

56. MELICA Linnaeus, Sp. Pl. 1: 66. 1753.臭草属 *chou cao shu*

Perennial, tufted or rhizomatous. Culms erect or ascending. Leaf sheaths with fused margins; leaf blades linear; ligule membranous, often cylindrical and then sometimes with lobe on side opposite blade. Panicle spreading or more often contracted, sometimes scanty or racemelike; pedicels drooping, pubescent below spikelet. Spikelets weakly laterally compressed, composed of 1–3 lower fertile florets and a few upper reduced florets, these often compressed into a terminal cluster of rudimentary scales, disarticulating below lowest floret, tardily between florets, or spikelet falling entire; glumes well developed, broadly lanceolate or ovate, often not keeled, membranous or papery, equal or lower glume shorter, 1–5-veined, apex obtuse or acute; floret callus small, glabrous, obtuse; lemmas broadly lanceolate or ovate, usually herbaceous, sometimes largely membranous, back rounded, smooth, scabrid or hairy; 5–9(–13)-veined, apex membranous, obtuse, acute, or shallowly 2-lobed; palea usually shorter than lemma, or as long as lemma in upper florets, keels scabrid or ciliate. Stamens 3. $x = 9$.

About 90 species: temperate and subtropical regions of the world, except Australia; 23 species (eight endemic) in China.

- 1a. Lowest lemma conspicuously long-hairy from base to apex, on marginal or all veins, hairs 2–5 mm.
 - 2a. Lemmas long-pilose on all veins 1. *M. persica*
 - 2b. Lemmas long-ciliate on marginal veins only.
 - 3a. Panicle rather lax, often 1-sided, central axis usually visible; all leaf sheaths antrorsely scaberulous; leaf blades rolled; lower glume 2/3–4/5 length of upper 2. *M. ciliata*
 - 3b. Panicle dense, cylindrical, central axis not visible; lowermost leaf sheaths retrorsely scabrid or pubescent; leaf blades flat; lower glume 1/2–2/3 length of upper 3. *M. transsilvanica*
- 1b. Lowest lemma glabrous or with short scattered hairs.
 - 4a. Spikelets terminating in 1 sterile lemma, resembling the fertile lemmas but smaller; panicle branches up to 15 cm, often spreading, branchlets present.
 - 5a. Lowest lemma 6–9 mm; leaf sheaths harshly scabrid 4. *M. scaberrima*
 - 5b. Lowest lemma 4–6.5 mm; leaf sheaths smooth, scabrid or pubescent.
 - 6a. Plants with slender rhizomes; panicle narrow, branches erect or ascending.
 - 7a. Ligule 3–5 mm; leaf blades 2–2.5 mm wide; anthers ca. 2 mm 7. *M. longiligulata*
 - 7b. Ligule 0.3 mm or shorter; leaf blades 2–6 mm wide; anthers 0.5–1 mm 8. *M. przewalskyi*
 - 6b. Plants lacking slender rhizomes; panicle broad at maturity, branches spreading.
 - 8a. Culms up to 150 cm tall; leaf blades 6–14 mm wide; ligule 0.2–0.5 mm 5. *M. onoei*
 - 8b. Culms up to 80 cm tall (if taller, ligule 1–4 mm); leaf blades 2–6 mm wide.
 - 9a. Panicle with many branches and spikelets; spikelets with purple glumes and green florets; fertile florets 2 or 3 6. *M. schuetzeana*
 - 9b. Panicle with distant divaricate branches and widely spaced spikelets; spikelets green or gray-green; fertile florets 1 or 2.
 - 10a. Glumes hyaline, shining, upper glume 6–8 mm; pedicels up to 20 mm; anthers 1.8–2 mm 9. *M. yajiangensis*
 - 10b. Glumes not conspicuously hyaline and shining, upper glume 5–6 mm; pedicels 3–5 mm; anthers 1–1.25 mm 10. *M. taylorii*
 - 4b. Spikelets terminating in a globular cluster of rudimentary lemmas; panicle branches usually less than 5 cm, erect, unbranched or almost so, panicle sometimes racemelike (rarely branches longer or branchlets present).
 - 11a. Panicle racemelike, unbranched; spikelets few (3–15), borne directly on main axis.
 - 12a. Spikelets 5–8 mm; glumes purplish red; panicle eventually nodding 11. *M. nutans*
 - 12b. Spikelets 7–10 mm; glumes usually green; panicle erect.
 - 13a. Glumes subequal, ovate, obtuse 12. *M. grandiflora*
 - 13b. Glumes unequal, lanceolate, acute 13. *M. pappiana*
 - 11b. Panicle branched; spikelets more than 15, borne on panicle branches.
 - 14a. Culms up to 1.5 m tall; spikelets 8–14 mm; glumes obviously 5–7-veined.
 - 15a. Panicle open, ovate, branches spreading; lemmas hispid below middle 14. *M. turczaninowiana*
 - 15b. Panicle dense, linear-oblong, branches erect; lemmas glabrous 15. *M. altissima*
 - 14b. Culms less than 1 m tall; spikelets 3.5–8(–11) mm; glumes with short inconspicuous lateral veins.
 - 16a. Glumes unequal, much shorter than florets; lower glume ca. 1/2 length of adjacent lemma ... 16. *M. virgata*
 - 16b. Glumes subequal, large; lower glume slightly shorter to longer than adjacent lemma.
 - 17a. Lemma apex obtuse or acute.
 - 18a. Panicle with many crowded spikelets, 20–50 on lower branches (including branchlets); leaf blades flat, 2–7 mm wide 17. *M. scabrosa*
 - 18b. Panicle with few spikelets, 1–6 on lower branches (branchlets absent); leaf

