

88. CALAMAGROSTIS Adanson, Fam. Pl. 2: 31, 530. 1763.

拂子茅属 fu zi mao shu

Lu Shenglian (卢生莲); Sylvia M. Phillips

Perennials, often robust, sometimes rhizomatous. Leaf blades linear, usually flat; ligule membranous. Inflorescence a panicle, loosely contracted to dense and spikelike, often plumose, branches usually whorled, bearing numerous spikelets. Spikelets with 1 floret; rachilla disarticulating above glumes, extension beyond floret absent or small and glabrous, rarely better developed and penicillate; glumes persistent, subequal or unequal with lower longer, narrowly lanceolate, much exceeding floret, lower glume 1-veined, upper glume 3-veined at base, apex finely acuminate or subulate; floret callus conspicuously bearded, hairs much exceeding floret; lemma ca. 1/2 as long as glumes, hyaline, 3–5-veined, awned, apex erose, denticulate or deeply 2-lobed; awn very slender, straight or almost so, arising from lemma back, apex or between teeth; palea 1/2 as long to slightly shorter than lemma. Stamens usually 3, rarely 1.

About 20 species: N temperate and arctic regions; six species (one endemic) in China.

Calamagrostis intergrades with both *Agrostis* and *Deyeuxia*, and the number of species in the genus is very uncertain. As in *Deyeuxia*, the taxonomy is complicated by polymorphic species complexes arising from polyploidy, apomixis, and hybridization.

- 1a. Awn arising from lemma apex or between apical teeth.
 - 2a. Lemma 5-veined, apex deeply 2-toothed; awn 5–9 mm, arising between teeth; stamen 1 1. *C. emodensis*
 - 2b. Lemma 3-veined, apex entire or slightly toothed; awn 0.5–3 mm, arising from apex; stamens 3.
 - 3a. Culms 40–150 cm; nodes (2–)3–6; panicle fairly lax, 10–30 cm 2. *C. pseudophragmites*
 - 3b. Culms 20–70 cm; nodes 2–3; panicle dense, 4–13 cm 3. *C. hedinii*
- 1b. Awn arising from lemma back.
 - 4a. Spikelets 7–11 mm; glumes unequal, upper 1–1.5 mm shorter than lower 4. *C. macrolepis*
 - 4b. Spikelets 3–7 mm; glumes subequal, upper less than 1 mm shorter than lower.
 - 5a. Culms 15–45 cm; spikelets 3–4 mm; awn 4.5–5 mm 30. *Deyeuxia debilis* (see p. 358)
 - 5b. Culms 45–150 cm; spikelets 4–7 mm; awn 1.5–3 mm.
 - 6a. Awn arising near middle of lemma back; lemma 3–3.5 mm; rachilla extension absent or glabrous if present 5. *C. epigeios*
 - 6b. Awn arising from upper 1/3 of lemma back; lemma 4–5 mm; rachilla extension present, penicillate 6. *C. kengii*

1. *Calamagrostis emodensis* Grisebach, Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ. 3: 80. 1868.

单蕊拂子茅 dan rui fu zi mao

Calamagrostis garwhalensis Hubbard & Bor.

Perennial, densely tufted, rhizomatous; rhizomes spreading. Culms erect, stout, 1–1.3 m tall, 3–4 mm in diam., smooth or slightly scabrid below panicle. Leaf sheaths with auricle on one side; leaf blades broadly linear, flat, 25–45 cm, 5–20 mm wide, adaxial surface scabrid, abaxial surface smooth, apex finely acuminate; ligule 0.5–3 mm, truncate. Panicle loosely contracted, lanceolate in outline, 15–25 cm, nodding, plumose; branches in whorls, bare at base, slightly scabrid. Spikelets silvery-green or tinged pale purple, 5.5–8 mm; glumes linear-lanceolate, subequal or lower glume slightly longer, keel scabrid, apex subulate; callus hairs 2–3 times length of lemma; lemma ca. 1/2 as long as glumes, 2–2.7 mm, 5-veined, deeply 2-toothed by up to 1/3 its length; awn 5–9 mm, arising between teeth, straight, usually projecting beyond glumes; palea slightly shorter than lemma; rachilla extension absent or rudimentary, glabrous. Stamen 1, anther 0.7–1 mm. Fl. and fr. Aug–Sep.

Grassy slopes in montane regions; 1900–5000 m. Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Kashmir, N Pakistan].

This is a well-defined species with relatively broad leaf blades, a pale, shining panicle, and a deeply toothed lemma. The floret contains a single plump anther.

2. *Calamagrostis pseudophragmites* (A. Haller) Koeler, Descr. Gram. 106. 1802.

假苇拂子茅 jia wei fu zi mao

Arundo pseudophragmites A. Haller, Arch. Bot. (Leipzig), 1(2): 11. 1797; *Calamagrostis nepalensis* Nees ex Steudel.

