

26. Tribe ERIACHNEAE

鸚鵡草族 zhe gu cao zu

Wu Zhenlan (吴珍兰); Sylvania M. Phillips

Annuals or perennials. Leaf blades narrow; ligule a line of hairs. Inflorescence a terminal panicle. Spikelets all alike, slightly laterally compressed, florets 2 without a rachilla extension, disarticulating below each floret; glumes persistent, membranous to papery, of variable length, (1–)7–14-veined, acute to acuminate; florets similar, both fertile, dorsally compressed, narrowly elliptic; lemmas leathery to crustaceous or sometimes cartilaginous, (3–)5–9-veined, hairy, margins inrolled and clasping palea keels, apex entire, awnless or with a straight or curved awn. Caryopsis ellipsoid to linear. Leaf anatomy Kranz PS type; microhairs slender or stout. $x = (9), 10, 12$.

Two genera and ca. 40 species: mainly in Australia, a few species extending into S and SE Asia; one species in China.

This small tribe resembles *Isachneae* and *Panicaceae* in its embryo structure and indurate lemmas with inrolled margins. However, the combination of bisexual florets, hairy, awned lemmas, and Kranz leaf anatomy distinguishes it from both.

183. ERIACHNE R. Brown, Prodr. 183. 1810.

鸚鵡草属 zhe gu cao shu

Annual or perennial. Leaf blades mostly rolled. Panicle open, contracted or spikelike with solitary, pedicellate spikelets. Glumes subequal, rounded on the back, 1/2 as long to much exceeding the florets, papery with hyaline or scarious margins; floret callus short, obtuse; lemmas pilose, grooved or smooth, usually awned but sometimes merely acute; paleas usually similar to lemmas in texture and indumentum, entire or bidentate, keels rounded, usually distant, sometimes excurrent into awns, margins hyaline and embracing the caryopsis. Stamens 3, rarely 2. Caryopsis \pm ellipsoid, dorsally compressed.

About 40 species: Australia, a few species extending into SE Asia, India, and Sri Lanka; one species in China.

1. *Eriachne pallescens* R. Brown, Prodr. 184. 1810.

鸚鵡草 zhe gu cao

Aira chinensis Retzius; *Eriachne chinensis* Hance.

Perennial. Culms tufted, erect, wiry, glabrous, smooth, 20–60 cm tall, 5–8-noded. Leaf sheaths usually shorter than internodes, ciliate along margins and mouth; leaf blades stiff, convolute, papillose-pilose, 2–10 cm; ligule ca. 0.5 mm. Panicle open, 5–10 cm, branches inserted singly, very slender, smooth, glabrous, up to 5 cm. Spikelets purplish, 4–5.5 mm; glumes ovate-lanceolate, 3–4 mm, 9–10-veined, glabrous, sharply acute; lemmas 3–3.5 mm, densely hispid, apex constricted, bidentate, awned from sinus; awn erect, rather stout, subequal to lemma

body; palea equal to its lemma, dorsally hispid. Anthers 2, 2–2.4 mm. Caryopsis oblong, ca. 2 mm. Fl. and fr. May–Oct.

Dry stony hillsides, grassland, sometimes the dominant ground-cover. Fujian, Guangdong, Guangxi, Jiangxi [E India, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam; Australia].

The names *Aira chinensis* Retzius (1783) and *Eriachne chinensis* Hance (1861) are based on different types. Although *A. chinensis* is the earliest legitimate name for the species, its specific epithet cannot be transferred to *Eriachne* without creating a later homonym, which would be illegitimate. *Eriachne pallescens* is therefore the correct name for the species.

This is a good forage grass.

27. Tribe ARUNDINELLEAE

野古草族 ye gu cao zu

Sun Bixing (孙必兴 Sun Bi-sin), Wu Zhenlan (吴珍兰); Sylvania M. Phillips

Annual or perennial. Leaf blades usually linear; ligule very short, membranous, margin sometimes ciliate. Inflorescence a panicle, often large with numerous spikelets, primary branches frequently racemose, spikelets usually paired (in China), often immature at emergence. Spikelets all alike, narrowly lanceolate to ovate, slightly laterally or dorsally compressed, florets 1 or 2, falling entire or breaking up; glumes equal to spikelet or lower glume usually shorter, membranous to leathery, 3–5-veined, often tuberculate-setose; lower floret (when florets 2) staminate or barren, its lemma resembling upper glume, often persistent, 3–5-veined, usually with a narrow palea; upper floret (or single floret) bisexual, its lemma membranous, thinly leathery or cartilaginous, entire to 2-lobed, awned from apex or sinus, rarely awnless; awn geniculate with twisted column, or straight, sometimes deciduous. Caryopsis with linear or punctiform hilum. Leaf anatomy mainly Kranz MS type, including the genera in China.

Twelve genera and ca. 175 species: tropics of both hemispheres, but mainly in Africa and Asia; two genera and 25 species (ten endemic) in China.

- 1a. Spikelets with 1 floret, falling entire 184. *Garnotia*
 1b. Spikelets with 2 florets, breaking up at maturity 185. *Arundinella*

184. GARNOTIA Brongniart in Duperrey, Voy. Monde, Phan. 2: 132. 1832.

耳稈草属 er fu cao shu

Wu Zhenlan (吴珍兰); Sylvia M. Phillips

Berghausia Endlicher; *Miquelia* Arnott & Nees (1843), not Meisner (1838).

Annual or perennial. Culms stiffly erect and unbranched, or weak, geniculate and branching; nodes usually pubescent. Leaf blades linear to lanceolate; ligule short, membranous, lacerate or ciliate. Panicle usually contracted, narrow with appressed branches, infrequently branches widely spreading; spikelets commonly paired, sometimes solitary or in threes; pedicels unequal. Spikelets with 1 floret, narrowly lanceolate, dorsally compressed, base often with a tuft of short stiff hairs, these sometimes sparse or absent, disarticulating below spikelet; glumes as long as spikelet, subequal, lower slightly longer, thinly herbaceous, 3-veined, glabrous or hispid, acute to acuminate, awned or awnless; lemma about as long as upper glume, membranous, 1–3-veined, apex entire or 2-toothed, awned or rarely awnless; awn slender, straight, flexuous, or geniculate from base or with a brown twisted column; palea subequal to lemma, margins ciliate, auriculate at base. $2n = 20$.

About 30 species: India and Nepal eastward through SE Asia to Polynesia, Hawaii, and Australia (Queensland), one species in the Seychelles; five species (two endemic) in China.

1a. Lemma with geniculate awn; annual.

2a. Spikelets 4–6 mm, excluding awns; glumes often with tubercle-based hairs 1. *G. ciliata*

2b. Spikelets 2–4 mm, excluding awns; glumes glabrous, scabrid.

3a. Culm nodes hairy; leaf blades lanceolate, 5–15 mm wide 2. *G. tenella*

3b. Culm nodes glabrous; leaf blades linear, 3–6 mm wide 3. *G. yunnanensis*

1b. Lemma awnless or with straight awn; perennial.

4a. Panicle branches appressed or loosely ascending; culms 20–60 cm 4. *G. acutigluma*

4b. Panicle at maturity with stiffly spreading branches; culms 60–130 cm 5. *G. patula*

1. *Garnotia ciliata* Merrill, Philipp. J. Sci. 13: 130. 1918.

纤毛耳稈草 xian mao er fu cao

Garnotia ciliata var. *conduplicata* Santos; *G. ciliata* var. *glabriuscula* Santos; *G. conduplicata* (Santos) Santos.

Annual, tufted. Culms delicate, usually decumbent at base, rooting at lower nodes, 20–70 cm tall, nodes hispid. Leaf sheaths loose, usually longer than internodes, hispid with tubercle-based hairs or nearly glabrous; leaf blades narrowly lanceolate, fairly thick, flat or folded, 3–12 cm × 2–8(–11) mm, hispid or villous, margins wavy; ligule ca. 0.5 mm. Panicle narrow, 5–15 cm; branches widely spaced, up to 5 cm, stout, appressed to rachis; pedicels scaberulous. Spikelets 4–6 mm, base glabrous or shortly bearded; glumes villous or sparsely pilose to glabrous, hairs tubercle-based, apex acuminate or short awned; glume awns 0.5–3 mm; lemma faintly 1–3-veined, glabrous, awned from between 2 delicate acuminate lobes; awn geniculate, column ca. 2 mm, bristle 7–10 mm. Fl. and fr. Aug–Oct.

