

49. PIPTATHERUM P. Beauvois, Ess. Agrostogr. 17. 1812.

落芒草属 luo mang cao shu

Eriocoma Nuttall; *Fendleria* Steudel; *Urachne* Trinius.

Perennials, tufted. Leaf blades linear to setaceous, flat or rolled. Inflorescence an open or contracted panicle. Spikelets with 1 floret, bisexual, disarticulating above glumes; rachilla extension absent; glumes ovate to lanceolate, subequal, usually longer than floret, herbaceous to membranous, 3–7-veined, veins linked by veinlets or anastomosing near apex, apex obtuse to acuminate; callus very short, rounded, glabrous; lemma lanceolate to ovate or elliptic, dorsally compressed, leathery to bony, brown or black-brown at maturity, glossy, usually with appressed ascending white hairs, infrequently glabrous, covering sides of palea, apex entire or minutely 2-toothed, awned; awn caducous (rarely persistent), fine, straight, scabrid; palea back exposed between lemma margins. Lodicules 3. Stamens 3, anthers usually bearded at apex. Stigmas 2.

About 30 species: Europe through C Asia to the Himalayas and China, also in North America; nine species (two endemic) in China.

Quantitative characters are very variable and reliable qualitative characters are rather few. Plant size varies within wide limits for most species and spikelet size is also very variable. Lemma shape, a stable character, refers to the mature floret when full width has been attained. Other reliable characters for species separation, such as lemma pubescence and awn insertion, require careful observation and a good magnification.

- 1a. Lemma glabrous, slightly longer than glumes at maturity; glumes elliptic-obovate, apex broadly rounded; anthers glabrous at apex 1. *P. kuoi*
- 1b. Lemma usually pubescent, shorter than or equaling glumes; glumes lanceolate, apex obtuse or denticulate to acuminate; anthers usually hairy at apex (glabrous in *P. hilariae*).
 - 2a. Awn 2–4(–7) mm; culms 20–60 cm tall, 2–3-noded; panicle often narrow.
 - 3a. Lemma elliptic to ovate, apex shortly beaked, shortly 2-lobed, each lobe bearing hair tuft; anthers glabrous 2. *P. hilariae*
 - 3b. Lemma narrowly lanceolate, apex entire or obscurely 2-lobed, not beaked, without hair tufts; anthers densely bearded.
 - 4a. Lemma back pilose with 0.4–0.5 mm hairs, apex minutely 2-lobed; awn subterminal, bent at insertion 3. *P. gracile*
 - 4b. Lemma back pubescent with 0.2–0.4 mm hairs, apex entire; awn terminal, straight at insertion 4. *P. laterale*
 - 2b. Awn 5–9 mm; culms up to 100 cm tall, 3–5-noded; panicle lax, usually open.
 - 5a. Glumes equaling or only slightly longer than lemma; branches of panicle 3–5 per node.
 - 6a. Spikelets lanceolate, 5–9 mm; lemma 4–7.5 mm 5. *P. aequiglume*
 - 6b. Spikelets ovate, 3.5–5 mm; lemma 2.5–4 mm 6. *P. tibeticum*
 - 5b. Glumes distinctly longer than lemma; branches of panicle 2(–3) per node.
 - 7a. Lemma lanceolate, hairy throughout; glumes herbaceous, apex usually purple.
 - 8a. Panicle branches and pedicels scabrid; glumes 4.5–8 mm 7. *P. munroi*
 - 8b. Panicle branches and pedicels smooth; glumes 8–9 mm 8. *P. grandispiculum*
 - 7b. Lemma ovate, hairy in upper part, glabrous below; glumes membranous, green or gray brown 9. *P. songaricum*

1. *Piptatherum kuoi* S. M. Phillips & Z. L. Wu, Novon 15: 474. 2005.

钝颖落芒草 dun ying luo mang cao

Oryzopsis obtusa Stapf, Hooker's Icon. Pl. 24: t. 2393. 1895; *Piptatherum obtusum* (Stapf) Roshevitz (1951), not Nees & Meyen (1841).

