.5 × ca. 1 cm, florets 5–10, light brown sometimes violet tinged; rachilla 2–4 mm, laterally visible, sparsely to densely pilose; glumes membranous, glabrous, lower glume narrowly lanceolate, 6–8 mm, 1-veined, upper glume narrowly lanceolate, 6–11 mm, 3-veined; lemmas broadly lanceolate, 10–15 mm, 5–7-veined, margins densely pubescent with white, 1–2 mm hairs, apex obtuse; awn absent; palea narrow, subequal to lemma, keels ciliate in upper part. Anthers 5–7 mm. Fl. and fr. May–Sep.

Wet riverside sands, sand dunes. Gansu, Nei Mongol, Xinjiang [Mongolia, Russia (Siberia)].

**15. Bromus formosanus** Honda, Bot. Mag. (Tokyo) 42: 136. 1928.

台湾雀麦 tai wan que mai

Perennial, with downwardly extending long rhizomes and dense, fibrous roots up to 20 cm deep. Culms 20–30 cm tall, ca. 1 mm in diam. Leaf sheaths persistent; leaf blades 10–20 cm × 3–5 mm, glabrous, apex acuminate; ligule ca. 0.5 mm. Panicle

10–12 cm, nearly racemose; branches paired, slender, bearing few spikelets. Spikelets elliptic-lanceolate, ca.  $20 \times 5$ –9 mm, purplish brown, florets 5–7; rachilla internodes exposed, 2–3 mm, loosely pubescent; glumes pubescent, apex acute, lower glume linear-lanceolate, 8–9 mm, 1-veined, upper glume 10–12 mm, 3-veined; lemmas long elliptic,  $15$ (–18)  $\times$  ca. 2 mm in side view, 7-veined, scabrid, margins densely pubescent, awned from apex; awn 3–7 mm, straight; palea ca. 9 mm, keels densely ciliate. Anthers ca. 2 mm. Fl. Jul–Aug, fr. Sep–Oct.

• Alpine areas, rock crevices, cliffs, exposed rocks; 3500–3800 m. Taiwan.

**16. *Bromus riparius*** Rehmman, Verh. Naturf. Vereins Brünn. 10: 8. 1872 [“1871”].

山丹雀麦 shan dan que mai

*Bromopsis riparia* (Rehmman) Holub; *Zerna riparia* (Rehmman) Nevski.

Perennial, with short rhizomes, base covered by fibrous dry leaf sheaths. Culms densely tufted, 30–50(–90) cm tall. Leaf sheaths  $\pm$  scattered villous; leaf blades narrowly linear, 15–20 cm  $\times$  1–2 mm, scabrid, margins ciliate; ligule short. Panicle lax, 10–15  $\times$  ca. 10 cm; branches obliquely erect, scabrid, bearing 1 or 2 spikelets. Spikelets wedge-shaped, 25–35  $\times$  6–7 mm, florets 5–7, lax; rachilla 3–4 mm, shortly hairy, laterally visible; glumes apex acuminate, lower glume 8–10 mm, 1–3-veined, upper glume 9–12 mm; lemmas 11–13 mm, puberulous along sides or throughout, 5–7-veined, membranous, apex acuminate; awn 5–8 mm, slender, straight; palea shorter than lemma, keels spinulose. Anthers ca. 6 mm. Fl. and fr. May–Jul.  $2n = 56$ .

Dry meadows, grasslands, forest margins, low-mountain thickets, on calcareous soils. Gansu [Russia (European part, adventive in Far East); SW Asia, Europe].

No specimens of this species were found in PE.

**17. *Bromus paulsenii*** Hackel ex Paulsen, Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn 1903: 174. 1903.

波申雀麦 bo shen que mai

*Bromopsis angrenica* (Drobow) Holub; *B. pamirica* (Drobow) Holub; *B. paulsenii* (Hackel ex Paulsen) Holub; *B. paulsenii* subsp. *angrenica* (Drobow) Tzvelev; *B. paulsenii* subsp. *pamirica* (Drobow) Tzvelev; *B. paulsenii* subsp. *turkestanica* (Drobow) Tzvelev; *B. turkestanica* (Drobow) Holub; *Bromus angrenicus* Drobow; *B. pamiricus* Drobow; *B. turkestanicus* Drobow; *Zerna angrenica* (Drobow) Nevski; *Z. pamirica* (Drobow) Nevski; *Z. paulsenii* (Hackel ex Paulsen) Nevski subsp. *pamirica* (Drobow) Tzvelev; *Z. turkestanica* (Drobow) Nevski.

Perennial, often with rhizomes, basal sheaths persistent, fibrous or lacerate. Culms densely tufted, erect or geniculately ascending, 20–40 cm tall, pubescent or upper part often glabrous, 2-noded. Leaf sheaths smooth, glabrous; leaf blades linear-acuminate, hard, erect, flat or slightly inrolled, 8–15 cm  $\times$  (2–)3–5 mm, densely pubescent; ligule short. Panicle ovoid, erect or spreading, (6–)10–12  $\times$  5–6 cm; branches paired or single, often shorter than spikelet, scabrid, each bearing 1 spike-

let. Spikelets lanceolate, 20–25 mm, florets 5–7, yellow; glumes lanceolate, glabrous, apex acuminate, lower glume 6–8 mm, 3–5-veined, upper glume 8–10 mm, 3–5-veined; lemmas broadly lanceolate, ca. 10 mm, 7-veined, glabrous, smooth or scabrid, margins and apex dry membranous; awn 3–5 mm, straight. Fl. Jun–Aug.

Grassy slopes; 2000–4000 m. Nei Mongol, Xinjiang [Afghanistan, Kazakhstan (Tien Shan), Kyrgyzstan, Tajikistan (Pamirs), Uzbekistan].

**18. *Bromus cappadocicus*** Boissier & Balansa, Bull. Soc. Bot. France 4: 306. 1857.

卡帕雀麦 ka pa que mai

*Bromus tomentellus* Boissier subsp. *cappadocicus* (Boissier & Balansa) Tzvelev.

Perennial, old basal sheaths persistent, fibrous. Culms densely tufted, slender, 25–45 cm tall. Leaf sheaths smooth, glabrous; leaf blades flat or inrolled, 4–10 cm  $\times$  ca. 1.5 mm, scattered pubescent or glabrous, apex acuminate, cauline leaves short. Panicle ovate-elliptic, 5–9 cm, erect; branches 2–3 per node, slender, reflexed, nodding, each bearing 1 or 2 spikelets. Spikelets 15–25  $\times$  3–5 mm, florets 5 or 6, green or grayish white; glumes unequal, lower glume 5–7 mm, upper glume 7–8 mm; lemmas lanceolate, 8–10 mm, pubescent, thin, awned from apex; awn 4–5(–10) mm, straight or slightly recurved; palea shorter than lemma. Anthers 2–2.5 mm. Fl. Jun–Jul.  $2n = 42, 56$ .

Dry slopes; 1000–3200 m. Gansu [SW Asia (Caucasus, Iran, Turkey), Europe].

**19. *Bromus tytholepis*** (Nevski) Nevski in Komarov, Fl. URSS 2: 563. 1934.

土沙雀麦 tu sha que mai

*Zerna tytholepis* Nevski, Trudy Sredne-Aziatsk. Gosud. Univ., Ser. 8b, Bot. 17: 16. 1934; *Bromopsis tytholepis* (Nevski) Holub.

Perennial, base enclosed in old withered leaf sheaths. Culms densely tufted with many tillers, 50–90 cm tall, 4–6-noded, uppermost node ca. 1/2 way up culm, pubescent below nodes. Leaf sheaths glabrous or pubescent; leaf blades narrowly linear, flat, 15–20 cm  $\times$  3–5 mm, densely pubescent or glabrous, margins scabrid; ligule ca. 1.5 mm. Panicle narrow, contracted, 7–15 cm, axis scabrid; branches 2–6 per node, each bearing 1 or 2 spikelets. Spikelets linear-lanceolate, 20–25 mm, pale green or slightly yellow or tinged with purple, florets 5–11; lower glume 5–6 mm, 1-veined, upper glume 7–8 mm, 3-veined; lemmas 5–7-veined, 8–9 mm, glabrous, scabrid, awned from apex; awn 2–3 mm, scabrid. Fl. and fr. Jun–Jul.

Dry rocky slopes. Xinjiang [E Kazakhstan, Kyrgyzstan, Tajikistan].

