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187. SACCHARUM Linnaeus, Sp. Pl. 1: 54. 1753.

甘蔗属 gan zhe shu

Chen Shouliang (陈守良); Sylvia M. Phillips

Erianthus Michaux; *Narenga* Bor; *Ripidium* Trinius (1820), not Bernhardi (1801).

Perennials, rhizomatous or tufted. Culms robust, up to 7 m tall. Leaf blades cauline, narrowly to broadly linear, midrib usually broad, white; ligule membranous, margin ciliolate. Inflorescence terminal, a large plumose panicle with elongate central axis, its branches bearing numerous hairy racemes; racemes fragile, sessile and pedicelled spikelet of a pair similar, both fertile; rachis internodes and pedicels filiform with cupular apex, pedicels resembling internodes but often shorter. Spikelets usually small, lanceolate, dorsally compressed or pedicelled spikelet more rounded on back; callus short, obtuse, bearded, often with long silky hairs surrounding the spikelet; lower glume membranous, thinly cartilaginous, or becoming leathery below, flat to broadly convex, veins indistinct, laterally 2-keeled; upper glume boat-shaped, resembling lower glume in texture and color; lower floret reduced to an empty hyaline lemma; upper floret bisexual, lemma entire, rarely 2-toothed, sometimes very narrow or small, with or without a short straight awn; stamens 2–3. $x = 10$.

Between 35 and 40 species: throughout the tropics and subtropics, but mainly in Asia; 12 species (two endemic, two introduced) in China.

Species with awns are sometimes separated as the genus *Erianthus*, but this is an artificial distinction. *Saccharum* includes the important crop plant *S. officinarum* (sugarcane).

The fluffy callus hairs are an efficient aid to wind dispersal.

1a. Spikelets awned, awn clearly exserted from glumes.
  2a. Awn 4–8 mm.
    3a. Panicle much branched; racemes with 3–4 joints; culms 2–3 m tall, glabrous below panicle ..... 1. *S. ravennae*
    3b. Panicle simple; racemes with numerous joints; culms 0.7–1.5 m tall, hirsute below panicle ..... 2. *S. formosanum*
  2b. Awn 10–28 mm.
    4a. Spikelets 4–6 mm; awn 13–28 mm ..... 3. *S. longesetosum*
    4b. Spikelets 2–3.5 mm; awn 10–15 mm ..... 4. *S. rufipilum*
1b. Spikelets awnless or a short awn concealed within glumes (if exserted, awn up to 6 mm and panicle brown).
  5a. Lower glume glabrous on back; callus hairs much longer than spikelet.
    6a. Plant rhizomatous; leaf blades 0.2–0.8 cm wide, narrowed to midrib at base; wild plant ..... 5. *S. spontaneum*
    6b. Plant clump-forming; leaf blades 1–6 cm wide, laminate to base; cultivated plant.
      7a. Culm apex and axis of panicle glabrous; rachis internodes glabrous; spikelets 3.5–4 mm ..... 6. *S. officinarum*
      7b. Culm apex and axis of panicle pilose; rachis internodes pilose; spikelets ca. 4.5 mm.
        8a. Culms 3–4 m tall, 3–4 cm in diam.; leaf blades ca. 100 × 3–5 cm ..... 7. *S. sinense*
        8b. Culms ca. 2 m tall, 1–2 cm in diam.; leaf blades ca. 50 × 1–2 cm ..... 8. *S. barberi*
  5b. Lower glume hairy on back (if subglabrous, panicle purplish); callus hairs equal to or shorter than spikelet.
    9a. Lower glume with white hairs, hairs 2–3 times longer than spikelet.
      10a. Culms 1.5–4(–6) m tall; rachis internodes 3–5 mm; upper lemma mucronate or with awn to 3 mm ..... 9. *S. arundinaceum*
      10b. Culms up to 7 m tall, rachis internodes 6–7 mm; upper lemma awnless ..... 10. *S. procerum*
    9b. Lower glume subglabrous or with brown hairs, hairs shorter than spikelet.
      11a. Inflorescence coppery or purplish brown; nodes white bearded; callus hairs white or purplish; lower glume subglabrous ..... 11. *S. narenga*
      11b. Inflorescence golden brown; nodes brown bearded; callus hairs golden brown; lower glume hirsute .... 12. *S. fallax*

1. Saccharum ravennae (Linnaeus) Linnaeus in Murray, Syst. Veg., ed. 13, 88. 1774.

沙生蔗茅 sha sheng zhe mao

Andropogon ravennae Linnaeus, Sp. Pl., ed. 2, 2: 1481. 1763; *Erianthus ravennae* (Linnaeus) P. Beauvois.

