

8. MURDANNIA Royle, Ill. Bot. Himal. Mts. 1: 403. 1840, nom. cons.

水竹叶属 *shui zhu ye shu*

Baoulia A. Chevalier; *Dichaespermum* Wight; *Dilasia* Rafinesque, nom. rej.; *Phaeneilema* Brückner; *Prionostachys* Hasskarl; *Streptylis* Rafinesque, nom. rej.

Herbs perennial, sometimes annual. Roots often fusiform thickened. Rhizomes present or absent. Stems creeping or ascending, sometimes scapiform. Leaves alternate and linear, or in a basal rosette on infertile main stems. Cincinni solitary or numerous, forming panicles, sometimes shortened into heads, sometimes reduced to solitary flowers. Flowers actinomorphic. Sepals free, shallowly to strongly boat-shaped. Petals free, purple, blue, pink, yellow, or nearly white, orbicular or obovate. Fertile stamens 3, sometimes 1 (or 2) abortive; filaments glabrous or hairy; anther locules longitudinally dehiscent; staminodes (absent to) 3 (or 4), inserted opposite petals; antherodes sagittate or 3-sect. Ovary 3-loculed; ovules 1–7 per locule. Capsule 3-valved, ovoid, ellipsoid, or globose. Seeds 1 or 2 per valve, uniseriate, quadrangular, reticulate, pitted, rugose, or verrucose; hilum orbicular.

About 50 species: tropical and subtropical regions, mainly in Asia; 20 species (six endemic) in China.

- 1a. Antherodes sagittate; flowers 1–5 in fascicles in leaf axils; plants aquatic or halophytic herbs, with elongate and horizontal rhizomes.
 - 2a. Leaf blade elliptic-ovate or ovate-cordate, more than 8 mm wide.
 - 3a. Leaf blade ovate-cordate or ovate; capsule more than 2.5 mm in diam. 2. *M. citrina*
 - 3b. Leaf blade ovate; capsule less than 2 mm in diam. 1. *M. yunnanensis*
 - 2b. Leaf blade linear-lanceolate, (20–)30–60 × 5–8 mm.
 - 4a. Capsule oblong, trigonous, 5–7 × 3–4 mm, subobtusate at both ends; seeds not flattened; sepals 4–6 mm 3. *M. triquetra*
 - 4b. Capsule long ellipsoid, obscurely trigonous, 8–10 × 2–3 mm, acute at both ends; seeds flattened; sepals 6–10 mm 4. *M. keisak*
- 1b. Antherodes 3-sect; panicles terminal or cincinni numerous and aggregated in spathe-like involucre bracts (in latter case pedicels with sheathlike, membranous bracteoles); plants terrestrial herbs, mostly without elongate and horizontal rhizomes.
 - 5a. Stems scapiform, leafless; leaves all basal; roots fusiform thickened, densely tomentose 8. *M. edulis*
 - 5b. Stems ± leafy.
 - 6a. Involucral bracts sheathlike, bladeless, subequal, more than 5 mm, with several to numerous 1-flowered cymes.
 - 7a. Roots not thickened; sheathlike involucre bracts distant, only 2 or 3 on each stem; capsule with 1 seed per valve 7. *M. vaginata*
 - 7b. Roots fusiform thickened; sheathlike involucre bracts dense, at least apical ones connate; capsule with several seeds per valve.
 - 8a. Leaf blade linear, less than 6 mm wide; roots more than 4 cm, fusiform thickened in middle; involucre bracts glabrous 5. *M. medica*
 - 8b. Leaf blade more than 10 mm wide; roots much shorter, mostly only ca. 2 cm, fusiform thickened near apex, sometimes not thickened; involucre bracts hirsute 6. *M. spectabilis*
 - 6b. Involucral bracts not sheathlike, distal ones gradually becoming shorter, cymes not 1-flowered.
 - 9a. Valves 3- to numerous seeded; flowers distant, never in heads.
 - 10a. Stems erect, not rooting at nodes; plants without elongate rhizomes.
 - 11a. Main stem abortive (inflorescences borne on lateral stems); leaf blade narrowly elliptic, (1.5–)2–4.5 cm wide, often with a yellowish white, undulate band at margin; capsule ca. 5 mm 10. *M. japonica*
 - 11b. Main stem developed; leaf blade narrower, linear to narrowly lanceolate, usually less than 1.5 cm wide, without white, undulate band at margin; capsule 6.5–15 mm.
 - 12a. Capsule 15–17 mm; leaf blade 40–50 cm; plants to 1 m tall 9. *M. macrocarpa*
 - 12b. Capsule 6.5–8 mm; leaf blade 5–15 cm; plants 15–60 cm tall 11. *M. divergens*
 - 10b. Stems ± prostrate proximally; plants with long, horizontal rhizomes.
 - 13a. Capsule 3–4 mm; stems slender, creeping for greater part; leaf blade long ovate to lanceolate, less than 3.5 cm 13. *M. spirata*
 - 13b. Capsule 5–7 mm; stems robust, creeping only proximally; leaf blade lanceolate to ovate-lanceolate, 5–12 cm.
 - 14a. Valves ca. 3-seeded; inflorescences nearly as long as distal leaves; leaf blade 1–2.2 cm wide, with straight margin 14. *M. hookeri*
 - 14b. Valves ca. 7-seeded; inflorescences much exceeding distal leaves; leaf blade 3–3.5