Perennial, loosely tufted from knotty rootstock. Culms stiffly erect, up to 1 m tall, 2–2.5 mm in diam., scaberulous-puberulous, 2–3-noded. Leaf sheaths glabrous, shorter than internodes; leaf blades stiffly ascending, linear or broadly linear, flat or margins inrolled, 10–25 cm, 5–12 mm wide, abaxial surface smooth, adaxial surface asperulous-puberulous, apex slenderly acuminate; ligule 1–3 mm, obtuse or truncate. Panicle narrow, 15–25 cm; branches 2 per node, suberect, 1–5 cm, densely scabrid. Spikelets yellowish green; glumes elliptic-

obovate, 4–5 × 3.5–4 mm, herbaceous, 5–7-veined with transverse veinlets, apex rounded; callus ca. 0.5 mm, knoblike, glabrous; lemma elliptic, 4–5 mm, shortly exerted from glumes, blackish brown at maturity, 5-veined, glabrous, margins overlapping (before caryopsis develops), apex entire; awn persistent, 10–17 mm. Anthers ca. 2.5 mm, glabrous at apex. Fl. and fr. Apr–Jul.

Under shrubs, moist shady places among rocks, roadsides; 600–1900 m. Guangdong, Guizhou, Henan, Hubei, Hunan, Shaanxi, E Sichuan, Taiwan, Yunnan, Zhejiang [Japan (Ryukyu Islands)].

This species is distinctive within the genus in China on account of its very broad glumes and plump, glabrous floret with the tip exerted from the glumes.

2. *Piptatherum hilariae* Pazij, Bot. Mater. Gerb. Inst. Bot. Zool. Akad. Nauk Uzbeksk. SSR 10: 20. 1948.

少穗落芒草 shao sui luo mang cao

Oryzopsis hilariae (Pazij) Uniyal; *O. humilis* Bor; *O. wendelboi* Bor; *Piptatherum humile* (Bor) S. Kumar & M. B. Raza-zada.

Perennial, densely tufted. Culms 20–50 cm tall, 2–3-noded. Leaf sheaths glabrous, usually shorter than internodes; leaf blades gray-green or gray purple, usually rolled, rarely flat, up to 10(–30) cm, 2–4 mm wide, abaxial surface smooth or scaberulous, adaxial surface puberulous; ligule lanceolate, 3–6 mm. Panicle open or contracted, 5–12(–30) cm; branches 2 per node, spreading at anthesis, erect at maturity, longest less than 1/2 panicle length. Spikelets purplish red or gray-green; glumes lanceolate-ovate, 5–8 mm, apex sharply acuminate; callus glabrous; lemma elliptic to narrowly ovate, 3.5–4 mm, back pubescent with 0.2–0.3 mm hairs, midline glabrescent at maturity, apex usually shortly beaked, pale, glabrous, shortly 2-lobed above awn insertion, lobes rounded, each with tuft of hairs; awn caducous, 2–4 mm, often slightly bent at insertion. Anthers 1.5–2.5 mm, glabrous at apex or almost so. Fl. and fr. Jun–Sep.

River banks, plateaus; 3100–4500 m. Xizang (Lhozhag, Qusum) [E Afghanistan, NW India, Kashmir, Pakistan, Tajikistan (Pamirs)].

This species is close to *Piptatherum gracile*, but has an abruptly narrowed lemma apex, and the short apical hair tufts are distinctive. It is the only species of *Piptatherum* in China (except for the distinctive *P. kuoi*) with glabrous anthers (1 or 2 short hairs may be present, but never a dense tuft). In neighboring countries it occurs in the upper forest belt and in alpine thickets.

The name *Piptatherum humile* refers to small specimens with linear panicles.

3. *Piptatherum gracile* Mez, Repert. Spec. Nov. Regni Veg. 17: 211. 1921.

