branchlets often subtended by a linear bract. Female spikelet: lemma inflated, shell- or urn-shaped, closed except for a tiny pore through which the 3 stigmas and palea apex protrude, prominently 5–9-ribbed, greatly enlarging after fertilization, coloring white, pink or purple; palea free or adnate to margins of lemma. Male spikelet: lemma conduplicate with free margins, 5–9-veined.

Four to six species: Old World tropics; one species in China.

1. Leptaspis banksii R. Brown, Prodr. 211. 1810.

囊稃竹 nang fu zhu

Leptaspis cumingii Steudel; *L. formosana* C. Hsu; *L. sessilis* Ohwi; *L. umbrosa* Balansa.

Perennial, caespitose from short rhizome. Culms erect, 40–60 cm tall. Leaf sheaths clustered at base, longer than internodes, strongly ribbed, laterally compressed, pubescent along keel upward; leaf blades lanceolate or linear-lanceolate, 15–30 × 1.5–3.5 cm, abaxial (upper) surface glabrous, adaxial (lower) surface pubescent, base attenuate into a 1–3 cm pseudopetiole, apex acute; ligule 0.3–0.5 mm. Panicle very narrow, 15–35 cm, densely hairy with short hooked hairs; branches inserted singly, erect or ascending, lowest 2–7 cm. Female spikelet: glumes subequal, broadly ovate, 1.5–2.3 mm, cuspidate; mature lemma globose, 3.5–5 mm, pink or purplish, asymmetrical, densely pubescent, hairs weakly hooked, 7-ribbed, ribs white or green; palea ca. 1/2 lemma length, base flat, upper part sulcate, apex 2-lobed. Male spikelet: lemma ovate, 2–3 mm, pubescent along veins; anthers 1.8–2.5 mm.

Forests, in shade. S Taiwan [Indonesia, New Guinea, Philippines; NE Australia, New Caledonia, Solomon Islands].

3. Tribe **EHRHARTEAE**

皱稃草族 zhou fu cao zu

Chen Shouliang (陈守良); Sylvia M. Phillips

Annuals or perennials. Leaf blades linear; ligule usually membranous. Inflorescence a panicle, often contracted or reduced. Spikelets with 3 florets, 2 lower florets reduced to sterile lemmas, upper floret fertile, laterally compressed, disarticulating above the glumes but not between the florets; glumes shorter than or exceeding florets, membranous, persistent; sterile lemmas subequal, leathery, keeled, often transversely wrinkled, the upper hooked at the base, enclosing fertile floret, sometimes awned; fertile lemma cartilaginous to leathery, keeled, 5–7-veined, entire, awnless; palea hyaline, 2-veined and 2-keeled, or occasionally only 1-veined or 3–5-veined; lodicules 2, elliptic or 2-lobed; stamens 1–4 or 6; stigmas 2. Caryopsis with small embryo and linear hilum. Leaf anatomy: non-Kranz; microhairs slender or apical cell short and inflated; fusoid cells absent. $x = 12$.

One genus and 38 species: warm-temperate regions of the Old World, mainly in Australia and South Africa; one species (introduced) in China.

36. **EHRHARTA** Thunberg, Kongl. Vetensk. Acad. Handl. 40: 217. 1779, nom. cons.

皱稃草属 zhou fu cao shu

Trochera Richard, nom. rej.

Description and distribution as for tribe.

1. Ehrharta erecta Lamarck, Encycl. 2: 347. 1786.

皱稃草 zhou fu cao

Perennials. Culms tufted, slender, straggling, 30–100 cm tall. Leaf sheaths glabrous or shortly hairy; leaf blades flat, rather thin, 6–16 × 0.2–1 cm, margins scabrous-pubescent, apex acute; ligule 3.8–5 mm. Panicle narrow, 5–20 cm; branches ascending or suberect. Spikelets oblong, 3–7 mm, pale green; glumes unequal, 5-veined, subacute; lower glume ovate, shorter than upper; upper glume ovate-oblong, about 1/2 spikelet length; lemmas papery, 7-veined, subacute, awnless; sterile lemmas narrowly elliptic-oblong, finely pubescent to almost glabrous; lower sterile lemma smooth or rarely transversely wrinkled near apex; upper sterile lemma transversely wrinkled, 2 frill-like appendages on basal hook, sometimes bearded at base; fertile lemma ovate, smooth, glabrous, obtuse; palea 2-veined. Stamens 6, anthers 0.7–1.2 mm.

Shady places along roadsides, introduced. Yunnan [native to Africa].

This native of Africa is adventive in both hemispheres and has recently become naturalized in Yunnan.