• Near streams, roadsides, moist places on rocks; 900–1000 m. Guangdong.

2. *Garnotia tenella* (Arnott ex Miquel) Janowski, Repert. Spec. Nov. Regni Veg. 17: 86. 1921.

脆枝耳稈草 cui zhi er fu cao

Berghausia tenella Arnott ex Miquel, Anal. Bot. Ind. 2: 22. 1851; *Garnotia brevifolia* Ohwi; *G. fragilis* Santos; *G. nitens* Santos; *G. tenuis* Santos (1950), not Keng ex S. L. Chen (1990).

Annual, tufted. Culms ascending or decumbent at base, 15–60 cm tall, often branched, rooting at lower node, nodes hispid or villous. Leaf sheaths loose, lower longer than inter-

nodes, usually glabrous, occasionally margins villous; leaf blades narrowly lanceolate, flat, thin, 5–15 cm × 5–15 mm, hispid, villous with tubercle-based hairs or shortly hairy, margins wavy; ligule 0.3–1.5 mm. Panicle narrow, 6–18 cm; branches loosely ascending, 1.5–7 cm, fascicled at lower nodes, paired or solitary toward apex; spikelets in pairs or threes; pedicels scabrid, appressed. Spikelets 2–4 mm, base very shortly hairy or glabrous; glumes equal or lower glume slightly longer, glabrous, scabrid, apex acute, acuminate or awned; glume awns 1–2.5 mm; lemma faintly 1-veined, typically awned from emarginate apex, lower spikelets in panicle occasionally awnless or mucronate; awn geniculate, column 2–3 mm, bristle ca. 7 mm. Fl. and fr. Aug–Oct.

Moist stony places on mountain slopes, near streams, shady places, dense forests; ca. 1700 m. Guangdong, Yunnan [Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

3. *Garnotia yunnanensis* B. S. Sun, J. Yunnan Univ. 21: 96. 1999.

云南耳稈草 yun nan er fu cao

Annual, tufted. Culms erect, unbranched or branching from lower nodes, 20–60 cm tall, 1–1.5 mm in diam., purplish red, nodes glabrous. Leaf sheaths smooth, glabrous, lower shorter than internodes; leaf blades linear, flat, 5–13 cm × 3–6 mm, abaxial surface glabrous, adaxial surface glabrous or scattered pilose; ligule ca. 0.7 mm. Panicle linear, 6–23 cm; branches erect, up to 8 cm, 3–4 at lower nodes; spikelets in pairs. Spikelets 3–5 mm, base shortly hairy; glumes equal or lower glume slightly shorter, glabrous, scabrid on veins, apex narrowly obtuse, awned; glume awns 0.5–3 mm; lemma obscurely veined, awned from 2-toothed apex, some spikelets in panicle with short straight awn, others geniculately awned; awn column ca. 2 mm, brown, bristle 7–9 mm. Fr. Oct.

• Roadsides, among rocks, wet places; ca. 1400 m. Yunnan (Menglian).

4. *Garnotia acutigluma* (Steudel) Ohwi, Bot. Mag. (Tokyo) 55: 393. 1941.

三芒耳稈草 san mang er fu cao

Urachne acutigluma Steudel, Syn. Pl. Glumac. 1: 121. 1854; *Garnotia caespitosa* Santos; *G. himalayensis* Santos; *G. khasiana* Santos; *G. tenuis* Keng ex S. L. Chen (1990), not Santos (1950); *G. kengii* S. L. Chen; *G. mindanaensis* Santos; *G. trisetata* Hitchcock; *G. trisetata* var. *decumbens* Keng.

Perennial, tufted. Culms erect or ascending from decumbent base, 20–60 cm tall, usually unbranched, rooting at nodes, nodes pubescent. Leaf sheaths often hirsute along collar and margins, otherwise glabrous; leaf blades variable, linear to narrowly lanceolate, flat or folded, 5–20(–35) cm × 2–7 mm, adaxial surface hispid or scabrid, hairs tubercle-based or not, abaxial surface usually glabrous; ligule 0.2–0.5 mm. Panicle narrow, 8–25(–40) cm; branches appressed or loosely erect or ascending; spikelets in threes at lower nodes, paired or solitary toward apex. Spikelets 3–5 mm, base usually conspicuously pilose; glumes subequal with lower slightly longer, scabrid on veins, apex acute to awned; glume awns 0.5–7 mm with lower glume longer awned; lemma 1–3-veined, awned; awn 8–15 mm, straight or slightly flexuous, capillary, uniform throughout. Fl. and fr. Aug–Dec.

Moist mountain slopes, moist shady places along streams, mixed forests; 300–1700 m. Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [Bangladesh, Bhutan, NE India, Indonesia, Malaysia, Myanmar, Philippines, N Vietnam; naturalized in Hawaii].

Garnotia kengii was published as a *nomen novum* for *G. tenuis* Keng ex S. L. Chen (1990), not Santos (1950).

5. *Garnotia patula* (Munro) Bentham, Fl. Hongk. 416. 1861.

耳稈草 er fu cao

Perennial, tussocky. Culms stiffly erect, (30–)60–130 cm tall, unbranched, nodes pubescent. Leaf sheaths keeled, longer than internodes, glabrous or thinly pilose; leaf blades linear, flat or folded, 15–60 cm × 4–12 mm, tapering to base and apex, glabrous to sparsely pilose, sometimes with tubercle-based hairs; ligule 2–5 mm. Panicle open, 15–40(–65) cm; branches stiffly divaricate, up to 12 cm, often rebranched, in threes near base, paired to solitary toward apex, varying from closely set and densely spiculate to widely spaced and sparsely spiculate.

Spikelets 3.7–6.3 mm, base shortly pubescent; glumes scaberulous on veins, apex acute, acuminate or awned, or only lower glume with a mucro; glume awns up to 7 mm, longer ones very fine; lemma 3-veined, apex acuminate, awned or awnless; awn to 15 mm, straight or undulate, very slender. Fl. and fr. Aug–Oct.

Valleys, forest margins, moist grassy slopes, moist field boundaries; 500–1000 m. Fujian, Guangdong, Guangxi, Hainan, Yunnan [E Myanmar, N Vietnam].

This species is quite different in habit from the others found in China. It is a much more robust plant, tussock forming, taller, and with a distinctive, open panicle of stiffly spreading branches.

- 1a. Glumes awned, awn of lower glume 2–8 mm; lemma awned, awn 7–15 mm 5a. var. *patula*
- 1b. Glumes acuminate or lower glume mucronate; lemma awnless or mucronate 5b. var. *mutica*

5a. *Garnotia patula* var. *patula*

耳稈草(原变种) er fu cao (yuan bian zhong)

Berghausia patula Munro, Proc. Amer. Acad. Arts 4: 362. 1860; *Garnotia drymeia* Hance; *G. maxima* Santos; *G. patula* var. *grandior* Santos; *G. patula* var. *hainanensis* Santos; *G. patula* var. *partitipilosa* Santos; *G. patula* var. *strictor* Santos; *G. poilanei* A. Camus.

Culms 60–130 cm tall. Glumes awned, awn of lower glume 2–8 mm. Lemma awned; awn 7–15 mm, slender, scaberulous, usually straight, rarely crinkled. Fl. and fr. Aug–Oct.

Valleys, woodland margins, moist grassy slopes, moist field boundaries; 500–1000 m. Fujian, Guangdong, Guangxi, Hainan [N Vietnam].

5b. *Garnotia patula* var. *mutica* (Munro) Rendle, J. Linn. Soc., Bot. 36: 387. 1904.