小落芒草 xiao luo mang cao

Oryzopsis gracilis (Mez) Pilger.

Perennial, densely tufted. Culms 10–50 cm tall, 2–3-noded. Leaf sheaths glabrous or scaberulous, shorter than internodes; leaf blades gray-green, filiform, usually rolled, 6–20 cm, 1–2 mm wide, abaxial surface smooth or scaberulous, adaxial surface pubescent; ligule lanceolate, 2–7 mm. Panicle laxly contracted to linear, 6–20 cm; branches 2(–4) per node, erect or ascending, longest ca. 1/3 panicle length. Spikelets yellowish green, apex purplish; glumes lanceolate, 5–8 mm, apex sharply acuminate; callus glabrous; lemma narrowly lanceolate, 3–5 mm, densely pilose with 0.4–0.5 mm hairs, apex minutely 2-lobed above awn insertion; awn caducous, delicate, 3–7 mm, slightly bent at insertion. Anthers 1.7–2.5 mm, densely bearded at apex. Fl. and fr. Jun–Aug.

Dry mountain slopes, alpine meadows; 3300–4900 m. Sichuan, Xizang, Yunnan [Afghanistan, NW India, Kashmir, Nepal, N Pakistan].

4. *Piptatherum laterale* (Regel) Munro ex Nevski, Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 4: 217. 1937.

细弱落芒草 xi ruo luo mang cao

Milium laterale Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 7: 645. 1881; *Oryzopsis lateralis* (Regel) Stapf ex J. D. Hooker.

Perennial, densely tufted. Culms 25–60 cm tall, 2–3-noded. Leaf sheaths glabrous, usually shorter than internodes; leaf blades rolled, setaceous or narrowly linear when flat, 5–15(–25) cm, 1–3 mm wide, abaxial surface scaberulous, adaxial surface pubescent; ligule lanceolate, 2–5 mm. Panicle loosely contracted to linear, 5–20 cm; branches 1–3 per node, erect or ascending, longest not usually more than 3 cm. Spikelets yellowish green, apex usually purplish; glumes lanceolate, 6–8 mm, herbaceous, apex acuminate; callus glabrous; lemma narrowly lanceolate to almost linear, (3.3–)4–6.5 mm, densely pubescent with 0.2–0.4 mm hairs, apex entire, awned from apex; awn sometimes tardily deciduous, delicate, 2–4(–6) mm, straight at insertion. Anthers 2–3.5 mm, bearded at apex. Fl. and fr. Jun–Aug.

Stony mountain slopes, grassy hollows, *Kobresia pygmaea* turf; 1800–4700 m. Sichuan, Xizang [Afghanistan, Kashmir, Kyrgyzstan, Nepal, N Pakistan, Tajikistan, Uzbekistan; SW Asia (Iran, Iraq, E Turkey)].

This is a variable species often confused in the literature with the closely related *Piptatherum gracile*.

5. *Piptatherum aequiglume* (Duthie ex J. D. Hooker) Roshevitz, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 14: 113. 1951.

等颖落芒草 deng ying luo mang cao

Perennial, loosely tufted from a short rhizome. Culms 60–130 cm tall, 3–5-noded. Leaf sheaths glabrous, scabrid; leaf blades linear, flat, up to 30 cm, 5–10 mm wide, abaxial surface scabrid, adaxial surface scaberulous; ligule rounded, 2–5(–13) mm. Panicle open at maturity, 10–25 cm; branches 3–5 per node, distant, ascending or widely spreading, longest up to 1/2 panicle length, scabrid, lower part bare. Spikelets gray-green; glumes narrowly lanceolate-oblong, (5–)5.5–9 mm, apex acute, occasionally mucronate; callus glabrous; lemma narrowly lanceolate, (4–)5.3–7.5 mm, equaling or slightly shorter than glumes, back pubescent with 0.15–0.3 mm hairs, glabrescent along midline at maturity, apex acute, smoothly extended into awn without constriction; awn tardily deciduous, 6–13 mm. Anthers 3–4 mm, bearded at apex. Fl. and fr. Jun–Sep.