4. Tribe **ORYZEAE**

稻族 dao zu

Liu Liang (刘亮); Sylvia M. Phillips

Annuals or perennials. Leaf blades usually linear, rarely elliptic; ligule membranous. Inflorescence a panicle, occasionally with simple racemelike primary branches; spikelets all alike or the sexes separate. Spikelets with 1 floret, mostly laterally compressed, ra-

chilla extension absent, falling entire; glumes absent or reduced to small scales at base of floret; lemma membranous to leathery, keeled, 5–10-veined, entire, with or without a straight awn from the apex; palea resembling lemma but narrower, 3–7-veined with central keel. Lodicules 2. Stamens usually 6 (1 in *Chikusichloa*). Caryopsis linear to ovoid. Leaf anatomy: non-Kranz; microhairs slender (apical cell short and inflated in *Hygroryza*); fusoid cells present or absent. $x = 12$ (in *Zizania* 15, 17).

Thirteen genera and ca. 70 species: tropical and warm-temperate regions of the world; five genera and thirteen species (two introduced) in China.

This is a widespread tribe of aquatic and marshland grasses. It can be recognized by its multi-veined keeled palea, and usually by the presence of 6 stamens.

1a. Spikelet with 2 narrow scales below the floret ..... 37. *Oryza*
1b. Spikelet without scales below the floret (if rarely present, anther 1).
2a. Spikelets unisexual ..... 41. *Zizania*
2b. Spikelets bisexual.
3a. Floret sessile; leaf blades linear ..... 38. *Leersia*
3b. Floret stipitate.
4a. Leaf blades linear, 20–50 cm; stamen 1 ..... 39. *Chikusichloa*
4b. Leaf blades elliptic, 3–7 cm; stamens 6 ..... 40. *Hygroryza*

37. ORYZA Linnaeus, Sp. Pl. 1: 333. 1753.

稻属 dao shu

Annual or perennial, tufted or shortly rhizomatous. Culms erect or ascending. Leaf blades mainly cauline, broadly linear, flat; ligule membranous, sometimes long. Inflorescence a panicle, usually many-spiculate, often nodding, lower branches usually whorled, unbranched or sparsely branched, pedicels short. Spikelets with 3 florets, 2 lower florets reduced, sterile, upper floret fertile, strongly laterally compressed, disarticulating below sterile lemmas, persistent in cultivated species; glumes vestigial, remaining after disarticulation as a shallow lobed frill at pedicel apex; sterile florets reduced to 2 narrow lemmas at base of fertile floret; fertile lemma boat-shaped, keeled, leathery, closely papillose, sometimes spinulose, infrequently smooth, prominently 5-veined, apex awnless to long awned; awn straight; palea resembling lemma but narrower, 3-veined, apex beaked. Stamens 6. Caryopsis variable in shape, embryo 1/4 length of caryopsis, hilum linear, as long as caryopsis. $x = 12$.

Twenty-four species: warm parts of Africa, Asia, Australia, and Central and South America; five species (two introduced) in China.

Oryza includes rice, *O. sativa*, the staple cereal crop throughout most of S China and tropical Asia.

The narrow scales at the base of the fertile floret are sometimes regarded as glumes rather than sterile lemmas, the shallow frill at the pedicel apex being then regarded simply as pedicel tissue. However, aberrant forms of *Oryza sativa* have been reported with one or more of the basal scales well developed and even enclosing a grain, which appears to support their derivation from lemmas.

Oryza latifolia Desvaux is a species from Central and South America which has been reported in Beijing.

1a. Spikelets 5–6 mm, disarticulating at maturity; ligule 1–4 mm.
2a. Annual; ligule with dense matted hairs on abaxial surface; leaf blades up to 4 cm wide ..... *O. latifolia* (see note above)
2b. Perennial; ligule glabrous on abaxial surface; leaf blades 1–2(–3) cm wide.
3a. Lemma awned; plant 1.5–3 m tall; leaf blades 30–50 cm ..... 1. *O. officinalis*
3b. Lemma awnless; plant 0.3–0.7 m tall; leaf blades 5–20 cm ..... 2. *O. meyeriana*
1b. Spikelets 8–10 mm, persistent or disarticulating at maturity; ligule 17–40 mm (if shorter, spikelets persistent).
4a. Plant wild; spikelets disarticulating; anthers 4–6 mm ..... 3. *O. rufipogon*
4b. Plant cultivated; spikelets persistent; anthers 1–2.5 mm.
5a. Ligule of lower leaves up to 40 mm, acuminate; fertile floret papillose and spinulose ..... 4. *O. sativa*
5b. Ligule of lower leaves 3–5 mm, rounded; fertile floret glabrous ..... 5. *O. glaberrima*

1. Oryza officinalis Wallich ex Watt, Dict. Econ. Prod. India 5: 501. 1891.

药用稻 yao yong dao

Oryza latifolia Desvaux var. *silvatica* Camus; *O. minuta* Presl var. *silvatica* (Camus) Veldkamp.

