

217. **HEMARTHRIA** R. Brown, Prodr. 207. 1810.

牛鞭草属 niu bian cao shu

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Perennial, rarely annual. Culms usually prostrate and rooting at lower nodes. Leaf blades linear, flat; ligule narrow, membranous, margin ciliate. Inflorescence composed of single axillary racemes; racemes solitary or in groups in upper leaf axils, dorsiventral, articulation line usually oblique but racemes tough, not or very tardily disarticulating; rachis internodes thickened, oblong-angular, adnate to adjacent pedicel. Sessile spikelet appressed to hollow in rachis, dorsally compressed (terete in *H. sibirica*); callus obtuse to cuneate, rarely truncate; lower glume narrowly elliptic, rigidly herbaceous to leathery, smooth, marginally 2-keeled, indistinctly winged above, obtuse to caudate or rarely 2-cleft; upper glume sometimes adnate to internode, mucronate or awned; lower floret barren, without palea; upper floret bisexual, with entire awnless lemma. Pedicelled spikelet similar to sessile, but base truncate and lacking callus; pedicel similar to adnate rachis internode, junction marked by a line. $x = 9, 10$.

Fourteen species: tropical and subtropical regions of the Old World; introduced in America; six species (one endemic) in China.

This is a genus of aquatic or semi-aquatic grasses concentrated in SE Asia. At first sight it is difficult to distinguish the sessile and pedicelled spikelets because they look very similar and, since the pedicel is fused to the rachis internode, both spikelets are in effect sessile. However, the sessile spikelet of a pair can be distinguished by its basal callus, which normally has an oblique articulation line beneath it. The strongly bilateral racemes have all the sessile spikelets on one side and all the pedicelled spikelets on the other.

- 1a. Sessile spikelets 8–15 mm 1. *H. longiflora*
- 1b. Sessile spikelets less than 8 mm.
 - 2a. Lower glume of sessile spikelet evenly narrowed to acuminate apex; upper glume of pedicelled spikelet caudate-aristate.
 - 3a. Leaf blades 3–8 mm wide; lower glume of sessile spikelet leathery; lower glume of pedicelled spikelet distally smooth along margins 2. *H. vaginata*
 - 3b. Leaf blades 1–2 mm wide; lower glume of sessile spikelet papery; lower glume of pedicelled spikelet distally scabrid along margins 3. *H. humilis*
 - 2b. Lower glume of sessile spikelet with rounded apex, usually with subapical constriction; upper glume of pedicelled spikelet acute to acuminate.
 - 4a. Racemes subterete; articulations of rachis transverse; callus short, truncate 4. *H. sibirica*
 - 4b. Racemes dorso-ventrally compressed; articulations of rachis oblique; callus triangular.
 - 5a. Sessile spikelet 3–5 mm; lower glume margins distally smooth; leaf blades rounded at base 5. *H. compressa*
 - 5b. Sessile spikelet 5–7 mm; lower glume margins distally scabrid; leaf blades subcordate at base 6. *H. altissima*

1. *Hemarthria longiflora* (J. D. Hooker) A. Camus in Le-comte, Fl. Indo-Chine 7: 380. 1922.

长花牛鞭草 chang hua niu bian cao

Rotboellia longiflora J. D. Hooker, Fl. Brit. India 7: 154. 1896 [“1897”]; *R. longiflora* var. *tonkinensis* (A. Camus) A. Camus; *R. tonkinensis* A. Camus.

Perennial. Culms loosely tufted, erect from decumbent base, 30–80 cm tall, 2–4 mm in diam., glabrous, spongy, nodes usually pubescent. Leaf sheaths loose, sub-compressed, indistinctly keeled; leaf blades linear-lanceolate, 6–15 × 0.5–0.8 cm, slightly flaccid, glabrous, base subcordate; ligule 0.8–2 mm. Racemes solitary or fascicled, 10–15 cm, stout, articulation line oblique, disarticulating tardily. Sessile spikelet twice as long as adjacent internode, 8–15 mm; callus triangular, 0.1–0.6 mm; lower glume lanceolate, back flat, margins scabrid, apex acuminate-caudate to awnlike; upper glume not adnate to rachis, 10–12 mm, acuminate-caudate; lower floret 3–7 mm; upper floret ca. 4 mm, palea very short. Pedicelled spikelet 8–20 mm, lower glume caudate-aristate, upper glume narrowly acuminate. Fl. and fr. Jul–Oct.

Ponds, ditches, other wet places; below 1000 m. Hainan, Yunnan [Bangladesh, NE India, Malaysia, Myanmar, Thailand, Vietnam].