- cm wide, undulate at margin 12. *M. undulata*
- 9b. Valves 2-seeded; flowers dense; cincinni capitate at anthesis, capitate or not in fruit; leaf blade linear.
- 15a. Seeds pitted, or shallowly pitted and white verrucose; main stem developed; pedicels thin but straight; most leaf sheaths hirsute throughout, sometimes hirsute on 1 side only 15. *M. nudiflora*
- 15b. Seeds not pitted but with other kinds of sculpturing; main stems abortive, with rosulate leaves; pedicels curved or straight; leaf sheaths mostly hirsute only on mouth side.
- 16a. Roots slender, fibrous, less than 1 mm in diam.; stems often creeping, rooting at proximal nodes; cincinni only 1 or 2(or 3), capitate at anthesis, capitate or nearly so in fruit.
- 17a. Cincinni densely capitate; pedicels strongly curved in fruit; bracts 5–7 mm, sub-persistent; basal leaves 20–30 × 1.2–1.8 cm 17. *M. bracteata*
- 17b. Cincinni subcapitate; pedicels slightly curved in fruit; bracts ca. 4 mm, caducous; basal leaves 5–15(–30) × 0.6–0.9 cm 16. *M. loriformis*
- 16b. Roots robust, 1–3 mm in diam.; stems erect or ascending; cincinni often 3 or more, forming panicles, never capitate in fruit.
- 18a. Roots ca. 1 mm in diam.; basal leaf blades 3–5 mm wide; seeds radiate striate
20. *M. kainantensis*
- 18b. Roots 2–3 mm in diam.; basal leaf blades 0.6–1.5 cm wide; seeds white radiate verrucose.
- 19a. Capsule 4–5 mm; sepals ca. 4 mm; leaf sheaths hirsute only on 1 side 18. *M. simplex*
- 19b. Capsule 6–7 mm; sepals 5–6 mm; leaf sheaths villous throughout, sometimes proximal ones hairy only on 1 side 19. *M. stenothyrsa*

1. *Murdannia yunnanensis* D. Y. Hong, Acta Phytotax. Sin. 12: 469. 1974.

云南水竹叶 yun nan shui zhu ye

Herbs perennial. Roots fibrous. Rhizomes horizontal, elongate. Stems creeping or ascending, often branched, 5–20 cm, with a line of multicellular villous hairs. Leaves all cauline, sessile; leaf sheath 2–4 mm, with a line of dense, multicellular villous hairs; proximal leaf blades elliptic, 2–4 × 0.7–1.3 cm, glabrous, apex acute; distal leaf blades ovate, ca. 10 mm. Flowers 1–3, in fascicles in leaf axils; pedicel ca. 3 cm, with transparent, membranous leaf sheath near base, jointed at middle, mostly straight in fruit, sometimes slightly curved. Sepals narrowly ovate, ca. 3.5 mm. Petals blue or pink, orbicular. Fertile stamens 3; filaments sparsely red torulose villous; staminodes 3; antherodes sagittate. Capsule ovoid-ellipsoid, 4–5 × ca. 2 mm. Seeds ca. 4 per valve, uniseriate, gray.