Perennial. Culms erect or creeping and rooting at lower nodes, 1.5–3 m tall, 7–10 mm in diam. Leaf sheaths more than 3 times internode length, auricles inconspicuous; leaf blades thick, 30–50 × 2–3 cm, abaxial surface and margins scabrous, adaxial surface scattered villous, midrib stout, lateral veins inconspicuous, base narrowed, puberulous, apex acuminate; ligule 1–4 mm. Panicle loosely contracted, 30–50 cm, base often included in terminal sheath; branches 3–5 at lowest node, axils bearded, longest 10–25 cm, naked in lower half, apices of lowermost branches drooping. Spikelets broadly ovate-oblong, 4–5 mm, length 1.5–2 times width, yellowish green or tinged brownish black, deciduous; sterile lemmas linear-lanceolate, 1.5–2 mm, apex acuminate; fertile lemma papillose, keel and

marginal veins with hard glassy hairs; awn 5–10(–25) mm, slender, scabrid. Anthers 1.5–2.5 mm. Caryopsis reddish brown, ca. 3 × 2 mm. 2*n* = 24.

Low hills, alluvial plains, ditch banks; below 1000 m. Guangdong, Guangxi, Hainan, Yunnan [Bhutan, Cambodia, India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam].

The name *Oryza latifolia* Desvaux has sometimes been misapplied to this species in Asian literature.

Oryza officinalis is normally diploid, with the genome CC. It is closely related to the tetraploid *O. minuta* Presl from the Philippines (genome BBCC), and is sometimes placed as *O. minuta* var. *silvatica*. *Oryza minuta* differs only slightly morphologically, the lowermost panicle branches having a shorter naked portion and ascending at the tip. It also has proportionately narrower spikelets with length 2–2.7 × width.

2. Oryza meyeriana (Zollinger & Moritzi) Baillon subsp. **granulata** (Nees & Arnott ex Watt) Tateoka, Bot. Mag. (Tokyo) 75: 460. 1962.

疣粒稻 you li dao

Oryza granulata Nees & Arnott ex Watt, Dict. Econ. Prod. India 5: 500. 1891; *O. meyeriana* var. *granulata* (Nees & Arnott ex Watt) Duistermaat; *O. meyeriana* subsp. *tuberculata* W. C. Wei & Y. G. Lu.

Perennial, loosely tufted or sometimes shortly stoloniferous. Culms erect or ascending, 30–70 cm tall, ca. 1.5 mm in diam. Leaf sheaths shorter than internodes, auricles ciliate; leaf blades thin, 5–20 × 0.6–2 cm, inrolled when dry, abaxial surface smooth, adaxial surface scabrid along veins, margins scabrid, base rounded, narrowed at insertion, apex acuminate; ligule 1–2 mm. Panicle narrow, erect, 3–15 cm; branches 2–5, inserted singly, 2–6 cm, unbranched, ascending, bearing few spikelets. Spikelets elliptic-oblong, 5–6.5 mm, length 2–3 times width, light green or gray; sterile lemmas narrowly lanceolate, slightly unequal, ca. 1 mm; fertile lemma irregularly granular, flanks sulcate, apex obtuse or shortly 3-toothed, awnless. Anthers 3.5–4.5 mm. Caryopsis brown, 3–4 mm. Fl. and fr. Oct–Feb. 2*n* = 24.

Hill forests, on well drained soils and damp places by streams; (below 100–)500–1000 m. Guangdong, Guangxi, Hainan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand].

The typical subspecies occurs in Indonesia and the Philippines. It has longer, (6–)7–10 mm spikelets, with length 3–6 × width. The two subspecies grade into each other. *Oryza meyeriana* is easily distinguished, as it is the only wild rice in China without awns. It is unlike other members of the genus, both in its low stature and shady upland habitat requirements. Phylogenetically this species has been shown to be basal in the genus, with genome GG.

3. Oryza rufipogon Griffith, Not. Pl. Asiat. 3: 5. 1851.

野生稻 ye sheng dao

Oryza sativa Linnaeus subsp. *rufipogon* (Griffith) de Wet; *O. sativa* var. *rufipogon* (Griffith) G. Watt.

Perennial, aquatic, tufted or stoloniferous. Culms decumbent, rooting and tillering at nodes, sometimes floating, lower part spongy, 0.7–1.5 m or more tall. Leaf sheaths slightly inflated below, upper sheaths tight, glabrous, auricles conspicuous, glabrous or ciliate; leaf blades up to 40 × 1–2 cm, margins and midrib scabrid, apex acuminate; ligule up to 17 mm. Panicle spreading, 12–30 cm, eventually nodding; branches 1–5 at lowest node, longest 2.5–12 cm, axils bearded or glabrous. Spikelets oblong, 8–11 mm, length 2.7–4.5 times width, yellowish green with reddish apex, deciduous; sterile lemmas lanceolate, ca. 2.5 mm, apex acuminate; fertile lemma finely reticulate with scattered short glassy hairs, flanks slightly sulcate, keel stiffly ciliate, apex acuminate; awn 5–40 mm or more, stout, scaberulous. Anthers 4–6 mm. Caryopsis reddish brown, 5–7 mm. Fl. and fr. Apr–May and Oct–Nov. 2*n* = 24.

Riversides, ponds, streams, lotus ponds, rice fields, ditches, marshes; below 700 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Bangladesh, Cambodia, India, Indonesia, Malaysia, Myanmar, New Guinea, Sri Lanka, Philippines, Thailand, Vietnam; Australia (Queensland)].

