

**105. KENGYILIA C. Yen & J. L. Yang, Canad. J. Bot. 68: 1897. 1990.**

以礼草属 *yi li cao shu*

Plants perennial, with creeping, underground rhizomes. Culms densely tufted, rarely laxly so. Leaf blade flat, rolled. Spike dense, rarely lax, usually with terminal spikelet. Spikelets 1(or 2) per node, sessile, with (5–)7 or 8 florets; rachilla disarticulating above glumes. Glumes rounded abaxially or keeled only at apex, rarely keeled throughout length. Lemma rounded abaxially, rarely keeled, usually 5-veined, densely pilose or hirsute, awnless or shortly awned. Palea apex retuse, obtuse, or 2-lobed. Caryopsis oblong, apex usually hairy.  $x = 7$ .

About 30 species: mountains of C Asia and the Xizang-Qinghai Plateau; 24 species (21 endemic) in China.

- 1a. Plants laxly tufted.
  - 2a. Spikelets usually 2 per node in proximal part of spike, 1 per node in distal part ..... 1. *K. geminata*
  - 2b. Spikelets 1 per node throughout spike.
    - 3a. Glumes slightly asymmetric, midvein raised, forming keel from base to apex, often ciliate ..... 6. *K. habahenensis*
    - 3b. Glumes ovate, ovate-lanceolate, or oblong-lanceolate, midvein slightly raised, not forming keel.
      - 4a. Glumes equaling first lemma or distal glume slightly longer ..... 2. *K. grandiglumis*
      - 4b. Glumes shorter than first lemma.
        - 5a. Glumes oblong-lanceolate; lemma densely pubescent ..... 5. *K. melanthera*
        - 5b. Glumes ovate or ovate-lanceolate; lemma laxly puberulent or densely hirsute.
          - 6a. Palea equaling or slightly longer than lemma; lemma laxly puberulent ..... 3. *K. rigidula*
          - 6b. Palea shorter than lemma; lemma densely hirsute ..... 4. *K. eremopyroides*
  - 1b. Plants ± densely tufted.
    - 7a. Spike lax, rachis internodes (4–)5–10(–15) mm.
      - 8a. Spike rachis densely pubescent.
        - 9a. Glumes oblong, subequal, 6.7–7.5 mm, hirsute along veins ..... 7. *K. gobicola*
        - 9b. Glumes lanceolate, unequal, proximal one 4.5–6 mm, distal one 5.5–7 mm, both scabrous along veins ..... 8. *K. pendula*
      - 8b. Spike rachis glabrous, scabrous, or sparsely puberulent.
        - 10a. Rachis puberulent throughout, pilosulose only distally, or puberulent.
          - 11a. Rachis puberulent throughout; glumes white pilose; lemma awn 10–15 mm ..... 11. *K. tahelacana*
          - 11b. Rachis pilosulose only distally or puberulent; glumes glabrous; lemma awn 1–3 mm.
            - 12a. Spikelets 16–22 mm, with 6–9 florets ..... 9. *K. laxiflora*
            - 12b. Spikelets 10–12 mm, with 3–5 florets ..... 10. *K. laxistachya*
        - 10b. Rachis glabrous or margin ciliate.
          - 13a. Glumes oblong-lanceolate, 1–3(–5)-veined, anthers yellow or nearly black.
            - 14a. Lemma laxly or distally densely hirsute; anthers nearly black ..... 14. *K. stenachyra*
            - 14b. Lemma densely pubescent; anthers yellow ..... 15. *K. shawanensis*
          - 13b. Glumes oblong or ovate-lanceolate, 4–6-veined, anthers yellow.
            - 15a. Lemma densely villous; anthers 3.5–4 mm ..... 12. *K. zhaosuensis*
            - 15b. Lemma scabrous or sparsely spinose; anthers 1.4–1.8 mm ..... 13. *K. hejingensis*
    - 7b. Spike dense, rachis internodes 1–5(–7) mm.
      - 16a. Glumes glabrous, puberulent, or only scabrous or ciliate along midvein.
        - 17a. Lemma awnless; palea usually slightly longer than lemma ..... 16. *K. mutica*
        - 17b. Lemma awn 2–11 mm; palea usually shorter than lemma.
          - 18a. Lemma awn usually recurved, 7–11 mm ..... 19. *K. kaschgarica*
          - 18b. Lemma awn usually straight or slightly reflexed, 2–6 mm.
            - 19a. Glumes ovate-oblong, 3- or 4-veined ..... 17. *K. hirsuta*
            - 19b. Glumes lanceolate, 5-veined ..... 18. *K. alatavis*
      - 16b. Glumes densely hirsute, villous, or hirsutulous, rarely scabrous and then lemma awn 5–7 mm.
        - 20a. Spike rachis glabrous, if puberulent or villous then culms less than 50 cm tall.
          - 21a. Anthers black; lemma awn 1–7 mm; glumes oblong-lanceolate ..... 20. *K. thorldiana*
          - 21b. Anthers yellow or purple; lemma awn 10–13 mm; glumes oblong-ovate or ovate-lanceolate ..... 21. *K. batalinii*
        - 20b. Spike rachis densely hairy.
          - 22a. Culms 60–70 cm tall; spike slightly secund ..... 24. *K. pamirica*
          - 22b. Culms 12–50 cm tall; spike clearly distichous.
            - 23a. Lemma densely white hairy (hairs ca. 1 mm), awn 1.5–4 mm; anthers yellow, ca. 3 mm ..... 22. *K. guidenensis*

23b. Lemma densely hirsute, awn 4–6 mm; anthers yellowish black, 2–2.2 mm ..... 23. *K. kokonorica*

**1. *Kengyilia geminata*** (Keng & S. L. Chen) S. L. Chen, Bull. Bot. Res., Harbin 14: 141. 1994.

孪生以礼草 luan sheng yi li cao

*Roegneria geminata* Keng & S. L. Chen, Acta Univ. Nankin. Sci. Nat. 1963(1): 80. 1963; *Elymus geminatus* (Keng & S. L. Chen) S. L. Chen.