2. *Hemarthria vaginata* Buse in Miquel, Pl. Jungh. 3: 14. Feb 1854 [preprint]; 3: 354. Aug 1854.

具鞘牛鞭草 ju qiao niu bian cao

Hemarthria protensa Nees ex Steudel; *Manisuris protensa* (Nees ex Steudel) Hitchcock; *Rotboellia protensa* (Nees ex Steudel) Hackel; *R. vaginata* (Buse) Backer.

Perennial. Culms loosely tufted, stout, ascending or sometimes decumbent and rooting from lower nodes, 20–80 cm tall, nodes conspicuous, dark, glabrous or pilose. Leaf sheaths rather loose, compressed, keeled, longer than internodes; leaf blades linear, 1–20 × 0.3–0.8 cm, soft, glabrous, base subcordate; ligule 0.5–2 mm. Racemes solitary or fascicled, 6–18 cm, articulation line oblique, not disarticulating. Sessile spikelet somewhat longer than adjacent internode, 6–11 mm; callus acute, 1.5–4 mm; lower glume narrowly lanceolate, leathery, flat on back, smooth, evenly tapering to an acuminate, usually minutely emarginate apex; upper glume adnate to rachis, 5–7 mm, acuminate-aristate; lower floret 3–5 mm; upper floret ca. 3 mm, palea linear, ca. 2 mm; anthers 1.2–1.3 mm. Pedicelled spikelet 7–12 mm, lower glume smooth on upper edges, long-acuminate, upper glume caudate-aristate. Fl. and fr. autumn. $2n = 54$.

Field margins, open wet places; below 500 m. Guangdong, Guangxi, S Yunnan [Bangladesh, Bhutan, NE India, Indonesia, Myanmar, Nepal, Thailand, Vietnam].

3. *Hemarthria humilis* Keng, Sunyatsenia 1: 128. 1933.

小牛鞭草 xiao niu bian cao

Perennial. Culms tufted, slender, erect or geniculately ascending but not rooting from lower nodes, 14–18 cm tall, nodes inconspicuous, glabrous. Leaf sheaths loose, compressed, keeled, longer than internodes; leaf blades narrowly linear, 1–6 × 0.1–0.2 cm, glabrous; ligule ca. 0.5 mm. Racemes solitary or several per node, 5–10 cm, articulation line oblique, not disarticulating. Sessile spikelet longer than adjacent internode, or lower ones shorter, 3–7.5 mm; callus obscure; lower glume lanceolate, papery, flat on back, smooth, evenly tapering to an acuminate or shortly caudate, sometimes minutely emarginate apex; upper glume adnate to rachis, 4–7.5 mm, long acuminate; lower floret 2–3 mm; upper floret 1.7–2.8 mm; anthers 0.7–0.8 mm. Pedicelled spikelet 7–12 mm, lower glume scabrid on upper edges, long-acuminate, upper glume caudate-aristate. Fl. May.

- Open marshes. Guangdong.

This species is known only from the type gathering. It has been included in *Hemarthria vaginata*, but *H. humilis* is a more slender plant and, besides the key characters, also differs in its inconspicuous culm nodes, shorter lemmas, and shorter anthers.

4. *Hemarthria sibirica* (Gandoger) Ohwi, Bull. Tokyo Sci. Mus. 18: 1. 1947.

牛鞭草 niu bian cao

Rottboellia sibirica Gandoger, Bull. Soc. Bot. France 66: 302. 1920 [“1919”]; *Hemarthria compressa* (Linnaeus f.) R. Brown var. *japonica* (Hackel) Y. N. Lee; *H. japonica* (Hackel) Roshevitz; *Rottboellia compressa* Linnaeus f. var. *japonica* Hackel; *R. japonica* (Hackel) Honda.

Perennial, with long creeping rhizomes. Culms usually solitary at rhizome nodes, erect, 1(–1.5) m tall, ca. 3 mm in diam., branched mainly above middle, nodes conspicuous, dark, glabrous. Leaf sheaths loose, compressed, lightly keeled, shorter to longer than internodes; leaf blades linear, 15–30(–40) × 0.4–0.8 cm, rather stiff, glabrous, narrowed or subcordate at base, apex acuminate; ligule 0.5–1.5 mm. Racemes solitary or fascicled, subterete, 6–10 cm, fairly stout, articulation line horizontal, disarticulating at maturity. Sessile spikelet slightly longer than adjacent internode, 5–8 mm; callus truncate, 0.4–0.8 mm; lower glume narrowly lanceolate, leathery, flat to subconvex on back, subapically slightly constricted, obtuse to emarginate; upper glume adnate to rachis, 4–7 mm, acute; lower floret 3.4–5.2 mm; upper floret 3.4–4.3 mm. Pedicelled spikelet 5.3–9.4 mm, both glumes slenderly acuminate. Fl. and fr. Jul–Oct. $2n = 18$.