- blades usually rolled, 1–3 mm wide.
- 19a. Plant tufted; ligules ca. 0.5 mm; lemmas coarsely tubercular-scabrid 18. *M. radula*
- 19b. Plant rhizomatous; ligule 2–5 mm; lemmas scaberulous 19. *M. secunda*
- 17b. Lemma apex very broad, denticulate-erose, usually 2-lobed or emarginate.
- 20a. Panicle lax; ligules with ca. 3 mm lobe on side opposite blade; anthers 1.2–2.2 mm 20. *M. kozlovii*
- 20b. Panicle very dense; ligules without lobe on side opposite blade; anthers 0.6–1 mm.
- 21a. Spikelets silvery green; lemmas narrowly membranous at apex; ligule abaxially glabrous 21. *M. tangutorum*
- 21b. Spikelets purple or yellow; lemmas membranous and slightly enlarged in upper 1/3; ligule abaxially pubescent.
- 22a. Panicle purple; spikelets 5–8 mm; ligules 0.8–1.5 mm 22. *M. tibetica*
- 22b. Panicle yellow; spikelets 8–11 mm; ligules 2–4 mm 23. *M. subflava*

1. *Melica persica* Kunth, Révis. Gramin. 1: 351. 1829.

伊朗臭草 yi lang chou cao

Perennial, forming dense tussocks, with wiry rhizomes. Culms 15–50 cm tall, ca. 1 mm in diam. Leaf sheaths glabrous, scabrid or retrorsely pubescent; leaf blades flat or rolled, 5–15 cm × 1–3 mm, glabrous to densely pubescent on one or both surfaces; ligule 0.5–5 mm. Panicle spikeletlike, 5–12 cm, lax and 1-sided to densely cylindrical. Spikelets gaping, 5–11 mm, pallid or purplish, fertile florets 1 or 2, terminal sterile lemmas gathered into globular cluster; lower glume broadly lanceolate, 1/3–3/4 length of upper, 3-veined, upper glume lanceolate, as long as spikelet, 5-veined, both acute; lemmas elliptic, lowest 4–7.5 mm, granular-scabrous, 7–9-veined, densely hairy with 3–5 mm hairs along all veins, apex acute or 2-toothed, second lemma (when present) shorter, glabrous; palea keels shortly ciliate. Anthers 1–1.8 mm. Fl. and fr. May–Aug. $2n = 18$.

Grassy hillsides. Gansu, Jilin, Sichuan, W Xizang [Afghanistan, NW India, Kashmir, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; NE Africa (Egypt), SW Asia].

Melica persica s.l. comprises a perplexing complex of forms, extending from the E Mediterranean through C Asia. Variable characters include hairiness of the leaf sheaths and blades, angle of the leaf blades, panicle density, spikelet length and color, and the relative length of the glumes. A particularly hairy variant, present in Xizang, is recognized at subspecific rank here. The other Chinese records are based on plants described as having sparsely pubescent lemmas with ca. 1 mm hairs. This is atypical for *M. persica* s.s. and is also a big extension eastward from its known range. It has not been possible to confirm their identity.

- 1a. Leaf sheaths and blades glabrous to pubescent; spikelets 5–11 mm 1a. subsp. *persica*
- 1b. Leaf sheaths and blades densely pubescent; spikelets 6–8 mm, crowded 1b. subsp. *canescens*

1a. *Melica persica* subsp. *persica* s.l.

伊朗臭草(原亚种) yi lang chou cao (yuan ya zhong)

Melica inaequiglumis Boissier; *M. jacquemontii* Decaisne; *M. vestita* Boissier.

Leaf sheaths and blades glabrous to pubescent; spikelets 5–11 mm.

Grassland on stony hillsides. Gansu (Wudu), Jilin (Changbai Shan), Sichuan (Baishui) [Afghanistan, NW India, Kyrgyzstan, Paki-

stan, Tajikistan, Turkmenistan, Uzbekistan; NE Africa (Egypt), SW Asia].

The presence of *Melica persica* in China, apart from subsp. *canescens*, has not been confirmed (see the comment under the species).

1b. *Melica persica* subsp. *canescens* (Regel) P. H. Davis, Fl. Turkey 9: 534. 1985.

毛鞘臭草 mao qiao chou cao

Melica cupani Gussoni var. *canescens* Regel, Descr. Pl. Nov. Rar. 8: 88. 1880; *M. canescens* (Regel) Lavrenko ex Nevski; *M. jacquemontii* Decaisne subsp. *canescens* (Regel) Bor.

Leaf sheaths and blades densely pubescent with retrorse hairs; spikelets 6–8 mm, crowded.

Gravel banks; ca. 3500 m. Xizang [Afghanistan, NW India, Kashmir, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan; SW Asia (Iran, E Turkey)].

2. *Melica ciliata* Linnaeus, Sp. Pl. 1: 66. 1753.

小穗臭草 xiao sui chou cao

Melica ciliata subsp. *taurica* (K. Koch) Tzvelev; *M. ciliata* var. *taurica* (K. Koch) Grisebach; *M. taurica* K. Koch.

Perennial, densely tufted, shortly rhizomatous. Culms 20–80 cm tall, 1–2 mm in diam. Leaf sheaths scabrid with upwardly directed teeth; leaf blades usually rolled, 6–10 cm × 1–4 mm, abaxial (outer) surface smooth or scabrid; ligule 1–4 mm. Panicle spikeletlike, 2.5–8 cm, dense or rather lax, strongly to indistinctly 1-sided, sometimes lobed below, main axis usually visible. Spikelets 4–8 mm, green or purplish, fertile floret 1, terminal sterile lemmas gathered into globular cluster; glumes ovate, papery, 5-veined, lower glume 3/4–4/5 length of upper, upper glume as long as spikelet, both acute; lemma lanceolate, 2.5–3.2 mm, granular-scabrous, 7–9-veined, densely ciliate along marginal veins with 2–3 mm hairs, apex acute; palea keels ciliate. Anthers 0.8–1.5 mm. Fl. May–Jul. $2n = 18$.

Grassy places in rock gullies; ca. 1500 m. Xinjiang [Kazakhstan, Russia, Turkmenistan; SW Asia (Caucasus, N Iran), Europe].