This is a member of the AA genome complex, which includes cultivated rice, of which it is a progenitor. Members of this group hybridize quite easily and have contributed to the development of rice cultivars. *Oryza rufipogon* is perennial, but the most important difference from cultivated rice is the possession of readily deciduous spikelets.

4. Oryza sativa Linnaeus, Sp. Pl. 1: 333. 1753.

稻 dao

Oryza formosana Masamune & Suzuki; *O. sativa* var. *formosana* (Masamune & Suzuki) Yeh & Henderson.

Annual, aquatic, tufted. Culms erect, rooting at lower submerged nodes, 0.5–1.5 m tall. Leaf sheaths slightly inflated below, upper sheaths tight, glabrous, auricles falcate, ciliate; leaf blades 25–60 × 0.5–2 cm, glabrous, smooth or scabrid on both sides, margins scabrid, apex acuminate; ligule 10–40 mm. Panicle loosely contracted, up to 30 cm, nodding at maturity; branches 1–3 at lowest node, longest 2–12 cm, axils bearded or glabrous. Spikelets oblong to oblong-lanceolate, 7–10 mm, length 2–3.5 times width, persistent; sterile lemmas lanceolate, 1.5–4 mm, apex acuminate; fertile lemma papillose, spinulose, apex acuminate; awn very variable, slender or stout, up to 60 mm or more, scaberulous, sometimes absent. Anthers 1–3 mm. Caryopsis ovate or elliptic to cylindrical, 5–7 mm, whitish yellow to brown or blackish. 2*n* = 24.

Cultivated, mainly in flooded fields. Throughout most of China [domesticated in SE Asia].

This is the staple cereal rice, widely cultivated in tropical and warm-temperate parts of the world, and with many different cultivated races. It has the AA genome, and where *Oryza rufipogon* occurs as a weed in rice fields, intermediates may occur.

5. Oryza glaberrima Steudel, Syn. Pl. Glumac. 1: 3. 1853.

光稃稻 guang fu dao

Annual. Culms erect, spongy, up to 1 m tall. Leaf sheaths glabrous, leaf blades up to 30 × 1–1.5 cm, glabrous, margins scabrid; ligule 3–5 mm. Panicle loosely contracted, 20–25 cm; branches long, mostly simple. Spikelets obliquely inserted on pedicels, oblong, 7–9 mm, length twice width, yellow or dark brown, persistent; sterile lemmas lanceolate, 1.5–3 mm, mar-

gins sparsely ciliate, apex acuminate; fertile lemma smooth, glabrous or keel ciliate, apex with acute beak, usually awnless. Anthers ca. 1.5 mm. Caryopsis oblong, 5–6 mm. $2n = 24$.

Cultivated, in flooded fields. Hainan, Yunnan [domesticated in W tropical Africa].

This African rice is the other cultivated species in *Oryza*, but its cultivation is much less widespread than that of *O. sativa*. It belongs to the AA genome complex, but can be clearly distinguished from *O. sativa* and others of this complex in China by its much shorter, rounded ligule.

38. LEERSIA Solander ex Swartz, Prodr. 21. 1788, nom. cons.

假稻属 jia dao shu

Homalocenchrus Mieg, nom. rej.

Perennial aquatic or marsh plants, stoloniferous or rhizomatous. Culms slender, lower part creeping or floating, upper part erect or ascending, many-noded, nodes swollen, hairy. Leaf blades mainly cauline, linear-lanceolate; ligule papery. Inflorescence a lax panicle, branches often simple and racemelike, pedicels short. Spikelets with one floret, elliptic to narrowly oblong, straighter on one side, strongly laterally compressed, disarticulating from pedicel; glumes absent; lemma boat-shaped, keeled, firmly papery or leathery, prominently 5-veined, marginal veins interlocking with marginal veins of palea, keel scabrid to pectinate ciliate, apex acute or beaked, awnless; palea resembling lemma but narrower, 3-veined, keel ciliate. Stamens 1, 2, 3, or 6. Caryopsis oblong, embryo 1/3 length of caryopsis, hilum linear. $x = 12$.

About 20 species: tropical and warm-temperate regions of the world; four species in China.

This genus is distinguished from *Oryza* only by the absence of sterile lemmas.

1a. Stamens 6; panicle 5–12 cm, branches without branchlets, bearing spikelets to near base.
2a. Spikelets 3–4.5 mm, lateral veins of lemma minutely spinulose; panicle branches slender, terete ..... 1. *L. hexandra*
2b. Spikelets 4.5–6 mm, lateral veins of lemma smooth; panicle branches thick, flattened ..... 2. *L. japonica*
1b. Stamens 3; panicle 10–20 cm, branches with branchlets, lower part long naked.
3a. Spikelets elliptic-oblong, 5–6 mm, surface strigillose ..... 3. *L. oryzoides*
3b. Spikelets narrowly oblong, 6–8 mm, surface minutely hispidulous ..... 4. *L. sayanuka*

1. Leersia hexandra Swartz, Prodr. 21. 1788.

李氏禾 li shi he

Leersia australis R. Brown; *L. parviflora* Desvaux.