Perennial, forming large clumps. Culms (1.5–)2–3(–4) m tall, ca. 1 cm in diam., lower nodes yellowish villous, glabrous below panicle. Lower leaf sheaths hirsute with tubercle-based hairs, upper sheaths smooth; leaf blades 50–120 × 0.5–1.8 cm, woolly above ligule with long yellowish hairs, otherwise glabrous, margins scabrid, tapering to midrib at base, apex filiform; ligule a narrow rim, back villous with ca. 2 mm hairs. Panicle dense, lobed, 30–50 × 10–15 cm, grayish sometimes tinged pink, axis glabrous, branches much branched; racemes short, crowded, with 3–4 joints; rachis internodes 2–3 mm, silky villous. Spikelets 3–6 mm, purplish; callus hairs as long as spikelet; lower glume lanceolate, membranous, back glabrous or pilose with spreading hairs, keels scabrid, apex attenuate, minutely notched; lower lemma 3/4 as long to subequaling glumes; upper lemma elliptic, apex acute, awned; awn almost

straight, 4–8 mm. Anthers 3, 2.1–2.2 mm. Fl. and fr. autumn. 2*n* = 20, 60.

Sandy places; 1200–3000 m. Xinjiang [Afghanistan, NW India, Kazakhstan, Kyrgyzstan, Pakistan, Tajikstan, Turkmenistan, Uzbekistan; SW Asia, S Europe; introduced in America].

This is a polymorphic species showing much variability in the disposition of hairs on the glumes. Sometimes the spikelets are slightly dimorphic, with the sessile spikelet almost glabrous and the pedicelled one strongly pilose. This species has a more profusely branched panicle with shorter racemes than others in China.

The stout clumps are useful in erosion control. This grass is also used for forage when young.

2. Saccharum formosanum (Stapf) Ohwi, Acta Phytotax. Geobot. 11: 152. 1942.

台蔗茅 tai zhe mao

Erianthus formosanus Stapf, Bull. Misc. Inform. Kew 1898: 228. 1898; *E. pollinioides* Rendle; *Saccharum formosanum* var. *pollinioides* (Rendle) Ohwi.

Perennial, rhizomatous. Culms 0.7–1.9 m tall, 2–5 mm in diam., nodes glabrous, hirsute below panicle. Leaf sheaths longer or upper shorter than internodes; leaf blades flat or involute, 30–100 × 0.3–0.6 cm, pilose at base, otherwise glabrous, margins scabrid, base straight, apex long acuminate; ligule ca. 0.5 mm, margin ciliolate. Panicle obovate in outline, 15–24 cm, grayish white or pinkish, unbranched, axis 8–12 cm, shorter than racemes or subequaling lowest racemes, silky pilose; racemes 15–30, 11–12 cm, ascending or spreading; rachis internodes ca. 2.5 mm, silky villous, hairs 2–3 times spikelet length. Spikelets 3–3.6 mm; callus hairs short, ca. 0.5 mm; lower glume lanceolate, papery, brown, membranous and pallid near apex, back pilose with white or purplish hairs 2–3 times spikelet length, keels scabrid above, apex attenuate, minutely notched; lower lemma equaling glumes; upper lemma lanceolate, upper margins ciliate, apex subentire, awned; awn slender, 6–8 mm. Anthers 2, 1.5–2 mm. Fl. and fr. Aug–Nov.

● Open grassy hillsides. Fujian, Guangdong, Guizhou, Hainan, Jiangxi, Taiwan, Yunnan, Zhejiang.