• Swamps in forests, forest margins; ca. 800 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou).

Murdannia yunnanensis is similar to *M. wightii* R. S. Rao & Kammathy (described from India), but differs in having pedicels mostly straight in fruit, filaments of fertile stamens sparsely red torulose villous, and capsules smaller.

2. *Murdannia citrina* D. Fang, Guihaia 3: 195. 1983.

橙花水竹叶 cheng hua shui zhu ye

Herbs perennial. Roots fibrous. Rhizomes horizontal, elongate. Stems creeping proximally, ascending distally, branched, to 30 cm; internodes 1.5–7 cm × 1–3 mm, with a line of multicellular puberulent hairs. Leaves all cauline, sessile; leaf sheath 5–6 mm; leaf blade ovate-cordate or ovate, 1–3 × 0.8–2 cm, glabrous, base usually shallowly cordate, clasping, rarely rounded, apex acute or obtuse. Flowers 2–4, in fascicles in leaf axils; bracts ovate-oblong, 5–7 × ca. 3 mm, membranous; pedicel ca. 1.4 cm, to 2 cm in fruit, jointed at middle, straight in fruit. Sepals ovate, ca. 4 mm. Petals orange-yellow, orbicular or ovate.

Fertile stamens 3; filaments proximally brown torulose villous; staminodes 3; antherodes sagittate. Capsule ellipsoid, trigonous, ca. 6 × 2.5–3 mm. Seeds uniseriate, pitted.

• Rice fields or by water. S Guangxi (Fangcheng Ge Zu Zizhixian).

3. *Murdannia triquetra* (Wallich ex C. B. Clarke) Brückner in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 15a: 173. 1930.

水竹叶 shui zhu ye

Aneilema triquetrum Wallich ex C. B. Clarke, Commelyn. Cyrtandr. Bengal. 31, t. 19. 1874; *A. nutans* H. Léveillé.

Herbs perennial. Roots fibrous. Rhizomes horizontal, elongate. Stems creeping proximally, ascending distally, branched, to 40 cm; internodes ca. 8 cm, with a line of dense, white hairs. Leaves sessile; leaf sheath with a line of hairs on 1 side; leaf blade spreading or slightly folded, linear-lanceolate or linear-elliptic, 2–6 cm × 5–8 mm, ciliate only in proximal part, apex obtuse, abruptly narrowed into acuminate tip. Cincinni terminal and axillary, usually 1-flowered; peduncle 1–4 cm (terminal ones longer), with linear bract at middle, sometimes with a flower in axil of bract; pedicels 1–2 cm. Sepals narrowly oblong, 4–6 mm. Petals pink, purple-red, or blue-purple, obovate. Fertile stamens 3; filaments densely bearded; staminodes 3; antherodes sagittate. Capsule ovoid-globose, trigonous, 5–7 × 3–4 mm, obtuse or acute at both ends. Seeds (1–)3 per valve, uniseriate, reddish gray, not flattened. Fl. Sep–Oct (also May in Yunnan), fr. Oct–Nov.

By rice fields or wet places; near sea level to 1600 m. C and S Anhui, W Fujian (Liancheng Xian), Guangdong, Guangxi, Guizhou, Hainan, S Henan (Jigong Shan), Hubei, Hunan, S Jiangsu (Suzhou Shi), Jiangxi, SW Shaanxi (Nanzheng Xian), Sichuan, Taiwan, S and W Yunnan, N Zhejiang (Hangzhou Shi, Changhua) [India, Laos, Myanmar, Thailand, Vietnam].

Murdannia triquetra is a common weed in S China, with a high protein content (ca. 2.8% of fresh weight); it is used for forage, as a

vegetable, and medicinally as a febrifuge and diuretic.