Perennial with well-developed stolons and slender rhizomes. Culms decumbent, rooting at lower nodes, erect shoots up to 50 cm or more tall, nodes retrorsely pubescent. Leaf sheaths shorter than internodes, smooth or scabrid; leaf blades flat or sometimes rolled, 5–12 × 0.3–0.6 cm, abaxial surface scabrid on midrib, base contracted, apex sharply acute; ligule 1–3 mm, truncate. Panicle lanceolate-oblong in outline, 5–10 cm, exserted; branches inserted singly, ascending, 4–5 cm, unbranched, slenderly terete or triquetrous, densely clothed to near base with closely overlapping spikelets. Spikelets narrowly elliptic to elliptic-oblong, 3–4 mm, pale green or purple tinged; lemma conspicuously pectinate-hispid on keel, lateral veins and sometimes surface sparsely spinulose, margins shortly hispid, apex contracted into a short obtuse beak. Stamens 6, anthers 2–2.5 mm. Fl. and fr. May–Dec. $2n = 24, 48$.

Slow-moving shallow water of lake margins, ditches, and depressions, marshlands, sometimes forming floating mats. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan [Bangladesh, Bhutan, India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, America, Australia].

This is a serious weed of rice fields in tropical regions.

2. Leersia japonica (Makino ex Honda) Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 7. 1930.

假稻 jia dao

Homalocenchrus japonicus Makino ex Honda, Bot. Mag. (Tokyo) 39: 37. 1925; *Leersia sinensis* K. S. Hao.

Perennial, loosely tufted. Culms decumbent, rooting at lower nodes, upper part geniculately ascending, 60–80 cm tall, nodes densely retrorsely hispid. Leaf sheaths shorter than internodes, scabrid; leaf blades flat, 6–15 × 0.4–0.8 cm, scabrid or abaxial surface smooth, base contracted, apex sharply acute; ligule 2–3 mm, truncate. Panicle elliptic to ovate in outline, 9–12 cm, exserted; branches inserted singly, stiffly ascending or spreading, 4–7 cm, unbranched, thick, slightly flattened, smooth, clothed to near base with approximate or slightly overlapping spikelets. Spikelets lanceolate-oblong, 4.5–6 mm, pale green tinged brownish red; lemma pectinate-hispid on keel only, surface smooth, margins minutely spinulose, apex contracted into a narrowly obtuse beak. Stamens 6, anthers 2.5–3 mm. Fl. and fr. summer and autumn. $2n = 96$.

Ponds, flooded fields, wet streamsides, ditch banks, lake shores. Anhui, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Shaanxi, Shandong, Sichuan, Yunnan, Zhejiang [Japan, S Korea].

3. Leersia oryzoides (Linnaeus) Swartz, Prodr. 21. 1788.

蓉草 rong cao

Phalaris oryzoides Linnaeus, Sp. Pl. 1: 55. 1753; *Asprella oryzoides* (Linnaeus) Lamarck; *Homalocenchrus oryzoides* (Linnaeus) Haller; *Oryza oryzoides* (Linnaeus) Brand & W. D. J. Koch.

Perennial, loosely tufted, with slender rhizomes. Culms weak, decumbent, rooting at lower nodes, upper part up to 120 cm tall, branching near base, scabrid below panicle, nodes

retrorsely hispid. Leaf sheaths longer to slightly shorter than internodes, the upper retrorsely spinulose; leaf blades thin, 7–30 × 0.6–1 cm, scabrid on both surfaces, margins scabrid and spinulose, apex acuminate; ligule 1–2 mm, truncate. Panicle lax, ovate in outline, 10–20 cm; branches 1–3 per node, spreading, up to 10 cm, flexuous, very slender, scabrid, lower part long naked, upper part with branchlets bearing spikelets overlapping along one side of branchlets. Spikelets elliptic-oblong, 5–6 mm, whitish with green veins; lemma conspicuously pectinate-hispid on keel and margins, surface strigillose, sometimes sparsely, apex abruptly contracted, subacute. Stamens 3, anthers 1.5–2 mm. Fl. and fr. Jun–Sep. 2*n* = 48, 60.

Wet river banks, marshy places; 400–1100 m. Fujian, Hainan, Heilongjiang, Hunan, Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia (Caucasus), Europe, North America; introduced in Australia].

This widespread species has a more temperate distribution than *Leersia hexandra*. The panicles are sometimes produced only within inflated upper leaf sheaths, which remain included and bear cleistogamous spikelets with much smaller, 0.5 mm anthers. These enclosed panicles are produced under cooler conditions.

4. Leersia sayanuka Ohwi, Acta Phytotax. Geobot. 7: 36. 1938.

秕壳草 bi ke cao

Homalocenchrus oryzoides (Linnaeus) Haller var. *japonicus* (Hackel) Honda; *Leersia hackelii* Keng; *L. oryzoides* (Linnaeus) Swartz var. *japonica* Hackel; *L. oryzoides* subsp. *japonica* (Hackel) T. Koyama.