Plants usually with short rhizomes. Culms laxly tufted, 75–100 cm tall, glabrous or puberulent below spike. Leaf sheath glabrous; leaf blade flat, 7.5–27 × 0.3–0.5 cm, abaxial surface glabrous, adaxial surface puberulent or scabrous, margin ciliate. Spike usually curved, 8–15 cm. Spikelets usually 2 per node in proximal part of spike or with short branch at basal node, 1 per node in distal part of spike, greenish or tinged purplish, 16–20 mm, with 5–7 florets. Glumes lanceolate, laxly villos, apex acuminate or pointed; proximal glume 5–8 mm; distal glume 6–8 mm. Lemma oblong-lanceolate, densely villos; first lemma 9.5–10.5 mm; awn purple, 5–11 mm. Palea equaling lemma, abaxially laxly puberulent, margin ciliate (hairs hyaline, 0.6–1.2 mm), apex narrowly truncate. Fl. and fr. late summer.

- River banks; ca. 3000 m. Qinghai.

**2. *Kengyilia grandiglumis*** (Keng) J. L. Yang et al., Hereditas (Lund) 116: 28. 1992.

大颖以礼草 da ying yi li cao

*Roegneria grandiglumis* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 82. 1963.

Culms laxly tufted, geniculate at base, 40–70 cm tall, smooth, glabrous. Leaf sheath smooth, glabrous; leaf blade glaucescent green, involute or plicate, 6.5–17(–25) × 0.1–0.4 cm, abaxial surface smooth, glabrous, adaxial surface scabrous, apex acuminate. Spike 7–8 cm; rachis glabrous. Spikelets 10–13 mm, with 3–5 florets. Glumes pale green, tinged purplish, oblong-lanceolate, oblique distally, equal, 8–10 mm, or proximal glume slightly shorter, usually 3-veined, or 4- or 5-veined in distal glume, glabrous or pilose, margin submembranous, apex acuminate or shortly pointed. Lemma glabrous in proximal and middle parts, smooth but densely hispid in distal and lateral parts; first lemma ca. 9 mm, apex with point 1–3 mm. Palea slightly shorter than lemma, puberulent proximally, ciliate along keels distally, apex emarginate. Anthers black or dark green. Fl. and fr. late summer.  $2n = 42^*$ .

- Sandy river banks. Qinghai.

This species is used for forage.

**3. *Kengyilia rigidula*** (Keng) J. L. Yang et al., Hereditas (Lund) 116: 27. 1992.

硬秆以礼草 ying gan yi li cao

*Roegneria rigidula* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 77. 1963; *Kengyilia rigidula* var. *intermedia* (Keng) S. L. Chen; *K. rigidula* var. *trichocolea* L. B. Cai; *R. rigidula* var. *intermedia* Keng.

Culms laxly tufted, erect or geniculate at base, (40–)50–75 cm tall, rigid, 3- or 4-noded, glabrous. Leaf sheath glabrous or retrorsely puberulent; leaf blade involute, 3–10(–25) × (0.1–)0.2–0.4 cm, both surfaces puberulent, margin ciliate. Spike curved, 7.5–8 cm. Spikelets 10–15 mm, with 4–6 florets. Glumes ovate-lanceolate, 3- or 4-veined, glabrous but scabrous along midvein distally, apex acute; proximal glume 2–4 mm, sometimes 1- or 2-veined; distal glume 3–5 mm. Lemma oblong-lanceolate, 5-veined, laxly puberulent; first lemma 7–8 mm; awn 1–3 mm. Palea equaling or slightly longer than lemma, pubescent abaxially, ciliate along keels distally. Anthers yellow or nearly black. Fl. and fr. late summer.  $2n = 42^*$ .

- Dry mountain slopes; ca. 3300 m. Gansu, Qinghai, Xizang.

**4. *Kengyilia eremopyroides*** Nevski ex C. Yen et al., Novon 8: 96. 1998.

卵颖以礼草 luan ying yi li cao

Plants with short rhizomes. Culms densely tufted, erect, 31–37 cm tall, 1.5–2 mm in diam., 2-noded, glabrous but upper internodes pubescent. Leaf sheath glabrous; ligule ca. 0.5 mm, scarious-membranous, apex truncate; leaf blade flat, (1.5–)2–5.5 × 0.25–0.3 cm, abaxial surface densely pilose, adaxial surface pilose. Spikes erect, slightly secund, (3.5–)4–4.5 × 0.8–1 cm; rachis densely pilose; proximal internodes 5–7 mm, distal ones 1.5–2 mm. Spikelets stramineous or purple, ovate, 10–11 mm, with 4–6 florets; rachilla densely puberulent; internodes 0.8–1.2 mm. Glumes ovate, 3–5-veined, glabrous, apex acute or mucronate; proximal glume 4–4.5 mm; distal glume 4.5–5 mm. Lemma ovate-oblong, 7–8 mm, densely hirsute; awn 3–4 mm, scabrous. Palea shorter than lemma, sparsely ciliate along keels distally, apex emarginate. Anthers black, ca. 2 mm. Fl. Jul.

- Clayey-sandy ground; ca. 4000 m. Qinghai (Ngoring Hu).

This species is known only from the type, *N. M. Przewalski 339* (LE), collected in July 1884 at “Lacus Orin-Nor” (Ngoring Hu, located W of Madoi in Qinghai).