4. *Murdannia keisak* (Hasskarl) Handel-Mazzetti, Symb. Sin. 7: 1243. 1936.

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Aneilema keisak Hasskarl, Commelin. Ind. 32. 1870; *A. coreanum* H. Léveillé & Vaniot; *A. oliganthum* Franchet; *A. taquetii* H. Léveillé.

Herbs perennial. Roots fibrous. Rhizomes horizontal, elongate. Stems creeping proximally, ascending distally, branched, to 40 cm; internodes ca. 8 cm, with a line of dense, white hairs. Leaves sessile; leaf sheath with a line of hairs on 1 side; leaf blade spreading or slightly folded, linear-lanceolate or linear-elliptic, 2–8 cm × 5–8 mm, ciliate only in proximal part, apex acuminate. Cincinni terminal and axillary, usually 1-flowered; peduncle 1–4 cm (terminal ones longer), with linear bract at middle, sometimes with a flower in axil of bract; pedicels 1–2 cm. Sepals narrowly oblong, 6–10 mm. Petals pink, purple-red, blue-purple, or pale blue, obovate. Fertile stamens 3; filaments densely bearded; staminodes 3; antherodes sagittate. Capsule narrowly ovoid, trigonous, 5–10 × 2–3 mm, acute to subacuminate at both ends. Seeds 4 (sometimes fewer) per valve, uniseriate, gray, slightly flattened. Fl. Aug–Sep.

Wet places. S Fujian (Xiamen Shi), N Jiangxi (Jiujiang Shi, Xingjian Xian), E Jilin (Chunhua), Liaoning, NE Zhejiang (Zhenhai Xian) [S Japan, Korea].

Murdannia keisak is perhaps not distinct from *M. triquetra*. This complex is widely distributed from India to Japan (and recently recorded in E North America). The two taxa are extremely similar in habit and other qualitative characters, but size of sepals, shape and size of capsule, and number and shape of seeds show differences correlated with geographic distribution.

5. *Murdannia medica* (Loureiro) D. Y. Hong, Acta Phytotax. Sin. 12: 470. 1974.

少叶水竹叶 shao ye shui zhu ye

Commelina medica Loureiro, Fl. Cochinch. 1: 40. 1790; *Aneilema paucifolium* N. E. Brown.

Herbs perennial. Roots equal in thickness, fusiform thickened in middle with tubers to 5 mm in diam., densely white lanate. Rhizomes absent. Stems 1 to several, arising from rosette, scapiform, 10–35 cm × 1.5–2 mm, glabrous or rather densely hirsute, usually with 1 or 2 leaves. Basal leaves usually in a rosette, often ± reflexed, linear, 8–15(–20) cm × 3–6 mm, glabrous; leaf sheath of proximal cauline leaves 1–1.5 cm, glabrous or sparingly hirsute along 1 side, mouth open nearly to base; blade of proximal cauline leaves same shape as in basal leaves, 5–20 cm; distal cauline leaves often with only sheath developed or with blade to 3 cm. Flowers usually (1 or) 2 to several, in fascicles in involucre bracts, tightly closed upon main axis; involucre bracts forming laxly spicate inflorescence, sheathlike, glabrous; pedicels to 2 cm, jointed above middle, with membranous, sheathlike bracteole below middle. Sepals lanceolate, 5–6 mm, persistent. Petals pink-purple, obovate-orbicular. Fertile stamens 3; filaments pubescent; staminodes 3; antherodes 3-sect. Capsule broadly ovoid, trigonous, 5(–6) mm, apex obtuse, apiculate. Seeds up to 7 per valve, uni-

seriate, gray-green, often quadrangular, reticulate. Fl. Aug–Sep.

Open, humid places and meadows. E Guangdong (Lufeng Xian), Hainan (Changjiang Xian, Wanning Xian) [Cambodia, Thailand, Vietnam].

6. *Murdannia spectabilis* (Kurz) Faden, Taxon 29: 74. 1980.

腺毛水竹叶 xian mao shui zhu ye

Aneilema spectabile Kurz, J. Asiat. Soc. Bengal 40: 77. 1871; *A. loureiroi* Hance; *Murdannia loureiroi* (Hance) R. S. Rao & Kammathy.