Damp rocky places in montane forests; 1800–2900 m. Sichuan, Xizang, Yunnan [E Afghanistan, Bhutan, NW India, Kashmir, Pakistan].

This species is close to *Piptatherum munroi*, but is rather more lush and grows in more mesophytic habitats. The difference in awn insertion, although a small difference, is reliable for separating the two species.

- 1a. Ligules 2–5 mm; spikelets (5.5–)6.5–9 mm; awn tardily deciduous 5a. var. *aequiglume*
 1b. Ligules 8–13 mm; spikelets ca. 5 mm; awn readily deciduous 5b. var. *ligulatum*

5a. *Piptatherum aequiglume* var. *aequiglume*

等颖落芒草(原变种) deng ying luo mang cao (yuan bian zhong)

Oryzopsis aequiglumis Duthie ex J. D. Hooker, Fl. Brit. India 7: 234. 1896 [“1897”]; *O. multiradiata* (Hackel) Handel-Mazzetti; *O. munroi* Stapf f. *multiradiata* Hackel; *Piptatherum sinense* Mez.

Ligule ovate, rounded, 2–5 mm. Spikelets (5.5–)6.5–9 mm; lemma 5.5–7.5 mm, pubescent with 0.15–0.3 mm hairs, passing smoothly into awn; awn tardily deciduous, 6–13 mm. Fl. and fr. Aug–Sep.

Rocky fissures near streams; 1800–2900 m. Sichuan, Xizang, Yunnan [E Afghanistan, Bhutan, NW India, Kashmir, Pakistan].

5b. *Piptatherum aequiglume* var. *ligulatum* (P. C. Kuo & Z. L. Wu) S. M. Phillips & Z. L. Wu, Novon 15: 475. 2005.

长舌落芒草 chang she luo mang cao

Oryzopsis aequiglumis var. *ligulata* P. C. Kuo & Z. L. Wu, Acta Phytotax. Sin. 19: 435. 1981.

Ligule long-lanceolate, 8–13 mm. Spikelets 4.9–5.2 mm; lemma ca. 4 mm, pilose with ca. 0.4 mm hairs, constricted at awn junction; awn readily deciduous, 7–8 mm. Fr. Sep.

• Near rocks of rivers, moist ground; 1800–2800 m. Yunnan (Lijiang).

This taxon appears to be a local element from the *Piptatherum aequiglume-munroi* species group. The glumes clearly exceed the lemma, and the delicate, caducous awn with constricted disarticulation point are indicative of *P. munroi*, but glume shape is nearer *P. aequiglume*. The ligule is remarkably long, and lemma pubescence is longer than in either species. It may prove to merit separate specific status when better known.

6. *Piptatherum tibeticum* Roshevitz, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 11: 23. 1949.

藏落芒草 zang luo mang cao

Perennial, tufted from a short rhizome. Culms 30–100 cm, 2–5-noded. Leaf sheaths loose, shorter than internodes; leaf blades linear, flat or slightly rolled, 5–25 cm, 2–4 mm, scabrid; ligule ovate to long-lanceolate, 3–10 mm. Panicle open, ovate in outline, 10–20 cm; branches 3–5 per node, spreading, ca. 3 cm, scabrid, upper half with spikelets. Spikelets yellowish green, apex purplish red; glumes ovate, 3.5–5 mm, glabrous or puberulous, apex acuminate; callus glabrous; lemma ovate, 2.5–4 mm, equaling or slightly shorter than glumes, back pubescent, glabrescent along midline at maturity, infrequently always glabrous; awn caducous, 5–7 mm. Anthers ca. 1 mm, bearded at apex. Fl. and fr. Jun–Aug.

• Field margins, grassy mountain slopes, forest fringes; 1300–3900 m. Gansu, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan.