无芒耳稈草 wu mang er fu cao

Berghausia mutica Munro, Proc. Amer. Acad. Arts 4: 362. 1860; *Garnotia mutica* (Munro) Druce; *G. patula* var. *mucronata* L. C. Chia; *G. tectorum* J. D. Hooker.

Culms 30–100 cm tall. Glumes acuminate or lower glume with a mucro. Lemma acuminate, awnless or with a mucro to 1.5 mm. Fl. and fr. Sep–Oct.

Moist woodland margins, streams. Guangdong, Guangxi, Hainan, Yunnan [E Myanmar, N Vietnam].

185. ARUNDINELLA Raddi, Agrostogr. Bras. 36. 1823.

野古草属 ye gu cao shu

Sun Bixing (孙必兴 Sun Bi-sin); Sylvia M. Phillips

Perennial or annual, sometimes with scaly rhizomes. Leaf blades usually linear; ligule very short, membranous, a dense fringe of long hairs behind at base of blade. Panicle open or contracted, usually with simple racemelike primary branches; central axis smooth, scabrid or hispid on angles; spikelets paired; pedicels unequal, briefly connate. Spikelets with 2 florets, lanceolate to ovate, gaping, often purplish; lower floret staminate or barren, upper floret bisexual; rachilla disarticulating between florets; glumes unequal, upper as long as spikelet, often caudate, lower shorter, acute to caudate; lower lemma similar in texture to upper glume, often persistent, smooth, 3–5-veined, awnless, its palea hyaline; upper lemma terete, smaller than the lower, firmer in texture, scaberulous,

apex entire or 2-toothed, often awned, rarely awnless, occasionally lateral teeth also awned; awn usually geniculate with brown twisted column, sometimes caducous; palea margins sometimes auriculate; callus short, rounded, bearded. $x = 7$.

About 60 species: tropical and subtropical regions, but mainly in Asia; 20 species (eight endemic) in China.

- 1a. Upper lemma with an awn and 2 lateral bristles; pedicels often with stiff hairs at apex (if lateral bristles absent, lemma bidentate and pedicels with apical hairs).
- 2a. Awn almost straight; nodes concealed in leaf sheaths, bearded 1. *A. barbinodis*
- 2b. Awn clearly geniculate; nodes exposed, glabrous or bearded.
- 3a. Culms 0.2–0.5 m tall, 0.5–1.5 mm in diam.; leaf blades 1–2 mm wide; spikelets 4.5–5.5 mm 2. *A. nodosa*
- 3b. Culms (0.5–)1–2.5 m tall, 1.5–5 mm in diam.; leaf blades 3–9 mm wide; spikelets (3–)5–8 mm.
- 4a. Panicle loose; nodes usually glabrous (bearded in var. *tengchongensis* which has spikelets 3–3.5 mm); spikelets (3–)5–6.5 mm, usually glabrous 3. *A. setosa*
- 4b. Panicle contracted, dense; nodes woolly; spikelets 6–8 mm, usually with tubercle-based hairs 4. *A. khaseana*
- 1b. Upper lemma awnless or with a single awn, lateral bristles absent; pedicels without stiff hairs at apex.
- 5a. Upper lemma not awned, or awn very short and inconspicuous (2.5 mm or less).
- 6a. Upper lemma 2.5–3.5 mm; awn absent or a straight mucro up to 1.5 mm.
- 7a. Plant with spreading scaly rhizomes; culms 2–5 mm in diam.; leaf blade (4–)7–15 mm wide 5. *A. hirta*
- 7b. Plant with short rhizomes; culms 1–2 mm in diam.; leaf blade 4–6 mm wide 6. *A. fluviatilis*
- 6b. Upper lemma 1.3–2.5 mm; caducous awn present on some spikelets, geniculate, up to 2.5 mm.
- 8a. Culms to 2 m or more, stout; panicle 30–70 cm, lower branches 12–30 cm; spikelets 3.5–4 mm 7. *A. decempedalis*
- 8b. Culms to 1 m, more slender; panicle 7–30 cm, lower branches 2–7 cm; spikelets 2.5–3.5 mm 8. *A. bengalensis*
- 5b. Upper lemma awned, awn conspicuous, projecting from spikelet.
- 9a. Glumes setose with stiff tubercle-based hairs on veins; panicle densely contracted or spikelike, usually less than 12 cm.
- 10a. Axis of panicle densely pubescent; spikelets purplish 9. *A. hookeri*
- 10b. Axis of panicle scabrid; spikelets yellowish brown or grayish red.
- 11a. Leaf blades leathery, glabrous; culms branched at lower nodes; panicle branches less than 7 cm; spikelets yellowish brown 10. *A. flavida*
- 11b. Leaf blades papery, hispid; culms unbranched; panicle branches up to 18 cm; spikelets purplish 11. *A. tricholepis*
- 9b. Glumes glabrous or hispidulous on veins; panicle open or loosely contracted, (8–)15–60 cm.
- 12a. Culms 1–3 m; panicle 20–60 cm.
- 13a. Spikelets 2–2.8 mm 12. *A. parviflora*
- 13b. Spikelets 3.5–7 mm.
- 14a. Leaf blades 0.5–1.5 cm wide; panicle open or loosely contracted, central axis visible, branches ascending, loosely spiculate 13. *A. nepalensis*
- 14b. Leaf blades 1–2.5 cm wide; panicle dense, central axis concealed, branches suberect, densely spiculate 14. *A. cochinchinensis*
- 12b. Culms less than 1 m tall; panicle 5–30 cm (to 50 cm in *A. longispicata*).
- 15a. Panicle 30–50 cm, lowest branch to 20 cm 15. *A. longispicata*
- 15b. Panicle 5–30 cm, lowest branch to 8(–15) cm.
- 16a. Spikelets 6–7 mm; culms loosely tufted, with scaly rhizomes 16. *A. grandiflora*
- 16b. Spikelets 3.5–5.2 mm; culms densely tufted, with or without rhizomes.
- 17a. Panicle branches smooth or almost so; callus hairs 1/2 length of lemma; mountain meadows 17. *A. yunnanensis*
- 17b. Panicle branches usually scabrid or hispidulous; callus hairs 1/4–1/3(–1/2) lemma length; river banks and floodlands.
- 18a. Culms 15–35 cm tall; leaves mainly basal; nodes bearded; panicle branches almost smooth 18. *A. pubescens*
- 18b. Culms 30–80 cm tall; leaves cauline; nodes glabrous or pubescent; panicle branches hispidulous.
- 19a. Plant not rhizomatous; callus hairs 1/4–1/3 length of lemma 19. *A. rupestris*
- 19b. Plant strongly rhizomatous; callus hairs 1/2 length of lemma 20. *A. intricata*

1. *Arundinella barbinodis* Keng ex B. S. Sun & Z. H. Hu, Acta Bot. Yunnan. 2: 329. 1980.

毛节野古草 mao jie ye gu cao

Perennial, loosely tufted. Culms erect, herbaceous, 60–130 cm tall, 1–2 mm in diam., nodes densely bearded with appressed silky hairs. Leaf sheaths longer than internodes, sparingly puberulous to softly pilose, margins ciliate; leaf blades linear, flat, 20–35 cm × 3–7 mm, thinly pubescent on

both surfaces or abaxial surface glabrescent, apex acute; ligule ca. 0.5 mm. Panicle very loose, open, 30–35 cm; branches slender, 9–20 cm, patent or ascending, solitary or paired, spikelet pairs mostly distant; pedicels scabrid, without apical bristles. Spikelets 4.5–5.5 mm, widely gaping, pale with dark green veins; glumes glabrous, scabrid on veins; lower glume 3.5–4 mm, 3–5-veined, apex caudate; upper glume 7-veined, apex narrowly acuminate; lower floret staminate or barren, ca. 4 mm; upper floret 2.5–3 mm, lemma apex awned, awn flanked by 2 slender erect bristles; bristles 1–2 mm; awn almost straight, slightly twisted in lower part, pale throughout, 5–6 mm; callus hairs 1/3 length of lemma. Fl. and fr. Sep–Nov.