**5. *Kengyilia melanthera*** (Keng) J. L. Yang et al., Hereditas (Lund) 116: 28. 1992.

黑药以礼草 hei yao yi li cao

Plants with underground rhizome. Culms laxly tufted, erect, lucid, 15–60 cm tall, 2- or 3-noded. Leaf blade 2.5–8 (–12) × 0.2–0.4 cm. Spike erect or curved, 4–7 × 1–1.5 cm. Spikelets crowded, 10–14 mm, with 3–5 florets. Glumes oblong-lanceolate, 3–5-veined, glabrous, puberulent, or densely pubescent; proximal glume 4–6 mm; distal glume 5–7 mm. Lemma densely pubescent, apex awnless, pointed, or with awn 2–4 mm; first lemma ca. 8 mm. Palea slightly shorter than or equaling lemma, puberulent abaxially, ciliate along keels, apex retuse or truncate. Anthers black. Fl. and fr. late summer.  $2n = 42^*$ .

- Mountain slopes, sandy grassy slopes, lake and river banks. Qinghai.

1a. Culms 15–25 cm tall; glumes glabrous or

- puberulent; lemma apex with awn 2–4 mm ..... 5a. var. *melanthera*  
1b. Culms 40–60 cm tall; glumes densely pubescent; lemma apex awnless or pointed ..... 5b. var. *tahopaica*

**5a. *Kengyilia melanthera* var. *melanthera***

黑药以礼草(原变种) *hei yao yi li cao* (yuan bian zhong)

*Agropyron melantherum* Keng, Sunyatsenia 6: 62. 1941; *Elymus melantherus* (Keng) Á. Löve; *Kengyilia thoroldiana* (Oliver) J. L. Yang et al. var. *melanthera* (Keng) L. B. Cai; *Roegneria melanthera* (Keng) Keng.

Culms 15–25 cm tall. Glumes glabrous or puberulent. Lemma apex with awn 2–4 mm. Fl. and fr. late summer.

- Mountain slopes, sandy grassy slopes, lake banks. Qinghai.

**5b. *Kengyilia melanthera* var. *tahopaica* (Keng) S. L. Chen, Bull. Bot. Res., Harbin 14: 141. 1994.**

大黑药以礼草 *da hei yao yi li cao*

*Roegneria melanthera* var. *tahopaica* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 78. 1963; *Kengyilia hirsuta* (Keng) J. L. Yang et al. var. *tahopaica* (Keng) L. B. Cai.

Culms 40–60 cm tall. Glumes densely pubescent. Lemma apex awnless or pointed. Fl. and fr. late summer.

- River banks. Qinghai.

**6. *Kengyilia habahenensis* B. R. Baum et al., Pl. Syst. Evol. 174: 103, 106. 1991.**

哈巴河以礼草 *ha ba he yi li cao*

Plants with short rhizomes. Culms laxly tufted, 80–120 cm tall. Leaf sheath long pilose proximally, glabrous or sparsely pilose distally; ligule fringed; leaf blade linear, flat or margin involute, margin ciliate. Spike dense with pectinate appearance, (3–)4–7(–8) × 0.5–1 cm; rachis sparsely hirsutulous. Spikelets linear-oblong, ca. 15 × 2 mm, with 3–11 florets. Glumes slightly asymmetric, 3–5(–7) mm, connately 3–5-veined, apex acute or mucronate to pointed; midvein raised, forming keel from base to apex, often ciliate; proximal glume slightly shorter than distal one. Lemma connately veined, softly hairy, apex pointed or with awn ca. 3 mm; first lemma ca. 7 mm. Palea equaling lemma. Lodicules ciliate at margin. Anthers ca. 2 mm. Fl. and fr. late summer.  $2n = 42^*$ .

- Slopes in sparse *Larix* forests, scrub, dense vegetation; ca. 1100 m. Xinjiang.

**7. *Kengyilia gobicola* C. Yen & J. L. Yang, Canad. J. Bot. 68: 1897. 1990.**

戈壁以礼草 *ge bi yi li cao*

Culms densely tufted, ca. 60 cm tall, 1.5–2 mm in diam., 2- or 3-noded, glabrous but pubescent below spike. Leaf sheath lacerate-fibrous at base, glabrous; ligule ca. 0.5 mm, scarious-membranous; leaf blade flat or rolled, (6–)7–8 × ca. 0.3 cm, abaxial surface glabrous, adaxial surface villous. Spike erect, 8–12 × 0.4–0.6 cm; rachis densely pubescent; internodes 5–10

mm. Spikelets ovate, 15–20 mm, with (5–)7 or 8 florets; rachis pubescent; internodes 1–1.8 mm. Glumes oblong, sometimes oblique, subequal, 6.7–7.5 mm, herbaceous, 3–5-veined, glabrous but hirsute along veins, apex pointed or with a tooth on one side. Lemma 7–9 mm, villous; awn 1–4 mm. Palea slightly shorter than or equaling lemma, pubescent, ciliolate along keels, apex truncate. Anthers yellow or purple, 2–3 mm. Caryopsis dark brown, ca. 7 mm. Fl. and fr. late summer.  $2n = 42^*$ .

- Stony mountain deserts, roadsides; 2700–3700 m. Xinjiang.

