

151. ZOYSIA Willdenow, Ges. Naturf. Freunde Berlin Neue Schriften 3: 440. 1801, nom. cons.

结缕草属 *jie lü cao shu*

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Osterdamia Necker ex Kuntze, nom. illeg. superfl.

Perennials, rhizomatous and/or stoloniferous, sward forming. Culms arising from nodes along stolons, often densely branched at ground level. Leaf blades conspicuously distichous, stiff, flat or involute; ligule short, ciliolate. Inflorescence a cylindrical, dense, spike-like raceme; spikelets appressed to axis, falling entire; pedicels persistent, flattened, sometimes widened upward. Spikelets laterally compressed, floret 1; lower glume usually absent; upper glume as long as spikelet, enclosing floret, laterally compressed, leathery, rounded on back, smooth, glossy, apex acute or midvein excurrent into mucro; lemma membranous, 1–3-veined, apex acute or emarginate; palea reduced or absent. Lodicules absent. Styles connate at base, stigmas apically exerted. Caryopsis ovoid. $x = 9, 10$.

Nine species: tropical and subtropical coasts of the Indian Ocean, W Pacific, and Australasia; several species widely introduced elsewhere as tropical lawn grasses; five species in China.

The spikelets often consist of only two scales: a leathery, glossy glume (technically the upper glume) enclosing a much thinner lemma.

The species are good sand-binding and lawn grasses.

- 1a. Spikelets usually ca. 2 mm wide; uppermost leaf sheaths inflated, enclosing base of inflorescence 1. *Z. macrostachya*
- 1b. Spikelets less than 1.5 mm wide; uppermost leaf sheaths not inflated.
 - 2a. Spikelets ovate, 2–2.5 times as long as wide; pedicels flexuous, usually longer than spikelet 2. *Z. japonica*
 - 2b. Spikelets lanceolate to oblong, 3–4 times as long as wide; pedicels straight, usually shorter than spikelet.
 - 3a. Spikelets 4–8 mm 3. *Z. sinica*
 - 3b. Spikelets 2–3 mm.
 - 4a. Leaf blades 1.5–2.5 mm wide (when flattened); inflorescence 2–4 cm; spikelets 10–30 4. *Z. matrella*
 - 4b. Leaf blades ca. 1 mm wide, setaceous; inflorescence up to 1.5 cm; spikelets 6–12 5. *Z. pacifica*

1. *Zoysia macrostachya* Franchet & Savatier, Enum. Pl. Jap. 2: 608. 1879.

大穗结缕草 *da sui jie lü cao*

Perennial, loosely spreading from extensive, deep, slender rhizomes. Culms erect or ascending, 10–20 cm tall, much branched at ground level, many-noded. Leaf sheaths overlapping over whole culm length, glabrous, bearded at mouth with 2–3 mm hairs; leaf blades linear-lanceolate, stiff, patent, margins involute, 1.5–8 cm, 2–4 mm wide, abaxial surface glabrous or puberulous, adaxial surface glaucous, glabrous, apex pungent. Inflorescence lanceolate-oblong, 3–5 × 0.5–1 cm, base enclosed in inflated uppermost leaf sheaths; spikelets many, closely overlapping; pedicels stout, 1–2 mm, apex slightly oblique. Spikelets 6–8 × ca. 2 mm, yellowish, brown or purplish brown; lower glume absent; upper glume elliptic-oblong, obscurely 7-veined, minutely puberulent along margins and near apex, apex acute or with subapical awn to 1.2 mm; lemma lanceolate, ca. 4 mm, 1-veined; palea absent. Anthers 2–2.5 mm. Caryopsis 1.8–2 mm. Fl. and fr. Jun–Sep. $2n = 40$.

Coastal sands extending to grazed or trodden places inland. Anhui, Fujian, Jiangsu, Shandong, Zhejiang [Japan, Korea].

This species is used as a lawn grass.

2. *Zoysia japonica* Steudel, Syn. Pl. Glumac. 1: 414. 1854.

结缕草 *jie lü cao*

Zoysia koreana Mez; *Z. matrella* (Linnaeus) Merrill subsp.

japonica (Steudel) Masamune & Yanagita; *Z. matrella* var. *japonica* (Steudel) Sasaki; *Z. pungens* Willdenow var. *japonica* (Steudel) Hackel.

Perennial, with long slender stolons, forming large mats. Culms erect, up to 20 cm tall, sometimes branched at base. Leaf sheaths glabrous, pilose at mouth with 1–2 mm hairs, basal sheaths persistent; leaf blades aggregated toward culm base, linear-lanceolate, flat or margins involute, tough, patent, 2.5–6 cm, 2–4 mm wide, abaxial surface subglabrous, adaxial surface thinly pilose, apex pungent. Inflorescence linear-elliptic, 2–4 × 0.3–0.5 cm, long exerted above leaves; spikelets many, loosely overlapping; pedicels slender, slightly flexuous, longer than spikelet, up to 5 mm. Spikelets 2.5–3.5 × 1–1.5 mm, yellowish green becoming purplish brown; lower glume absent; upper glume obliquely ovate, obscurely 5–7-veined, upper margins broad, papery, apex obtuse, sometimes mucronate; lemma boat-shaped, slightly shorter than glume, 1-veined; palea absent. Anthers ca. 1.5 mm. Caryopsis 1.5–2 mm. Fl. and fr. May–Aug. $2n = 40$.

Coastal areas, grassy hillsides, open places. Hebei, Hong Kong, Jiangsu, Jiangxi, Liaoning, Shandong, Taiwan, Zhejiang [Japan, Korea].