• Grassy slopes, roadsides, among rocks, light shade; 600–1500 m. Fujian, Guangdong, Hunan, Jiangxi, Zhejiang.

This grass has a softer habit than *Arundinella setosa*, with which it has been confused. It also differs in its bearded nodes, which are not exposed as in *A. setosa*, but are hidden within the overlapping leaf sheaths. The non-geniculate awn is another clear difference between the two species.

2. *Arundinella nodosa* B. S. Sun & Z. H. Hu, Acta Bot. Yunnan. 2: 327. 1980.

多节野古草 duo jie ye gu cao

Perennial, densely tufted. Culms erect, slender, hard, 20–50 cm tall, 0.5–1.5 mm in diam., 7–13-noded, nodes glabrous. Leaf sheaths shorter than internodes, densely tuberculate-hispid, glabrescent; leaf blades linear, 3–12 cm × 1–2 mm, with tubercle-based hairs on both surfaces, glabrescent; ligule 0.3–0.5 mm. Panicle sparse, 4–8 cm; central axis and branches scaberulous; branches few, 2.5–5 cm, laxly ascending; pedicels with a few long stiff hairs at apex. Spikelets 4.5–5.5 mm, green tinged purple; glumes setose along veins; lower glume 3.5–5 mm, 3-veined; upper glume 5-veined; lower floret staminate or barren, shorter than glumes; upper floret ca. 2 mm, lemma apex awned, awn flanked by 2 slender erect bristles; bristles 1.5–1.8 mm; awn geniculate, 4.5–5.5 mm; callus hairs 1/3 length of lemma. Fl. and fr. Aug–Dec.

• River banks among rocks, floodlands; ca. 500 m. Yunnan (Jinghong).

This is a slender species close to *Arundinella setosa*, found in the same riverine habitats as *A. fluvialis* and *A. rupestris*, but differing from the latter two by the lateral bristles flanking the geniculate awn on the upper lemma.

3. *Arundinella setosa* Trinius, Gram. Panic. 63. 1826.

刺芒野古草 ci mang ye gu cao

Perennial, tufted from a short rhizome with scaly buds. Culms erect or base geniculate, hard, (35–)60–180 cm tall, 1.5–4 mm in diam., sometimes branched, 3–7(–9)-noded, nodes glabrous. Leaf sheaths shorter than internodes, glabrous or infrequently tuberculate-hispid; leaf blades linear, 10–40(–70) cm × 3–9 mm, usually glabrous, sometimes tuberculate-hispid; ligule ca. 0.5 mm. Panicle open or somewhat contracted, 10–45 cm; central axis and branches scabrid; branches 5–20 cm, stiffly ascending or spreading, solitary or fasciculate, loosely spiculate; pedicels scabrid, apex usually with long stiff hairs. Spikelets 5–6.5 mm, green tinged purple; glumes glabrous or rarely

setose, scaberulous along veins; lower glume 4.5–5.5 mm, 3(–5)-veined; upper glume 5-veined; lower floret staminate or barren, shorter than glumes or equaling lower glume; upper floret 2.5–3 mm, lemma apex awned, awn flanked by 2 slender erect bristles; bristles mostly 1–2.5 mm; awn geniculate with brown twisted column, 6–10 mm; callus hairs 1/4–1/3 length of lemma. Fl. and fr. Aug–Dec.

Open forests, forest margins, grassy hillsides; 200–2300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia].

This is a variable species. The culms are slender or stout, and the leaves are occasionally hairy. The nodes are almost always glabrous, but can be bearded in very hairy specimens. The stiff bristles at the tips of the pedicels are usually obvious, but may sometimes be scanty or even absent. The length of the lateral bristles at the lemma tip is very variable. The bristles are frequently about as long as the column of the awn, but may be considerably shorter and in extreme cases almost absent. Forms without obvious bristles may be separated at varietal rank.

- 1a. Upper lemma with 2 lateral bristles arising at base of awn 3a. var. *setosa*
- 1b. Upper lemma without or with vestigial lateral bristles.
 - 2a. Spikelets 5–6 mm; awn with 1–2.5 mm column 3b. var. *esetosa*
 - 2b. Spikelets 3–3.5 mm; awn with ca. 0.5 mm column 3c. var. *tengchongensis*

3a. *Arundinella setosa* var. *setosa*

刺芒野古草(原变种) ci mang ye gu cao (yuan bian zhong)

Arundinella sinensis Rendle; *Danthonia neuroelytrum* Steudel.

Culm nodes glabrous; leaf sheaths loose; leaf blades usually glabrous. Panicle 15–45 cm, branches up to 20 cm; pedicels with long stiff hairs at apex. Spikelets 6–7 mm; glumes glabrous; upper lemma with 1–2.5 mm lateral bristles; awn 6–10 mm, geniculate, column 1.3–2.6 mm, obviously twisted; callus hairs 1/4–1/3 length of lemma. Fl. and fr. Aug–Dec.

Open forests, grassy slopes; 200–2300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia].

3b. *Arundinella setosa* var. *esetosa* Bor ex S. M. Phillips & S. L. Chen, Novon 15: 468. 2005.

无刺野古草 wu ci ye gu cao

Arundinella bidentata Keng; *A. hubeiensis* D. M. Chen (1983), not *A. hupeiensis* Keng & X. P. Liou (2002); *A. macaensis* Bor.

Culm nodes glabrous; leaf sheaths and blades glabrous or tuberculate-hispid. Panicle 15–45 cm; branches up to 20 cm; pedicels with long stiff hairs at apex. Spikelets 5–6 mm; glumes glabrous or setose; upper lemma without or with very short lateral bristles; awn 6–10 mm, geniculate, column 1.3–2.6 mm,

obviously twisted; callus hairs 1/4–1/3 length of lemma. Fl. and fr. Jul–Nov.

Dry mountain slopes, dry grasslands; 500–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Yunnan, Zhejiang [India, N Myanmar, Nepal].

This name was previously published by Bor (Grasses Burma, Ceylon, India, Pakistan, 425. 1960), but not validly so because no type was indicated.

Arundinella bidentata and *A. macauensis* are both based on exceptionally hairy specimens densely hispid in all their parts. *Arundinella bidentata* has short, blunt apical lemma lobes lacking bristles, whereas in *A. macauensis* the lobes are tipped by very short bristles. *Arundinella hupeiensis* Keng & X. P. Liou may also belong here, but it has not been possible to see the type (L. Y. Tai & C. H. Chien 465, holotype, N; isotype, HIB).

3c. *Arundinella setosa* var. *tengchongensis* B. S. Sun & Z. H. Hu ex S. L. Chen, Bull. Nanjing Bot. Gard. 1988–1989: 2. 1990.

腾冲野古草 *teng chong ye gu cao*

Culm nodes bearded; leaf sheaths and blades thinly pilose; leaf blades flat, 12–25 cm × 5–9 mm. Panicle elliptic in outline, 17–21 cm; branches 3–6 cm, ascending; pedicels with a few stiff hairs at apex. Spikelets 3–3.5 mm; glumes glabrous; upper lemma thinly cartilaginous, scabrid, without lateral bristles; awn 2.3–2.6 mm, column ca. 0.5 mm; callus hairs 1/2 length of lemma.

- Thickets on mountain slopes; ca. 2000 m. W Yunnan.

This variety has the setose pedicel tips of *Arundinella setosa*, but differs substantially in its bearded nodes, smaller spikelets, long callus hairs, lack of lemma lateral bristles, and awn structure. It will probably prove to be a distinct species when better known.

4. *Arundinella khaseana* Nees ex Steudel, Syn. Pl. Glumac. 1: 115. 1854.

滇西野古草 *dian xi ye gu cao*

Arundinella suniana S. M. Phillips & S. L. Chen.