Saccharum formosanum is closely related to *Eulalia fastigiata* (Nees ex Steudel) Stapf ex Bor (*S. fastigiatum* Nees ex Steudel; *Erianthus fastigiatus* (Nees ex Steudel) Andersson) from Bhutan, NE India, and Nepal. The latter species differs in its slightly larger (3.5–4.7 mm) spikelets, shorter spikelet and internode hairs not much exceeding the spikelet, and possession of 3 anthers. The two species are undoubtedly congeneric, but lie on the boundary between *Saccharum* and *Eulalia*, and have been placed in different genera in recent Floras. The inflorescence axis is shorter than is usual in *Saccharum*, but longer than in *Eulalia*, in which genus the racemes are usually digitate. On balance, the two species seem best placed in *Saccharum*.

3. Saccharum longesetosum (Andersson) V. Narayanaswami in Bor, Fl. Assam 5: 461. 1940 [*"longisetosum"*].

长齿蔗茅 chang chi zhe mao

Erianthus longesetosus Andersson, Öfvers. Kongl. Vetensk.-Akad. Förh. 12: 163. 1855; *Eccoilopus hookeri* (Hackel) Grassl; *E. longesetosus* (Andersson) Grassl; *Erianthus hookeri* Hackel; *E. rockii* Keng; *Saccharum hookeri* (Hackel) V. Narayanaswami; *S. longesetosum* var. *hookeri* (Hackel) U. Shukla.

Perennial. Culms 1–3 m tall, 0.5–1 cm in diam., many-noded, glabrous or hairy below panicle. Leaf sheaths longer than internodes, mouth bearded; leaf blades linear-elliptic, 30–50 × 1.5–2(–4) cm, glabrous, abaxial surface glaucous, tapering to base and apex, apex acuminate; ligule 2.3–2.5 mm. Panicle elliptic or oblong in outline, nodding, 15–40 cm, golden brown, branched, axis glabrous or pilose; racemes 3–10 cm; rachis internodes 2.5–4 mm, ciliate with long silky hairs. Spikelets 4–6 mm; callus hairs slightly shorter to longer than spikelet, white or pale yellow; lower glume lanceolate to elliptic-oblong, cartilaginous, golden brown, glossy, thinner and paler near apex, back glabrous or sparsely to densely pilose below middle, upper margins ciliate, apex bidenticulate; lower lemma slightly shorter than glumes; upper lemma linear-oblong, margins ciliate, shortly 2-toothed, awned; awn 1.3–2.8 cm. Anthers 3, 2–3 mm. Fl. and fr. Aug–Oct. 2*n* = 30.

Grassy hillsides; 300–2700 m. Guangxi, Guizhou, Sichuan, Xizang, Yunnan [Bhutan, N India, Myanmar, Thailand].

This species is variable in spikelet length and hairiness of the panicle. The callus hairs vary from slightly shorter to considerably longer than the spikelet, and the lower glume may be glabrous, thinly hairy, or densely hairy. Sometimes the pedicelled spikelet is hairier than the sessile spikelet. Particularly hairy specimens may be separated as var. *hookeri*, but there are many intermediate forms. The species as a whole is recognizable by its broad leaf blades glaucous below and evenly tapering to each end, together with a nodding, golden brown panicle of long-awned spikelets.

Neither combination *"Erianthus longisetosus* [sic] var. *hookeri* Bor" (Grasses Burma, Ceylon, India, Pakistan, 151. 1960) nor *"Saccharum longisetosum* [sic] var. *hookeri* Bor" (loc. cit. 212) was validly published because Bor proposed them simultaneously for the same taxon and based on the same type (alternative names; Saint Louis Code, Art. 34.2).

4. Saccharum rufipilum Steudel, Syn. Pl. Glumac. 1: 409. 1854.

蔗茅 zhe mao

Erianthus fulvus Nees ex Hackel (1889), not (Bory) Kunth (1829); *E. lancangensis* Y. Y. Qian; *E. pallens* Hackel; *E. rufipilus* (Steudel) Grisebach; *Miscanthus rufipilus* (Steudel) Grassl.