**20. *Bromus variegatus*** M. Bieberstein, Fl. Taur.-Caucas. 3: 79. 1819.

变色雀麦 bian se que mai

*Bromopsis variegata* (M. Bieberstein) Holub; *Zerna variegata* (M. Bieberstein) Nevski.

Perennial, old basal sheaths persistent. Culms ca. 20 cm tall, glabrous. Leaf sheaths densely pubescent in lower part; leaf blades ca. 5 cm × 2–4 mm, glabrous or both surfaces pubescent, adaxial surface and margins scabrid. Panicle contracted, 5–10 cm; lower branches crowded, erect, each bearing 5–15 clustered spikelets. Spikelets 15–25 mm, green or tinged with purple, florets 5–7; glumes acuminate, lower glume 7–10 mm, 1-veined, upper glume oblong, 8–12 mm, 5-veined; lemmas 10–12 mm, glabrous or scabrid, awned from apex; awn 4–9 mm.  $2n = 14$ .

Grassy slopes; (1600–)2400–3800 m. Xizang [Afghanistan; SW Asia].

**21. *Bromus confinis*** Nees ex Steudel, Syn. Pl. Glumac. 1: 320. 1854.

毗邻雀麦 pi lin que mai

*Bromopsis confinis* (Nees ex Steudel) Holub; *Bromus inermis* Leysser var. *confinis* (Nees ex Steudel) Stapf; *B. munroi* Boissier.

Perennial, with short rhizomes. Culms erect, ca. 60 cm tall, ca. 5 mm in diam., 3- or 4-noded. Leaf sheaths smooth, glabrous; leaf blades firm, 20–40 cm × 3–4 mm, adaxial surface and margins scattered pubescent; ligule ca. 2 mm. Panicle 10–16 cm; branches scabrid, varying in length, 2–4 per node, often with a single apical spikelet. Spikelets 15–25 mm, often purple, florets 5–7(–11); glumes narrowly lanceolate, pubescent or scabrid along keels; rachilla pubescent; lower glume ca. 7 mm, 1-veined, upper glume ca. 9 mm, 3-veined; lemmas 10–15 mm, abaxially pubescent, marginal veins densely hairy, awned from apex; awn 2.5(–6) mm, straight; palea as long as lemma, keels ciliate. Anthers ca. 4 mm. Fl. Jun–Aug.

Open grassy places; 1000–2000 m. Gansu [NW India, Pakistan; SW Asia].

**22. *Bromus morrisonensis*** Honda, Bot. Mag. (Tokyo) 43: 137. 1928.

玉山雀麦 yu shan que mai

?*Bromus piananensis* (Ohwi) L. Liu; ?*B. remotiflorus* (Steudel) Ohwi var. *piananensis* Ohwi.

Perennial. Culms tufted ca. 30 cm tall, ca. 1 mm in diam. Leaf sheaths densely pubescent; leaf blades ca. 15 cm × ca. 3 mm; ligule ca. 0.5 mm. Panicle spreading, ca. 15 cm; branches 5–8 cm, each bearing 2–4 spikelets in upper part. Spikelets 20–25 mm, florets 9–11; rachilla ca. 2 mm, shortly hairy; lower glume narrow, ca. 5 mm, 1-veined, upper glume ca. 7 mm, 3-veined; lemmas 7–9 × ca. 1.2 mm in side view, thickly chartaceous, 5-veined, intermediate veins inconspicuous, awned from apex; awn 5(–9) mm, straight; palea slightly shorter than lemma, keels sparsely ciliate. Anthers ca. 2 mm. Fl. and fr. Jul–Aug.

- Grassy places on gravel slopes; ca. 2800 m. Taiwan.

The identity of *Bromus piananensis* is uncertain. The type, a specimen from Taiwan, has not been seen.

**23. *Bromus nepalensis*** Melderis in H. Hara et al., Enum. Fl. Pl. Nepal 1: 125. 1978.

尼泊尔雀麦 ni bo er que mai

Perennials. Culms tufted, erect from an oblique base, ca. 50 cm tall, glabrous. Lower leaf sheaths shortly pilose, upper sheaths glabrous; leaf blades flat, 5–10 cm × 2.5–4 mm, veins fine, abaxial surface glabrous, adaxial surface scattered pubescent, apex acuminate; ligule 0.5–1 mm, lacerate. Panicle spreading, 8–15 cm, nodding, rachis glabrous; branches 3–5 per lower node, 2–4 cm, slender, recurved, scabrid, each bearing 1 or 2 spikelets. Spikelets 3–4 cm, keel distally scabrid, compressed; rachilla internodes ca. 2 mm, thick, pubescent; lower glume lanceolate, 5–6 mm, 3-veined, apex acuminate, upper glume ca. 8 mm, broadly lanceolate, 5–7-veined, apex acute or obtuse; lemmas 11–13 mm, conspicuously 5–7-veined, abaxial surface pubescent, awned from apex; awn 8–12 mm, straight; palea subequal to lemma. Anthers 0.8–1 mm, brownish purple. Fl. May–Aug.

River banks, grassy places, thickets on slopes; ca. 3000 m. Xizang [Nepal].

**24. *Bromus himalaicus*** Stapf in J. D. Hooker, Fl. Brit. India 7: 358. 1896 [“1897”].

喜马拉雅雀麦 xi ma la ya que mai

*Bromopsis himalaica* (Stapf) Holub; *Zerna himalaica* (Stapf) Henrard.

Perennial, loosely tufted. Culms erect, 50–70 cm tall, 3–4-noded, nodes pubescent with retrorse hairs. Leaf sheaths pubescent; leaf blades flat, 10–20 cm × 4–6 mm, adaxial surface pubescent, abaxial surface and margin scabrid; ligule 1–3.5 mm, brown. Panicle 10–25 cm, simple; branches 1–3 per node, spreading or drooping, bearing 1–3 spikelets. Spikelets 1.5–2.5 cm, florets 6–12; lower glume narrow, 5–8 mm, 1-veined, apex acute to awned, upper glume 7–12 mm, 3(–5)-veined, keel scabrid, apex often shortly awned; lemmas 8–10 mm, herbaceous, 5–7-veined, hairy near margins, apex acuminate; awn as long as or longer than lemma, 10–15 mm, scabrid, recurved outward; palea shorter than lemma, apex obtusely rounded, keels spinulose. Anthers 2–3 mm. Fl. and fr. Jun–Aug.  $2n = 14$ .

Alpine meadows; 3000–3500 m. Xizang (Yadong), Yunnan (Gaoligong Shan) [Bhutan, India (Darjeeling, Sikkim), Nepal].

**25. *Bromus porphyranthos*** Cope, Fl. Pakistan 143: 574. 1982.

大药雀麦 da yao que mai

*Bromus himalaicus* Stapf var. *grandis* Stapf in J. D. Hooker, Fl. Brit. India 7: 359. 1896 [“1897”]; *B. grandis* (Stapf) Melderis (1978), not (Shear) Hitchcock (1912).

Perennial. Culms loosely tufted, 50–70 cm tall. Leaf sheaths glabrous or hairy when young; leaf blades 10–20 cm × 3–5 mm, abaxial surface and margins scabrid, adaxial surface hairy. Panicle simple, lax, 10–20 cm; branches arched, often with a single apical spikelet. Spikelets 18–25 mm, florets 5–9; rachilla internodes later exposed; glumes pubescent, lower glume 12–15 mm, 1-veined, apex acuminate, upper glume 14–17 mm, 3-veined, apex shortly aristiform; lemmas 12–16 mm, 7-veined, densely pubescent throughout, apex shortly 2-toothed, awned from sinus; awn 12–18 mm, stout, scabrid, straight, later recurved; palea shorter than lemma, keels ciliate, abaxial surface minutely hairy. Anthers 1.5–2 mm. Fl. May–Aug.



Sandy places, meadows; ca. 3700 m. Xizang, Yunnan [Bhutan, India (Sikkim), Nepal, Pakistan].