**8. *Kengyilia pendula* L. B. Cai, Acta Phytotax. Sin. 37: 460. 1999.**

弯垂以礼草 *wan chui yi li cao*

Culms erect, 20–85 cm tall, 1.8–2.5 mm in diam., 3- or 4-noded, puberulent below spike. Leaf sheath usually shorter than internode, glabrous, or hispidulous at base; ligule ca. 0.5 mm, apex truncate; leaf blade flat or margin involute, 5–10 × 0.3–0.5 cm, abaxial surface glabrous, adaxial surface villous. Spike nodding, purple, 9–13 × 0.9–1.5 cm; rachis densely pubescent; internodes 4–6 mm, or to 24 mm at base of spike. Spikelets 14–18 mm excluding awns, with 5–8 florets; rachilla puberulent. Glumes lanceolate, 3–5-veined, scabrous along veins, apex usually mucronate; proximal glume 4.5–6 mm; distal glume 5.5–7 mm. Lemma lanceolate, distinctly 5-veined distally, abaxially pilose, margin densely villous; first lemma 8–9 mm; awn 5–6 mm. Palea slightly longer than lemma, spinose along keels, glabrous between keels, apex truncate. Anthers blackened, ca. 2.5 mm. Caryopsis apex puberulent. Fl. and fr. Aug.

- Sunny hillsides; ca. 3600 m. Qinghai (Baima).

**9. *Kengyilia laxiflora* (Keng) J. L. Yang et al., Hereditas (Lund) 116: 27. 1992.**

疏花以礼草 *shu hua yi li cao*

*Roegneria laxiflora* Keng, Acta Univ. Nankin. Sci. Nat. 1963(1): 75. 1963.

Culms densely tufted, erect or geniculate at base, 50–70 cm tall. Leaf blade usually involute, ca. 10 × 0.3 cm. Spike curved, slender, rather lax, 10–15(–20) cm; rachis pilosulose only distally. Spikelets 16–22 mm, with 6–9 florets. Glumes soft, herbaceous, glabrous, margin membranous; proximal glume ca. 4 mm, 3-veined; distal glume 6–7 mm, 5-veined. Lemma lanceolate, 5-veined, hirsutulous, apex acute, acuminate, or with awn 1–2 mm; first lemma to 11 mm including awn. Palea slightly longer than lemma, ciliolate along keels. Fl. and fr. late summer.  $2n = 42^*$ .

- Mountain slopes. Gansu, Qinghai, W Sichuan.

**10. *Kengyilia laxistachya* L. B. Cai & D. F. Cui, Bull. Bot. Res., Harbin 15: 424. 1995.**

稀穗以礼草 *xi sui yi li cao*

Culms densely tufted, 25–55 cm tall, 2- or 3-noded. Leaf sheath glabrous; ligule ca. 0.3 mm, apex truncate; leaf blade usually involute, 5–8 cm, glabrous or adaxial surface puberulent. Spike erect or slightly curved, 5–7 × ca. 0.5 cm; rachis slender, puberulent on back; internodes 6–9 mm. Spikelets 10–12 mm, with 3–5 florets. Glumes broadly lanceolate or oblong,

2–4-veined, glabrous, margin membranous, apex pungent or mucronate; proximal glume 5–7 mm; distal glume 6–8 mm. Lemma oblong-lanceolate, abaxially densely villous; first lemma 7–8 mm; awn 2–3 mm. Palea slightly shorter than lemma, spinescent along keels distally, glabrous between keels, apex truncate. Anthers 2–2.5 mm. Fl. and fr. autumn.

- River banks; 2100–2700 m. Xinjiang (Heshuo, Shache).

**11. *Kengyilia tahelacana*** J. L. Yang et al., *Canad. J. Bot.* 71: 339. 1993.

黄药以礼草 huang yao yi li cao

Culms densely tufted, sometimes geniculate at base, 90–110 cm tall, 4- or 5-noded, glabrous but pubescent below spike. Leaf sheath glabrous; ligule ca. 0.4 mm, scarious-membranous, apex truncate; leaf blade flat, 15–32 × 0.5–0.8 cm, abaxial surface glabrous, adaxial surface scabrous. Spike slightly curved, 8–10 × ca. 1.5 cm; rachis puberulent throughout; internodes 4–9 mm. Spikelets green, lanceolate, 15–16 mm excluding awns, with ca. 7 florets; rachilla puberulent; internodes 1.5–2 mm. Glumes oblong, slightly oblique, subequal, 7–8 mm, herbaceous, (3–)5(or 6)-veined, white pilose, margin membranous, apex acuminate, mucronate, or with awn 1–2 mm. Lemma oblong-lanceolate, 6–9 mm, pubescent and hairy distally; callus glabrous but hairy on both sides; awn straight, 10–15 mm. Palea equaling or slightly longer than lemma, ciliolate along keels distally, puberulent between keels, apex emarginate. Anthers yellow, 2.5–3 mm. Caryopsis brown, ca. 6 mm. Fl. and fr. late summer.  $2n = 42^*$ .

- Rocky mountains; 2400–2500 m. Xinjiang.

**12. *Kengyilia zhaosuensis*** J. L. Yang et al., *Canad. J. Bot.* 71: 341. 1993.

昭苏以礼草 zhao su yi li cao

Culms densely tufted, 60–90 cm tall, ca. 2 mm in diam., 3- or 4-noded, glabrous but nodes pubescent. Leaf sheath glabrous; ligule ca. 0.5 mm, scarious-membranous, apex truncate; leaf blade flat or slightly involute, 18–20 × 0.5–0.7 cm, abaxial surface glabrous, adaxial surface scabrous. Spike erect or slightly curved, 14–20 × ca. 1 cm; rachis scabrous or hirsute; internodes 7–10 mm. Spikelets green, lanceolate, 15–17 mm excluding awns, with 6 or 7 florets; rachilla pubescent; internodes 1.5–2 mm. Glumes oblong, nearly oblique, 5-veined, glabrous, margin broadly membranous, apex acuminate, mucronate, or with awn 1–2 mm; proximal glume 9–11 mm; distal glume 10–12 mm. Lemma narrowly lanceolate, 8–10 mm excluding awn, herbaceous, densely villous, margin membranous; callus hairy; awn 2–6 mm. Palea shorter than lemma, ciliate along keels distally, apex truncate. Anthers yellowish, 3.5–4 mm. Caryopsis brown. Fl. and fr. late summer.  $2n = 42^*$ .