Perennial, tufted, with rhizomes. Culms ascending, 30–70 cm tall, nodes retrorsely hispid. Leaf sheaths retrorsely spinulose; ligule 1–2 mm, truncate; leaf blades grayish green, 7–10(–20) × 0.5–1 cm, margins scabrid; ligule ca. 0.5 mm, truncate. Panicle lax, ovate in outline, up to 20 cm, base often enclosed in terminal leaf sheath; branches inserted singly, spreading, up to 10 cm, slenderly triquetrous, scabrid, branched or not, lower part long naked. Spikelets narrowly oblong, 6–8 mm, pale green, whitish along keel; lemma hispid on keel, surface sparsely hispidulous, apex abruptly contracted, obtuse. Stamens 3(or 2), anthers 1–2 mm. Fl. and fr. autumn.

Forests, streamsides, lake shores, moist grassy places. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Jiangsu, Shandong, Zhejiang [Japan, Korea].

This species is very close to *Leersia oryzoides* and is not completely distinct from it. It can usually be recognized by its longer, less conspicuously hispid spikelets. *Leersia sayanuka* is not known to produce panicles with cleistogamous spikelets in the leaf axils.

39. CHIKUSICHLOA Koidzumi, Bot. Mag. (Tokyo) 39: 23. 1925.

山涧草属 shan jian cao shu

Perennial. Culms tufted, erect, unbranched. Leaf sheaths longer than internodes; leaf blades linear or broadly linear, with transverse veinlets; ligule membranous. Panicle lax, open. Spikelets with 1 floret, weakly dorsally flattened at anthesis, becoming terete at maturity, floret borne upon a long slender stipe derived from floret callus, disarticulating at base of stipe; glumes usually absent, sometimes 2 minute vestiges at stipe base; lemma membranous, strongly 5–7-veined, apex acute or awned; palea slightly shorter than lemma, (2–)3(–5)-veined. Stamen 1. Caryopsis fusiform, embryo small, hilum linear, slightly shorter than caryopsis.

Three species: Indonesia (Sumatra) to Japan; two species in China.

The species of this genus are apparently rare, but may be overlooked in moist places in the forests where they grow. The third species in the genus, *Chikusichloa brachyathera* Ohwi, is known only from the Ryukyu Islands. This is a shorter species with culms up to 70 cm and a shorter, 1.5–2 mm awn.

1a. Spikelets awnless; basal stipe 1–2 mm; leaf blades 1.5–2.5 cm broad ..... 1. *C. mutica*
1b. Spikelets awned; basal stipe 4–6 mm; leaf blades 0.6–1 cm broad ..... 2. *C. aquatica*

1. Chikusichloa mutica Keng, J. Wash. Acad. Sci. 21: 527. 1931.

无芒山涧草 wu mang shan jian cao

Culms 60–100 cm tall, 3–4 mm thick. Leaf sheaths smooth, glabrous; leaf blades broadly lanceolate, flat or conduplicate, 20–50 × 1.5–2.5 cm, glabrous, midrib pronounced on abaxial surface, margins scaberulous, apex acuminate; ligule 4–5 mm. Panicle lax, open, up to 50 × 15 cm; branches rather distant, usually solitary, ascending to widely spreading, smooth. Spikelets 5–7 mm (including stipe); callus stipe 1–2 mm, scabrous, slightly curved, basal subulate glume vestiges up to 1.5 mm occasionally present; lemma body lanceolate, ca. 4 mm, 5-veined, spinulose along veins, sulcate between veins, apex acuminate, awnless; palea narrowly lanceolate, 3-veined, spinulose along veins. Anther 1.5–2 mm. Caryopsis dark brown, ca. 2 mm. Fl. and fr. Aug–Oct.

Damp streamsides in forests. Guangdong, Guangxi, Hainan [Indonesia (Sumatra)].

2. Chikusichloa aquatica Koidzumi, Bot. Mag. (Tokyo) 39: 23. 1925.

山涧草 shan jian cao

Culms 90–150 cm tall, 3–6 mm thick. Leaf sheaths smooth, glabrous, keeled; leaf blades linear, flat, 30–50 × 0.6–1 cm, scabrous on both surfaces, narrowed toward base, apex long acuminate; ligule 1.5–2.5 mm. Panicle large, loose, 30–50 cm; branches usually solitary, ascending to spreading, smooth. Spikelets 10–17 mm (including stipe and awn), tinged purplish; callus stipe 4–6 mm, spinulose, lacking glume vestiges; lemma body lanceolate to narrowly ovate, ca. 4 mm, 5-veined, spinulose along veins, apex acuminate, awned; awn 4–6 mm, scabrous; palea narrowly lanceolate, 3-veined, spinulose along veins. Anther 1.2–1.5 mm. Caryopsis yellowish brown, 2–2.5 mm. Fl. and fr. Sep–Oct. 2*n* = 24.

Wet valleys, streamsides. Jiangsu (Yixing) [Japan].