**26. *Bromus epilis*** Keng ex P. C. Keng, Acta Bot. Yunnan. 4: 348. 1982.

光稃雀麦 *guang fu que mai*

Perennial. Culms loosely tufted, 50–70 cm tall, 1–2 mm in diam., 3-noded, uppermost node ca. 1/2 way up culm. Leaf sheaths glabrous, uppermost sheath ca. 10 cm; leaf blades 15–30 cm × 2–4 mm, rolled when dry, glabrous, abaxial surface and margins scabrid; ligule ca. 1 mm, ciliate. Panicle spreading, 15–20 cm, nodding; branches 2–4 per node, basal primary branch 4–6 cm, each bearing 1 or 2 spikelets. Spikelets 15–20 × ca. 10 mm, tinged with purple, florets 5–7; rachilla ca. 3 mm, spiny scabrid; glumes lanceolate, subequal to lower florets, upper keel scabrid, apex acuminate-mucronate, lower glume 10–12 mm, 1-veined, upper glume 12–15 mm, 3–5-veined; lemmas oblong-lanceolate, 12–15 × ca. 2 mm in side view, 5–7-veined, glabrous, margins narrowly membranous, yellowish brown, awned from apex; awn 8–14 mm, later recurved; palea ca. 10 mm, keels ciliate. Anthers 2.5–3 mm. Fl. and fr. Jul–Aug.

• Mountain slopes, *Pinus yunnanensis* forests, grassy places, scrub; 2800–3300 m. NW Yunnan.

**27. *Bromus mairei*** Hackel ex Handel-Mazzetti, Symb. Sin. 7: 1290. 1936.

梅氏雀麦 *mei shi que mai*

*Zerna mairei* (Hackel ex Handel-Mazzetti) Henrard.

Perennials. Culms loosely tufted, up to 100 cm tall, 7–8-noded. Leaf sheaths sparsely pubescent; leaf blades 20–30 cm × 4–6 mm, adaxial surface thinly pubescent; ligule ca. 1 mm, finely toothed. Panicle spreading, ca. 20 cm; branches 3–5 per node, 5–7 cm, nodding, finely spinulose, each bearing 1–3 spikelets in upper part. Spikelets 20–25 × ca. 10 mm wide, florets 6–8; rachilla ca. 3 mm, sparsely hairy; glumes with membranous margins, apex acuminate into 1–3 mm awn, lower glume 8–10 mm, 1-veined, upper glume 10–13 mm, 3-veined; lemmas lanceolate, 9–12 × 2–3 mm in side view, 7-veined, 3 median veins conspicuously thick, scabrid to hirsute throughout or near margins, awned from apex; awn 10–15 mm, recurved; palea ca. 8 mm, keels ciliate. Anthers ca. 3 mm. Fl. Aug.

• Thickets along margins of *Abies* forests, river beaches, grassy places; 3900–4300 m. Qinghai, Sichuan, Xizang, N Yunnan.

This species is sometimes misinterpreted as *Bromus sinensis*.

**28. *Bromus sinensis*** Keng ex P. C. Keng, Acta Bot. Yunnan. 4: 349. 1982.

华雀麦 *hua que mai*

Perennial. Culms loosely tufted, 30–70 cm tall, ca. 2 mm in diam., glabrous or with retrorse hairs, 3- or 4-noded. Leaf sheaths pubescent, auricles present; leaf blades erect, flat or rolled when dry, 10–25 cm × 2–5 mm, ± pubescent, midrib raised abaxially; ligule 1–3 mm, abaxial surface and margin hairy, toothed. Panicle spreading, 12–24 cm, nodding; branches (1–)2–4 per node, up to 10 cm, scabrid, each bearing 1–3 spikelets, or basal branch with branchlets and 4–5 spikelets.

Spikelets 12–20 × 6–8 mm, hairy throughout, florets (2–)5–8, lax, flabellate at anthesis; rachilla internodes 1–3 mm, pubescent; glumes shortly hairy, apex acuminate to aristiform, lower glume ca. 8 mm, 1-veined, upper glume 10–15 mm, 3-veined; lemmas lanceolate, 10–15 × ca. 1.5 mm in side view, 5-veined, back pubescent, awned from apex; awn 8–15 mm, recurved; palea 8–10 mm, keels ciliate. Anthers 2–3 mm. Fl. Jul.

• *Cupressus* forests, grassy places, sunny slopes, exposed crevices; 3500–4300 m. Qinghai, W Sichuan, Xizang, Yunnan.

- 1a. Panicle branches 2–4 per node; culms 50–70 cm tall; spikelets ca. 15 mm, florets 5–8 ..... 28a. var. *sinensis*
- 1b. Panicle branches 1 or 2 per node; culms ca. 30 cm tall; spikelets 10–14 mm, florets 2 or 3 ..... 28b. var. *minor*

**28a. *Bromus sinensis* var. *sinensis***

华雀麦(原变种) *hua que mai* (*yuan bian zhong*)

Culms loosely tufted, 50–70 cm tall. Leaf blades 15–25 cm × 3–5 mm. Panicle branches 2–4 per node, bearing 1–3 spikelets, or lower branches with branchlets and 4 or 5 spikelets. Spikelets 15–20 mm, florets 5–8.

• Grassy places, sunny slopes, exposed crevices; 3500–4300 m. Qinghai, W Sichuan (Kangding, Xiangcheng), Xizang, Yunnan.

**28b. *Bromus sinensis* var. *minor*** L. Liu, Fl. Xizang. 5: 136. 1987.

小华雀麦 *xiao hua que mai*

Culms tufted, ca. 30 cm tall. Leaf blades ca. 10 cm × 2–3 mm. Panicle branches 1 or 2 per node, slender, bearing 1 or 2 spikelets at apex. Spikelets 10–14 mm, florets 2 or 3.

• *Cupressus* forests, sunny slopes; ca. 3800 m. Qinghai, Xizang.

**29. *Bromus tectorum*** Linnaeus, Sp. Pl. 1: 77. 1753.

旱雀麦 *han que mai*

Annual. Culms erect, 20–60 cm tall, 3- or 4-noded. Leaf sheaths pubescent; leaf blades 5–20 cm, 2–4 mm wide, pubescent; ligule 1.5–2 mm. Panicle spreading, 8–15 cm, secund; branches 3–5 at lower nodes, slender, mostly curved, scabrid, pubescent, each bearing 1–8 slightly nodding spikelets. Spikelets 10–35(–50) mm; florets 4–8; rachilla internodes 2–3 mm; glumes narrowly lanceolate, margins membranous, lower glume 8–15 mm, 1–3-veined, upper glume 11–17 mm, 3–7-veined, apex acute, obtuse, or shortly aristiform; lemmas 9–22 mm, 1–1.5 mm wide in side view, 5–7-veined, scabrid or pubescent, margins thinly membranous, shiny, apex acuminate, acute, or obtuse, 2-toothed, awned from sinus, awn 12–25(–40) mm, slender, straight; palea shorter than or subequal to lemma, keels ciliate. Stamens 3; anthers 0.5–2 mm. Fl. and fr. May–Sep.

Grassy places, dry slopes, river beaches, dry sandy places, wastelands, roadsides; 100–3400(–4200) m. Gansu, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, Yunnan [NW India, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe; introduced in America and Australia].

This species is a widespread weed, adventive in most temperate regions of the world.

- 1a. Lower glume 1-veined, upper glume 3-veined; lemmas 9–13 mm, awn 12–18 mm ..... 29a. subsp. *tectorum*  
1b. Lower glume 3-veined, upper glume 5–7-veined; lemmas 15–22 mm, awn 15–25(–40) mm ..... 29b. subsp. *lucidus*

**29a. Bromus tectorum subsp. tectorum**

旱雀麦(原亚种) han que mai (yuan ya zhong)

*Anisantha tectorum* (Linnaeus) Nevski; *Festuca tectorum* (Linnaeus) Jessen; *Genea tectorum* (Linnaeus) Dumortier; *Schedonorus tectorum* (Linnaeus) Fries.

Culms erect, 20–60 cm tall. Panicle branches scabrid, pubescent, slender, with 4–8 spikelets. Spikelets 10–18 mm; lower glume 12–15 mm, 1-veined, apex acuminate, upper glume 14–17 mm, 3-veined, apex shortly aristiform; lemmas 9–13 mm, 7-veined, densely pubescent throughout, awn 12–18 mm; palea shorter than lemma, abaxial surface minutely hairy. Fl. and fr. Jun–Sep.  $2n = 14$ .

Grassy places, dry slopes, river beaches, wastelands, roadsides; 100–2300(–4200) m. Gansu, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, Yunnan [Kazakhstan, Kyrgystan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe; introduced in America and Australia].