Perennial, tussocky. Culms up to 3.5 m tall, 0.3–0.7 mm in diam., nodes bearded, silky villous below panicle. Leaf sheaths longer than internodes, smooth, margin and mouth hairy; leaf blades flat or involute, tough, 20–60 × 0.5–1.5 cm, glabrous, abaxial surface farinose, narrowed to base, apex acuminate; ligule 1–3 mm, ciliate. Panicle narrowly oblong in outline, very dense, 18–45 cm, cream or pinkish with long hairs obscuring the spikelets, unbranched or shortly branched at base, axis villous; racemes 2–4(–9) cm; rachis internodes 1.5–2.5 mm, villous. Spikelets 2.5–3.5 mm; callus hairs ca. 3 times spikelet length; lower glume lanceolate, thinly cartilaginous, dark brown at maturity, back subglabrous, margins shortly ciliate or occasionally with longer hairs, apex palely membranous, sharply acuminate; lower lemma slightly longer than glumes, apex at-

tenuate, sometimes awnlike; upper lemma linear-lanceolate, entire, awned; awn 1–1.5 cm. Anthers (1–)3, 1–1.5 mm. Fl. and fr. Jun–Oct. 2*n* = 20.

Dry grassy and rocky hillsides; 1300–2600 m. Gansu, Guizhou, Henan, Hubei, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Myanmar, Nepal, Pakistan].

This species can be recognized by its elongate, narrow panicle of small, pointed, long-awned spikelets sunk among copious long hairs. Some specimens from Yunnan appear to have only one anther.

5. Saccharum spontaneum Linnaeus, Mant. Pl. 2: 183. 1771.

甜根子草 tian gen zi cao

Imperata spontanea (Linnaeus) P. Beauvois; *Saccharum spontaneum* var. *roxburghii* Honda.

Perennial, with long rhizomes. Culms 1–4 m tall, 0.4–1 cm in diam., 5–10-noded, often hollow in center, nodes bearded, softly pilose below inflorescence. Leaf sheaths pilose at mouth and margin, sometimes tuberculate-pilose throughout; leaf blades 60–180 × 0.2–0.8 cm, glaucous, glabrous, margins serrate, tapering to midrib at base, apex long attentuate; ligule brown, 2–8 mm. Panicle 20–40 cm, axis silky pilose; racemes 4–17 cm; rachis internodes 1.5–5 mm, pilose with long silky hairs. Spikelets 3–4 mm; callus hairs 3–4 times length of spikelet; lower glume papery and dark brown below middle at maturity, membranous and pallid above, back glabrous, margins ciliate above, apex acuminate; lower lemma ovate-lanceolate, equal to glumes; upper lemma linear or linear-oblong, awnless. Lodicules ciliate. Anthers 3, 1.5–2 mm. Fl. and fr. Jul–Sep. 2*n* = 40–128.

Mountain slopes, gravelly river beds, low grassy places, forming colonies; below 2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, Cambodia, India, Indonesia, Japan, Malaysia, Myanmar, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Turkmenistan, Vietnam; Africa, SW Asia, Australia, Pacific Islands].

There are numerous local strains comprising a complex series of chromosome numbers. This species hybridizes readily with cultivated sugarcane (*Saccharum officinarum*) and is used in sugarcane breeding programs. The name *S. spontaneum* var. *juncifolium* Hackel (*S. juncifolium* (Hackel) Janaki-Ammal) has been applied to extreme forms with the leaf blades narrowed to the midrib along their whole length.

This species is a good forage grass and an efficient soil binder.

6. Saccharum officinarum Linnaeus, Sp. Pl. 1: 54. 1753.

甘蔗 gan zhe

Perennial, forming tall clumps. Culms 3–6 m tall, 2–5 cm in diam., 20–40-noded, solid, nodes glabrous, glabrous below inflorescence. Leaf sheaths glabrous, pilose at mouth; leaf blades 70–150 × 4–6 cm, usually glabrous, midrib large, white, margins sharply serrate, base rounded, apex acuminate; ligule 2–3 mm, ciliate. Panicle 50–100 cm, axis glabrous but pilose at nodes; racemes 10–25 cm; rachis internodes 3–6 mm, glabrous. Spikelets 3.5–4 mm; callus hairs 2–3 times length of spikelet; lower glume oblong, uniformly firm throughout, buff-colored, back glabrous, margins membranous and ciliate above, apex acuminate; lower lemma oblong-lanceolate, subequal to glumes; upper lemma linear, awnless. Lodicules glabrous. Anthers 3. Fl. and fr. autumn. 2*n* = 80.