This is a variant from the *Piptatherum aequiglume-munroi* species group with small, broad spikelets.

- 1a. Lemma 2.5–3.5 mm, pubescent when young, glabrescent along midline at maturity 6a. var. *tibeticum*
- 1b. Lemma 3–4 mm, always smooth and

glabrous 6b. var. *psilolepis*

6a. *Piptatherum tibeticum* var. *tibeticum*

藏落芒草(原变种) zang luo mang cao (yuan bian zhong)

Oryzopsis tibetica (Roshevitz) P. C. Kuo.

Lemma 2.5–3.5 mm, back pubescent when young, glabrescent along midline at maturity. Fl. and fr. Jun–Aug.

• Field margins, grassy mountain slopes, forest fringes; 1300–3900 m. Gansu, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan.

6b. *Piptatherum tibeticum* var. *psilolepis* (P. C. Kuo & Z. L. Wu) S. M. Phillips & Z. L. Wu, Novon 15: 475. 2005.

光稃落芒草 guang fu luo mang cao

Oryzopsis tibetica var. *psilolepis* P. C. Kuo & Z. L. Wu, Acta Phytotax. Sin. 19: 435. 1981; *O. psilolepis* (P. C. Kuo & Z. L. Wu) L. Liu.

Lemma 3–4 mm, always smooth and glabrous. Fl. Jun.

• Mountain slopes; 2400–3300 m. Sichuan, Xizang.

7. *Piptatherum munroi* (Stapf) Mez, Repert. Spec. Nov. Regni Veg. 17: 212. 1921.

落芒草 luo mang cao

Perennial, loosely tufted from a short rhizome. Culms 30–100 cm tall, 3–5-noded. Leaf sheaths smooth or scabrid; leaf blades linear, flat, 6–30 cm, 2–5 mm wide, abaxial surface glabrous, adaxial surface puberulous; ligule lanceolate, 2–5 mm. Panicle open, often ovate in outline, 10–25 cm; branches (1–)2(–3) per node, distant, ascending or widely spreading, longest up to 1/2 panicle length, scabrid, lower 2/3 bare. Spikelets gray-green or apex and margins purple; glumes lanceolate, 4.5–8 mm, papery, apex narrowly acuminate into sharp beak; callus glabrous; lemma lanceolate, 2.5–4.5(–5) mm, back pubescent, glabrescent along midline at maturity, apex acute, constricted at awn insertion; awn fine, caducous, 6–9 mm, straight or slightly flexuous. Anthers 1–2.5 mm, apex bearded. Fl. and fr. Jun–Aug.

Alpine scrub, mountain meadows, roadsides, farmlands, alluvial fans; 2200–5000 m. Gansu, Guizhou, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [E Afghanistan, Bhutan, N India, Kashmir, Nepal, N Pakistan].

This is a common species from high parts of W China and the W Himalayas. It is readily recognizable by its relatively robust habit, large, open panicle with sharply purple-beaked spikelets, lanceolate, hairy lemmas, and long, delicate awns constricted at the base and readily falling.

- 1a. Glumes 5–7 mm; lemma 4–5 mm; anthers 2–2.5 mm 7a. var. *munroi*
- 1b. Glumes 4.5–5 mm; lemma 2.5–3 mm; anthers 1–1.8 mm 7b. var. *parviflorum*

7a. *Piptatherum munroi* var. *munroi*

落芒草(原变种) luo mang cao (yuan bian zhong)

Oryzopsis munroi Stapf in J. D. Hooker, Fl. Brit. India 7:

234. 1896 [“1897”]; *O. geminiramula* Ohwi.

Glumes 5–7 mm; lemma 4–5 mm; awn 3–7 mm; anthers 2–2.5 mm. Fl. and fr. Jun–Aug.

Alpine scrub, mountain meadows, roadsides, farmlands; 2200–5000 m. Gansu, Guizhou, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [E Afghanistan, Bhutan, N India, Kashmir, Nepal, N Pakistan].