Perennial forming large tussocks, base clothed in papery old sheaths. Culms stout, canelike, 1–2.5 m tall, 3–5 mm in diam., internodes long, 2–3-noded, nodes woolly with cream hairs. Leaf sheaths shorter than internodes, loose, pilose or glabrescent; leaf blades linear, flat or convolute, rigid, 15–30 cm × 5–8 mm, glabrous or hairy, apex finely acuminate; ligule 0.3–0.5 mm. Panicle usually contracted, dense, infrequently looser, 15–35 cm; central axis and branches scabrid-hispidulous; branches 2.5–10 cm, fasciculate in middle part, ascending; pedicels scabrid, apex often with stiff bristles. Spikelets 6–8 mm, purple; glumes setose on raised veins; lower glume 6–6.5 mm; upper glume as long as spikelet; lower floret staminate, as long as lower glume; upper lemma 2-lobed, awned from sinus, 2 slender erect bristles arising from lobes; bristles ca. 1 mm; awn geniculate with brown twisted column, 5–6 mm; callus hairs ca. 1/3 length of lemma. Fl. and fr. Apr–Aug.

Grasslands, often in wet meadows; 600–1500 m. Yunnan [NE India, N Myanmar].

5. *Arundinella hirta* (Thunberg) Tanaka, Bull. Sci. Fak. Terk. Kjusu Imp. Univ. 1: 196, 208. 1925.

毛秆野古草 *mao gan ye gu cao*

Perennial, loosely tufted with stout scaly rhizomes. Culms erect, 60–150 cm tall, 2–5 mm in diam., glabrous or less often tuberculate-hispid or densely pilose, nodes glabrous or bearded. Leaf sheaths usually tuberculate-hispid on margins, often thinly hispid throughout, less often densely pilose or completely glabrous; leaf blades broadly linear, 10–50 cm × (4–)7–15 mm, tuberculate-setose on margins only, or thinly hispid to densely pilose on both surfaces, or glabrous, apex long-acuminate; ligule 0.2–0.7 mm. Panicle contracted, narrowly elliptic-oblong in outline, 8–45 cm; central axis scabrid to setose; branches 5–20 cm, ascending, lower often with branchlets, densely spiculate; pedicels scabrid. Spikelets 3–4.8 mm, plump; glumes glabrous or rarely hispid, scabrid along prominent veins; lower glume 2.5–4 mm, 3(–5)-veined; upper glume 5–7-veined; lower floret subequal to spikelet; upper floret 2.5–3.5 mm, lemma apex acute to shortly mucronate, callus hairs nearly 1/2 length of lemma. Fl. and fr. Jul–Oct. $2n = 28, 34, 36, 56$.

Grassy mountain slopes, river banks, roadsides, field margins; 100–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, E Russia].

This polymorphic species exhibits much minor variation in the hairiness of culms, nodes, and leaves, and many infraspecific names have been applied. The name *Arundinella anomala* has been used in the past for plants with glabrous culms and glabrous to moderately hairy leaf sheaths, whereas plants with densely hairy culms and leaf sheaths have been referred to *A. hirta*. However, the protologue of *A. hirta* states that the culms are glabrous. In practice, the different combinations of hairiness of culms, nodes, and leaves make a subdivision into two entities impracticable on this character, even at infraspecific rank. Rarely variants occur with setose spikelets, and these can be recognized at varietal rank.

- 1a. Spikelets glabrous 5a. var. *hirta*
 1b. Spikelets with stiff tubercle-based hairs 5b. var. *hondana*

5a. *Arundinella hirta* var. *hirta*

毛秆野古草(原变种) *mao gan ye gu cao (yuan bian zhong)*

Poa hirta Thunberg in Murray, Syst. Veg., ed. 14, 113. 1784; *Arundinella anomala* Steudel; *A. hirta* subsp. *anomala* (Steudel) Tzvelev; *A. kengiana* N. X. Zhao; *Panicum mandshuricum* Maximowicz; *P. mandshuricum* var. *pekinense* Maximowicz; *P. williamsii* Hance.

Spikelets glabrous, lacking tubercle-based hairs.

Grassy mountain slopes, river banks, roadsides, field margins; 100–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan [Japan, Korea, N Myanmar, E Russia, N Vietnam].

5b. *Arundinella hirta* var. *hondana* Koidzumi, Bot. Mag. (Tokyo) 39: 303. 1925.

庐山野古草 *lu shan ye gu cao*

Arundinella hondana (Koidzumi) B. S. Sun & Z. H. Hu.

Spikelets setose with tubercle-based hairs.

Thickets on mountainsides. Jiangxi, Zhejiang [Japan, Korea].

6. *Arundinella fluviatilis* Handel-Mazzetti, Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz. 63: 111. 1926.

溪边野古草 xi bian ye gu cao

Perennial, densely tufted with a short rhizome. Culms 40–80 cm tall, 1–2 mm in diam., internodes and nodes glabrous. Leaf sheaths smooth, glabrous, shorter or longer than internodes, margins membranous, sometimes ciliate, especially at mouth; leaf blades linear, stiff, often involute, 5–15(–20) cm × 4–6 mm, glabrous on both surfaces; ligule 0.4–0.7 mm. Panicle narrow, 4–15 cm; central axis scabrid-hispidulous; branches 2–6 cm, erect or narrowly ascending; usually solitary; pedicels 1–3 mm, scabrid. Spikelets 3.5–4.5 mm, purplish; glumes smooth or almost so along veins; lower glume 2.6–3.5 mm, 5-veined; upper glume 5-veined; lower floret staminate; upper floret 2.6–3.4 mm, lemma shortly awned; awn straight, 0.3–1.5 mm; callus hairs usually ca. 1/2 length of lemma. Fl. and fr. Jul–Nov.

• Watersides, land flooded during summer, rock fissures, between stones; 200–500 m. Guizhou, Hubei, Hunan, Jiangxi, Sichuan.

This is a rather small, slender variant from the *Arundinella hirta* complex, typically lacking conspicuous, stout, scaly rhizomes and apparently confined to wet places by streams. *Arundinella hirta* var. *riparia* (Honda) T. Koyama, from Japan, is very similar and also occurs on rocky stream banks, but the upper floret has a longer awn to 3.75 mm.

Arundinella hirta (Thunberg) Tanaka var. *depauperata* (Rendle) Keng (Claves Gen. Sp. Gram. Prim. Sin. 230. 1957; *A. anomala* Steudel var. *depauperata* Rendle, J. Linn. Soc., Bot. 36: 341. 1904), described from Hubei, is another slender variant from rocky streamsides that will key out to *A. fluviatilis*. It differs from that species by its stoloniferous habit, leafy vegetative shoots with concealed nodes, and short callus hairs only 1/4 as long as the fertile floret. Occasionally specimens of typical, more robust, broad-leaved *A. hirta* also occur with short callus hairs. Possibly none of these slender variants merits separate specific status, but they do present a recognizable habit and occupy a particular ecological niche.

7. *Arundinella decempedalis* (Kuntze) Janowski, Repert. Spec. Nov. Regni Veg. 17: 84. 1921.

丈野古草 zhang ye gu cao

Panicum decempedale Kuntze, Revis. Gen. Pl. 2: 783. 1891; *Arundinella clarkei* J. D. Hooker.

Perennial. Culms very stout, erect, up to 2.5 m, 7–10 mm in diam., nodes densely pubescent, glabrescent. Leaf sheaths slightly inflated, tuberculate-hispid when young, margins ciliate; leaf blades linear-lanceolate, flat, rather rigid, 30–60 cm × 10–25 mm, glabrous or tuberculate-hispid, midrib broad, white, apex long acuminate; ligule 0.5–1 mm. Panicle loosely contracted, (20–)30–70 cm; central axis almost smooth; branches numerous, slender, 10–25 cm, ascending or spreading, fascicled or in whorls, loosely spiculate, scabrid; pedicels slender, scabrid. Spikelets 3.5–4 mm; glumes glabrous; lower glume ca. 3 mm, 3–5-veined, scabrid on veins; upper glume 5–7-veined, glabrous; lower floret staminate, equaling or shorter than lower glume; upper floret 2.2–2.3 mm, lemma apex narrowed into a poorly developed awn or awnless; awn soon deciduous, geni-

culate with short brown twisted column, up to 2.5 mm; callus hairs 2/5 length of lemma. Fl. and fr. Jul–Nov.