This is an extremely variable species, variants differing in the number of culm nodes, degree and position of roughness on the leaves, panicle shape and density, and spikelet color and length. This variation is often partitioned among several ill-defined subspecies. *Melica ciliata* subsp. *taurica* has been reported from Xinjiang (as *M. taurica*). This variant is distinguished by scabrid leaf sheaths, scabrid abaxial surface of leaf blades, and a rather dense, almost cylindrical panicle of many

pale green, 4–6 mm spikelets.

3. *Melica transsilvanica* Schur, Enum. Pl. Transsilv. 764. 1866, nom. cons.

德兰臭草 de lan chou cao

Melica altissima Linnaeus var. *transsilvanica* (Schur) Schur; *M. caricina* Dumont d'Urville; *M. ciliata* Linnaeus subsp. *transsilvanica* (Schur) Čelakovský; *M. ciliata* var. *transsilvanica* (Schur) Hackel.

Perennial, loosely tufted. Culms 30–100 cm tall, 2–3 mm in diam., scabrid below panicle. Leaf sheaths at base retrorsely scabrid or pubescent; leaf blades usually flat, 10–20 cm × 3–6 mm, abaxial surface scabrid, adaxial surface pubescent, midrib prominent; ligule 2–5 mm. Panicle spike-like, 5–11 cm, dense, cylindrical, sometimes lobed below, main axis hidden. Spikelets 4.5–9 mm, pallid, fertile florets 1 or 2, terminal sterile lemmas gathered into globular cluster; glumes papery, 5-veined, scabrid, lower glume ovate, 1/2–2/3 length of upper, sharply acute, upper glume lanceolate-oblong, as long as spikelet, abruptly acuminate; lemma lanceolate, 5–5.5 mm, granular-scaberulous, 7-veined, densely ciliate along marginal veins with ca. 3 mm hairs, apex subacute, second lemma (when present) shorter, glabrous. Anthers 0.6–1.2 mm; palea shorter than lemma. Fl. May–Aug. $2n = 18$.

Deciduous broad-leaved forests, hills in steppe, dry places; 800–2000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia (N Iran), Europe].

4. *Melica scaberrima* (Nees ex Steudel) J. D. Hooker, Fl. Brit. India 7: 330. 1896 [“1897”].

糙臭草 cao chou cao

Glyceria scaberrima Nees ex Steudel, Syn. Pl. Glumac. 1: 287. 1854.

Perennial. Culms 90–200 cm tall, 2–3 mm in diam., many-noded. Leaves all cauline, leaf sheaths as long as or longer than internodes, harshly retrorsely scabrid on veins, teeth sometimes elongated into short bristles; leaf blades thin, 15–25 cm × 3–7 mm, abaxial surface scabrid, adaxial surface smooth, glabrous or sparsely hispid; ligule 1–2.3 mm. Panicle open, 15–30 cm; branches 2 or 3 per node, distant, eventually divaricate, usually branched, up to 15 cm, spikelets often clustered on the branchlets. Spikelets narrowly elliptic, 10–14 mm, green, fertile florets 2 or 3, 1 or 2 similar but smaller sterile florets raised on elongate internodes; glumes unequal, clearly shorter than adjacent florets, lower glume narrowly ovate, 2.6–5.2 mm, upper glume lanceolate, 3.8–6.5 mm, both acute; lemmas narrowly lanceolate, lowest 6–9 mm, granular-scaberulous, 5–7-veined, upper margins and apex membranous, apex subacute; palea keels scabrid-ciliolate. Anthers ca. 2 mm. Fl. Jul–Aug.

Forest fringes, grassy places on mountain slopes; 2800–4000 m. Xizang, NW Yunnan (Dêqên, Zhongdian) [NW India, Kashmir, W Nepal, N Pakistan].

This is a tall species with a large panicle, only likely to be confused with *Melica onoei*, from which it can be distinguished by its narrower, thinner leaf blades, longer ligules, and spikelets with more florets, in addition to the key characters. It is a species of the W Himalayas. Specimens reported from China have not been seen.

5. *Melica onoei* Franchet & Savatier, Enum. Pl. Jap. 2: 603. 1879.

广序臭草 guang xu chou cao

Melica matsumurae Hackel; *M. kumana* Honda; *M. scaberrima* (Nees ex Steudel) J. D. Hooker var. *micrantha* J. D. Hooker.

Perennial, tufted. Culms few, 75–150 cm tall, 2–2.5 mm in diam., many-noded. Leaves all cauline; leaf sheaths much longer than internodes, scaberulous or puberulous, lower sheaths with reduced blades, often retrorsely setose; leaf blades broadly linear, 10–25 cm × 6–14 mm, abaxial surface smooth, adaxial surface hispid or pilose, often sparsely; ligule 0.2–0.5 mm. Panicle lax, 15–35 cm; branches 2 or 3 per node, ascending or spreading, branched, up to 15 cm, spikelets diffuse. Spikelets linear-lanceolate, 5–9.5 mm, green, fertile florets 1 or 2, 1 smaller sterile floret raised on ca. 2 mm internode; glumes unequal, clearly shorter than adjacent florets, lower glume narrowly ovate, 2.5–3.5 mm, upper glume lanceolate-oblong, 4–5 mm, both obtuse to acute; lemmas lanceolate-oblong, lowest 4.8–5.5 mm, herbaceous, granular-scaberulous, 7-veined, additional weaker veins sometimes present, upper margins and apex broadly membranous, apex obtuse; palea keels scaberulous near apex, otherwise smooth. Anthers 0.8–1.5 mm. Fl. and fr. May–Oct. $2n = 18$.

Woodlands, damp shady places on hillsides, gullies, roadsides; 400–2500 m. Anhui, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Kashmir, Korea, N Pakistan].

This species is mainly distributed from Japan to Yunnan, but a few gatherings are known from the W Himalayas. The combination of broad leaf blades, short ligule, narrow, green spikelets and smooth palea keels distinguishes it from other Chinese *Melica* species with a large, open panicle.