**29b. Bromus tectorum subsp. lucidus** Sales, Fl. Veg. Mundi 9: 32. 1991.

绢雀麦 juan que mai

*Bromus sericeus* Drobow in Vvedensky et al., Key Fl. Tashkent 1: 36. 1923, not Tenore (1811); *Anisantha sericea* Nevski.

Culms erect or geniculately ascending, 20–30 cm tall. Panicle branches shorter than spikelets, thinly hairy or scabrid, curved or reflexed, apex with 1 or 2 spikelets; rachis glabrous. Spikelets 20–35(–50) mm; lower glume 8–10(–14) mm, 3-veined, apex acuminate, upper glume broadly lanceolate, 11–15 mm, 5–7-veined, apex acute or obtuse; lemmas 15–22 mm, conspicuously 5–7-veined, abaxial surface pubescent, awn 15–25(–40) mm, straight; palea subequal to lemma. Fl. and fr. May–Aug.  $2n = 14$ .

Dry sandy places; 2700–3400 m. Xizang, Yunnan [NW India, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan; SW Asia (Iran, Iraq, Turkey)].

**30. Bromus sterilis** Linnaeus, Sp. Pl. 1: 77. 1753, nom. cons.

贫育雀麦 pin yu que mai

*Anisantha sterilis* (Linnaeus) Nevski; *Festuca sterilis* (Linnaeus) Jessen; *Genea sterilis* (Linnaeus) Dumortier; *Schedonorus sterilis* (Linnaeus) Fries; *Zerna sterilis* (Linnaeus) Panzer.

Annual. Culms simple or loosely tufted, erect or geniculately ascending, 50–100 cm tall, ca. 5 mm in diam., glabrous. Leaf sheaths pubescent; leaf blades soft, 5–20 cm × 4–10

mm, pubescent; ligule 2–4 mm. Panicle lax, open, 10–20 × 7–12 cm, nodding; branches spreading, up to 10 cm, each bearing 1–3 nodding spikelets. Spikelets oblong, wedge-shaped when mature, 20–35 × 4–8 mm, florets 5–9; lower glume subulate, 8–14 mm, 1-veined, upper glume oblong-lanceolate, 10–20 mm, 3-veined; lemmas lanceolate, 15–20 × 2–4 mm in side view, 7-veined, margins white membranous, apex 2-toothed, teeth 1–2 mm, awned from sinus; awn 15–30 mm, as long as or longer than lemma body, slender, straight; palea subequal to lemma, keels sparsely ciliate. Stamens 3, anthers ca. 1 mm. Fl. May–Jun.  $2n = 14$ .

Wastelands; 600–3200 m. Sichuan, Jiangsu [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe; introduced in America and Australia].

This species is a widespread weed, adventive in most temperate regions of the world.

**31. Bromus rigidus** Roth, Bot. Mag. (Römer & Usteri) 4(10): 21. 1790.

硬雀麦 ying que mai

*Anisantha diandra* (Roth) Tutin ex Tzvelev subsp. *rigida* (Roth) Tzvelev; *A. rigida* (Roth) Hylander; *Bromus diandrus* Roth subsp. *rigidus* (Roth) O. Bolòs, R. M. Masalles & J. Vigo; *B. diandrus* var. *rigidus* (Roth) F. Sales; *B. gussonii* Parlatores var. *rigidus* (Roth) H. Lindberg; *B. madritensis* Linnaeus var. *rigidus* (Roth) Babington ex Syme; *B. rubens* Linnaeus var. *rigidus* (Roth) Mutel; *B. villosus* Scopoli var. *rigidus* (Roth) Ascherson & Graebner; *Genea rigida* (Roth) Dumortier.

Annual. Culms tufted, erect, 20–70 cm tall, pubescent below inflorescence. Leaf sheaths with spreading hairs; leaf blades 10–25 cm × 4–6 mm, both surfaces densely pubescent; ligule 3–5 mm. Panicle contracted, stiffly erect, 10–25 cm; branches short, scabrid, hairy, bearing erect spikelets. Spikelets wedge-shaped, 15–30 × 7–8 mm, florets 5–7; glumes linear-lanceolate, lower glume 15–20 mm, 1-veined, upper glume 20–25 mm, 3-veined; floret callus pointed, scar elliptic; lemmas narrowly lanceolate, 20–30 × 1–1.5 mm in side view, conspicuously 7-veined, scabrid, apex 2-toothed, awned from sinus; awn 20–40 mm, straight, stiff, scabrid; palea shorter than lemma. Stamens 2, anthers ca. 1 mm. Fl. and fr. Apr–Jul.  $2n = 42$ , 56, 70.

Streamsides, moist places; ca. 1000 m. Jiangxi, Taiwan [N Africa, C and SW Europe, SW Asia, Mediterranean region; introduced in America and Australia].

*Bromus diandrus* Roth has been recorded from Xizang, but this is most probably based on a misidentification. It is distinguished from *B. rigidus* by a laxer, spreading panicle and a rounded floret callus with a circular scar.

**32. Bromus madritensis** Linnaeus, Cent. Pl. 1: 5. 1755.

马德雀麦 ma de que mai

*Anisantha madritensis* (Linnaeus) Nevski; *Festuca madritensis* (Linnaeus) Desfontaines; *Genea madritensis* (Linnaeus) Dumortier; *Zerna madritensis* (Linnaeus) Panzer ex B. D. Jackson.

Annual. Culms loosely tufted, simple, erect or geniculately ascending, 40–60 cm tall, glabrous. Leaf sheaths hairy, at least

the lower; leaf blades linear-lanceolate, flat, ca. 20 cm × 2–4 mm, glabrous or pubescent, margins scabrid, apex acuminate; ligule 1.5–4 mm. Panicle dense or slightly lax, erect, 4–15 × 2–6 cm; branches 2–3 per node, 1–3 cm, hairy, sometimes branched. Spikelets oblong, flabellate at maturity, 35–60 mm, florets 6–13, lax; lower glume subulate, 6–11 mm, 1-veined, upper glume linear-lanceolate, 10–16 mm, 3-veined; lemmas oblong, 12–19 × 3–3.5 mm in side view, 7-veined, glabrous or pubescent, margins inrolled, apex acuminate, 2-toothed; awn 12–18 mm, straight or weakly recurved; palea shorter than lemma. Stamens 2, anthers ca. 1 mm. Fl. May–Aug.  $2n = 14, 28$ .

Sunny slopes, dry sandy grassy places; ca. 3500 m. Xizang [N Africa, America, SW Asia (Iran, Iraq), Europe].

**33. *Bromus fasciculatus*** C. Presl, Cyper. Gramin. Sicul. 39. 1820.

束生雀麦 shu sheng que mai

*Anisantha fasciculata* (C. Presl) Nevski; *Bromus rubens* Linnaeus subsp. *fasciculatus* (C. Presl) Trabut; *Genea fasciculata* (C. Presl) Dumortier.

Annual. Culms erect or geniculately ascending, 5–20(–25) cm tall, pubescent below inflorescence. Leaf sheaths pubescent; leaf blades 2–10 cm × 1–2 mm, hairy. Panicle racemelike, stiffly erect, 2–5 × 0.7–2 cm; branches shorter than spikelets, rigid, each bearing 1 or 2 spikelets. Spikelets broadly wedge-shaped, 10–30 mm; glumes narrowly lanceolate, lower glume 7–8 mm, upper glume 12–14 mm; lemmas 13–15 × 1–1.5 mm in side view, glabrous or hairy, margins sometimes incurved, recurved outward when mature, apex 2-toothed, teeth ca. 3 mm; awn 13–18 mm, subequal to lemma body, stout, straight or slightly divaricate at maturity; palea shorter than lemma. Stamens 3, anthers ca. 1 mm. Fl. May–Jun.  $2n = 14$ .

Wastelands. Xinjiang [Europe, Mediterranean region].

The presence of this species in China has not been confirmed.

**34. *Bromus rubens*** Linnaeus, Cent. Pl. 1: 5. 1755.

红雀麦 hong que mai

*Anisantha rubens* (Linnaeus) Nevski; *Bromus madritensis* Linnaeus subsp. *rubens* (Linnaeus) Husnot; *B. scoparius* Linnaeus var. *rubens* (Linnaeus) Saint-Amans; *Festuca rubens* (Linnaeus) Persoon; *Zerna rubens* (Linnaeus) Grossheim.