Grassy mountain slopes, hill thickets; 400–1500 m. W Yunnan [NE India, N Myanmar].

8. *Arundinella bengalensis* (Sprengel) Druce, Bot. Soc. Exch. Club Brit. Isles 4: 605. 1917 [“1916”].

孟加拉野古草 meng jia la ye gu cao

Panicum bengalense Sprengel, Syst. Veg. 1: 311. 1825; *Arundinella wallichii* Nees ex Steudel.

Perennial, with branching scaly rhizomes. Culms solitary, erect, moderately slender to stout, 50–120 cm tall, 1.5–4 mm in diam., nodes bearded or glabrescent. Leaf sheaths loose, densely tuberculate-hispid, rarely subglabrous; leaf blades broadly linear, flat, 6–30 cm × 5–15 mm, tuberculate-hispid on both surfaces, rarely subglabrous, midrib broad, white, apex finely acuminate; ligule 0.3–0.5 mm. Panicle narrowly cylindrical, dense, 6–30(–40) cm; central axis scabrid; branches spikelike, 2–7 cm, erect, arranged in whorls of (1–)2–6, secund, densely spiculate; pedicels short, densely scabrid. Spikelets not gaping, 2.5–3.5 mm; lower glume 2–2.5 mm, 3-veined, hispidulous on veins, apex acute; upper glume 5-veined, usually tuberculate-setose on veins; lower floret staminate, longer than lower glume; upper floret ca. 2 mm, lemma apex narrowed into a poorly developed awn; awn soon deciduous, geniculate with short brown twisted column, 1–1.5 mm; callus shortly pubescent. Fl. and fr. Aug–Oct.

Plains, hill thickets, moist meadows, river banks, ditches, forming open spreading patches; 100–1800 m. Guangdong, Guangxi, Guizhou, Hainan, S Sichuan, SE Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Thailand, Vietnam].

The panicle appears awnless at first sight, but close inspection will reveal very reduced, easily deciduous awns on at least some of the spikelets.

9. *Arundinella hookeri* Munro ex Keng, Nat. Centr. Univ. Sci. Rep., Nanking, Ser. B, 2(3): 50. 1936.

西南野古草 xi nan ye gu cao

Arundinella chenii Keng; *A. villosa* Arnott ex Steudel var. *himalaica* J. D. Hooker.

Perennial, tufted with a short knotty rhizome, base clothed with old papery sheaths. Culms erect or ascending, herbaceous, (18–)30–60(–90) cm tall, 1–3 mm in diam., internodes glabrous, 1–2-noded, nodes purple, glabrous or puberulent. Leaf sheaths shorter than internodes, densely hirsute; leaf blades mainly basal, linear-lanceolate, 2–20 cm × 2–12 mm, densely villous, apex acute; ligule 0.2–0.5 mm. Panicle contracted, oblong or narrowly pyramidal in outline, 3–12 cm; central axis densely pubescent; branches 1–2(–3) cm, suberect or ascending, inserted singly, spaced below, crowded above, densely spiculate; pedicels short, densely pubescent. Spikelets 5–7 mm, gray-green tinged purplish; glumes 5-veined, setose on veins, apex caudate; lower glume 3.5–5 mm; upper glume 4.5–6 mm; lower floret staminate, ± equaling lower glume; upper floret 2.5–3.5 mm, lemma apex emarginate, awned; awn geniculate with

brown twisted column, 2–5 mm; callus hairs 2/5 length of lemma. Fl. and fr. Oct–Nov.

Common on mountainsides, open forests, meadows; 1800–3200 m. W Guizhou, SW and W Sichuan, SE Xizang, Yunnan [Bhutan, NE India, N Myanmar, Nepal].

This slender species is recognized by its tufts of hairy leaves; compact panicle with short, broad branches of densely packed, large spikelets; setose, caudate glumes; and clearly visible, geniculate awns.

10. *Arundinella flavida* Keng, Nat. Centr. Univ. Sci. Rep., Nanking, Ser. B, 2(3): 44. 1936.

硬叶野古草 ying ye ye gu cao

Perennial, with stout scaly rhizomes. Culms erect, stiff, 50–120 cm, 2–3 mm in diam., branching at lower nodes forming leafy fascicles, nodes glabrous or pubescent. Leaf sheaths glabrous or shortly tuberculate-hispid, margins ciliate; leaf blades erect or stiffly divaricate, flat, leathery, (6–)15–30 cm × 5–10 mm, glabrous except for basal fringe and spaced bristles on lower margins, lacking an obvious midvein, apex acuminate; ligule ca. 0.2 mm. Panicle narrowly elliptic-oblong in outline, fairly dense, 9–15(–27) cm; central axis scabrid; branches 1.5–7 cm, narrowly ascending, lower often with branchlets; pedicels slender, finely scaberulous. Spikelets 4–5 mm, yellowish brown; glumes 3(–5)-veined, setose from large tubercles along the raised veins, apex narrowly acuminate; lower glume 3.1–3.7 mm; upper glume 3.8–4.1 mm; lower floret equal to lower glume or slightly longer; upper floret 2–2.5 mm, lemma apex entire, awned; awn geniculate with brown twisted column, 2.2–3 mm; callus hairs 1/4 length of lemma. Fl. and fr. Sep–Nov.

Dry slopes; ca. 500 m. Guangxi, Guizhou [Vietnam].

This is a lowland species with distinctive, smooth, leathery leaf blades and a rather dense panicle of setose, awned spikelets.

11. *Arundinella tricholepis* B. S. Sun & Z. H. Hu, Acta Bot. Yunnan. 2: 321. 1980.

毛颖野古草 mao ying ye gu cao

Perennial, with short scaly rhizomes. Culms erect, often solitary, 1–1.2 m tall, 2–3 mm in diam., 5–6-noded, internodes glabrous, nodes densely pubescent. Leaf sheaths sparingly tuberculate-hairy when young, glabrescent, margins ciliate; leaf blades linear-lanceolate, 15–40 cm × 5–15 mm, densely tuberculate-hairy on both surfaces; ligule up to 0.8 mm. Panicle contracted, 30–45 cm; central axis slightly scabrid; branches slender, up to 18 cm, ascending or spreading, loosely spiculate; pedicels slightly scabrid. Spikelets 3.5–4.2 mm, purplish; glumes setose along veins; lower glume ca. 4 mm, 5-veined; upper glume 5–7-veined; lower floret staminate, equal to lower glume or slightly longer; upper floret 2–2.3 mm, lemma awned; awn geniculate with brown twisted column, ca. 3 mm; callus hairs 1/4 length of lemma. Fl. and fr. Jul–Dec.

• Roadsides, mountain slopes; 1500–1700 m. W Yunnan.

This is a variant of *Arundinella nepalensis* distinguished by its sparsely setose glumes.

12. *Arundinella parviflora* B. S. Sun & Z. H. Hu, Acta Bot. Yunnan. 2: 319. 1980.

小花野古草 xiao hua ye gu cao

Perennial, tufted with short scaly rhizomes. Culms 0.6–1.2(–2) m tall, 2–5 mm in diam., often branched, internodes glabrous, nodes pubescent. Leaf sheaths glabrous; leaf blades broadly linear, 10–25 cm × 4–10 mm, sparingly tuberculate-hispid on both surfaces. Panicle loosely contracted, narrowly oblong in outline, 16–32 cm; central axis and branches somewhat scabrid; branches 5–13 cm, fasciculate or whorled, spikelets solitary in upper part; pedicels glabrous. Spikelets 2–2.5(–2.8) mm, purplish; glumes subequal, glabrous; lower glume 1.9–2.5 mm, 5-veined; upper glume as long as spikelet, 5-veined; lower floret staminate or bisexual, slightly longer than lower glume, mucronate or shortly awned; upper floret bisexual or often reduced, lemma 1.1–1.8 mm, apex awned; awn 1.3–2.8 mm, weakly geniculate with slightly twisted column; callus hairs ca. 1/3 length of lemma. Fl. and fr. Jul–Dec.