Melica onoei var. *pilosula* Papp (Acad. Romana, Mem. Sect. Sti., ser. 3, 12: 242. 1937) was described as having a simple, contracted panicle, smooth leaf sheaths, a long pilose adaxial leaf surface, and a pointed, ca. 5 mm ligule. The panicle and ligule definitely exclude it from *M. onoei*. It is based on a specimen from Beijing that has not been seen.

6. *Melica schuetzeana* W. Hempel, Feddes Repert. 83: 4. 1972.

藏东臭草 zang dong chou cao

Perennial. Culms 80–110 cm tall, 2–3 mm in diam., many-noded. Leaves all cauline; leaf sheaths usually longer than internodes, retrorsely scabrid on veins, basal sheaths purplish; leaf blades stiff, 15–30 cm × 3–6 mm, abaxial surface scabrid, adaxial surface scaberulous; ligule cylindrical, 1–4 mm, soon splitting. Panicle open, up to 35 cm; branches whorled, distant, ascending or spreading, branched, up to 12 cm, spikelets diffuse. Spikelets elliptic, 6–8 mm, glumes purple, florets pale green, fertile florets 2 or 3, 1 smaller sterile floret raised on ca. 2 mm internode; glumes unequal, clearly shorter than adjacent florets, lower glume narrowly ovate, 2.8–4 mm, upper glume lanceolate-oblong, 4.5–6.5 mm, both acute; lemmas elliptic-oblong, lowest 5–6.5 mm, herbaceous, granular-scaberulous, 5–7-veined, midvein extending to apex, apex membranous, emarginate; palea keels scabrid, ciliolate near apex. Anthers 1.1–1.8

mm. Fl. Jul–Aug.

Forest margins; 3200–3500 m. Qinghai, Sichuan, SE Xizang, Yunnan [Bhutan].

This species is similar to *Melica onoei*, but can be distinguished by its longer ligules, narrower leaf blades, broader spikelets with purple glumes, and ciliolate palea keels.

7. *Melica longiligulata* Z. L. Wu, Acta Phytotax. Sin. 30: 171. 1992.

长舌臭草 chang she chou cao

Perennial, loosely tufted, with slender rhizomes. Culms wiry, up to 60 cm tall, 0.7–1 mm in diam., 3–5-noded. Leaves all cauline, leaf sheaths purple, longer than internodes, asperulous-puberulous between veins, veins smooth; leaf blades narrowly linear, loosely rolled when dry, 8–20 cm × 2–2.5 mm, abaxial surface scaberulous, adaxial surface closely ribbed, ribs scabrid; ligule cylindrical, 3–5 mm, soon splitting into lanceolate lobes. Panicle narrow, 10–18 cm; branches 2–4 per node, suberect, branched, longest ca. 6 cm. Spikelets ovate, 5–7 mm, glumes purplish and florets pale green, fertile florets 2 or 3, 1 or 2 smaller sterile florets raised on ca. 2 mm internode; glumes unequal, shorter than adjacent florets, lower glume ovate-oblong, 3–3.7 mm, upper glume elliptic, 4–5.5 mm, both acute; lemmas narrowly lanceolate, lowest 4.3–5 mm, herbaceous, granular-scaberulous, 7-veined, upper margins and apex broadly membranous, apex obtuse; palea keels ciliolate above middle. Anthers ca. 2 mm. Fl. Jul.

- Dry mountain slopes, among shrubs; 3300–3400 m. Sichuan.

This is a delicate species, with very slender culms and narrow leaf blades. The long ligule resembles that of the more robust *Melica schuetzeana*, which has similar spikelets with purple glumes and green florets, but slightly longer spikelet parts. Both these species are known from very few gatherings.

8. *Melica przewalskyi* Roshevitz, Bot. Mater. Gerb. Glavn. Bot. Sada RSFSR 2: 25. 1921.

甘肃臭草 gan su chou cao

Melica polyantha Keng.

Perennial, loosely tufted, with slender rhizomes. Culms 40–90 cm tall, 1.5–2 mm in diam., scabrid below panicle, several-noded. Leaves all cauline; leaf sheaths densely pubescent at base, scaberulous upward; leaf blades flat or loosely involute when dry, 8–22 cm × 2–6 mm, abaxial surface scabrid, adaxial surface puberulous, sometimes sparsely pilose; ligule ca. 0.3 mm or almost absent. Panicle narrow, 12–30 cm; branches 2–4 per node, erect or ascending, longest 6–15 cm. Spikelets linear-lanceolate, 5–9(–11) mm, usually purple tinged, fertile florets 2–3(–4), 1 very small sterile floret raised on 2–3 mm internode; glumes membranous, lower glume 2–3.5 mm, upper glume 3–5 mm, both acute; lemmas lanceolate, lowest 4–6 mm, minutely scaberulous upward, apex membranous, obtuse; palea keels scabrid to ciliolate. Anthers 0.5–1 mm. Fl. Jun–Aug.

- Rocky slopes, moist ground, roadsides; 2300–4200 m. Gansu, Guizhou, Hubei, Ningxia, Qinghai, Shaanxi, Sichuan, Xizang.

9. *Melica yajiangensis* Z. L. Wu, Acta Phytotax. Sin. 30: 172. 1992.

雅江臭草 ya jiang chou cao

Perennial, loosely tufted. Culms 55–75 cm tall, 1–2 mm in diam., 4–5-noded. Lower leaf sheaths pilose, longer than internodes, upper sheaths glabrous, shorter than internodes; leaf blades narrowly linear, up to 27 cm × 2–3 mm, abaxial surface smooth, adaxial surface ribbed, ribs scaberulous; ligule 0.3–0.5 mm. Panicle open, 15–25 cm; branches 2 per node, horizontally spreading, very fine, unbranched, up to 12 cm, bearing relatively few distant spikelets; pedicels setaceous, up to 20 mm. Spikelets 5–8 mm, gray-green, fertile floret 1, 1 smaller sterile floret raised on 2–3 mm densely scabrid internode; glumes subequal, narrowly lanceolate, as long as or longer than florets, hyaline, lower glume 5–7 mm, upper glume 6–8 mm, both acuminate; lemmas lanceolate-oblong, lowest 4–5 mm, herbaceous, granular-scaberulous, 7-veined, upper margins and apex narrowly membranous, apex acute; palea as long as or slightly shorter than lemma, keels scabrid, ciliolate near apex. Anthers 1.8–2 mm. Fl. Aug–Sep.