- Rocky mountain ravines; ca. 1800 m. Xinjiang.

**13. *Kengyilia hejingensis*** L. B. Cai & D. F. Cui, *Bull. Bot. Res.*, Harbin 15: 426. 1995 [*“hejingensi”*].

和静以礼草 he jing yi li cao

Culms erect or slightly geniculate, 60–80 cm tall, 2.5–3.5

mm in diam., 3- or 4-noded. Leaf sheath glabrous; ligule ca. 5 mm, membranous, apex truncate; leaf blade flat, 7–14 × 0.4–0.8 cm, abaxial surface glabrous or scabrous, adaxial surface white villous. Spike erect, green, dense, 8–11 × 0.6–0.8 cm; rachis margin ciliate; internodes ca. 5 mm. Spikelets 15–18 mm, with 4–6 florets. Glumes ovate-lanceolate, subequal, 8–9 mm, 4–6-veined, glabrous, margin membranous; awn 2–5 mm. Lemma lanceolate, 5–7-veined, abaxially scabrous or sparsely spinescent; first lemma 10–11 mm; awn 7–12 mm. Palea slightly shorter than lemma, ciliolate along keels, scabrous between keels. Anthers yellow, 1.4–1.8 mm. Ovary apex hirsute. Fl. and fr. autumn.

- Sloping meadows; 2200–2600 m. Xinjiang (Hejing).

**14. *Kengyilia stenachyra*** (Keng) J. L. Yang et al., *Hereditas* (Lund) 116: 27. 1992.

窄颖以礼草 zhai ying yi li cao

*Roegneria stenachyra* Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 79. 1963.

Culms erect, 60–90 cm tall, 3-noded, glabrous. Leaf sheath glabrous; leaf blade flat when fresh, soon involute on drying, 5–15 × 0.3–0.5 cm, stiff, abaxial surface glabrous, adaxial surface puberulent. Spike ca. 10 × 1 cm. Spikelets purplish stramineous, 12–15 mm excluding awns, with 4 or 5 florets. Glumes lanceolate-oblong, 4–5 mm or distal glume slightly longer, 1–3-veined, hirsutulous along veins, apex acute. Lemma laxly or distally densely hirsute; first lemma ca. 10 mm; awn 5–10 mm, scabrous. Palea shorter than lemma, ciliate along keels distally, apex emarginate or truncate. Anthers nearly black. Fl. and fr. late summer.  $2n = 42^*$ .

- Mountain slopes; ca. 3200 m. Gansu, Qinghai.

**15. *Kengyilia shawanensis*** L. B. Cai, *Guihaia* 16: 202. 1996.

沙湾以礼草 sha wan yi li cao

Culms laxly tufted, erect or slightly geniculate at base, 20–30 cm tall, 1.5–2.5 mm in diam., 3- or 4-noded. Leaf sheath glabrous; ligule very short, papery, apex truncate; leaf blade flat, 5–10 × 0.25–0.5 cm, both surfaces glabrous or adaxial surface sparsely villous, margin ciliate. Spike erect, 5–10 × 0.3–0.5 cm; rachis scabrous on back, margin spinose; internodes 6–9 mm. Spikelets green, 10–16 mm excluding awns, with 3–5 florets; rachilla puberulent. Glumes broadly lanceolate or oblong, 3–5-veined, glabrous, margin broadly membranous, apex acute or pungent; proximal glume 5.5–7.5 mm; distal glume 7–8.5 mm. Lemma lanceolate, abaxially densely pubescent; first lemma 8–9 mm; awn straight, 2–7 mm. Palea subequaling lemma, spinose along keels distally, glabrous between keels. Anthers yellow, ca. 3 mm. Fl. and fr. Jun–Jul.

- Arid mountain slopes; ca. 3000 m. Xinjiang (Shawan).

**16. *Kengyilia mutica*** (Keng) J. L. Yang et al., *Hereditas* (Lund) 116: 28. 1992.

无芒以礼草 wu mang yi li cao

*Roegneria mutica* Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 87. 1963.

Culms usually geniculate at base, 60–70 cm tall, 3-noded, puberulent below spike. Leaf sheath glabrous; leaf blade 12–19 × 0.4–0.6 cm, stiff, glabrous. Spike erect, 5–7 × ca. 0.8 cm. Spikelets greenish, ca. 12 mm, with 4 or 5 florets. Glumes oblong-ovate, 5–6 mm, 3-veined, glabrous or puberulent, apex acute; midvein prominent. Lemma densely villous, apex acute or pointed; first lemma ca. 9.5 mm. Palea equaling or slightly longer than lemma, ciliate along keels distally, apex emarginate or obtuse. Fl. and fr. late summer.  $2n = 42^*$ .

- Grasslands. Qinghai.

**17. *Kengyilia hirsuta*** (Keng) J. L. Yang et al., *Hereditas* (Lund) 116: 28. 1992.

糙毛以礼草 cao mao yi li cao

*Roegneria hirsuta* Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 84. 1963; *Agropyron kengii* Tzvelev; *Elymus kengii* (Tzvelev) Á. Löve; *Kengyilia hirsuta* var. *obviaristata* L. B. Cai; *K. hirsuta* var. *variabilis* (Keng) L. B. Cai; *K. obviaristata* (L. B. Cai) L. B. Cai; *R. hirsuta* var. *leiophylla* Keng & S. L. Chen; *R. hirsuta* var. *variabilis* Keng.