Herbs perennial. Roots numerous, mostly ca. 2 cm long, fusiform thickened at end into tubers ca. 1 cm in diam., densely lanate, a few roots longer, not thickened. Rhizomes absent. Stem 1, erect, simple, 8–30 cm × 1.5–3 mm, glabrous or rather densely hirsutulous, with 1 or 2 leaves. Leaf sheaths pubescent; basal leaves several in a rosette, leaf blade linear, 5–15 × 1–2 cm, margin undulate, ciliate proximally; cauline leaves with blade similar in shape and size to that of basal leaves, or smaller. Flowers several, in fascicles in axils of involucre bracts; involucre bracts several, forming 4–8 cm long spicate inflorescence, sheathlike, basal one sometimes ± leaflike, but much smaller than leaves, usually 1–2.5 cm, sparsely hirsute; pedicels to 2 cm, jointed above middle, with a sheathlike, membranous bracteole at middle, capitate glandular. Sepals lanceolate, 5–6 mm, persistent. Petals purple, purple-red, or blue, orbicular. Fertile stamens 2; filaments lanate proximally; staminodes 3; antherodes 3-sect. Capsule broadly ellipsoid, trigonous, 5–6 mm. Seeds ca. 4 per valve, gray. Fl. May–Jul, fr. Jun–Jul.

Forests, thickets; near sea level to 1600 m. Guangdong (Bei Jiang, Luofu Shan), Hainan (Zhanxian), S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [Cambodia, Laos, Myanmar, Philippines, Thailand, Vietnam].

7. *Murdannia vaginata* (Linnaeus) Brückner in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 15a: 173. 1930.

细柄水竹叶 xi bing shui zhu ye

Commelina vaginata Linnaeus, Mant. Pl. 2: 177. 1771; *Dictyospermum vaginatum* (Linnaeus) D. Y. Hong.

Herbs perennial. Roots fibrous, lanate. Rhizomes elongate, with long internodes. Stems creeping or slightly robust and ascending, branched at base, usually simple distally, 15–50 cm × 1–2.2 mm, glabrous or with a line of hairs. Leaves 2 to several; leaf sheath open; leaf blade linear, 4–10(–20) cm × 4–7 mm, glabrous, margin ciliate. Flowers 1–5, in fascicles; peduncle slender, 5–10(–20) cm; sheathlike involucre bracts 1–3 on each stem, distant, striate; pedicels 1–1.5 cm, with 2 bracteoles, hirsute distally. Sepals lanceolate, ca. 3 mm, persistent. Petals blue, obovate-orbicular. Fertile stamens 2; filaments pubescent; staminodes 3 or 4; antherodes 3-sect. Capsule globose, ca. 3 mm in diam. Seeds 1 per valve, gray-black, reticulate. Fl. Aug–Sep.

Usually on sandy beaches. Guangdong, Guangxi, Hainan, N Jiangsu (Yantai Shan) [India, Philippines, Sri Lanka, Thailand, Vietnam].

8. *Murdannia edulis* (Stokes) Faden, Taxon 29: 77. 1980.

葶花水竹叶 ting hua shui zhu ye

Commelina edulis Stokes, Bot. Mat. Med. 1: 184. 1812; *Aneilema formosanum* N. E. Brown; *A. scapiflorum* (Roxburgh) Wight; *A. scapiflorum* var. *latifolium* N. E. Brown; *C. scapiflora* Roxburgh; *Murdannia formosanum* (N. E. Brown) K. S. Hsu; *M. scapiflora* (Roxburgh) Royle.