Annual. Culms tufted, erect or ascending, 15–35 cm tall, pubescent below inflorescence. Leaf sheaths pubescent; leaf blades 5–10 cm × 3–5 mm, both surfaces pubescent. Panicle densely contracted, narrowly elliptic in outline, stiffly erect, 4–7 × ca. 2 cm, often tinged with purple; branches 2–5 mm, much shorter than spikelets, branches and pedicels pubescent. Spikelets 15–25 mm, florets 4–9, upper florets sterile, reduced; glumes minutely hairy, keel ciliate, lower glume 7–9 mm, upper glume 10–12 mm; lemmas 12–16 mm, scabrid to pubescent, 2-toothed, apical teeth 4–5 mm, awned from sinus; awn 10–20 mm, scabrid, spreading at maturity; palea shorter than lemma, keels sparsely villous. Stamens (2 or)3, anthers to 2 mm. Fl. May–Jul.  $2n = 14, 28$ .

Dry slopes; ca. 3900 m. Xinjiang [Tajikistan, Turkmenistan; N Africa, SW Asia, S Europe; introduced in America and Australia].

Many Chinese gatherings identified as *Bromus rubens* were misidentified specimens of *B. tectorum*. The presence of this species in China has not been confirmed.

**35. *Bromus gracillimus*** Bunge, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 7: 527. 1851.

细雀麦 xi que mai

*Nevskiella gracillima* (Bunge) V. I. Kreczetowicz & Vvedensky.

Annual. Culms slender, erect or geniculately ascending, 20–40 cm tall, sparsely hairy. Leaf sheaths pubescent; leaf blades flat, 10–15 cm × ca. 3 mm, both surfaces pubescent, margins scabrid; ligule ca. 2 mm. Panicle ovate in outline, lax, 4–10 × 3–5 cm; branches whorled, 4–8 per node, 2–6 cm, glabrous, each bearing 1–4 spikelets. Spikelets broadly elliptic, 5–8 mm, florets 3–6; internodes exposed; lower glume lanceolate, 3–4 mm, 1-veined, upper glume narrowly ovate, 4–5 mm, 3-veined, margins membranous, apex acuminate; lemmas oblanceolate, 3.5–4.5 mm, 5–7-veined, margins strongly inrolled and sparsely ciliolate, apex minutely 2-toothed, awned from sinus; awn 15–20 mm, slender, straight; palea subequal to lemma, keels ciliolate. Anthers 0.3–0.5 mm. Fl. and fr. Jun–Aug.  $2n = 14$ .

Mountain slopes, river banks, grassy places among thickets; 2000–3400(–4200) m. Xinjiang, W Xizang [Afghanistan, Kashmir, Kazakhstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia (Iran)].

**36. *Bromus secalinus*** Linnaeus, Sp. Pl. 1: 76. 1753.

黑麦状雀麦 hei mai zhuang que mai

*Avena secalina* (Linnaeus) Salisbury; *Bromus mollis* Linnaeus var. *secalinus* (Linnaeus) Hudson; *Forasaccus secalinus* (Linnaeus) Bubani; *Serrafalcus secalinus* (Linnaeus) Buntingon.

Annual. Culms stout, erect, 30–60(–100) cm tall. Leaf sheaths usually glabrous; leaf blades 5–15 cm × 3–6 mm, pubescent; ligule 1–2 mm. Panicle lax, 5–15 × 2–6 cm, oblique, nodding; branches subwhorled, up to 8 cm, each bearing 1–4 spikelets. Spikelets narrowly oblong, 15–20 × 6–8 mm, florets 5–15, not overlapping at maturity; rachilla internodes exposed; glumes subequal, firm, veins inconspicuous, scabrid, lower glume 4–5 mm, 3–5-veined, upper glume 6–7 mm, 7-veined, apex obtuse, mucronate; lemmas elliptic, 8–9 × 4–5 mm in side view, herbaceous, 7-veined, glabrous, margins inrolled, apex obtuse, awned from back below apex; awn 5–7 mm, shorter than lemma body, slightly reflexed; palea as long as or slightly shorter than lemma. Anthers ca. 2 mm. Caryopsis ca. 5 × 1 mm, longitudinally inrolled, brownish red. Fl. and fr. May–Aug.  $2n = 28$ .

Slopes, grassy places; 500–1500 m. Gansu, Taiwan, Xinjiang, Xizang [Japan, Russia; SW Asia, Europe; introduced in America].

This species is adventive in many temperate countries as a field weed.

**37. *Bromus lepidus*** Holmberg, Bot. Not. 1924: 326. 1924.

鳞稈雀麦 lin fu que mai

*Bromus gracilis* Krösche, Repert. Spec. Nov. Regni Veg.

19: 329. 1924, not Leysser (1761), nor Weigel (1772); *Bromus hordeaceus* Linnaeus subsp. *lepidus* (Holmberg) A. Pedersen.

Annual or biennial. Culms slender, erect, 20–50 cm tall, 2–6-noded. Leaf sheaths pubescent or upper sheaths glabrous; leaf blades flat, 5–20 cm × 2–4 mm, pubescent; ligule up to 1 mm. Panicle erect, narrow, lax or dense, 2–10 cm; branches clustered, up to 4 cm, each bearing 1–3 spikelets. Spikelets lanceolate, 7–15 × 2.5–4 mm, glabrous, shiny, florets 3–11, overlapping at first, later slightly separated; glumes unequal, lower glume ca. 6 mm, upper glume 7–8 mm; lemmas broadly ovate, 7–8 mm, 7-veined, scaberrulous, margins membranous, sharply incurved at maturity, apex 2-toothed; awn 2–5 mm, straight; palea shorter than lemma, keels ciliate. Anthers 0.5–2 mm. Caryopsis longer than palea.  $2n = 28$ .

Waste ground; ca. 700 m. Xinjiang [Europe; introduced in America].

**38. *Bromus brachystachys*** Hornung, Flora 16: 417. 1833.

短轴雀麦 duan zhou que mai

Annual. Culms loosely tufted with basal branches, erect or geniculately ascending, ca. 10 cm tall, glabrous. Leaf sheaths sparsely pubescent; leaf blades flat, 3–4 cm × ca. 2 mm, both surfaces densely pubescent; ligule ca. 1 mm. Panicle contracted, ca. 3 cm, with few spikelets; pedicels short, minutely pubescent. Spikelets ca. 10 × 4 mm, florets 5–8; glumes with membranous margins, apex acuminate, lower glume ca. 4 mm, 3-veined, upper glume 4–5 mm, 5-veined; lemmas broadly elliptic, 4–5 × 3–4 mm in side view, 7-veined, smooth or scabrid, margins membranous, ciliate, apex 2-toothed, teeth ca. 0.5 mm, awned from sinus; awn 4–7 mm, recurved at maturity; palea 4–5 mm, keels sparsely ciliate. Anthers ca. 1 mm. Fl. and fr. Jul–Sep.

Riversides, grassy places; ca. 1000 m. Gansu [Afghanistan; SW Asia, Europe].

The treatment here is doubtful and is probably based on a misidentification of *Bromus pseudobrachystachys* H. Scholz (Bot. Jahrb. Syst. 91: 462. 1972), recorded from Afghanistan, Iran, Iraq, Syria, and Turkey. *Bromus brachystachys* is a little-known species described from Germany.

**39. *Bromus squarrosus*** Linnaeus, Sp. Pl. 1: 76. 1753.

偏穗雀麦 pian sui que mai

*Bromus wolgensis* Fischer ex J. Jacquin; *Forasaccus squarrosus* (Linnaeus) Bubani; *Serrafalcus squarrosus* (Linnaeus) Babington.

Annual. Culms erect or geniculately ascending, 20–60 cm tall, 3–4(–5)-noded. Leaf sheaths pubescent; leaf blades flat, up to 15 cm × 2–5 mm, pubescent; ligule ca. 1 mm. Panicle lax, (5–)20 × 4–6 cm, usually 1-sided; branches few, shorter than or equaling spikelets, each bearing 1 or 2 pendent spikelets. Spikelets ovate, upper part gradually narrowed, (15–)20–50 × 5–15 mm, florets (6–)10–25; rachilla ca. 2 mm, smooth or scabrid; glumes oblong to elliptic, margins membranous, glabrous, lower glume 5–7 mm, 5-veined, apex acuminate, upper glume 6–8 mm, 9-veined, apex obtuse; lemmas obovate, 8–11 × (2–)3–6 mm in side view, 9-veined, glabrous or pubescent, margins

white-membranous and angled near halfway point, apex entire or shallowly 2-toothed, awned from sinus ca. 2 mm below apex; awn 7–12 mm, longer on upper lemmas than lower lemmas, base flattened, slightly twisted, divaricate at maturity; palea 1/3 length of lemma, keels stiffly ciliate. Anthers 1–1.5 mm. Fl. and fr. May–Jul.  $2n = 14$ .