Culms densely tufted, erect or decumbent, 40–70(–150) cm tall, rigid, 2- or 3-noded, pubescent only below spike. Leaf sheath glabrous or villous at base; leaf blade flat or margin involute, stiff, usually both surfaces glabrous or adaxial surface pilose or abaxial surface densely puberulent, margin ciliate. Spike (3–)6–8 × 0.7–1 cm. Spikelets densely imbricate, greenish or purplish, 10–15 mm excluding awns, with 3–7 florets. Glumes greenish, ovate-oblong, 3- or 4-veined, glabrous, or scabrous along midvein distally, apex acuminate or pointed; proximal glume 4.5–6 mm; distal glume 5–7 mm. Lemma yellowish brown, hirsute; first lemma 8–10 mm; awn erect or slightly reflexed, (1–)2–6 mm. Palea slightly shorter than or equaling lemma, hirsute-ciliate along keels, apex emarginate or 2-lobed. Anthers dark green. Fl. and fr. Aug–Sep.  $2n = 42^*$ .

- Mountain steppes, river banks. Gansu, Qinghai, Xinjiang.

**18. *Kengyilia alata*** (Drobow) J. L. Yang et al., *Canad. J. Bot.* 71: 343. 1993.

毛稃以礼草 mao fu yi li cao

Culms densely tufted, erect or geniculate at base, 25–70 cm tall, smooth and glabrous, puberulent at nodes, or densely retrorsely hairy throughout. Leaf sheath smooth and glabrous or densely pubescent; leaf blade glaucous, 5–10 × 0.3–0.5 cm, abaxial surface smooth and glabrous or pubescent, adaxial surface scabrous (together with margin) or puberulent. Spike erect, dense, 5–8 × 0.8–1.1 cm; rachis puberulent to densely pubescent, margin scabrous or hispidulous. Spikelets green or purplish green, 10–16 × 5–7 mm, with 3–6 florets. Glumes lanceolate, 7–11 × ca. 2.5 mm, 5-veined, glabrous, or scabrous distally, margin broadly membranous. Lemma lanceolate, 8–9 mm, densely hispidulous or pubescent; awn 2–5 mm. Palea equaling or slightly longer than lemma, ciliate along keels distally. Lodicules shortly broadly triangular or long narrowly triangular. Anthers yellow, 2–3 mm. Fl. and fr. Jun–Sep.

Meadows on mountain slopes, dry steppes; 1500–3000 m. Gansu, Xinjiang, Xizang [Mongolia, Russia].

- 1a. Culms smooth and glabrous or nodes puberulent; leaf sheath smooth, glabrous, leaf blade abaxial surface smooth, glabrous; lodicules shortly broadly triangular ..... 18a. var. *alata*
- 1b. Culms densely retrorsely hairy throughout; leaf sheath densely pubescent, leaf blade abaxial surface pubescent; lodicules long narrowly triangular ..... 18b. var. *longiglumis*

**18a. *Kengyilia alata* var. *alata***

毛稃以礼草(原变种) mao fu yi li cao (yuan bian zhong)

*Agropyron alata* Drobow, *Repert. Spec. Nov. Regni Veg.* 21: 43. 1925; *Elymus alata* (Drobow) Á. Löve; *Elytrigia alata* (Drobow) Nevski.

Culms smooth and glabrous or nodes puberulent. Leaf sheath smooth, glabrous; leaf blade abaxial surface smooth, glabrous, adaxial surface and margin scabrous. Lodicules shortly broadly triangular.

Meadows on mountain slopes; 1500–3000 m. Xinjiang, Xizang [Mongolia, Russia].

**18b. *Kengyilia alata* var. *longiglumis*** (Keng) C. Yen et al., *Novon* 8: 94. 1998.

长颖以礼草 chang ying yi li cao

*Roegneria longiglumis* Keng, *Acta Univ. Nankin. Sci. Nat.* 1963(1): 83. 1963; *Kengyilia longiglumis* (Keng) J. L. Yang et al.

Culms densely retrorsely hairy throughout. Leaf sheath densely pubescent; leaf blade abaxial surface pubescent, adaxial surface puberulent. Lodicules long narrowly triangular.  $2n = 42^*$ .

- Dry steppes; ca. 2500 m. Gansu.

**19. *Kengyilia kaschgarica*** (D. F. Cui) L. B. Cai, *Novon* 6: 142. 1996.

喀什以礼草 ka shi yi li cao

*Elymus kaschgaricus* D. F. Cui, *Bull. Bot. Res.*, Harbin 10(3): 27. 1990; *Roegneria kaschgarica* (D. F. Cui) Y. H. Wu.

Culms densely tufted, 25–35 cm tall, ca. 2 mm in diam., 2- or 3-noded, glabrous but puberulent below spike. Leaf sheath of lower leaves usually densely retrorsely pubescent, of upper leaves glabrous; leaf blade usually involute, 6–15 × 0.15–0.2 cm, abaxial surface glabrous, smooth or scabrous, adaxial surface villous and scabrous; ligule ca. 0.5 mm, membranous, apex truncate. Spike erect, dense, 3–8 × 0.5–0.7 cm; rachis densely pubescent; internodes 4–5 mm or ca. 8 mm at base of spike. Spikelets 9–11 mm, with 3–5 florets; rachilla densely pubescent; internodes 1–1.5 mm. Glumes ovate-oblong, 3–5-veined, strongly ciliate along veins, margin broadly membranous; proximal glume 5–7 mm excluding awn; distal glume 6–8 mm excluding awn. Lemma oblong, densely pubescent; first lemma 7–9 mm; callus pilose on both sides; awn recurved, 7–11 mm.