Herbs perennial. Roots fibrous, robust, to more than 10 cm × (1–)2–4 mm, partly or totally fusiform thickened near end into tubers to 8 mm in diam., densely lanate. Rhizomes absent. Stems several from rosette, scapiform, subequaling leaves, ca. 2 mm in diam., subglabrous to densely hispidulous. Leaves all basal, rosulate; leaf blade linear, 10–42 × 2–4.5 cm, glabrous or sparsely puberulent on both surfaces, margin hirsutulous-ciliate and often undulate, apex often acuminate or arcuate. Cincinni solitary in each involucre bract or sometimes several in leaf axils, proximal cincinni to 3 cm, distal ones gradually becoming smaller, apical ones ca. 2 mm; involucre bracts sheathlike, rarely with blade, basal 1–3 often infertile; bracts red, cupular, minute; pedicels 5–8 mm in fruit, with sheathlike, membranous involucre bracts, forming reduced inflorescence shoots. Sepals lanceolate, ca. 4 mm, persistent. Petals pink or purple, obovate-orbicular. Fertile stamens 3; filaments pubescent; staminodes 3; antherodes 3-sect. Capsule ellipsoid, trigonous, ca. 7 mm. Seeds ca. 7 per valve, slightly flattened, reticulate. Fl. Jun–Aug.

Forests; near sea level to 1000 m. E Guangdong (Lufeng Xian), SE Guangxi (Bobai Xian), Hainan, Taiwan [India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam].

9. *Murdannia macrocarpa* D. Y. Hong, Acta Phytotax. Sin. 12: 471. 1974.

大果水竹叶 da guo shui zhu ye

Herbs perennial. Roots fibrous, ca. 2.5 mm in diam., glabrous to densely tomentose. Rhizomes absent. Stem 1, erect, simple, to 1 m × 5 mm, subglabrous, striate. Basal leaves with blade long linear, 40–50 × 1–1.5 cm, glabrous. Cauline leaves 3–5; leaf sheaths 2–3 cm; proximal leaf blades slightly shorter than basal ones, distal blades becoming shorter, apical leaf bladeless. Cincinni ca. 6 cm; flowers dense, 20–30, only 1 or 2 fertile; peduncle 3–4 cm; involucre bracts sheathlike, 5–10 mm, membranous, glabrous; bracts ovate-orbicular, 1–1.5 cm × ca. 8 mm, membranous; pedicels straight, very short at anthesis, to 1 cm in fruit. Sepals elliptic, 1–1.2 cm, persistent. Petals purplish, elliptic. Fertile stamens 3, in a few flowers only anterior 2 fertile, posterior 1 depauperate or absent, often anterior 2 also depauperate; filaments densely white lanate; staminodes 3; antherodes 3-sect. Capsule ovoid, 1.5–1.7 cm, acute at apex. Seeds ca. 4 per valve, brown, rugose. Fl. Jun–Oct.

• Forests and open, wet places; near sea level to 1600 m. S Guangdong (Taishan Xian), S and W Yunnan (Xishuangbanna Dai Zu Zizhizhou, Zhenkang Xian).

The one or two capsules produced in each cincinnus emerge from nearly closed flowers. No open flowers have been observed by the present authors.

10. *Murdannia japonica* (Thunberg) Faden, Taxon 26: 142. 1977.

宽叶水竹叶 kuan ye shui zhu ye

Commelina japonica Thunberg, Trans. Linn. Soc. London 2: 332. 1794; *Aneilema herbaceum* (Roxburgh) Wallich ex C. B. Clarke; *C. elata* Vahl; *C. herbacea* Roxburgh; *C. lineolata* Blume; *Murdannia elata* (Vahl) Brückner.

Herbs perennial. Roots fibrous, ca. 2 mm in diam., slightly fusiform thickened, densely or rarely sparsely tomentose. Rhizomes absent. Main stem undeveloped and very short; fertile stems arising from base of main stems, erect, 20–40 cm × ca. 3 mm, glabrous or hispidulous near nodes. Leaves on main stems several, basal, rosulate; leaf blade narrowly elliptic, 8–15 × (1.5–)2–4.5 cm, glabrous, base cuneate or broadly cuneate, margin undulate, apex obtuse, acute, or shortly acuminate. Leaves on fertile stems several, cauline; basal leaf sheathlike, membranous, bladeless, 2-lobed, lobes subulate-triangular; other leaves with blade similar to that of rosulate leaves but wider, hirsute only on sheath, undulate at margin. Panicles terminal, consisting of several cincinni, glabrous throughout; cincinni to 3 cm, with several flowers, 2 to several fertile; involucre bracts small, proximal ones longest, ca. 1.5 cm, distal ones ca. 3 mm, membranous; bracts extremely small, membranous, enveloping cincinnus axis; pedicels straight, very short at anthesis, to 7 mm in fruit. Sepals narrowly elliptic, 0.5–6 mm, persistent. Petals purple or blue, obovate-orbicular. Fertile stamens 2 or 3; filaments pubescent; staminodes 3; antherodes 3-sect. Capsule broadly ellipsoid, trigonous, ca. 5 × 4 mm, obtuse at both ends. Seeds 2–4 per valve, uniseriate, brown-gray, tetragonal, 3 sides flat, 1 slightly convex and verrucose. Fl. May–Jul, fr. Aug–Sep.