7b. *Piptatherum munroi* var. *parviflorum* (Z. L. Wu) S. M. Phillips & Z. L. Wu, *Novon* 15: 475. 2005.

小花落芒草 xiao hua luo mang cao

Oryzopsis munroi var. *parviflora* Z. L. Wu, *Acta Phytotax. Sin.* 30(2): 174. 1992; *O. stewartiana* Bor.

Glumes 4.5–5 mm; lemma 2.5–3 mm; awn 7–9 mm; anthers 1–1.8 mm. Fl. and fr. Jul–Sep.

Alluvial fans; ca. 2700 m. Gansu, Qinghai [NW India].

This taxon differs very little from *Piptatherum tibeticum*, which is reported to have a broader floret and more branches at the panicle nodes.

8. *Piptatherum grandispiculum* (P. C. Kuo & Z. L. Wu) S. M. Phillips & Z. L. Wu, *Novon* 15: 475. 2005.

大穗落芒草 da sui luo mang cao

Oryzopsis grandispicula P. C. Kuo & Z. L. Wu, *Acta Phytotax. Sin.* 19: 435. 1981; *O. macrospicula* P. C. Kuo & Z. L. Wu, nom. illeg. superfl.

Perennial, tufted from a short rhizome. Culms ca. 100 cm tall, 3–4-noded. Leaf sheaths shorter than internodes; leaf blades gray-green, flat or rolled, 4–15 cm, 2–3 mm wide, smooth; ligule lanceolate, 4–5 mm. Panicle open, broadly ovate, up to 25 cm; branches 2–6 per node, up to 10 cm, smooth, lower 1/2–2/3 bare. Spikelets gray-green, apex purplish gray; glumes lanceolate, 8–9 mm, glabrous, apex long acuminate into beak; callus glabrous; lemma narrowly lanceolate, 5–6 mm, back pubescent, glabrescent at maturity; awn caducous, 4–7 mm. Anthers ca. 3.5 mm, bearded at apex. Fl. and fr. Aug–Sep.

• Rocky slopes; ca. 3700 m. Xizang (Xigazê).

This is a variant from the *Piptatherum aequiglume-munroi* species group, distinguished by its smooth leaves and panicle branches.

9. *Piptatherum songaricum* (Trinius & Ruprecht) Roshevitz, *Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR* 14: 106. 1951.

新疆落芒草 xin jiang luo mang cao

Urachne songarica Trinius & Ruprecht, *Sp. Gram. Stipac.* 15. 1842; *Oryzopsis songarica* (Trinius & Ruprecht) B. Fedtschenko; *O. tianschanica* Drobow & Vvedensky; *Piptatherum songaricum* subsp. *tianschanicum* (Drobow & Vvedensky) velev.

Perennial, densely tufted from a short rhizome. Culms (25–)30–60(–100) cm tall, 2–4-noded. Leaf sheaths glabrous, shorter than internodes; leaf blades flat or loosely rolled, 5–20 cm, 2–4 mm wide, abaxial surface scaberulous toward apex, adaxial surface glabrous or puberulous; ligule lanceolate, 5–8 mm. Panicle lax, 10–20(–30) cm; branches (1–)2 per node, slender, ascending, sinuous or sometimes nodding, longest 1/2–2/3 panicle length, scabrid at least in upper part, spikelets clustered toward apices. Spikelets green or gray-brown; glumes broadly lanceolate, 6–10 mm, membranous except at base, scabrid, apex acuminate; callus glabrous; lemma ovate, 3–5.2 mm, pubescent above middle, glabrous below except for small tufts at basal margins, glabrescent along midline at maturity, apex acute; awn caducous, 5–8 mm. Anthers 1.5–2 mm, bearded at apex. Fl. and fr. Jun–Aug.

Rocky moist places on mountain slopes; 1000–1900 m. Xinjiang [Kazakhstan, W Mongolia, Russia].

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