Palea slightly shorter than lemma, ciliate along keels. Anthers ca. 1.5 mm. Fl. and fr. Jul–Sep.

- Cold alpine meadows; 2800–3800 m. Xinjiang.

**20. *Kengyilia thoroldiana*** (Oliver) J. L. Yang et al., *Hereditas* (Lund) 116: 27. 1992.

梭罗以礼草 suo luo yi li cao

Culms densely tufted, 12–15 cm tall, 1- or 2-noded, glabrous. Leaf sheath glabrous; leaf blade involute, 2–5(–8) × 0.2–0.35 cm, abaxial surface glabrous, adaxial surface and margin scabrous. Spike ovate or oblong-ovate, dense or moderately lax, 3–7.5 × 1–1.5 cm excluding awns; rachis glabrous. Spikelets 10–13 mm, with 4–6 florets. Glumes oblong-lanceolate, villous or only scabrous along midvein, apex acute, acuminate, or pointed; proximal glume 5–6 mm, 3(or 4)-veined; distal glume 6–7 mm, 5-veined. Lemma 5-veined, densely pubescent; first lemma 7–8 mm; awn 1–7 mm. Palea slightly shorter than lemma, long ciliate along keels distally, apex emarginate or 2-lobed. Anthers black. Fl. and fr. late summer.

Mountain slopes, valleys, river and lake banks; 4700–5100 m. Gansu, Qinghai, Xinjiang, Xizang [India (Sikkim)].

- 1a. Glumes villous; lemma awn 1–2.5 mm; spike dense, 3–4 cm excluding awns ..... 20a. var. *thoroldiana*
- 1b. Glumes only scabrous along midvein; lemma awn 5–7 mm; spike moderately lax, 5–7.5 cm excluding awns ..... 20b. var. *laxiuscula*

**20a. *Kengyilia thoroldiana* var. *thoroldiana***

梭罗以礼草(原变种) suo luo yi li cao (yuan bian zhong)

*Agropyron thoroldianum* Oliver in Hooker's Icon. Pl. 23: t. 2262. 1893; *Elymus thoroldianus* (Oliver) G. Singh; *Roegneria thoroldiana* (Oliver) Keng.

Spike 3–4 cm excluding awns. Glumes villous. Lemma awn 1–2.5 mm. Fl. and fr. late summer.

Mountain slopes, valleys, river banks; 4700–5100 m. Gansu, Qinghai, Xizang [India (Sikkim)].

**20b. *Kengyilia thoroldiana* var. *laxiuscula*** (Melderis) S. L. Chen, *Novon* 7: 229. 1997.

疏穗梭罗以礼草 shu sui suo luo yi li cao

*Agropyron thoroldianum* var. *laxiusculum* Melderis in Bor, Grasses Burma, Ceylon, India, Pakistan, 696. 1960; *Elymus thoroldianus* subsp. *laxiusculus* (Melderis) Á. Löve; *E. thoroldianus* var. *laxiusculus* (Melderis) G. Singh; *Kengyilia grandiglumis* (Keng) J. L. Yang et al. var. *laxiuscula* (Melderis) L. B. Cai; *K. laxiuscula* (Melderis) Tzvelev; *Roegneria thoroldiana* var. *laxiuscula* (Melderis) H. L. Yang.

Spike 5–7.5 cm excluding awns. Glumes only scabrous along midvein. Lemma awn 5–7 mm. Fl. and fr. late summer.

- Lake banks; ca. 4700 m. Xizang.

**21. *Kengyilia batalinii*** (Krasnov) J. L. Yang et al., *Canad. J.*

*Bot.* 71: 343. 1993.

巴塔以礼草 ba ta yi li cao

Culms densely tufted, erect or geniculate at base, 12–40 cm tall, glabrous or puberulent below spike. Leaf sheath glabrous, pubescent or densely so, or ciliate at margin; ligule short; leaf blade flat or involute, ca. 0.4 cm wide, abaxial surface glabrous or pubescent, adaxial surface softly hairy. Spike dense, 2.5–7 × 0.6–1 cm; rachis glabrous, puberulent, or densely villous; internodes 2–5 mm. Spikelets green or purplish green, 8–14 mm, with 3–6 florets, softly pale hairy. Glumes oblong-ovate or ovate-lanceolate, 4–7 mm, herbaceous, 3–5-veined, white hirsute or softly hairy, ciliate along veins, margin broadly membranous, apex acute or with awn 2–4 mm. Lemma ovate or broadly lanceolate, 6–8 mm, densely hirsute or softly long hairy; awn slightly curved, 8.5–13 mm. Palea lanceolate, subequaling lemma, ciliolate along keels distally, apex truncate or emarginate. Anthers yellow or purple, 2.5–4 mm. Fl. and fr. Jun–Sep.

Mountain slope grasslands, alpine steppes; 2100–4200 m. Xinjiang, Xizang [Mongolia, Russia].

- 1a. Culms 20–40 cm tall; leaf sheath glabrous, rarely pubescent or margin ciliate; spike rachis glabrous or puberulent; anthers yellow, ca. 4 mm ..... 21a. var. *batalinii*
- 1b. Culms 12–25(–35) cm tall; leaf sheath densely pubescent; spike rachis densely villous; anthers purple, 2.5–2.7 mm ..... 21b. var. *nana*

**21a. *Kengyilia batalinii* var. *batalinii***

巴塔以礼草(原变种) ba ta yi li cao (yuan bian zhong)

*Triticum batalinii* Krasnov, *Bot. Zap.* 2: 21. 1887–1888 [“*batalini*”]; *Agropyron argenteum* (Nevski) Pavlov; *A. batalinii* (Krasnov) Roshevitz; *Elymus batalinii* (Krasnov) Á. Löve; *Elytrigia argentea* Nevski; *E. batalinii* (Krasnov) Nevski.