Humid forests, forest margins, thickets; 1400–2000 m. S Yunnan [Bhutan, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Sikkim, Thailand].

11. *Murdannia divergens* (C. B. Clarke) Brückner in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 15a: 173. 1930.

紫背水竹叶 zi bei shui zhu ye

Aneilema herbaceum (Roxburgh) Wallich ex C. B. Clarke var. *divergens* C. B. Clarke, J. Linn. Soc., Bot. 11: 448. 1871; *A. divergens* (C. B. Clarke) C. B. Clarke; *Murdannia divergens* var. *dilatata* Handel-Mazzetti.

Herbs perennial. Roots fibrous, to more than 5 cm × 1.5–4 mm, slightly fusiform thickened at middle, sparsely or densely tomentose. Rhizomes absent. Stem 1, erect, usually simple, 15–60 cm, sparsely hairy. Leaves 4–10, all cauline, evenly distributed or aggregated; leaf sheath ca. 2 cm, white hirsute usually along mouth slit or sometimes throughout; leaf blade lanceolate to long linear, 5–15 × 1–2.5 cm, often glabrous, sometimes abaxially hirsute. Cincinni numerous, opposite or whorled, forming terminal panicles, rarely compound panicles, several flowered, 2–4 cm, glabrous throughout; involucre bracts ovate to lanceolate, 2–10 mm; bracts ovate; pedicels 1–3 mm, 5–10 mm in fruit, straight, thin. Sepals ovate-orbicular, 7–8 mm, persistent. Petals purple, purple-red, or purple-blue, obovate-orbicular. Fertile stamens 3; staminodes 3; antherodes 3-sect. Capsule obovoid or ellipsoid, trigonous, 6.5–8 mm excluding apiculate apex. Seeds 3–5 per valve, uniseriate, gray-black. Fl. Jun–Sep, fr. Aug–Sep.

Forests, forest margins, wet grasslands; 1500–3400 m. NW Guangxi (Longlin Ge Zu Zizhixian), C and SW Sichuan, Yunnan [Bhutan, India, Myanmar].

12. *Murdannia undulata* D. Y. Hong, Acta Phytotax. Sin. 12: 472. 1974.

波缘水竹叶 bo yuan shui zhu ye

Herbs perennial. Roots fibrous, to more than 5 cm × 1.5–4 mm, slightly fusiform thickened at middle, sparsely or densely tomentose. Rhizomes horizontal, elongate. Stems long creeping, ascending distally, to 50 cm, with infertile, short branches; internodes ca. 6 × 0.3–0.4 mm, subglabrous. Leaves sessile; leaf sheath ca. 1 cm, hirsute on 1 side; leaf blade ovate-lanceolate, ca. 12 × 3–3.5 cm, glabrous, margin undulate, apex shortly acuminate. Inflorescence terminal, corymbose, branched; cincinni lax, to 4 cm, glabrous; involucre bracts leaflike but much smaller than leaves; bracts lanceolate, apex acute; pedicels 1–1.3 cm, nearly straight. Sepals narrowly elliptic, 0.5–6 mm, persistent. Petals purple or black, obovate-orbicular. Fertile stamens 3; filaments pubescent; staminodes 3; antherodes 3-sect. Capsule ellipsoid, trigonous, ca. 7 mm. Seeds ca. 7 per valve, uniseriate, reticulate-pitted, pits white. Fr. May.