- Mountain slopes; ca. 2700 m. Sichuan.

This species is apparently known only from the type. The panicle with paired, divaricate branches resembles that of *Melica taylorii*, but the glistening, long-glumed spikelets on long, very fine pedicels are distinctive.

10. *Melica taylorii* W. Hempel, Feddes Repert. 83: 2. 1972 [“*taylori*”].

高山臭草 gao shan chou cao

Perennial, tufted; roots woolly. Culms 55–80 cm tall, 0.5–2 mm in diam., 4–5-noded. Leaf sheaths longer than internodes, basal sheaths membranous, short, bladeless, retrorsely scabrid-pubescent on veins, upper sheaths smooth, glabrous, pilose at collar; leaf blades thin, 10–18 cm × 3–6 mm, abaxial surface scaberulous, adaxial surface slightly scaberulous; ligule 1–1.5 mm. Panicle open, ca. 14 cm; branches 2 per node, finally horizontally spreading, slender, not or scarcely branched, bearing relatively few distant spikelets; pedicels 3–5 mm. Spikelets 5–7.5 mm, greenish brown, fertile florets 1 or 2, 1 smaller sterile floret raised on 2–2.5 mm, scabrid internode; glumes unequal, shorter than adjacent floret, narrowly lanceolate, lower glume 3.8–5.8 mm, upper glume 5–6 mm, both acute; lemmas narrowly lanceolate-oblong, purple tinged, lowest 5–6 mm, herbaceous, granular-scaberulous, 5–7-veined, upper margins and apex narrowly membranous, apex subacute; palea keels ciliolate. Anthers 1–1.25 mm. Fl. Jul–Sep.

- Mountain slopes, in *Picea* or *Quercus* forests; 4000–4500 m. Xizang.

11. *Melica nutans* Linnaeus, Sp. Pl. 1: 66. 1753.

俯垂臭草 fu chui chou cao

Perennial, with slender creeping rhizomes. Culms scattered, 25–970 cm tall, 1–2 mm in diam. Leaf sheaths keeled, very narrowly winged, wing margin and sometimes veins scabrid, glabrous or sparsely pubescent at junction with blade, lower sheaths purplish; leaf blades flat, thin, 10–26 cm × 2–5 mm, abaxial surface smooth, adaxial surface puberulous, some-

times sparsely pilose, transverse veinlets present; ligule ca. 0.3 mm or almost absent. Panicle lax, 4–15 cm, racemelike, 1-sided, eventually nodding; spikelets 5–15, mostly borne in pairs or singly directly on main axis, lowest branch sometimes bearing 2 or 3 spikelets. Spikelets obovate, 5–8 mm, glumes purple, florets green, fertile florets 2(or 3), terminal sterile lemmas gathered into globular cluster; glumes broadly ovate, subequal, 4–6 mm, margins broadly membranous, 3–7-veined, both obtuse; lemmas broadly elliptic, lowest 5–7 mm, leathery, 7–9-veined, additional intermediate veins in lower part, scaberulous or puberulous, apex obtuse; palea keels ciliolate. Anthers 1–1.5 mm. Fl. May–Jul. $2n = 18$.

Hill slopes, shady places; 1500–2300 m. Heilongjiang, Xinjiang [Japan, Kashmir, Kazakhstan, Korea, Kyrgyzstan, Russia, Tajikistan, Uzbekistan; SW Asia (Caucasus), Europe].

12. *Melica grandiflora* Koidzumi, Bot. Mag. (Tokyo) 39: 17. 1925.

大花臭草 da hua chou cao

Melica komarovii Luchnik; *M. nutans* subsp. *grandiflora* (Koidzumi) T. Koyama; *M. nutans* var. *argyrolepis* Komarov.

Perennial, with slender creeping rhizomes. Culms 20–60 cm, 1–2 mm in diam. Leaf sheaths keeled, keel broadly winged, wing margin scabrid, otherwise smooth, glabrous or pubescent at junction with blade, lower sheaths purplish; leaf blades flat, thin, 6–15 cm × 2–5 mm, abaxial surface smooth, adaxial surface puberulent or scaberulous, transverse veinlets present; ligule 0.2–0.7 mm. Panicle lax, 3–10 cm, racemelike, 1-sided, erect (not nodding); spikelets 3–12, mostly borne in pairs or singly directly on main axis, lowest branch sometimes bearing 2 or 3 spikelets. Spikelets ovate, 7–10 mm, pale green or infrequently glumes pale purplish, fertile florets 2(or 3), terminal sterile lemmas gathered into globular cluster; glumes subequal, ovate, margins broadly membranous, lower glume 4–6 mm, 3–7-veined, upper glume 5–7 mm, 5–7-veined, both obtuse; lemmas lanceolate-oblong, lowest 6–10 mm, leathery, prominently 7–9-veined, additional intermediate veins in lower half, scaberulous or puberulous, apex obtuse; palea keels ciliolate. Anthers 1.2–1.7 mm. Fl. and fr. Apr–Jul.

Mountain slopes, forests, among shrubs, grassy roadsides, damp places; 500–3200 m. Anhui, Heilongjiang, Henan, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shandong, Shanxi, Zhejiang [Japan, Korea].

The name *Melica komarovii* has been applied to a form with a more than usually densely pubescent leaf sheath/blade junction.

13. *Melica pappiana* Hempel, Analele Ști. Univ. “Al. I. Cuza” Iași, Ser. Nouă, 2.a. 17(2): 380. 1971.

北臭草 bei chou cao

Melica uniflora Retzius f. *glabra* Papp, Acad. Romana, Mem. Sect. Sti., ser. 3, 12: 251. 1937.