Culms 20–40 cm tall. Leaf sheath glabrous, rarely pubescent or margin ciliate. Spike rachis glabrous or puberulent. Anthers yellow, ca. 4 mm. Fl. and fr. Jun–Sep.  $2n = 42$ .

Mountain slope grasslands; 2100–3500 m. Xinjiang (Kunlun Shan, Tian Shan), Xizang [Mongolia, Russia].

**21b. *Kengyilia batalinii* var. *nana*** (J. L. Yang et al.) C. Yen et al., *Novon* 8: 95. 1998.

矮生以礼草 ai sheng yi li cao

*Kengyilia nana* J. L. Yang et al., *Canad. J. Bot.* 71: 341. 1993.

Culms 12–25(–35) cm tall. Leaf sheath densely pubescent. Spike rachis densely villous. Anthers purple, 2.5–2.7 mm. Fl. and fr. late summer.  $2n = 42^*$ .

- Alpine steppes; ca. 4200 m. Xinjiang.

**22. *Kengyilia guidenensis*** C. Yen et al., *Novon* 5: 395. 1995.

贵德以礼草 gui de yi li cao

Culms densely tufted, erect, 35–50 cm tall, ca. 1.5 mm in diam., 2- or 3-noded, pubescent just below spike. Leaf sheath glabrous, rarely pubescent on lowermost leaves; ligule ca. 0.5 mm, scarious-membranous, apex truncate; leaf blade narrowly lanceolate, flat or slightly involute, 8.5–9 × ca. 0.3 cm, abaxial surface glabrous, adaxial surface densely white hairy, hairs ca. 1 mm. Spike erect, ovate, 3–3.5 × ca. 0.5 cm; rachis densely white pilose; internodes 1.5–2 mm. Spikelets greenish purple, oblong-ovate, ca. 7 mm excluding awns, with 5–7 florets; rachilla densely hirsutulous; internodes 1–1.2 mm. Glumes broadly lanceolate, unequal, 1(–3)-veined, densely white hirsute, margin herbaceous-membranous, apex acuminate or mucronate; proximal glume 3–5 mm; distal glume 4–7 mm. Lemma ovate, 7–9 mm excluding awn, densely white hairy, hairs ca. 1 mm; first lemma ca. 7 mm; callus with hairs ca. 0.8 mm; awn 1.5–4 mm. Palea equaling lemma, ciliate along keels, densely hirsute between keels, apex emarginate. Lodicules triangular. Anthers yellow, ca. 3 mm. Caryopsis brown, ca. 5 mm. Fl. and fr. autumn.

• Stony slopes, between broken granite rocks; ca. 3100 m. Qinghai (Guide).

**23. *Kengyilia kokonorica*** (Keng) J. L. Yang et al., *Hereditas* (Lund) 116: 27. 1992.

青海以礼草 qing hai yi li cao

*Roegneria kokonorica* Keng, *Acta Univ. Nankin. Sci. Nat.*

1963(1): 88. 1963; *Elymus kokonoricus* (Keng) Á. Löve ex D. F. Cui.

Culms solitary or tufted, 30–50 cm tall, 2- or 3-noded, puberulent below spike. Leaf sheath glabrous; leaf blade rolled, 2–15(–18) × 0.2–0.5 cm, glabrous. Spike dense, 3–6 × 0.7–0.8 cm. Spikelets green or tinged purplish, 8–10 mm, with 3 or 4(–6) florets. Glumes green abaxially, lanceolate-ovate, 3–4 mm excluding awn, 1–3-veined, densely hirsute, margin membranous; midvein somewhat prominent; awn 2–3 mm. Lemma densely hirsute; first lemma ca. 6 mm; awn 4–6 mm, scabrous. Palea equaling lemma, ciliate along keels. Anthers yellowish black, 2–2.2 mm. Ovary apex puberulent. Fl. and fr. late summer.  $2n = 42^*$ .

• Dry steppes. Gansu, Ningxia, Qinghai, Xinjiang, Xizang.

**24. *Kengyilia pamirica*** J. L. Yang & C. Yen, *J. Sichuan Agric. Univ.* 10: 566. 1992.

帕米尔以礼草 pa mi er yi li cao

Culms densely tufted, 60–70 cm tall, 1.2–2 mm in diam., 2- or 3-noded, glabrous but pubescent just below spike. Leaf sheath glabrous; ligule ca. 0.5 mm, hyaline-membranous, apex truncate; leaf blade involute, 9–10(–15) × 0.2–0.7 cm, abaxial surface glabrous, adaxial surface densely villous along lateral veins, or both surfaces villous on surculose leaves. Spike lanceolate to obovate, 8–10 × 0.8–1.2 cm; rachis densely villous; internodes 2–7 mm. Spikelets purple, 12–16 mm excluding awns, with 5–8 florets; rachilla densely pubescent; internodes 0.5–2 mm. Glumes oblong, equal or subequal, 6–7(–9) mm, 3–5-veined, densely hirsute, apex acute, mucronate, or with awn 1–2 mm. Lemma ovate, 7–9 mm, densely villous; callus with hairs ca. 0.8 mm laterally, 0.2–0.5 mm elsewhere; awn erect, 10–15 mm, scabrous. Palea subequaling lemma, sparsely ciliate along keels distally, puberulent or scabrous between keels, apex emarginate or truncate. Anthers yellow to purple, ca. 3 mm. Caryopsis brown, ca. 6 mm. Fl. and fr. late summer.  $2n = 42^*$ .

• Steppes; ca. 2800 m. Xinjiang.