40. HYGRORYZA Nees, Edinburgh New Philos. J. 15: 380. 1833.

水禾属 shui he shu

Perennial, aquatic, stoloniferous, numerous feathery adventitious roots arising from nodes. Culms floating, spongy, much branched. Leaf sheaths inflated, bladderlike, with transverse veinlets; leaf blades ovate-lanceolate; ligule short, membranous. Inflorescence few-spiculate panicle, base enclosed by uppermost leaf sheath. Spikelets with 1 floret, laterally compressed, floret borne upon a long slender stipe derived from floret callus, disarticulating at base of stipe, disarticulation point marked by a brown line; glumes absent; lemma lanceolate, papery, keeled, strongly 5-veined, outermost veins close to margins, apex acuminate, extended into a slender awn; palea as long as lemma body and enclosed within it, papery, 3-veined. Stamens 6. Caryopsis terete, embryo small, hilum linear, almost as long as caryopsis. $x = 12$.

One species: S and SE Asia, including China.

1. Hygroryza aristata (Retzius) Nees, Edinburgh New Philos. J. 15: 380. 1833.

水禾 shui he

Pharus aristatus Retzius, Observ. Bot. 5: 23. 1789; *Potamochloa aristata* (Retzius) Griffith ex Steudel; *Zizania aristata* (Retzius) Kunth.

Culms floating, 0.5–1.5 m long. Leaf blades 3–7 × 0.5–2.5 cm, adaxial surface papillate, base rounded to cordate, abruptly constricted to a ca. 1 mm petiole-like base at junction with sheath, apex obtuse; ligule truncate, 0.5–0.8 mm. Inflorescence triangular in outline; branches short, lowermost subverticillate, reflexing at maturity. Spikelets greenish; stipe 3–6 mm; lemma body 7.5–8 mm, hispidulous on back, spinulose on veins; awn 1–1.4 cm; palea keeled and spinulose along midvein, outer veins smooth, apex acute. Anthers ca. 3.5 mm.

An aquatic grass forming extensive floating mats in ponds and lakes, often in shade of trees. Fujian, Guangdong, Hainan, Taiwan, Yunnan [Bangladesh, Cambodia, India, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam].

41. ZIZANIA Linnaeus, Sp. Pl. 2: 991. 1753.

菰属 gu shu

Monoecious aquatic annuals or perennials, rhizomes and stolons sometimes present. Culms tall, erect, robust. Leaf blades linear to broadly lanceolate; ligule membranous. Inflorescence a large panicle, spikelets unisexual and mostly borne on separate branches; lower branches spreading, bearing pendulous, caducous male spikelets; upper branches erect or ascending at maturity, bearing appressed, tardily deciduous female spikelets; or middle branches with mixed male and female spikelets (*Z. latifolia*). Spikelets with 1 floret, falling entire; glumes absent; lemma as long as spikelet, 5-veined; palea subequal to lemma, narrower, 3-veined. Male spikelet: lemma membranous, weakly flattened, acuminate or awn-pointed; stamens 6. Female spikelet: lemma papery or leathery, cylindrical, tapering into a long slender awn; palea closely clasped by lemma. Caryopsis cylindrical, embryo half as long, hilum almost as long as caryopsis. $x = 15$ or 17.

Four species: E Asia and North America; one species in China.

All species are used as food crops. *Zizania aquatica* Linnaeus and *Z. palustris* Linnaeus are cultivated in botanical gardens in China. They are highly valued cereals in North America (Wild Rice).

1a. Plant perennial; panicle with middle branches bearing both male and female spikelets ..... 1. *Z. latifolia*
1b. Plant annual; panicle with all male spikelets on lower branches and all female spikelets on upper branches.
2a. Plant 2–4 m; ligule to 30 mm, acute or acuminate; lemma of female spikelet papery, with scattered prickle-hairs ..... *Z. aquatica* (see note above)
2b. Plant 0.6–2 m; ligule to 16 mm, subrounded; lemma of female spikelet leathery, glabrous or with prickle-hairs in lines on back and dense at apex ..... *Z. palustris* (see note above)

1. Zizania latifolia (Grisebach) Turczaninow ex Stapf, Bull. Misc. Inform. Kew 1909: 385. 1909.

菰 gu

Hydropyrum latifolium Grisebach in Ledebour, Fl. Ross. 4: 466. 1853; *Zizania aquatica* Linnaeus var. *latifolia* (Grisebach) Komarov; *Z. caduciflora* Handel-Mazzetti, nom. illeg. superfl.; *Z. dahurica* Turczaninow ex Steudel.

Perennial, rhizomatous. Culms erect, 1–2.5 m, ca. 1 cm thick, rooting at lower nodes, nodes glabrous. Leaf sheaths longer than internodes, thickened, lower sheaths tessellate; leaf blades broadly linear, 50–90 × 1.5–3.5 cm, abaxial surface scabrous, adaxial surface glabrous, tapering to base, apex abruptly narrowed to a long point; ligule triangular, 1–1.5 cm. Panicle 30–50 × 10–15 cm, lower branches with male spikelets, upper branches with female spikelets, middle branches mixed; branches semiverticillate, many at each node, sparsely spinulose; pedicel apex disk-shaped with spinulose margin. Male spikelet 0.8–1.5 cm; lemma elliptic-oblong, margin ciliate; awn 2–8 mm, scabrous; anthers 5–8 mm. Female spikelet 1.5–2.5 cm; lemma linear, scabrous on veins; awn 1.5–3 cm, scabrous. Caryopsis ca. 1 cm. Fl. and fr. Jun–Sep. $2n = 30, 34$.