• Thickets at roadsides; 1000–1400 m. W Yunnan.

This species has remarkably small spikelets, and the sex of the two florets is variable, with the lower floret sometimes bisexual and the upper one reduced.

13. *Arundinella nepalensis* Trinius, Gram. Panic. 62. 1826.

石芒草 shi mang cao

Acratherum miliaceum Link; *Arundinella glabra* Nees ex Hooker & Arnott; *A. miliacea* (Link) Nees; *A. pilaxilis* B. S. Sun & Z. H. Hu; *A. pilomarginata* B. S. Sun; *A. virgata* Janowski.

Perennial, tufted with short scaly rhizomes. Culms erect, slender to stout, 0.9–2(–3) m tall, 2–7 mm in diam., simple or branched, internodes usually glabrous, 6–8-noded, nodes appressed silky pubescent. Leaf sheaths usually glabrous, occasionally tuberculate-pilose, usually bearded at mouth; leaf blades linear-lanceolate, stiff, flat or convolute, 10–50 cm × 5–18 mm, glabrous or thinly to densely tuberculate-pilose, apex long acuminate; ligule 0.3–0.5 mm. Panicle open or loosely contracted, 10–50 cm; central axis scaberulous or almost smooth; branches numerous, slender, 7–20 cm, subverticillate, simple or lowest branched, loosely spiculate; pedicels smooth or scabrid. Spikelets (3.5–)4–5.5 mm; pale green to dark purple; glumes usually glabrous; lower glume 3–3.5 mm, strongly 3-veined; upper glume 4.5–5.5 mm, faintly 5-veined; lower floret staminate or barren, equaling or longer than lower glume; upper floret 2–2.5 mm, lemma awned; awn geniculate with brown twisted column, 3.5–5 mm; callus hairs 1/4–1/3 length of lemma. Fl. and fr. Aug–Nov.

Mountain grasslands, hill thickets; 500–1800 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, SE Xizang, Yunnan [Bhutan, India, Myanmar, Nepal, Pakistan, Thailand, Vietnam; Africa, Australia].

This is a widespread species showing much variation in height and vigor, hairiness of the vegetative parts, and compactness of the panicle. The many-noded culms are characteristic, with silky-pubescent nodes and a banded effect from green internodes alternating with yellowish leaf sheaths, together with a panicle of numerous whorled branches.

Arundinella pilaxilis is based on a variant with tuberculate-hispid

culms. *Arundinella pilomarginata* is based on a specimen from Yunnan with the lower glume ciliate on one or both margins in some of the spikelets.

14. *Arundinella cochinchinensis* Keng, Nat. Centr. Univ. Sci. Rep., Nanking, Ser. B, 2(3): 24. 1936.

大序野古草 da xu ye gu cao

Perennial, loosely tufted with stout scaly rhizomes. Culms stout, erect, 1.5–3 m tall, 3–10 mm in diam., many-noded, nodes appressed silky-pilose. Leaf sheaths tuberculate-hispid when young, margin densely tuberculate-ciliate; leaf blades linear-lanceolate, flat, 30–80 cm × 10–25 mm, tuberculate-hispid or glabrescent, midrib broad, white, apex finely acuminate; ligule 1–1.5 mm. Panicle narrowly oblong in outline, dense, 30–60 × 5–10 cm; central axis scaberulous; branches numerous, 5–15 cm, suberect, crowded in whorls, densely spiculate; pedicels scaberulous. Spikelets 4–5 mm, green; glumes glabrous; lower glume 3–3.8 mm, 3–5-veined, scabrid along midvein; upper glume as long as spikelet, 3–5-veined; lower floret staminate, slightly longer than lower glume; upper floret ca. 2 mm, lemma awned; awn geniculate with brown twisted column, ca. 4 mm; callus hairs ca. 1/4 length of lemma. Fl. and fr. Jul.

Mountain grasslands, hill thickets; 500–1500 m. SW Guangxi, SW Guizhou, S Yunnan [Thailand, Vietnam].

This large, robust species is similar in habit to *Arundinella decempedalis*, and grows in the same habitats, but does not occur west of Yunnan. The panicle is denser, with rather shorter branches, and the spikelets have well-developed, persistent awns.

15. *Arundinella longispicata* B. S. Sun, J. Yunnan Univ. 21: 94. 1999 [“*longiscata*”].

长序野古草 chang xu ye gu cao

Perennial, loosely tufted, rhizomatous. Culms ascending, 35–90 cm tall, ca. 3 mm in diam., internodes glabrous, 5-noded, nodes bearded. Leaf sheaths longer than internodes, hispid with tubercle-based hairs; leaf blades linear, flat, 24–33 cm × 7–8 mm, tuberculate-hispid, midrib broad, white, margins scabrid, apex acuminate; ligule ca. 0.5 mm. Panicle large, open, 30–50 cm; central axis scabrid; branches up to 20 cm, in distant whorls, loosely ascending, bare in lower part, spikelet pairs spaced, spikelets not overlapping; pedicels scabrid, longer of pair twice spikelet length. Spikelets 4.7–4.8 mm, brownish green; glumes glabrous, midvein scabrid; lower glume ca. 4.2 mm, 3-veined; upper glume as long as spikelet, 5-veined; lower floret staminate, subequal to lower glume; upper floret ca. 2.4 mm, lemma apex awned; awn geniculate, ca. 3.5 mm, brown twisted column very short; callus hairs fine, woolly, almost 1/2 length of lemma. Fl. and fr. Jul–Sep.

• Streamsides; ca. 2000 m. Yunnan.

16. *Arundinella grandiflora* Hackel, Repert. Spec. Nov. Regni Veg. 8: 514. 1910.

大花野古草 da hua ye gu cao

Perennial, loosely tufted with scaly rhizomes. Culms erect, 0.6–1.2 m tall, 2–5 mm in diam., internodes glabrous, 3-noded, nodes blackish, bearded or glabrous. Leaf sheaths with tub-

ercle-based hairs when young, glabrescent; leaf blades linear-lanceolate, flat, rather rigid, 10–30 cm × 5–14 mm, glabrous on both surfaces, lacking an obvious midvein, margins scabrid or tuberculate-ciliate, apex acuminate; ligule ca. 0.5 mm. Panicle contracted, lanceolate in outline, 10–30 cm; central axis smooth, glabrous; branches up to 10(–15) cm, single or paired, densely spiculate, usually with branchlets; pedicels smooth. Spikelets 6–7 mm, purple or purplish red; glumes glabrous, smooth or veins scabrid; lower glume 3.8–4.5 mm, (3–)5(–7)-veined; upper glume as long as spikelet, 5-veined; lower floret staminate or barren, slightly longer than lower glume; upper floret 3–3.5 mm, lemma scabrid on back, apex awned; awn geniculate with brown twisted column, 5–6 mm; callus hairs ca. 1/3 length of lemma. Fl. and fr. Jul–Sep.

• Open forests, mountain slope thickets; 1700–2600 m. NC Yunnan.

This is a well-defined species with relatively short culms, broad leaf blades, a contracted inflorescence with secondary branching, smooth axis and pedicels, and large, glabrous spikelets.

17. *Arundinella yunnanensis* Keng ex B. S. Sun & Z. H. Hu, Acta Bot. Yunnan. 2: 326. 1980.

云南野古草 yun nan ye gu cao

Perennial, tufted, rhizome absent. Culms wiry, 30–50 cm tall, 1–1.5 mm in diam., often branched below, 4–7-noded, internodes and nodes glabrous. Leaf sheaths mostly shorter than internodes, glabrous; leaf blades firm, often involute, 3–10 cm × 1–3 mm, glabrous except adaxial surface at base; ligule almost absent. Panicle narrow, 8–19 cm; central axis and branches glabrous, smooth or slightly scabrid; branches spaced in lower part, 4–7.5 cm, erect, loosely spiculate; pedicels slightly scabrid. Spikelets 4.5–5.2 mm, glaucous or flushed purplish; glumes glabrous, smooth or scabrid on upper part of midvein; lower glume 2.5–3.5 mm, 3–5-veined; upper glume as long as spikelet, 5-veined; lower floret staminate, slightly longer than lower glume; upper floret 2.6–3 mm, lemma slightly scabrid on back, apex awned; awn geniculate with brown twisted column, 2–4 mm; callus hairs 1/2 length of lemma. Fl. and fr. Aug–Sep.