Damp places, sandy beaches. Anhui, Guangdong, Guangxi, Guizhou, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shandong, Zhejiang [Japan, Korea, Pakistan, Russia (E Siberia)].

This is the only species in China with terete racemes, a transverse

articulation line, and a truncate callus beneath the sessile spikelet. The racemes disarticulate at maturity more readily than those of the other species. In spikelet characters it is similar to *Hemarthria altissima*.

5. *Hemarthria compressa* (Linnaeus f.) R. Brown, Prodr. 207. 1810.

扁穗牛鞭草 bian sui niu bian cao

Rottboellia compressa Linnaeus f., Suppl. Pl. 114. 1782 [“1781”]; *Hemarthria coromandelina* Steudel, nom. illeg. superfl.; *H. glabra* (Roxburgh) Blatter & McCann; *H. laxa* Nees ex Steudel; *Manisuris compressa* (Linnaeus f.) Kuntze; *Rottboellia glabra* Roxburgh.

Perennial. Culms decumbent to long-stoloniferous, rooting at lower nodes, up to 1 m or more, much branched from base, nodes conspicuous, dark, glabrous. Leaf sheaths loose, compressed, keeled, glabrous or hairy along mouth, often shorter than internodes; leaf blades linear, 2–15 × 0.2–0.5 cm, base rounded, apex subacute; ligule 0.3–1 mm. Racemes solitary or few per node, lightly compressed, 2–10 cm, articulation line oblique, tardily disarticulating. Sessile spikelet slightly longer than adjacent internode, 3–5 mm; callus broadly triangular, 0.5–1 mm; lower glume narrowly oblong, leathery, flat or subconvex on back, abruptly constricted into obtuse or emarginate apex; upper glume adnate to rachis, equaling lower glume, thin,

acute; lower floret 2.4–3.3 mm; upper floret 2–3.2 mm, palea small, rarely absent. Pedicelled spikelet 2.4–5 mm, lower glume narrowly obtuse, upper glume acuminate-caudate. Fl. and fr. Jul–Sep. $2n = 18, 27, 36$.

Marshes, wet places, coasts; below 2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Nei Mongol, Shaanxi, Sichuan, Taiwan, Yunnan [Afghanistan, Bangladesh, Bhutan, India, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam; SW Asia (Iraq)].

Hemarthria compressa is not completely distinct from *H. altissima*, but is generally a more slender plant with smaller spikelets.

6. *Hemarthria altissima* (Poiret) Stapf & C. E. Hubbard, Bull. Misc. Inform. Kew 1934: 109. 1934.

大牛鞭草 da niu bian cao

Rottboellia altissima Poiret, Voy. Barbarie 2: 105. 1789; *Hemarthria compressa* (Linnaeus f.) R. Brown var. *altissima* (Poiret) Maire; *H. compressa* var. *fasciculata* (Hackel) Keng; *Rottboellia compressa* Linnaeus f. var. *fasciculata* Hackel; *R. fasciculata* Lamarck, nom. illeg. superfl.

Perennial, or sometimes annual. Culms loosely tufted to decumbent or stoloniferous, rooting at lower nodes, ascending up to 1.6 m tall, nodes glabrous. Leaf sheaths loose, compressed, keeled, usually shorter than internodes, glabrous except near mouth; leaf blades linear, 5–25 × 0.3–0.6 cm, acute; ligule ca. 0.3 mm. Racemes solitary or several per node, 5–10 cm, semicylindrical, articulation line oblique, tardily disarticulating. Sessile spikelet longer than adjacent internode, 5–7 mm; callus triangular, 0.8–2 mm; lower glume elliptic-oblong, leathery, flat on back, often with subapical constriction, apex obtuse to emarginate; upper glume papery, adnate to rachis, 4–7 mm, apex obtuse to acute; lower floret 3.5–5.2 mm; upper floret 3.2–4.6 mm. Pedicelled spikelet narrowly lanceolate, lower glume acute, upper glume acuminate. $2n = 20, 36$.

In or near water, damp places; 700–1900 m. Anhui, Beijing, Guizhou, Heilongjiang, Henan, Hubei, Shandong, Yunnan, Zhejiang [India, Indonesia, Myanmar, Thailand, Vietnam; Africa, SW Asia, Mediterranean region; introduced in America and New Zealand].

Hemarthria altissima occurs naturally mainly from the Mediterranean region through Africa, but there are scattered records from Asia and it is now widely naturalized in warm parts of America.

Flora of China 22: 640–642. 2006.