Cultivated. Fujian, Guangdong, Guangxi, Hainan, Sichuan, Taiwan, Xizang, Yunnan [SE Asia, Pacific Islands; widely cultivated elsewhere].

This is the commercial crop sugarcane, now widely cultivated in tropical regions of the world. Most present-day cultivars contain genes from *Saccharum spontaneum*. Sugar is extracted from the soft, central tissue of the culm. The dyed inflorescence is used as an ornament.

7. Saccharum sinense Roxburgh, Pl. Coromandel 3: t. 232. 1818.

竹蔗 zhu zhe

Saccharum officinarum Linnaeus subsp. *sinense* (Roxburgh) Burkill; *S. spontaneum* Linnaeus var. *sinense* (Roxburgh) Andersson.

Perennial. Culms 3–4 m tall, 3–4 cm in diam., many-noded, solid, softly pilose below inflorescence. Leaf blades ca. 100 × 3–5 cm, glaucous, glabrous, midrib large, white, margins serrate; ligule ca. 2 mm. Panicle 30–60 cm, axis with white silky hairs; rachis internodes pilose. Spikelets ca. 4.5 mm; callus hairs 2–3 times length of spikelet; lower glume lanceolate, dark brown; lower lemma oblong-lanceolate; upper lemma linear, 1.2–3 mm or reduced, awnless. Lodicules glabrous. Anthers 3, 1.5–2 mm. Fl. and fr. Nov–Mar. 2*n* = 106–120*.

● Cultivated. S Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [of cultivated origin; cultivated elsewhere].

Canes of this form of cultivated sugarcane were sent from Guangzhou to Calcutta in 1796, establishing its cultivation in India. Like *Saccharum barberi*, this is a primitive form of sugarcane of hybrid origin with introgression from wild species. A number of different clones exists, and these are usually included in *S. officinarum* as the Pansahi group, of which the best known is the Uba cane. The clone Tekcha, which was cultivated in Taiwan for many years, also belongs here. *Saccharum sinense* clones have been used in breeding programmes, and many modern cultivars have this species in their ancestry.

The leaf blades and uppermost part of the culms are used for forage. The whole culm except the apex is used for sugar and medicine.

8. Saccharum barberi Jeswiet, Arch. Suikerindustr. Ned.-Indie 12: 396. 1925.

细秆甘蔗 xi gan gan zhe

Saccharum officinarum Linnaeus subsp. *barberi* (Jeswiet) Burkill.

Perennial with short stout rhizomes. Culms solid, up to 2 m tall, 1–2 cm in diam., solid, nodes bearded, softly pilose below inflorescence. Leaf sheaths longer than internodes; leaf blades ca. 50 × 1–2 cm, margins serrate; ligule well developed. Panicle very large, axis with white silky hairs. Spikelets oblong; callus hairs longer than spikelet; lower glume oblong, glabrous, margin infolded; lower lemma slightly shorter than glumes; upper lemma narrowly linear, awnless. Fl. and fr. summer and

autumn. 2*n* = 82–124.

Cultivated. Guangxi, Taiwan, Yunnan [originating in Bangladesh and India].

This name covers a group of slender, relatively hardy, cultivated sugarcane clones originating in subtropical N India. These are ancient types not far removed from wild *Saccharum spontaneum* and now usually included in *S. officinarum* under cultivar names. They have mostly been superseded by modern, commercial varieties.