This species can be distinguished by its relatively short, broad leaf blades, broadly linear inflorescence well exerted above the leaves, and many short, plump spikelets on long, slender pedicels.

This species is a good lawn grass.

3. *Zoysia sinica* Hance, J. Bot. 7: 168. 1869.

中华结缕草 *zhong hua jie lü cao*

Zoysia matrella (Linnaeus) Merrill var. *macrantha* Nakai ex Honda; *Z. sinica* var. *macrantha* (Nakai ex Honda) Ohwi; *Z. sinica* subsp. *nipponica* (Ohwi) T. Koyama; *Z. sinica* var. *nipponica* Ohwi.

Perennial, forming dense spreading mats from slender underground rhizomes. Culms erect from nodes of rhizome, stiff, 10–30 cm tall, branched at base. Leaf sheaths glabrous, usually persistent at base, pilose at mouth; leaf blades broadly linear, flat or margins involute, stiff, suberect to patent, 2–10 cm, 2–3 mm wide, green or gray-green, glabrous, apex pungent. Inflorescence linear-elliptic, 2–4(–8) × 0.4–0.5 cm, usually shortly exerted from uppermost leaf sheath; spikelets many, closely overlapping; pedicels shorter than spikelet, ca. 3 mm, widened at apex. Spikelets 4–8 × 1–1.5 mm, yellowish brown or purplish brown; lower glume absent; upper glume lanceolate-oblong to narrowly oblong with slightly falcate apex, obscurely 7–11-veined, midvein usually shortly excurrent; lemma lanceolate-oblong, 3–4 mm, 1-veined; palea absent. Anthers 1.5–2.5 mm. Fl. and fr. May–Oct.

Coastal sands, extending to grazed and trodden places inland. Anhui, Fujian, Guangdong, Guangxi, Hebei, Jiangsu, Liaoning, Shandong, Taiwan, Zhejiang [Japan, Korea].

This species can be recognized by its long, straight-sided spikelets with falcate tips. Specimens with spikelets at the upper end of the size range (5–8 mm) have been separated as var. *nipponica*, but variation is continuous and spikelet size can be variable even on a single specimen.

This species is a good lawn grass.

4. *Zoysia matrella* (Linnaeus) Merrill, Philipp. J. Sci. 7: 230. 1912.

沟叶结缕草 *gou ye jie lü cao*

Agrostis matrella Linnaeus, Mant. Pl. 2: 185. 1771; *Zoysia pungens* Willdenow; *Z. serrulata* Mez; *Z. tenuifolia* Thiele.

Perennial, stoloniferous, mat-forming, also with shallow underground rhizomes. Culms up to 20 cm tall. Leaf sheaths glabrous, bearded at mouth with 4–5 mm hairs; leaf blades flat or involute, tough, suberect to spreading, 3–8 cm, 1.5–2.5 mm wide, glabrous or adaxial surface thinly pilose, apex acute. Inflorescence linear, 2–4 × 0.2–0.3 cm, exerted above leaves; spikelets 10–30, loosely overlapping; rachis somewhat wavy; pedicels shorter than spikelet, 1–3 mm, widened at apex. Spikelets 2–3 × ca. 1 mm, yellowish brown or purplish brown; lower glume usually absent; upper glume lanceolate, 5-veined, midrib prominent, sometimes scabrous toward apex, lateral veins obscure, apex obtuse; lemma oblong-ovate, 2–2.5 mm, obscurely 3-veined, midvein sometimes shortly excurrent; palea lanceolate, 1/2 as long as lemma. Anthers 1–1.5 mm. Caryopsis ca. 1.5 mm. Fl. and fr. Jul–Oct. $2n = 20, 40$.

Coastal sands. Guangdong, Hainan, Taiwan [India, Indonesia, Japan (S Kyushu and Ryukyu Islands), Malaysia, Philippines, Sri Lanka, Thailand, Vietnam].

This species forms natural hybrids with *Zoysia sinica*.

Zoysia matrella is a good sand-binding and lawn grass.

5. *Zoysia pacifica* (Goudswaard) M. Hotta & S. Kuroki, Acta

Phytotax. Geobot. 45: 71. 1994.

细叶结缕草 *xi ye jie lü cao*

Zoysia matrella (Linnaeus) Merrill var. *pacifica* Goudswaard, Blumea 26: 172. 1980.

Perennial, stoloniferous, forming a low dense sward. Culms 5–10 cm tall, much branched. Leaf sheaths glabrous, bearded at mouth with 2–5 mm hairs; leaf blades setaceous, soft, 4–6 cm, ca. 1 mm wide. Inflorescence linear, up to 1.5 cm; spikelets 6–12, loosely overlapping; rachis somewhat wavy;

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pedicels shorter than spikelet, up to 1.6 mm, scabrous, slightly widened at apex. Spikelets 2–3 × ca. 0.6 mm, straw colored tinged purplish; lower glume absent; upper glume lanceolate, shiny, obscurely 5-veined, apex subacute, sometimes with subapical awn-point; lemma slightly shorter than upper glume, 1-veined; palea absent. Anthers 0.6–0.8 mm. Fl. and fr. Aug–Dec. $2n = 40^*$.

Rocky and coral beaches. Taiwan [Japan (S Kyushu and Ryukyu Islands), Philippines, Thailand; Pacific Islands].

This grass has been widely known as *Zoysia tenuifolia* Thiele, but the type specimens of that name belong taxonomically to *Z. matrella*.

This fine-leaved, densely growing, low grass forms excellent lawns and is grown in gardens in S and SE China.

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