Plants tufted. Culms slender, basal internodes swollen, 40–60 cm tall. Leaf sheaths glabrous; leaf blades flat, 4–15 cm × 1–3 mm, glabrous or adaxial surface pubescent, transverse veinlets present; ligule 0.5–1.5 mm. Panicle racemelike, 5–6 cm, erect; spikelets 3–4; pedicels 0.4–1.5 cm, scabrid. Spikelets ca.

7 mm, glumes purplish red, florets green, fertile florets 2, terminal sterile lemmas gathered into clavate cluster; glumes unequal, lanceolate, lower glume 4.5–5.5 mm, upper glume 6.5–7.5 mm, 5-veined, acute; lemmas ovate-lanceolate, lowest ca. 6.5 mm, 7-veined; palea keels ciliolate. Fr. Jul.

• Open *Larix* forests, grassy mountain slopes; 500–2000 m. Jilin (Changbai Shan), Shanxi (Ningwu).

This little-known species is based on an over-mature specimen in which the florets have been shed. It appears close to *Melica grandiflora*, but is excluded from that species by the unequal, acute glumes. The type has not been seen, but is reported to have swollen basal internodes, which are not otherwise found in E Asian *Melica* species. A second gathering cited in the protologue is a specimen of *M. turczaninowiana*.

14. *Melica turczaninowiana* Ohwi, Acta Phytotax. Geobot. 1: 142. 1932.

大臭草 da chou cao

Melica gmelinii Turczaninow ex Trinius, Mém. Acad. Imp. Sci. St.-Petersbourg, Sér. 6, Sci. Math. 1: 368. 1831, not Roth (1789).

Perennial, tufted. Culms 40–130 cm tall, ca. 1.5 mm in diam. Leaf sheaths glabrous, lower sheaths tinged purplish brown; leaf blades flat, 6–18 cm × 3–7 mm, abaxial surface strongly scabrid on veins, adaxial surface shortly pilose; ligule 2–4 mm. Panicle open, ovate in outline, 10–20 cm; branches 2–3 per node, flexuously ascending or spreading, up to 9 cm, unbranched, spikelets spaced on 3–7 mm pedicels. Spikelets broadly elliptic, 8–13 mm, fertile florets 2 or 3, terminal sterile lemmas gathered into elongate cluster; glumes brownish purple or blackish, elliptic-oblong, subequal, 8–11 mm, papery, 5–7-veined with connecting veinlets, both obtuse; lemmas lanceolate-oblong, lowest 9–11 mm, 7-veined, additional intermediate veins in lower half, scaberulous-puberulous, hispid on veins below middle with stiff, ca. 1 mm, yellowish hairs, apex obtuse, sometimes shortly split; palea 1/2–2/3 lemma length, keels ciliolate. Anthers 1.5–3.5 mm. Fl. and fr. Jun–Aug. $2n = 18$.

Fringes of conifer and *Betula japonica* forests in mountainous regions, meadows on N slopes; 700–2200 m. Hebei, Heilongjiang, Henan, Nei Mongol, Shanxi [N Korea, Mongolia, Russia (Far East, E Siberia)].

15. *Melica altissima* Linnaeus, Sp. Pl. 1: 66. 1753.

高臭草 gao chou cao

Melica altissima var. *atropurpurea* Papp; *M. altissima* var. *interrupta* Reichenbach; *M. sibirica* Lamarck.

Perennial, loosely tufted, with long creeping rhizomes. Culms 50–150 cm tall, 2–3 mm in diam. Leaf sheaths scabrid on veins; leaf blades flat, thin, 10–20 cm × 4–12 mm, abaxial surface strongly scabrid on veins, adaxial surface smooth; ligule 2–5 mm. Panicle linear-oblong in outline, very dense with many crowded spikelets, interrupted below, 10–20 cm, 1-sided; branches erect, appressed to main axis, up to 5 cm. Spikelets broadly elliptic to obovate, 10–14 mm, fertile florets 2(or 3), terminal sterile lemmas gathered into globular cluster; glumes dark purple or white at maturity, oblanceolate-oblong to ovate, subequal, 7–11 mm, papery, 5–7-veined with connecting vein-

lets, both acute or obtuse; lemmas oblanceolate-oblong, lowest 8–11 mm, 7-veined, additional intermediate veins in lower half, scaberulous, apex obtuse, acute or minutely mucronate; palea 2/3 lemma length, keels ciliolate. Anthers 1.8–2.5 mm. Fl. and fr. Jun–Aug. $2n = 18$.

Woodland fringes, among shrubs; 800–1400 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan; SW Asia (Caucasus, N Iran), C and E Europe].

This is a tall, robust species with a showy, dense panicle of large, papery spikelets. It is closely related to the E Asian *Melica turczaninowiana* by its spikelet structure and by the strongly scabrid abaxial surface of the leaf blade. However, the two species are completely different in panicle structure.

16. *Melica virgata* Turczaninow ex Trinius, Mém. Acad. Imp. Sci. St.-Petersbourg, Sér. 6, Sci. Math. 1: 369. 1831.

抱草 bao cao

Perennial, tufted, old basal sheaths becoming fibrous. Culms wiry, 30–80 cm tall, 0.6–1.4 mm in diam. Leaf sheaths smooth; leaf blades usually rolled, 7–15 cm × 2–4(–6) mm, smooth, abaxial surface green, adaxial surface grayish green; ligule 0.7–1 mm, ca. 1.5 mm lobe on side opposite blade. Panicle linear, 10–25 cm; branches clustered at nodes, erect, flexuous, 1–2 cm, distant or slightly overlapping, bearing 1–5 spikelets. Spikelets ovate-oblong, 3.5–6.5 mm, purple or straw-colored, fertile florets 2 or 3, terminal sterile lemmas gathered into globular cluster; glumes unequal, much shorter than florets, lower glume ovate, 1.5–3.5 mm, 3–5-veined, upper glume broadly lanceolate, 2.5–4.2 mm, 5-veined, both acute; lemmas elliptic-oblong, lowest 3–5 mm, herbaceous, 7-veined, granular-scabrid, usually sparsely hirsute at middle back with stiff, 0.3–0.6 mm hairs along veins, rarely glabrous, apex obtuse or acute; palea as long as lemma, keels scaberulous. Anthers 1–1.8 mm. Fl. and fr. May–Jul.