• Mountain meadows; ca. 3000 m. SE Xizang, NW Yunnan.

18. *Arundinella pubescens* Merrill & Hackel, Philipp. J. Sci. 2: 419. 1907.

毛野古草 mao ye gu cao

Arundinella caespitosa Janowski; *A. filiformis* Janowski; *A. hispida* (Humboldt & Bonpland ex Willdenow) Kuntze subsp. *humilior* (Hackel) Hackel; *A. humilior* (Hackel) Jansen.

Perennial forming small dense tuft, rhizomes absent. Culms erect, slender, 15–35 cm tall, ca. 1 mm in diam., internodes glabrous or thinly hirsute upward, 4–6-noded below middle, nodes bearded. Leaves mainly basal; leaf sheaths longer than internodes, glabrous to hirsute, margins ciliate, bearded at mouth; leaf blades linear or often inrolled, pale green, stiff, 6–16 cm × 2–6 mm, tuberculate-hirsute on both surfaces or glabrous, apex finely acute; ligule ca. 0.3 mm. Panicle open or loosely contracted, narrowly oblong to lanceolate in outline, 12–30 cm; central axis scabrid or sparingly pilose; branches erect to spreading, 1.5–4 cm, mostly single or paired; pedicels

smooth or scaberulous. Spikelets 3.5–4.5 mm, greenish or purplish; glumes glabrous; lower glume 2.3–2.5 mm, 3–5-veined, scabrid along veins; upper glume as long as spikelet, 5-veined; lower floret staminate, longer than lower glume; upper floret 2–2.2 mm, lemma apex 2-denticulate, awned; awn geniculate with brown twisted column, 3–6 mm; callus hairs 1/4 length of lemma. Fl. and fr. Apr.

Shady rock fissures along river banks. Taiwan [Philippines].

19. *Arundinella rupestris* A. Camus, Bull. Mus. Natl. Hist. Nat. 25: 367. 1919.

岩生野古草 *yan sheng ye gu cao*

Arundinella fluviatilis var. *pachyathera* Handel-Mazzetti; *A. rupestris* var. *pachyathera* (Handel-Mazzetti) B. S. Sun & Z. H. Hu.

Perennial, tufted, rhizomes absent, base with persistent papery sheaths. Culms very slender, erect or decumbent and rooting at base, 30–80 cm tall, ca. 1 mm in diam., 7–10-noded, nodes glabrous or pubescent. Leaf sheaths longer than internodes, thinly pilose, glabrescent, one margin ciliate, bearded at mouth; leaf blades linear or often involute, 5–20 cm × 2–5 mm, glabrous or adaxial surface thinly pilose, apex finely acuminate; ligule ca. 0.25 mm. Panicle loosely contracted, 7–15 cm; central axis and branches scabrid-hispidulous; branches narrowly ascending, 3–7 cm, loosely spiculate; pedicels scabrid. Spikelets 3.5–4 mm, yellowish green or purplish; glumes glabrous, smooth or midvein scabrid; lower glume 2.5–3.5 mm, 3–5-veined; upper glume as long as spikelet, 5-veined; lower floret staminate, as long as lower glume; upper floret 2.5–3 mm, lemma apex 2-

denticulate, awned; awn geniculate with brown twisted column, 2–5 mm; callus hairs 1/4–1/3 length of lemma. Fl. and fr. May–Oct.

River banks, floodlands, rock fissures; 300–500 m. Guangxi, Guizhou, Hunan [Thailand, Vietnam].

This is a lowland, riverine species with tufts of wiry, many-noded culms. The lower leaf blades and upper part of the lower sheaths are often broken away, exposing the nodes.

20. *Arundinella intricata* Hughes, Bull. Misc. Inform. Kew 1920(3): 112. 1920.

错立野古草 *cuo li ye gu cao*

Perennial, densely tufted, strongly rhizomatous. Culms erect or ascending, 35–80 cm tall, 1.5–2 mm in diam., 5–9-noded, nodes glabrous. Leaf sheaths longer than internodes, glabrous or pilose, one margin ciliate; leaf blades linear, 11–20 cm × 2–5 mm, glabrous or pilose, margins scabrid, apex finely acuminate; ligule ca. 0.5 mm. Panicle loosely contracted, narrowly elliptic in outline, 10–17 cm; central axis and branches scabrid-hispidulous; branches narrowly ascending, 3–6 cm, loosely spiculate; pedicels scabrid. Spikelets 3.8–4.5 mm, usually purple tinged; glumes glabrous, veins scaberulous; lower glume 2.5–3 mm, 3–5-veined; upper glume as long as spikelet, 5-veined; lower floret staminate, as long as lower glume; upper floret 2.2–3 mm, lemma apex subentire, awned; awn geniculate with brown twisted column, 2.7–5 mm; callus hairs ca. 1/2 length of lemma.

Cliffs, sandy river banks. Xizang [Bhutan, NE India].

This species is reputed to be a good soil binder.

28. Tribe ANDROPOGONEAE

高粱族 *gao liang zu*

Chen Shouliang (陈守良), Sun Bixing (孙必兴 Sun Bi-sin); Sylvia M. Phillips, Stephen A. Renvoize

Annual or perennial. Leaf blades linear, rarely lanceolate or filiform; ligule membranous, rarely ciliate. Inflorescence composed of fragile (infrequently tough) racemes, these arranged in a terminal panicle with elongate central axis, or more frequently subdigitate, paired or solitary, often axillary, subtended by spathes and spatheoles and gathered into a compound panicle. Racemes usually bearing paired spikelets (with a terminal triad), rarely spikelets single or in threes, usually one spikelet of a pair sessile and the other pedicelled, infrequently both pedicelled; rachis fracturing at maturity beneath each spikelet pair. Spikelets of a pair alike or more often dissimilar in shape and sex, when dissimilar sessile spikelet bisexual or female, pedicelled spikelet male or barren, rarely pedicelled spikelet vestigial or absent and sessile spikelet then apparently single; sometimes 1 or more of lowermost pairs in raceme infertile, resembling pedicelled spikelets, persistent (homogamous pairs); rachis internodes and pedicels filiform, linear or thickened, sometimes very stout and partially enclosing spikelet, falling with adjacent sessile spikelet, pedicelled spikelet falling separately; callus at base of sessile spikelet obtuse to pungent. Sessile spikelet with 2 florets, usually dorsally compressed; glumes enclosing florets, hardened, lower glume facing outward, very variable, convex or 2-keeled, upper glume boat-shaped, fitting between internode and pedicel; lower floret male or barren, lower lemma hyaline, 2-keeled, lower palea suppressed when floret barren; upper floret fertile, upper lemma hyaline, narrow, entire or 2-toothed, awnless or bearing a geniculate awn with twisted column, upper palea short or absent. Pedicelled spikelet usually lanceolate, papery, often smaller than pedicelled spikelet; pedicel resembling rachis internode, rarely absent or fused to internode. Leaf anatomy Kranz MS. $x = 5, 9$.

About 85 genera and ca. 1000 species: throughout the tropics, extending into warm-temperate regions; 41 genera (one or two introduced) and 204 species (42 endemic, seven or eight introduced) in China.

Members of this tribe can usually be readily recognized by their fragile racemes bearing paired spikelets, one sessile and the other pedicelled. The dispersal unit is thus composed of sessile spikelet, rachis internode, and pedicel (the pedicelled spikelet falls separately), all of which contribute to the protection of the seed and are frequently ornamented or modified.

In the more primitive members both spikelets of a pair are alike and fertile and are arranged in a terminal panicle. In most genera, however, the