Shallow water of lake margins and swamps, forming large patches. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shan-

dong, Sichuan, Taiwan, Yunnan, Zhejiang [NE India, Japan, Korea, Myanmar, Russia; cultivated in SE Asia].

This species is cultivated as a vegetable in China. The young shoots and rhizomes are edible when infected, swollen, and softened by the fungus *Ustilago esculenta*. The presence of the fungus prevents flowering. The grains were used for food by the Emperor in ancient China, and are currently being used by fishermen.

5. Tribe **BRACHYELYTREAE**

短颖草族 duan ying cao zu

Lu Shenglian (卢生莲); Sylvia M. Phillips

Perennials. Leaf blades narrowly lanceolate, with or without indistinct cross veins, constricted at base; ligule membranous. Inflorescence a scanty panicle. Spikelets all alike, floret 1 with bristle-like rachilla extension, dorsally compressed, disarticulating above glumes; glumes unequal, tiny, lower glume vestigial, upper glume subulate, 1/10–1/4 length of floret; lemma firmly herbaceous, 5-veined, tapering into a straight awn from apex; palea as long as lemma, convolute; stamens 2. Caryopsis linear, the apex with a pallid pubescent beak bearing 2 terminal stigmas; pericarp thick, separable with difficulty. Leaf anatomy: non-Kranz, microhairs and fusoid cells absent. $x = 11$.

One genus and three species: two in E North America and one in E Asia including China.

42. **BRACHYELYTRUM** P. Beauvois, Ess. Agrostogr. 39. 1812.

短颖草属 duan ying cao shu

Description and distribution as for tribe.

1. Brachyelytrum japonicum (Hackel) Matsumura ex Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 210. 1930.

日本短颖草 ri ben duan ying cao

Brachyelytrum erectum var. *japonicum* Hackel, Bull. Herb. Boissier 7: 647. 1899; *Brachyelytrum erectum* subsp. *japonicum* (Hackel) T. Koyama & Kawano.

Perennial from a short knotty rhizome. Culms solitary or loosely tufted, slender, erect, 40–100 cm tall, unbranched, 6–7-noded. Leaf sheaths shorter than internodes, glabrous or puberulent; leaf blades linear-lanceolate, thin, soft, 8–15 × 0.6–0.8 cm, scabridulous or puberulous when young, margins ciliate, apex acuminate; ligule 2–5 mm, obtuse to acuminate, usually erose. Panicle narrow, 9–15 cm; branches short, suberect, capillary, scabrous, bearing a few subsessile spikelets. Spikelets 8–10 mm, gray-green; lower glume 0.4–1.5 mm; upper glume 1–4 mm, 1-veined or obscurely 3-veined at base, margins scarious; lemma narrowly lanceolate, 8–10 mm, rigid, 5-veined, scabrous on veins; awn 1.2–1.8 cm, slender, scabrous; palea 2-toothed at apex; callus ca. 0.8 mm, shortly pilose. Anthers 3.3–4.5 mm. Rachilla extension 4–7 mm. Fl. Jun–Jul.

Woodland shade. Anhui, Jiangsu, Jiangxi, Yunnan, Zhejiang [Japan, Korea (Cheju Island)].

This species is very similar to the other two species of the genus in North America, but these have wider leaf blades (0.8–2 cm wide) and a shorter lower glume (0.2–0.7 mm).

6. Tribe **PHAENOSPERMATEAE**

显子草族 xian zi cao zu

Lu Shenglian (卢生莲); Sylvia M. Phillips

Perennial. Leaf blades broadly linear with transverse veinlets, narrowed into a false petiole, this twisted to bring the abaxial surface uppermost; ligule long, membranous. Inflorescence a large open panicle, branches usually verticillate, scabridulous. Spikelets all alike, floret 1, rachilla extension absent, dorsally compressed, falling entire; glumes unequal, membranous to scarious; lemma as long as spikelet, herbaceous with scarious margins, strongly 3–5-veined, marginal veins obscure; palea resembling lemma but 2-veined, furrowed between keels, splitting at maturity; lodicules 3; stamens 3; stigmas 2. Caryopsis globose with small apical beak from style base, exposed between gaping lemma and palea at maturity, pericarp thick, softening and peeling away when wet, embryo very small, hilum as long as the caryopsis. Leaf anatomy: non-Kranz; microhairs absent; fusoid cells absent. $x = 12$.

One species: E Asia.

43. **PHAENOSPERMA** Munro ex Bentham, J. Linn. Soc., Bot. 19: 59. 1881.

显子草属 xian zi cao shu

Euthryptochloa Cope.

Description and distribution as for tribe.