

9. ACHYRANTHES Linnaeus, Sp. Pl. 1: 204. 1753.

牛膝属 niu xi shu

Herbs or subshrubs. Stem with conspicuous nodes; branches opposite. Leaves opposite, petiolate. Spikes terminal or axillary, erect. Flowers reflexed or spreading, perfect, with 3 bracts; midvein of bracteoles spiny, long, excurrent. Tepals 4 or 5, membranous, apex awn-pointed, rigid in fruit. Stamens 5, rarely 4 or 2, shorter than perianth; filaments connate into a short cup at base, pseudostaminodes fringed; anthers 2-loculed. Ovary oblong; style linear, persistent; stigma capitate. Utricles ovoid-oblong, ovoid, or subglobose, falling off with tepals and bracteoles. Seed oblong, lenticular.

About 15 species: tropical and subtropical regions; three species in China.

The two species *Achyranthes aspera* and *A. bidentata* are highly variable. Further study might show *A. longifolia* to be merely a variant of *A. bidentata*.

Achyranthes megaphylla Y. H. Li (Guihaia 9: 26. 1989, not Standley, 1917) was described from Yunnan and *A. ogatae* Yamamoto (Icon. Pl. Formosan., Suppl. 3: 23. 1927) was described from Taiwan. We have seen no specimens of either taxon and are therefore unable to treat them in this account. Further revisionary study is necessary.

- 1a. Leaves lanceolate or broadly lanceolate; pseudostaminodes inconspicuously dentate at apex 3. *A. longifolia*
- 1b. Leaves obovate, elliptic, or oblong; pseudostaminodes ciliate or serrulate at apex.
 - 2a. Leaves obovate, broadly obovate, or elliptic-oblong, apex obtuse with a mucro; bracteoles spiny, 2-winged at base; pseudostaminode long fimbriate and ciliate at apex 1. *A. aspera*
 - 2b. Leaves elliptic or elliptic-lanceolate, apex caudate; bracteoles spiny, 2-parted at base; pseudostaminode serrulate at apex 2. *A. bidentata*

1. *Achyranthes aspera* Linnaeus, Sp. Pl. 1: 204. 1753.

土牛膝 tu niu xi

Herbs perennial, 20–120 cm tall. Stem quadrangular, pubescent; nodes slightly inflated; branches opposite. Petiole 0.5–1.5 cm, somewhat hairy; leaf blade broadly obovate or elliptic-oblong, 1.5–7 × 0.4–4 mm, papery, both surfaces hairy, base cuneate or rounded, margin entire or undulate, apex obtuse, with a mucro. Spikes terminal, erect, reflexed after anthesis, 10–30 cm; rachis angular, stout, densely hairy. Bracts lanceolate, 3–4 mm, apex acuminate; bracteoles spiny, shiny, 2.5–4.5 mm, rigid, base 2-winged; wings 1.5–2 mm, membranous, margin entire. Tepals lanceolate, 3.5–5 mm, with a vein. Stamens 2.5–3.5 mm; pseudostaminodes truncate or crenate at apex, fimbriate and ciliate. Utricles ovoid, 2.5–3 mm. Seeds brown, ovoid, ca. 2 mm. Fl. Jun–Aug, fr. Oct. $2n = 42, 48, 84, 96$.

Hillsides, waste places, roadsides, riverbanks; 800–2300 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Sikkim, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Europe].

- 1a. Leaves abaxially silvery sericeous 1d. var. *argentea*
- 1b. Leaves pubescent or subglabrous.
 - 2a. Leaves apically acute, brownish red when dried 1c. var. *rubrofusca*
 - 2b. Leaves apically obtuse or mucronate, not brownish red when dried.
 - 3a. Stem pubescent; leaves broadly obovate or elliptic-oblong, basally cuneate or rounded 1a. var. *aspera*
 - 3b. Stem densely white or yellow villous; leaves obovate, basally broadly cuneate 1b. var. *indica*

1a. *Achyranthes aspera* var. *aspera*

土牛膝(原变种) tu niu xi (yuan bian zhong)

Stem quadrangular, pubescent. Leaves broadly obovate or elliptic-oblong, densely pubescent or subglabrous, base cuneate or rounded, margin slightly undulate, apex obtuse or mucronate.

Hillsides, waste places; 800–2300 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Sikkim, Thailand, Vietnam].

1b. *Achyranthes aspera* var. *indica* Linnaeus, Sp. Pl. 1: 204. 1753.

钝叶土牛膝 dun ye tu niu xi

Achyranthes obtusifolia Lamarck.

Stem densely white or yellow villous. Leaves obovate, 1.5–6.5 × 2–4 cm, densely hairy, base cuneate, margin undulate, apex obtuse, often with a mucro.

Roadsides, riverbanks. Guangdong, Sichuan, Taiwan, Yunnan [India, Sri Lanka].

1c. *Achyranthes aspera* var. *rubrofusca* (Wight) J. D. Hooker, Fl. Brit. India 4: 730. 1885.