Field margins, grasslands, waste ground; 500–3000 m. Gansu, Xinjiang [Kazakhstan, Mongolia, Russia; N Africa, SW Asia, Europe; introduced in America].

The name *Bromus wolgensis* has been applied to a variant with pubescent spikelets.

**40. *Bromus arvensis*** Linnaeus, Sp. Pl. 1: 77. 1753.

田雀麦 tian que mai

*Avena arvensis* (Linnaeus) Salisbury; *Bromus arvensis* Linnaeus var. *phragmitoides* (A. Nyárady) Borza; *B. erectus* Hudson var. *arvensis* (Linnaeus) Hudson; *B. phragmitoides* A. Nyárady; *Forasaccus arvensis* (Linnaeus) Bubani; *Serrafalcus arvensis* (Linnaeus) Godron.

Annual. Culms loosely tufted, 40–100 cm tall, 2–5-noded. Leaf sheaths hairy; leaf blades 10–20 cm × 3–6 mm, scattered pubescent, margins and adaxial surface scabrid; ligule 2–4 mm. Panicle lax, 15–30 × 10–20 cm; branches clustered, spreading or nodding, scabrid, each bearing 5–8 spikelets. Spikelets oblong-lanceolate, 12–22 × 3–4 mm, tinged with purple, florets 5–8, overlapping; rachilla ca. 2 mm; glumes unequal, margins membranous, apices acuminate, lower glume 4–6 mm, 3-veined, upper glume 6–8 mm, 5–7-veined; lemmas broadly elliptic or obovate, 7–9 mm, back rounded, 7-veined, glabrous, margins membranous with obtuse angle, apex minutely 2-toothed, awned from ca. 2 mm below apex; awn 7–10 mm, slender, straight; palea subequal to lemma, keels ciliate. Anthers 3–4.5 mm. Caryopsis blackish brown, 7–9 × ca. 1 mm. Fl. and fr. Jun–Aug.  $2n = 14$ .

Roadsides, fields, forest margins, moist places. Gansu, Jiangsu [Russia; N Africa, SW Asia, Europe; introduced in America].

**41. *Bromus racemosus*** Linnaeus, Sp. Pl., ed. 2, 1: 114. 1762.

总状雀麦 zong zhuang que mai

*Brachypodium commutatum* (Schrader) P. Beauvois; *Bromus arvensis* Linnaeus var. *racemosus* (Linnaeus) Neilreich; *B. commutatus* Schrader; *B. mollis* Linnaeus var. *commutatus* (Schrader) Sanio; *B. mutabilis* F. W. Schultz var. *commutatus* (Schrader) F. W. Schultz; *B. popovii* Drobow; *B. racemosus* subsp. *commutatus* (Schrader) Maire & Weiller; *B. racemosus* var. *commutatus* (Schrader) Cosson & T. Durand; *B. squarrosus* Linnaeus var. *racemosus* (Linnaeus) Regel; *Forasaccus commutatus* (Schrader) Bubani; *F. racemosus* (Linnaeus) Bubani; *Serrafalcus commutatus* (Schrader) Babington; *S. racemosus* (Linnaeus) Parlato; *S. racemosus* subsp. *commutatus* (Schrader) Rouy; *S. racemosus* var. *commutatus* (Schrader) Husnot.

Annual. Culms slender, loosely tufted, erect or ascending, 25–80(–100) cm tall, glabrous or pubescent, 2–5-noded. Leaf sheaths hairy toward base, upper sheaths sparsely hairy or glabrous; leaf blades 5–30 cm × 2–8 mm, pubescent; ligule 1–3

mm. Panicle erect, narrow, 12–15 × 2–4 cm, sometimes nodding at maturity; branches 2–6 per node, lowest up to 6 cm, each bearing 1–4 spikelets. Spikelets oblong, slightly compressed, 12–20 × 4–6 mm, florets 5–10, overlapping; glumes unequal, apex acuminate, lower glume 4–6 mm, 3-veined, upper glume 4.5–7 mm, 5–7-veined; lemmas elliptic, 6–10 × 2–2.5 mm in side view, scabrid, 7–9-veined, apex obtuse, awned from ca. 1 mm below apex; awn 3–9 mm, straight; palea shorter than lemma. Anthers 1.5–3 mm. Caryopsis thin, flat, ca. 7 × 2 mm, slightly shorter than palea. Fl. and fr. Jun–Aug.  $2n = 14$ , 28, 56.

River valleys, moist grasslands, roadsides, grassy places; 2700–4400 m. Gansu, Qinghai, Xinjiang, Xizang [Afghanistan, Bhutan; N Africa, Europe].

**42. *Bromus japonicus*** Thunberg in Murray, Syst. Veg., ed. 14, 119. 1784.

雀麦 que mai

*Serrafalcus japonicus* (Thunberg) Wilmott.

Annual. Culms erect, 40–90 cm tall. Leaf sheaths pubescent; leaf blades 12–30 cm × 4–8 mm, both surfaces pubescent; ligule 1–2.5 mm. Panicle effuse, 20–30 × 5–10 cm, nodding; branches 2–8, 5–10 cm, slender, each bearing 1–4 spikelets. Spikelets lanceolate-oblong, 12–20 × ca. 5 mm, yellowish green, florets 7–11, closely overlapping; rachilla internodes shortly clavate, ca. 2 mm; glumes subequal, keel scabrid, margins membranous, lower glume 5–7 mm, 3–5-veined, upper glume 5–7.5 mm, 7–9-veined; lemmas elliptic, 8–10 × ca. 2 mm in side view, herbaceous, 9-veined, usually glabrous, margins membranous with conspicuous angle at maturity, scabrid, apex obtuse, minutely 2-toothed, awned from 1–2 mm below apex; awn 5–10 mm, longer on upper lemmas than lower lemmas, base slightly flattened, conspicuously recurved at maturity; palea shorter than lemma, ca. 1 mm wide, keels stiffly ciliate. Anthers ca. 1 mm. Caryopsis 7–8 mm. Fl. and fr. May–Jul.  $2n = 14$ .

Forest margins, roadsides, waste ground, river beaches; near sea level to 2500(–3500) m. Anhui, Gansu, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan [Japan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe; introduced in North America].

**43. *Bromus sewerzowii*** Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 75: 601. 1881.

密穗雀麦 mi sui que mai

Annual. Culms 30–70 cm tall, pubescent on nodes and below panicle. Leaf sheaths pubescent; leaf blades flat, 10–20 cm × 3–5 mm, pubescent; ligule 2–3 mm, abaxial surface and margin ciliate. Panicle contracted, oblong in outline, erect, ca. 10 × 3–4 cm; branches short, pubescent, each bearing 1–3 erect spikelets. Spikelets lanceolate, 15–25 mm, florets 6–10; glumes unequal, acuminate, lower glume linear-lanceolate, ca. 7 mm, 3-veined, upper glume 5-veined, slightly longer than lower glume; lemmas lanceolate, 9–11 mm, glabrous or pubescent, margins broadly membranous, apex 2-toothed, teeth acute, awned from sinus ca. 1 mm below apex; awn 8–15 mm, straight

or slightly divergent; palea ca. 2 mm shorter than lemma. Anthers ca. 1 mm. Caryopsis long elliptic, ca. 5 × ca. 1 mm, pale brown. Fl. and fr. Jun–Jul.  $2n = 28$ .

Desert grasslands; 700–1400 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan; SW Asia (NE Iran)].

**44. *Bromus tyttanthus*** Nevski, Trudy Sredne-Aziatsk. Gosud. Univ., Ser. 8b, Bot. 17: 30. 1934.

裂稈雀麦 lie fu que mai

*Bromus gracilis* Popov (1922), not Weigel (1772).