9. Saccharum arundinaceum Retzius, Observ. Bot. 4: 14. 1786.

斑茅 ban mao

Perennial, forming large clumps. Culms robust, (0.7–)1–6 m tall, 1–2 cm in diam., glabrous. Leaf sheaths glabrous or pubescent, ciliate at mouth and margins; leaf blades (60–)100–200 × 1–2 cm, abaxial surface glabrous, adaxial surface velvety with long soft hairs on broad lower midvein, margins serrate, base narrow, apex long attenuate; ligule 1–2 mm. Panicle (25–)30–80 cm, much branched, axis glabrous; racemes 3–5.5 cm; rachis internodes 3–5 mm, pilose with long silky hairs. Spikelets 3–4 mm, straw-colored tinged purple upward; callus hairs ca. 1 mm, shorter than spikelet; lower glume thinly cartilaginous, back pilose with silky hairs twice length of spikelet, keels scabrid, apex acuminate; upper glume usually glabrous in sessile spikelet, rarely thinly pilose, clearly pilose in pedicelled spikelet; lower lemma subequal to glumes; upper lemma lanceolate, apex mucronate or with awn to 3 mm. Lodicules glabrous. Anthers 1.8–2 mm. Fl. and fr. Aug–Dec. 2*n* = 30, 40, 50, 60.

Hill slopes, riversides, dry stream beds, often on sandy soils. S Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

It is necessary to look carefully, preferably using a disarticulated spikelet, in order to distinguish the basal, short callus hairs from the long, silky hairs of the rachis internodes, pedicels, and glumes.

This species is used for forage in China.

Saccharum arundinaceum is similar to *S. bengalense* Retzius, from N India and Pakistan. The latter species is distinguished mainly by its rather narrow panicle and much narrower leaf blades, which are channeled and consist mostly of midrib.

1a. Culms up to 6 m; upper glume of sessile spikelet glabrous ..... 9b. var. *arundinaceum*
1b. Culms up to 1.5 m; upper glume of sessile spikelet thinly pilose ..... 9b. var. *trichophyllum*

9a. Saccharum arundinaceum var. **arundinaceum**

斑茅(原变种) ban mao (yuan bian zhong)

Erianthus arundinaceus (Retzius) Jeswiet; *Ripidium arundinaceum* (Retzius) Grassl; *Saccharum barbicostatum* Ohwi.

Culms up to 6 m tall. Inflorescence usually large, 30–80 × 6–17 cm. Upper glume of sessile spikelet glabrous.

Hill slopes, or along riversides, dry stream beds, often on sandy soils. S Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

9b. Saccharum arundinaceum var. **trichophyllum** (Handel-Mazzetti) S. M. Phillips & S. L. Chen, Novon 15: 469. 2005.

毛颖斑茅 mao ying ban mao

Erianthus griffithii J. D. Hooker var. *trichophyllus* Handel-Mazzetti, Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz. 58: 154. 1921; *Erianthus trichophyllus* (Handel-Mazzetti) Handel-Mazzetti.

Culms up to 1.5 m tall. Inflorescence narrow, 25–50 × 4.5–6 cm. Upper glume of sessile spikelet thinly pilose with long silky hairs.

Open grassy places; 600–1900 m. Yunnan [India (Sikkim)].

This is a small variant, apparently of local distribution, distinguished mainly by the hairy upper glume of the sessile spikelet.

10. Saccharum procerum Roxburgh, Fl. Ind. 1: 248. 1820.

狭叶斑茅 xia ye ban mao

Erianthus procerus (Roxburgh) Raizada; *Ripidium procerum* (Roxburgh) Grassl.

Perennial, forming large clumps. Culms very robust, up to 7 m tall, glabrous. Leaf sheaths glabrous except at mouth and margins; leaf blades 60–150 × 2–5 cm, abaxial surface glabrous, adaxial surface velvety with long soft hairs on broad lower midvein, midrib white, thick, margins coarsely serrate, base narrow, apex long attenuate; ligule less than 1 mm. Panicle 30–80 cm, much branched, axis glabrous; racemes 4–5 cm; rachis internodes 6–7 mm, pilose with long silky hairs. Spikelets 3–4.3 mm, straw-colored or tinged purplish; callus hairs 1–2.5 mm, shorter than spikelet; lower glume thinly cartilaginous, back pilose with long silky hairs 2–3 times spikelet length, keels smooth, apex cuspidate; upper glume glabrous in sessile spikelet, pilose in pedicelled spikelet; lower lemma subequal to glumes; upper lemma lanceolate-oblong, apex apiculate, awnless. Lodicules glabrous. Anthers 3, ca. 1.6 mm.

Streams, valley bottoms; below 1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Xizang, Yunnan [Bangladesh, NE India, Myanmar, Nepal, Thailand].