禾叶土牛膝 he ye tu niu xi

Achyranthes rubrofusca Wight, Icon. Pl. Ind. Orient. 5(2): 3, t. 1778. 1852.

Leaves brownish red when dried, elliptic-ovate, 2–9 × 1–4 cm, both surfaces hairy, densely so abaxially, base cuneate, margin slightly undulate, apex acute.

Roadsides. Fujian, Hunan, Taiwan, Yunnan [India].

1d. *Achyranthes aspera* var. *argentea* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 730. 1885.

银毛土牛膝 yin mao tu niu xi

Achyranthes argentea Thwaites, Enum. 249. 1861, not Lamarck (1785).

Stem quadrangular, pilose or glabrescent. Leaves green, broadly obovate or elliptic-oblong, abaxially silvery sericeous, apex acute.

Hillsides. Sichuan [India; Africa, SW Asia, Europe].

2. *Achyranthes bidentata* Blume, Bijdr. Fl. Ned. Ind. 545. 1826.

牛膝 niu xi

Herbs perennial, 70–120 cm tall. Stem green or tinged purple, angulate or quadrangular, appressed or spreading pubescent, or nearly glabrous; branches opposite. Petioles 0.5–3 cm, hairy; leaf blade elliptic or elliptic-lanceolate, rarely oblanceolate, 4.5–12 × 2–7.5 cm, both surfaces annexed or spreading pubescent, base cuneate or broadly cuneate, caudate. Spikes terminal or axillary, 3–5 cm; rachis 1–2 cm, white hairy. Flowers dense, ca. 5 mm. Bracts reflexed after anthesis, broadly ovate, 2–3 mm, apex acuminate; bracteoles 2.5–3 mm, spiny, base 2-parted, apex curved. Tepals shiny, lanceolate, 3–5 mm, with a midvein, apex acute. Stamens 2–2.5 mm; pseudostaminodes slightly serrulate, apex rounded. Utricles yellowish brown, shiny, oblong, 2–2.5 mm, smooth. Seeds light brown, oblong, ca. 1 mm. Fl. Jul–Sep, fr. Sep–Oct. $2n = 42, 84^*$.

Hillsides; 200–1800 m. Anhui, Fujian, Hebei, Hunan, Guangxi, Guizhou, Hubei, Jiangsu, Shaanxi, Shanxi, Sichuan, Taiwan, Xizang, Zhejiang [Bhutan, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Russia, Sikkim, Thailand, Vietnam].

- 1a. Plants sparsely hairy; flowers sparse in long spikes; tepals 3-veined 2b. var. *japonica*
1b. Plants hairy or subglabrous; flowers dense in spikes; tepals with a midvein 2a. var. *bidentata*

2a. *Achyranthes bidentata* var. *bidentata*

牛膝(原变种) niu xi (yuan bian zhong)

Plants hairy or subglabrous. Leaves elliptic or elliptic-lanceolate. Spikes terminal or axillary, densely flowered. Tepals with a midvein.

Hillsides; 200–1800 m. Fujian, Hebei, Guangxi, Guizhou, Hubei, Jiangsu, Shaanxi, Shanxi, Sichuan, Taiwan, Xizang, Zhejiang [Bhutan, India, Indonesia, Korea, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Russia, Sikkim, Thailand, Vietnam].

2b. *Achyranthes bidentata* var. *japonica* Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 132. 1865.

少毛牛膝 shao mao niu xi

Achyranthes japonica (Miquel) Nakai.

Spikes longer; flowers laxly arranged; spines of bracts shorter than perianth. Tepals 3-veined. Pseudostaminodes irregularly dentate or slightly 2-lobed, apex truncate.

Anhui, Hunan, Taiwan, Zhejiang [Japan].

3. *Achyranthes longifolia* (Makino) Makino, Bot. Mag. (Tokyo) 28: 180. 1914.

柳叶牛膝 liu ye niu xi

Achyranthes bidentata Blume var. *longifolia* Makino, Bot. Mag. (Tokyo) 12: 51. 1898.

Herbs perennial. Stem green or tinged purple, angulate or quadrangular; branches opposite. Petioles hairy; leaf blade lanceolate or broadly lanceolate, 10–20 × 2–5 cm, apex caudate. Spikes terminal or axillary; rachis white hairy. Flowers dense. Bracteoles reflexed after anthesis, acerose, ca. 3.5 mm, ciliate. Tepals shiny, lanceolate, with a midvein, apex acute. Pseudostaminodes indistinctly dentate at apex. Utricles yellowish brown, shiny, oblong, smooth. Seeds light brown, oblong.

Hillsides; below 1200 m. Guangdong, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Laos, Thailand, Vietnam].

This species is similar to *Achyranthes bidentata*, but differs in having leaves lanceolate or broadly so, 10–20 × 2–5 cm, caudate at the apex; bracteoles acerose, ca. 3.5 mm, ciliate at the margin; and pseudostaminodes indistinctly dentate at the apex.