Annual. Culms 10–30 cm tall. Leaf sheaths pubescent; leaf blades 6–10 cm × ca. 2 mm, both surfaces pubescent. Panicle contracted, 3–7 cm, 1-sided, spikelets few; branches short, straight, scabrid, shorter than spikelets. Spikelets lanceolate, 12–18 mm, florets 4–8; glumes linear-lanceolate, apex acute to acuminate, veins 3, lateral veins sometimes inconspicuous, lower glume ca. 4 mm, upper glume ca. 5 mm; lemmas lanceolate, 8–10 mm, pubescent, apex 2-toothed, teeth lanceolate, 0.5–1 mm, awned from ca. 3 mm below apex; awn as long as lemma body, base slightly flattened, recurved at maturity; palea shorter than lemma. Anthers 0.5–1 mm. Fl. Jun–Jul.

Mountain thickets, stony slopes. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan; SW Asia (NE Iran)].

**45. *Bromus scoparius*** Linnaeus, Cent. Pl. 1: 6. 1755.

帚雀麦 zhou que mai

*Serrafalcus scoparius* (Linnaeus) Parlatores.

Annual. Culms erect or geniculately ascending, 20–50 cm tall. Leaf sheaths glabrous or scattered hirsute; leaf blades 10–20 cm × 2–5 mm, adaxial surface hairy. Panicle densely contracted, oblong or ovate in outline, sometimes interrupted, base wedge-shaped, top rounded, 4–7 × 2–3 cm, with many spikelets; branches very short, straight, spikelets sessile. Spikelets oblong-lanceolate, 12–20 × 2–3 mm, florets 7–12, overlapping; rachilla internodes thick, ca. 1 mm, not exposed; glumes lanceolate, margins membranous, lower glume 4–5 mm, 3-veined, upper glume 5–7 mm, 5–7-veined; lemmas oblong-lanceolate, 7–8(–10) × ca. 1 mm in side view, 7-veined, glabrous or pubescent, margins and apex membranous, apex 2-toothed, teeth 1.3–2.5 mm, acute, awned from sinus; awn 7–10 mm, slightly flattened at base, recurved at maturity; palea slightly shorter than lemma, keels ciliate. Anthers 0.3–0.6 mm. Fl. May–Jul.  $2n = 14$ .

Waste ground, moist fields; 400–2300 m. Jiangsu, W Xinjiang [NW India, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe].

**46. *Bromus hordeaceus*** Linnaeus, Sp. Pl. 1: 77. 1753.

毛雀麦 mao que mai

*Avena mollis* (Linnaeus) R. A. Salisbury; *Bromus mollis* Linnaeus; *B. secalinus* Linnaeus var. *hordeaceus* (Linnaeus) Linnaeus; *Serrafalcus hordeaceus* (Linnaeus) Grenier & Godron; *S. mollis* (Linnaeus) Parlatores.

Annual. Culms erect from a creeping or obliquely ascending base, 30–80 cm tall, minutely hairy immediately below in-

florescence, nodes thinly hairy. Leaf sheaths pubescent; leaf blades linear, flat, 3–5 mm wide, soft, both surfaces pubescent; ligule ca. 1 mm. Panicle erect, usually dense, 5–10 cm; branches short; pedicels mostly shorter than spikelets, pubescent, spikelets many. Spikelets oblong, 12–20 × 4–6 mm, usually hairy, florets 6–12(–16), distal florets mostly sterile; rachilla internodes ca. 1 mm, with small bristles; glumes unequal, margins membranous, pubescent, obtuse, lower glume 4–5 mm, 3–5-veined, upper glume 5–8 mm, 5–7-veined; lemmas elliptic, 8–11 × ca. 2 mm in side view, papery, glabrous, prominently 7–9-veined, pubescent, margins membranous, apex obtuse, minutely 2-toothed, awned from 1–2 mm below apex; awn 5–10 mm, stout, straight; palea shorter than lemma, keels ciliate. Anthers 0.2–1 mm. Caryopsis shorter than or as long as palea. Fl. and fr. May–Jul.  $2n = 28$ .

Gansu, Hebei, Qinghai, Taiwan, Xinjiang [Pakistan, Russia; SW Asia, Europe; adventive in America and Australia].

This species is widely introduced in temperate parts of the world.

**47. *Bromus intermedius*** Gussone, Fl. Sicul. Prodr. 1: 114. 1827.

中间雀麦 *zhong jian que mai*

*Bromus hordeaceus* Linnaeus var. *intermedius* (Gussone) Shear; *B. lanceolatus* Roth subsp. *intermedius* (Gussone) Lloret; *Serrafalcus hughii* Todaro.

Annual. Culms erect or obliquely ascending, 20–60 cm tall, glabrous. Leaf sheaths pubescent; leaf blades 5–10 cm × 2–4 mm, flat, scattered pubescent. Panicle lax, 5–10 cm, erect or nodding; branches 1 or 2(–5) per node, slender, recurved, glabrous, each bearing 1–3 spikelets; pedicels about as long as or longer than spikelet. Spikelets lanceolate, 10–15(–25) mm, with curved pubescence; rachilla internodes short, not exposed; glumes unequal, lower glume 4–5 mm, upper glume 6–8 mm; lemmas oblong-lanceolate, 7–9 mm, pubescent, margins narrowly membranous, apex deeply 2-toothed, teeth 2–3 mm; awn 5–9 mm, base slightly flattened and twisted, spreading or recurved; palea shorter than lemma. Anthers ca. 1 mm. Fl. and fr. Apr–Jul.  $2n = 14$ .

Moist places in fields, deciduous forests; 1200–1800 m. Xinjiang [N Africa, SW Asia, S Europe].

The presence of this species in China has not been confirmed.

**48. *Bromus oxyodon*** Schrenk, Bull. Sci. Acad. Imp. Sci. Saint-Petersbourg 10: 355. 1842.

尖齿雀麦 *jian chi que mai*

*Bromus lanceolatus* Roth subsp. *oxyodon* (Schrenk) Tzvelev; *B. macrostachys* Desfontaines var. *oxyodon* (Schrenk) Grisebach.

Annual. Culms loosely tufted, erect or geniculately ascending, 30–60 cm tall. Lower leaf sheaths retrorsely pubescent, upper sheaths glabrous; leaf blades linear, 10–20 cm × 4–8 mm, both surfaces pubescent. Panicle lax, spreading, 10–25 × 10–15 cm, often purplish; branches whorled, usually much longer than spikelets, filiform, flexuous, scabrid, each bearing 2–4 nodding spikelets. Spikelets lanceolate, 25–35 mm, florets 6–10, overlapping; glumes unequal, lanceolate, margins mem-

branous, apex acuminate, lower glume 9–11 mm, upper glume 11–14 mm; lemmas oblong-elliptic, 12–15 mm, 7-veined, glabrous or pubescent, margins broad, hyaline, apex 2-toothed, teeth acuminate, 1.5–3 mm, awned from sinus; awn 15–25 mm, base flattened and slightly twisted, recurved at maturity; palea 2/3 as long as lemma, keels ciliate. Anthers 1.2–1.8 mm. Caryopsis lanceolate, 8–10 × ca. 2 mm. Fl. and fr. May–Aug.  $2n = 28$ .

Desert grasslands, semi-dry slopes, mountain ravines, roadsides; 500–2600 m. Xinjiang [Afghanistan, NW India, Kashmir, Kazakhstan, Kyrgyzstan, W Mongolia, Pakistan, Tajikistan, Uzbekistan].

This is a short-lived forage grass in deserts and dry mountains.

**49. *Bromus pectinatus*** Thunberg, Prodr. Fl. Cap. 1: 22. 1794.

篦齿雀麦 *bi chi que mai*

*Bromus japonicus* Thunberg var. *pectinatus* (Thunberg) Ascherson & Graebner; *B. patulus* Mertens & W. D. J. Koch var. *pectinatus* (Thunberg) Stapf; *B. gedrosianus* Pénzes; *B. rechingeri* Melderis.

Annual. Culms loosely tufted, geniculately ascending, 50–80 cm. Leaf sheaths pubescent; leaf blades 15–30 cm × 4–8 mm. Panicle lax, spreading, 15–25 cm; branches and pedicels longer than spikelets, ascending or nodding, filiform, flexuous. Spikelets lanceolate, 20–30 mm, florets 6–10; glumes unequal, lower glume 5–8 mm, narrowly lanceolate, 3-veined, apex acuminate, upper glume 8–10 mm, 5-veined, apex acute; lemmas narrowly oblanceolate, (8–)10–15 mm, herbaceous, margins membranous, inrolled at maturity, apex 2-toothed, teeth acuminate, 2–3 mm, awned from sinus; awn 8–17 mm, usually straight, erect or weakly recurved; palea keels pectinate-ciliate, hairs ca. 0.5 mm. Anthers 0.5–1.4 mm. Fl. and fr. May–Sep.