This very large and ornamental species is used for forage and fiber. It intergrades with *Saccharum arundinaceum*, but tends to have more widely spaced spikelet pairs and lacks a definite awnlet on the upper lemma.

11. Saccharum narenga (Nees ex Steudel) Wallich ex Hackel in A. Candolle & C. Candolle, Monogr. Phan. 6: 119. 1889.

河八王 he ba wang

Eriochrysis narenga Nees ex Steudel, Syn. Pl. Glumac. 1: 411. 1854; *E. porphyrocoma* Hance; *Narenga porphyrocoma* (Hance) Bor; *Saccharum porphyrocomum* (Hance) Hackel; *Sclerostachya narenga* (Nees ex Steudel) Grassl.

Perennial from a short stout rhizome. Culms 1–3(–5) m tall, 5–8 mm in diam., nodes bearded, hirsute below panicle.

Leaf sheaths hispid with tubercle-based hairs; leaf blades 1–1.5 m × 0.6–2 cm, adaxial surface thinly hispidulous, abaxial surface glabrous, margins scabrid, tapering to midrib at base, apex attenuate; ligule 3–4 mm, rounded. Panicle narrowly elliptic-oblong in outline, 20–50 cm, copper brown or purplish brown, axis white-pilose; racemes arising almost from main axis, stiffly ascending, densely spiculate, lowest 6–10 cm; rachis internodes 1.7–2.5 mm, ciliate. Spikelets 2.5–3 mm, brown, glossy; callus hairs about equaling spikelet, white or purplish; lower glume narrowly lanceolate-oblong, leathery, back glabrous or thinly pilose below middle, keels scabrid and margins ciliate near apex, apex narrowly truncate; lower lemma equal to glumes; upper lemma narrow, truncate, awnless. Anthers 3, 1.2–1.5 mm. Fl. and fr. Aug–Nov. 2*n* = 30.

Open mountain slopes, dry grassy places. Anhui, Fujian, Guangdong, Guizhou, Henan, Jiangsu, Sichuan, Taiwan, Yunnan, Zhejiang [Bangladesh, India, Myanmar, Nepal, Pakistan, Thailand, Vietnam].

12. Saccharum fallax Balansa, J. Bot. (Morot) 4: 80. 1890.

金猫尾 jin mao wei

Erianthus chrysothrix Hackel; *E. fallax* (Balansa) Ohwi; *Narenga fallax* (Balansa) Bor; *N. fallax* var. *aristata* (Balansa) L. Liu; *Saccharum fallax* var. *aristatum* Balansa; *Sclerostachya fallax* (Balansa) Grassl.

Perennial. Culms 1.5–3 m tall, 8–12 mm in diam., nodes bearded with golden-brown hairs, hirsute below panicle. Leaf sheaths usually longer than internodes, margin brown-hirsute; leaf blades stiff, 40–80 × 1–1.5 cm, uppermost usually very small, glabrous or tuberculate-pilose, margins scabrid, base narrowed, apex acuminate; ligule ca. 1.5 mm. Panicle loosely oblong in outline, 30–60 cm, golden or ferruginous brown, axis pilose, bearded at nodes, primary branches sparsely branched in lower part; racemes flexuously ascending, densely spiculate, 8–16 cm; rachis internodes 2–2.4 mm, ciliate. Spikelets 3–4 mm, brown; callus hairs a little shorter than spikelet, brown; lower glume oblong-lanceolate, papery becoming herbaceous toward apex, back brown-hirsute, apex narrowly truncate; lower lemma 3/4 length of glumes; upper lemma oblong, obtuse and awnless or minutely mucronate, varying to shortly 2-toothed and awned from sinus; awn twisted, bent, up to 6 mm. Anthers 3, 1.6–2.2 mm. Fl. and fr. Aug–Oct.

Hill slopes; 400–1000 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [NE India, Indonesia, Laos, Myanmar, Vietnam].

This is a very handsome grass with a striking golden or rusty brown, softly hairy inflorescence. The racemes often contain a mixture of awned and awnless spikelets in varying proportions. Even adjacent spikelets may differ in this character, which is not related to whether the spikelet is sessile or pedicelled.

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