Perennial, tufted, rhizomatous; rhizomes spreading. Culms erect, 40–150 cm tall, 1.5–4 mm in diam., 2–6-noded, scabrid below panicle. Leaf sheaths smooth or scabrid; leaf blades flat or weakly inrolled, 10–30 cm, 2–5(–7) mm wide, adaxial surface and margins scabrid, abaxial surface smooth; ligule 4–10 mm, obtuse or lacerate. Panicle oblong-lanceolate, rather lax, 10–30 × 2–5 cm, primary branches distinct, nodding; branches in dense whorls, scabrid. Spikelets 5–9 mm, yellowish green or purple; glumes linear-lanceolate, unequal, upper glume 2/3–3/4 length of lower glume, keel scabrid, apex acuminate-subulate; callus hairs 2–3 times length of lemma; lemma about 1/2 as long as glumes, 3–4 mm, 3-veined, apex entire or 2-denticulate; awn arising just below lemma apex, 1–3 mm, scarcely projecting from glumes, straight; palea 1/2–2/3 as long as lemma. Stamens 3; anthers 1–2 mm; rachilla not extended. Fl. and fr. Jul–Sep.

Damp grassy slopes, near riversides; 300–2500 m. Gansu, Guizhou, Hubei, Nei Mongol, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan and NE China [Bhutan, India (Darjeeling), Japan, Kazakhstan, Korea, Pakistan, Turkmenistan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Uz-

bekistan; SW Asia, Europe].

3. *Calamagrostis hedinii* Pilger in Hedin, S. Tibet, Bot. 6(3): 93. 1922.

短芒拂子茅 duan mang fu zi mao

Calamagrostis littorea (Schrader) P. Beauvois var. *tartarica* J. D. Hooker; *C. pseudophragmites* (A. Haller) Koeler subsp. *tartarica* (J. D. Hooker) Tzvelev; *C. pseudophragmites* var. *tartarica* (J. D. Hooker) R. R. Stewart; *C. tartarica* (J. D. Hooker) D. F. Cui, nom. illeg. superfl.

Perennial, densely tufted, rhizomatous. Culms erect, 20–70 cm tall, 1–3 mm in diam., 2–4-noded, smooth. Leaf sheaths smooth; leaf blades often involute, 5–10(–20) cm, 1–3 mm wide, adaxial surface and margin scabrid, abaxial surface smooth; ligule 3–5 mm, apex lacerate. Panicle dense, cylindrical, 4–13 cm, slightly lobed but primary branches congested; branches scabrid. Spikelets 4.5–6.5 mm, grayish brown or purplish; glumes narrowly lanceolate, unequal, upper glume 2/3–7/8 length of lower glume, keel scabrid, apex acuminate-subulate; callus hairs equaling or longer than lemma; lemma about 1/2 as long as glumes, 2–4 mm, apex slightly denticulate; awn arising from apex, 0.5–1(–2) mm, straight, not projecting from glumes; palea 1/2 as long as lemma; rachilla not extended. Stamens 3, anthers ca. 2 mm. Fl. Aug–Sep.

Damp sandy or stony places; 700–3000 m. Qinghai, Sichuan, Xinjiang, Xizang [NW India, Kashmir, Kyrgyzstan, Pakistan, Tajikistan].

This taxon represents a small form of *Calamagrostis pseudophragmites* with a congested, usually purple panicle. It is often recognized at infraspecific rank (*C. pseudophragmites* subsp. *tartarica*), but at the specific rank the epithet “*hedinii*” has priority.

4. *Calamagrostis macrolepis* Litvinov, Bot. Mater. Gerb. Glavn. Bot. Sada RSFSR 2: 125. 1921.

大拂子茅 da fu zi mao

Calamagrostis epigeios (Linnaeus) Roth subsp. *macrolepis* (Litvinov) Tzvelev; *C. macrolepis* var. *rigidula* T. F. Wang.

Perennial, densely tufted, rhizomatous; rhizomes spreading. Culms erect, 90–120 cm tall, 3–4 mm in diam., 4–5-noded, scabrid below panicle. Leaf sheaths smooth; leaf blades flat or margins involute, grayish green, 15–40 cm, 5–10 mm wide, scabrid; ligule 5–12 mm, apex tattered. Panicle fairly dense, lobed, 15–25 × 3–4.5 cm; branches erect, 1–3 cm, scabrid. Spikelets 7–11 mm, greenish, purplish or yellowish green; glumes lanceolate-subulate, unequal, lower glume 7–11 mm, upper glume 1–1.5 mm shorter, keel scabrid; callus hairs 1.5 times length of lemma; lemma 3–5 mm, 3-veined, smooth or scabrid, apex slightly 2-lobed; awn arising near middle of lemma back, 3–4 mm, straight or slightly curved; palea 2/3 as long as lemma. Rachilla extension usually absent. Stamens 3, anthers 2.5–3 mm. Fl. and fr. Jul–Sep.