Slopes, grassy places, ditch banks; 700–1400 m. Gansu, Hebei, Henan, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang Xizang, Yunnan [Afghanistan, Bhutan, India, Kashmir, Nepal, Pakistan, Tajikistan; Africa, SW Asia, Europe].

**50. *Bromus grossus*** Desfontaines ex Candolle in Lamarck & Candolle, Fl. Franç., ed. 3, 3: 68. 1805.

粗雀麦 *cu que mai*

*Serrafalcus grossus* (Desfontaines ex Candolle) Rouy.

Annual. Culms erect, stout, 60–120 cm tall. Leaf sheaths hairy or glabrous; leaf blades large. Panicle erect, effuse, 15–20 cm, one-sided at maturity. Spikelets ovate-lanceolate, 20–40 × ca. 10 mm, florets 10–12; glumes leathery, veins conspicuous, sometimes with a short mucro at apex; lemmas 11–14 mm, scabrid, margins obtusely angled, apex shallowly 2-toothed, awned from below sinus; awn 5–10 mm, straight, stout; palea slightly shorter than lemma. Anthers 2–3 mm. Caryopsis 10–20 mm, inrolled when mature, slightly shorter than lemma. Fl. and fr. Jun–Sep.  $2n = 28$ .

Waste ground on slopes. Xizang [Europe].

The presence of this species in China has not been confirmed.

**51. *Bromus lanceolatus*** Roth, Catal. Bot. 1: 18. 1797.

大穗雀麦 *da sui que mai*

*Forasaccus lanceolatus* (Roth) Bubani; *Serrafalcus lanceolatus* (Roth) Parlatores.

Annual. Culms erect or geniculately ascending, 60–80 (–100) cm tall. Leaf sheaths pubescent; leaf blades 15(–20) cm × 3–6 mm, both surfaces pubescent. Panicle narrow, 8–15 cm; branches erect, shorter than spikelets, scabrid, rather stout. Spikelets lanceolate cylindrical, 20–30 × 6–10 mm, florets 10–16, overlapping; rachilla internodes not visible; lower glume 6–8 mm, 3–5-veined, apex acuminate, upper glume 9–11 mm, 5–7-veined; lemmas elliptic, 12–15 × 2–2.5 mm in side view, herbaceous, smooth, glabrous or pubescent, margins membranous, 7–9-veined, apex 2-toothed, teeth acuminate, 1–2 mm, awned from sinus; awn 10–20 mm, base slightly flattened, twisted, recurved at maturity; palea slightly shorter than lemma, keels ciliate. Anthers 1.5–2.5 mm. Fl. and fr. Apr–Jul.  $2n = 28$ .

Forest margins, slopes, thickets, grasslands; 300–1800 m. Xinjiang [Afghanistan, Pakistan, Turkmenistan; N Africa, SW Asia, S Europe].

**52. *Bromus danthoniae*** Trinius ex C. A. Meyer, Verz. Pfl. Casp. Meer. 24. 1831.

三芒雀麦 san mang que mai

*Boissiera danthoniae* (Trinius) A. Braun; *Bromus lanceolatus* Roth var. *danthoniae* (Trinius) Dinsmore; *B. macrostachys* Desfontaines var. *danthoniae* (Trinius) Ascherson & Graebner; *Trinisia danthoniae* (Trinius) Steudel.

Annual. Culms erect or geniculately ascending, 30–50 cm tall, pubescent below inflorescence. Leaf sheaths pubescent; leaf blades 10–15 cm × 2–4 mm, both surfaces densely pubescent or later glabrescent. Panicle contracted or racemelike, dense, ovate in outline, 5–10 × 1–5 cm; branches and pedicels shorter than spikelets, ascending, scabrid. Spikelets oblong-lanceolate, 20–40 × 6–12 mm, florets 8–16, overlapping; rachilla internodes not visible; glumes broad, lower glume 5–8.5 mm, 3–5-veined, upper glume 7–9 mm, 7–9-veined; lemmas broadly elliptic, 9–12 mm, glabrous, pubescent or villous, 9–11-veined, veins scabrid, margins broadly membranous, broader and obtusely angled in upper half, apex lacerate, lowest lemmas shortly 1-awned, upper lemmas 3-awned from 2–4 mm below apex; central awn 15–25 mm, base flattened, twisted, recurved, lateral awns 4–10 mm, straight or recurved; palea shorter than lemma, keels ciliate. Anthers 1–1.8 mm. Fl. May–Aug.

Wastelands, dry grassy places on gravel slopes; 1500–3000 m. W Xizang [Afghanistan, NW India, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Mediterranean (Cyprus)].

*Bromus danthoniae* has been placed in *B. sect. Trinisia* (Steudel) Nevski. However, the available molecular data indicate that the species is nested within *B. sect. Bromus*.

**53. *Bromus marginatus*** Nees ex Steudel, Syn. Pl. Glumac. 1: 322. 1854.

山地雀麦 shan di que mai

*Ceratochloa marginata* (Nees ex Steudel) W. A. Weber; *Forasaccus marginatus* (Nees ex Steudel) Lunell.

Perennial. Culms tufted, ca. 50 cm tall, ca. 5 mm in diam. Leaf sheaths retrorsely pubescent; leaf blades 10–20 cm × 4–10 mm, pubescent. Panicle erect, rather narrow, 10–15 cm; primary branches 3–5 cm, lower branches erect or spreading, each bearing 1 or 2 spikelets. Spikelets 20–30 × 5–8 mm, florets 9–13, overlapping; rachilla internodes not visible; lower glume 6–7 mm, upper glume ca. 8 mm, apex acuminate; lemmas 10–20 × ca. 2.2 mm in side view, keeled, pubescent, margins membranous, awned from apex; awn 5–7 mm. Fl. May–Jun.  $2n = 28, 42, 56, 70$ .

Roadsides, forest margins, moist places, adventive. Hebei [native to North America].

**54. *Bromus catharticus*** Vahl, Symb. Bot. 2: 22. 1791.

扁穗雀麦 bian sui que mai

*Bromus uniolooides* Kunth; *Schedonorus uniolooides* (Kunth) Roemer & Schultes; *Serrafalcus uniolooides* (Kunth) Sampaio; *Zerna uniolooides* (Kunth) Lindman.

Annual. Culms erect or geniculately ascending, 60–100 cm tall, ca. 5 mm in diam. Leaf sheaths pubescent; leaf blades 30–40 cm × 4–6 mm, scattered pubescent; ligule ca. 2 mm. Panicle lax, oblong in outline, 10–40 cm; branches ca. 10 cm, scabrid, each bearing 1–3 spikelets. Spikelets ovate-oblong, laterally compressed, 15–30 × 8–10 mm, florets 6–11, overlapping; rachilla internodes not visible, ca. 2 mm, scabrid; glumes

narrowly lanceolate, lower glume 10–12 mm, upper glume slightly longer than lower glume; lemmas 15–20 mm, keeled, 11-veined, veins scabrid, apex mucronate; palea narrow, ca. 1/2 as long as lemma, keels ciliate. Anthers 0.3–0.6 mm. Fl. May, fr. Sep.  $2n = 28, 42, 58$ .

Shady ditch sides, introduced. Guizhou, Hebei, Jiangsu, Nei Mongol, Taiwan, Yunnan [native to South America].

This species is widely introduced as a winter forage (Rescue Grass) and is now adventive in most temperate countries.

**55. *Bromus carinatus*** Hooker & Arnott, Bot. Beechey Voy. 403. 1840.

显脊雀麦 xian ji que mai

*Ceratochloa carinata* (Hooker & Arnott) Tutin.

Annual. Culms erect, 40–50 cm tall or more, glabrous. Leaf sheaths glabrous or pubescent near mouth; leaf blades flat, 20–30 cm × 5–10 mm, apex acuminate. Panicle open, 15–30 cm; branches long, spreading or drooping. Spikelets linear-lanceolate, laterally compressed, 30–40 mm, florets 5–11, lax; glumes lanceolate, 3–5-veined, apex acuminate, upper glume shorter than lower lemma, 5–7-veined; lemma 15–17 mm, compressed to keel, back scabrid, awn apical, 4(–10) mm; palea subequal to lemma; anthers ca. 0.5 mm.  $2n = 56$ .

Cultivated. Beijing, Taiwan [native to NW Europe and North America].