Stony and grassy mountain slopes, rocky gullies; 1000–3900 m. Gansu, Hebei, Nei Mongol, Ningxia, Qinghai, Sichuan, Xizang [Mongolia, Russia (SE Siberia)].

This species has unusually short glumes, much shorter than the florets, and is also distinguished by its hirsute lemmas and short, clustered panicle branches. A specimen found in Jiangsu (Nanjing) was presumably a chance introduction.

17. *Melica scabrosa* Trinius in Bunge, Enum. Pl. China Bor. 72. 1833.

臭草 chou cao

Melica scabrosa var. *limprichtii* Papp; *M. scabrosa* var. *puberula* Papp.

Perennial, tufted. Culms 20–90 cm tall, 1–3 mm in diam. Leaf sheaths usually glabrous, lower occasionally sparsely to densely pilose; leaf blades usually flat, 6–15 cm × 2–7 mm, abaxial surface smooth, keeled, adaxial surface scaberulous or sparsely pilose; ligule 1–3 mm, often extended into 2–4 mm acuminate lobe on side opposite blade. Panicle linear or linear-oblong in outline, lax to moderately dense, 8–22 cm; branches erect or obliquely ascending, branched in vigorous specimens,

up to 5 cm, 1-sided, bearing 20–50 crowded spikelets. Spikelets ovate, 5–8 mm, pale greenish brown or milky white, fertile florets 2–4(–6), terminal sterile lemmas gathered into globular cluster; glumes keeled, lanceolate in side view, subequal, 4–8 mm, slightly shorter to slightly longer than florets, 3–5-veined, keel usually ciliolate, both acuminate; lemmas ovate-oblong, lowest 4–8 mm, herbaceous with membranous upper margins and apex, 7-veined, coarsely tubercular-scabrid, apex acute to obtuse; palea keels ciliolate. Anthers 0.8–1.3 mm. Fl. and fr. May–Aug.

Rocky slopes, river gravel banks; 200–3300 m. Anhui, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Shandong, Sichuan, Xizang [Korea, Mongolia].

18. *Melica radula* Franchet, Pl. David. 1: 336. 1884.

细叶臭草 xi ye chou cao

Melica scabrosa Trinius var. *radula* (Franchet) Papp; *M. sinica* Ohwi.

Perennial, tufted. Culms 30–45 cm tall, 1–2 mm in diam. Leaf sheaths smooth or scabrid; leaf blades usually rolled, 5–12 cm × 0.8–2 mm (flattened), abaxial surface scabrid at least toward apex, adaxial surface shortly but densely pubescent; ligule ca. 0.5 mm. Panicle linear in outline, 6–15 cm; branches few, single, mostly erect, unbranched, laxly bearing 3–6 spikelets. Spikelets ovate, 5–8 mm, whitish green, fertile florets (1–)2(–3), terminal sterile lemmas gathered into globular cluster; glumes keeled, narrowly oblong-lanceolate in side view, subequal, 4–7 mm, slightly shorter than florets, lower glume 1–3-veined, upper glume 3–5-veined, keel scaberulous, both subacute; lemmas lanceolate-oblong, lowest 4.5–7 mm, herbaceous with narrowly membranous upper margins and apex, 7-veined with additional intermediate veins in lower half, coarsely tubercular-scabrid, apex obtuse; palea 2/3 lemma length, keels ciliolate. Anthers 1–2 mm. Fl. and fr. May–Aug.

• Mountain slopes, stream banks, field margins; 300–2100 m. Gansu, Hebei, Henan, Hubei, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, W Sichuan, NW Yunnan (Dèqên).

The spikelets are much like those of *Melica scabrosa*, but the habit is more slender, with narrower leaf blades, pubescent on the adaxial surface, and a scanty panicle with markedly fewer spikelets.

19. *Melica secunda* Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 7: 629. 1881.

偏穗臭草 pian sui chou cao

Melica gracilis Aitchison & Hemsley.

Perennial, tufted, with creeping rhizomes. Culms 40–80 cm tall, 1–2 mm in diam. Leaf sheaths smooth, glabrous; leaf blades flat or rolled, 12–18 cm × 1.5–3 mm, abaxial surface smooth except near apex, adaxial surface scaberulous; ligule 2–5 mm, extended into acuminate lobe on side opposite blade. Panicle linear in outline, lax, usually 1-sided, 10–18 cm; branches erect or almost so, unbranched, up to 2 cm, bearing 1–6 spikelets. Spikelets ovate, 5–8.5 mm, silvery green, sometimes purple tinged, fertile florets (1–)2(–4), usually 3rd floret smaller and enclosing terminal sterile globular cluster; glumes

subequal, 5.5–7 mm, mainly hyaline, herbaceous around veins in lower part, lower glume lanceolate, 1–3-veined, upper glume elliptic, 3–5-veined, both acute; lemmas elliptic-oblong, lowest 5–6.5 mm, 7–9-veined, scaberulous, apex hyaline, obtuse-erose; palea ca. 3/4 lemma length, keels ciliolate. Anthers 1.1–1.5 mm. Fl. and fr. May–Aug.

Grassy mountainsides, stony and gravel slopes; 2400–3300 m. Gansu, Sichuan, Xinjiang, Xizang [E Afghanistan, NW India, Kashmir, Kazakhstan (Tien Shan), Kyrgyzstan, Tajikistan, Uzbekistan].

The name "*Melica secunda* var. *interrupta* Hackel" (Trudy Imp. S.-Peterburgsk. Bot. Sada 26: 58. 1906) was not validly published because it was merely cited as a synonym.