Grassy slopes in montane regions, sandy places near rivers, on waste ground; 100–3200 m. Hebei, Heilongjiang, Jilin, Nei Mongol, Qinghai, Shanxi, Xinjiang [SW Asia (Caucasus), Japan, Mongolia, Russia, Tajikistan].

This is an element from the *Calamagrostis epigeios* complex and is often included within that species.

5. *Calamagrostis epigeios* (Linnaeus) Roth, Tent. Fl. Germ. 1: 34. 1788.

拂子茅 fu zi mao

Perennial, tufted, rhizomatous; rhizomes spreading. Culms erect, 45–150 cm tall, 2–3 mm in diam., 4–7-noded, smooth or scabrid below panicle. Leaf sheaths smooth or scabrid; leaf blades flat or weakly inrolled, 15–30 cm, 4–8(–13) mm wide, adaxial surface and margins scabrid, abaxial surface smooth, apex finely acuminate; ligule 5–9 mm, oblong, lacerate. Panicle densely contracted, linear to lanceolate in outline, spike-like or interrupted, erect, 10–30 × 1.5–4 cm; branches erect or ascending, scabrid. Spikelets (4–)5–7 mm, silvery green or tinged light purple; glumes equal or upper glume slightly shorter, linear-lanceolate, scaberulous, keel scabrid, apex acuminate; callus hairs ca. 2 times length of lemma; lemma ca. 1/2 length of glumes, 3-veined, smooth, apex shortly 2-toothed; awn arising near middle of lemma back, (1.5–)2–3 mm, straight, scarcely projecting from glumes; palea ca. 2/3 length of lemma; rachilla extension absent or rarely present, glabrous. Stamens 3, anthers ca. 1.5 mm. Fl. and fr. May–Sep.

Damp places, especially riversides; 100–3900 m. Common in China [Japan, Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan; SW Asia, Europe].

This is a polymorphic, polyploid complex, in which some forms have been given separate infraspecific names. However, intermediates are common and such names are of very limited use.

This species provides forage and has soil-holding qualities.

- 1a. Spikelets 5–7 mm; lemmas 3–3.5 mm; awn 2–3 mm 5a. var. *epigeios*
- 1b. Spikelets 4–4.5 mm; lemmas ca. 2.5 mm; awn ca. 1.5 mm 5b. var. *parviflora*

5a. *Calamagrostis epigeios* var. *epigeios*

拂子茅(原变种) fu zi mao (yuan bian zhong)

Arundo epigeios Linnaeus, Sp. Pl. 1: 81. 1753; *Calamagrostis epigeios* var. *densiflora* Grisebach; *Calamagrostis epigeios* var. *sylvatica* T. F. Wang.

Panicle dense, interrupted, 10–30 cm. Spikelets 5–7 mm; lemma 3–3.5 mm; awn 2–3 mm; rachilla extension absent or rudimentary.

Moist ground near ditches and along riversides; 100–3900 m. Common in China [Japan, Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan; SW Asia, Europe].

A small, glabrous rachilla process is occasionally present (the basis of var. *sylvatica*), but this is of no taxonomic significance.

5b. *Calamagrostis epigeios* var. *parviflora* Keng ex T. F. Wang, Acta Phytotax. Sin. 10: 309. 1965.

小花拂子茅 xiao hua fu zi mao

Plants dwarfish. Panicle spikelike, 6–9 cm. Spikelets 4–4.5 mm, lemma ca. 2.5 mm; awn ca. 1.5 mm.

Moist ground near ditches and along riversides. Heilongjiang, W Sichuan (alpine regions) [E Russia].

Calamagrostis extremiorientalis (Tzvelev) Probatova (*C. epigeios* subsp. *extremiorientalis* Tzvelev; *C. epigeios* var. *extremiorientalis* (Tzvelev) Kitagawa), from the Russian Far East and NE China, has similar dimensions to this variety, but the awn arises further up the lemma back. It has not been possible to see any authentic material.

6. *Calamagrostis kengii* T. F. Wang, Acta Phytotax. Sin. 10: 312. 1965.

东北拂子茅 dong bei fu zi mao

Perennial, densely tufted. Culms 90–135 cm tall. Leaf sheaths glabrous; leaf blades linear, involute when dry, 25–35 cm, ca. 5 mm wide, adaxial surface very scabrid, abaxial surface smooth, margin scabrid; ligule 3–4(–7) mm, truncate or lacerate. Panicle lanceolate in outline, often lobed in lower half, 12–17(–22) × 1.2–1.5 cm. Spikelets 6–7 mm; glumes lanceolate-subulate, subequal, scabrid along keel, apex long acuminate; callus hairs 5.5–6.8 mm; lemma 4–5 mm, 3-veined, apex 2-toothed; awn arising from upper 1/3 of lemma back, 2.5–3 mm, straight; palea 3/4 as long as lemma; rachilla 0.5–0.8 mm, upper part or apex penicillate with a few or many long silky hairs. Fl. and fr. Jul–Aug.

• Forests, forest margins, moist places, waste ground. Heilongjiang, Jilin.

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