20. *Melica kozlovii* Tzvelev, Rast. Tsent. Azii 4: 125. 1968.

柴达木臭草 *chai da mu chou cao*

Perennial, loosely tufted, with short rhizomes, basal sheaths finally fibrous. Culms 20–60 cm tall, ca. 1 mm in diam., scabrid below panicle, 2–3-noded. Leaf sheaths scabrid or pubescent; leaf blades flat or slightly rolled, 5–10 cm × 1–2.7 mm, abaxial surface scabrid, adaxial surface scabrid to pubescent; ligule 0.5–1.5 mm, lobe on side opposite blade ca. 3 mm, this soon splitting. Panicle lax, narrow, 6–16 cm; branches suberect or spreading, 1–2 cm, 1-sided, bearing 1–5 spaced spikelets. Spikelets ovate, 6.8–8.3 mm, flushed grayish purple, fertile florets 2 or 3, terminal sterile lemmas gathered into globular cluster; glumes membranous, lower glume elliptic to broadly ovate, 5–7 mm, 3–5-veined, upper glume oblong, 6–8.2 mm, 5–9-veined, obtuse or acute; lemmas broadly oblong, lowest 5–8 mm, herbaceous, 7–9-veined, tuberculate-scabrid, a very few ca. 0.5 mm hairs sometimes present at middle back, apex broadly membranous, obtuse or weakly emarginate; palea keels ciliolate. Anthers 1.2–2.2 mm. Fl. and fr. May–Aug.

Rocky slopes, mountain valleys; 2000–3900 m. Gansu, Qinghai, Shanxi [Mongolia].

21. *Melica tangutorum* Tzvelev, Rast. Tsent. Azii 4: 126. 1968.

青甘臭草 *qing gan chou cao*

Perennial, loosely tufted. Culms 30–80 cm tall, 1–2 mm in diam., scabrid below panicle, 3–4-noded. Leaf sheaths scabrid; leaf blades flat or slightly rolled, 10–15 cm × 1–4 mm, scabrid on both surfaces; ligule 2–6.5 mm. Panicle narrow, fairly dense, 10–20 cm, slightly 1-sided, spikelets many; branches short, erect. Spikelets 4–7 mm, silvery green, fertile florets 2 or 3, terminal sterile lemmas gathered into globular cluster; glumes elliptic, papery, scabrid, lower glume 4–5 mm, 3–5-veined, upper glume 4–7 mm, 5–7-veined, both obtuse; lemmas obovate-oblong, lowest 3–4.5 mm, firmly herbaceous, 7–9-veined, granular scabrid, apex narrowly membranous, emarginate or shortly 2-lobed; palea keels ciliolate. Anthers 0.7–1 mm. Fl. and fr. May–Sep.

Rocky mountain slopes, river gravel banks, or under shrubs; 1500–3200 m. Gansu, Qinghai, Sichuan [Mongolia].

22. *Melica tibetica* Roshevitz, Bot. Mater. Gerb. Glavn. Bot. Sada RSFSR 2: 27. 1921.

藏臭草 *zang chou cao*

Perennial, tufted. Culms erect or inclined at base, 15–60 cm tall, ca. 2 mm in diam., 3–6-noded, scabrid below panicle. Leaf sheaths keeled, harshly scabrid on veins; leaf blades flat or folded, 10–20 cm × 3–6 mm, abaxial surface scabrid, adaxial surface puberulous; ligule 0.8–1.5 mm, truncate, backside (blade side) pubescent. Panicle broadly linear in outline, 6–18 cm, dense, spikelets many; branches erect, appressed to main axis. Spikelets broadly ovate, 5–8 mm, purplish, fertile florets (1–)2(–3), terminal sterile lemmas gathered into globular cluster; glumes as long as spikelet, papery, slightly unequal, lower glume broadly elliptic, (4–)5–7 mm, 1–3-veined, upper glume broadly oblanceolate, 5–8 mm, 3–5-veined, both acute or obtuse; lemmas oblong, lowest 3.5–6 mm, lower part herbaceous, pallid, 5–7-veined, minutely hispidulous or granular-scabrid, upper 1/3 slightly enlarged, membranous, purple, apex shallowly 2-lobed, erose; palea as long as herbaceous part of lemma, keels ciliolate. Anthers 0.6–1 mm. Fl. and fr. Jul–Sep.

• Alpine meadows, usually under shrubs; 3500–4300 m. Nei Mongol (Alxa Youqi), Qinghai, Sichuan, Xizang.

23. *Melica subflava* Z. L. Wu, Fl. Reipubl. Popularis Sin. 9(2): 314. 2002.

黄穗臭草 *huang sui chou cao*

Melica flava Z. L. Wu, Acta Phytotax. Sin. 30: 171. 1992, not Steudel (1855); *M. qinghaiensis* W. Hempel, nom. illeg. superfl.

Perennial, loosely tufted. Culms erect or inclined at base, 50–80 cm tall, 2–4 mm in diam., 3–5-noded, scabrid below panicle. Leaf sheaths keeled, scabrid on veins; leaf blades flat or folded, 10–22 cm × 3–6 mm, both surfaces scaberulous; ligule 2–4 mm, truncate, back pubescent. Panicle broadly linear in outline, 6–12 cm, dense, interrupted below, weakly 1-sided, spikelets many; branches laxly erect. Spikelets broadly ovate,

8–11 mm, yellow, fertile florets 2–4, terminal sterile lemmas gathered into globular cluster; glumes as long as spikelet, papery, slightly unequal, obovate-oblong or oblong-lanceolate, lower glume 6–8 mm, 1–3-veined, upper glume 7–11 mm, 3-veined, both acute; lemmas oblong, lowest 5.5–7 mm, lower part herbaceous, 5–7-veined, upper 1/3 slightly enlarged, membranous, apex 2-lobed, lobes rounded; palea as long as herbaceous part of lemma, keels ciliolate. Anthers ca. 1 mm. Fl. Jul–Aug.

- Grassy mountain slopes; ca. 3600 m. Qinghai.