- SE Yunnan (Hekou Yao Zu Zizhixian).

Murdannia undulata differs from *M. japonica* in its creeping stems and elongate capsule; from *M. hookeri* in its much wider, undulate leaves and corymbose inflorescences far exceeding the leaves; and from both species in having more seeds per valve.

13. *Murdannia spirata* (Linnaeus) Brückner in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 15a: 173. 1930.

矮水竹叶 ai shui zhu ye

Commelina spirata Linnaeus, Mant. Pl. 2: 176. 1771; *Aneilema melanostictum* Hance; *A. nanum* Kunth.

Herbs perennial. Roots fibrous. Rhizomes horizontal, elongate, 1–1.5 mm in diam., with sheaths at nodes; internodes to 4 cm, densely yellow hirsute in a line. Stems slender, as thick as rhizomes, creeping proximally, ascending distally, simple or branched, to 35 cm; internodes 1.5–4.5 cm, densely hirsute in a line. Leaf sheaths ca. 5 mm, densely hirsute in a line along mouth slit; leaf blade narrowly ovate to lanceolate, 1.5–3.5 × 0.5–1 cm, glabrous on both surfaces, base truncate, slightly clasping, margin undulate, apex obtuse or acute. Cincinni 1–4, forming terminal panicles, glabrous throughout; peduncle with an infertile, membranous involucre bract above middle; apical involucre bract sheathlike, proximal 1 or 2 involucre bracts similar to leaves in shape, membranous, if only 2 cincinni present then involucre bracts usually absent, if only 1 cincinnus present then cincinni filiform, to 7 cm; bracts very small; pedicels elongate, to 7 mm in fruit. Sepals elliptic, 3–4 mm, persistent. Petals pale blue or nearly white, obovate-orbicular. Fertile stamens 3; filaments lanate; staminodes 3; antherodes 3-sect. Capsule oblong, trigonous, 3–4 mm (excluding apiculus), obtuse at both ends, apiculate at apex. Seeds 3–7 per valve, uniseriate, gray-white, verrucose. Fl. Jan–Dec. $2n = 40$.

Forests, humid wastelands, sandy places by streams; near sea level to 1000 m. S Fujian (Xiamen Shi), S Guangdong (Enping Xian),

Hainan, Taiwan, W Yunnan (Zhenkang Xian) [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Vietnam; Pacific Islands (Samoa)].

14. *Murdannia hookeri* (C. B. Clarke) Brückner in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 15a: 173. 1930.

根茎水竹叶 gen jing shui zhu ye

Aneilema hookeri C. B. Clarke, Commelyn. Cyrtandr. Bengal. 28, t. 17. 1874; *A. bodinieri* H. Léveillé & Vaniot; ?*Floscopa cavaleriei* H. Léveillé & Vaniot.

Herbs perennial. Roots fibrous. Rhizomes horizontal, elongate, ca. 3 mm in diam., glabrous. Stems creeping proximally, ascending distally, sometimes branched, to 60 cm × 3–5 mm, with a line of dense hairs. Leaf sheaths hirsute in a line; leaf blade lanceolate, ca. 12 × 1–2.2 cm, glabrous, base slightly clasping, apex shortly acuminate or obtuse. Panicles terminal, of several cincinni, 2–4 cm, glabrous throughout; basal 1 or 2 involucre bracts leaflike, nearly as large as leaves, others small, less than 1 cm; bracts ca. 2 mm; pedicels straight. Sepals obovate-orbicular, ca. 4 mm. Petals pale purple to nearly white, obovate-orbicular. Fertile stamens 3; filaments lanate; staminodes 3; antherodes 3-sect. Capsule narrowly ellipsoid, trigonous, 6–7 mm (excluding apiculus), acute at both ends, apiculate at apex. Seeds ca. 3 per valve, gray, red spotted. Fl. and fr. Jun-Sep.

Forests, streamsides in ravines; near sea level to 2800 m. N Fujian (Chong'an Xian), N Guangdong (Yangshan Xian), NE Guangxi (Longsheng Ge Zu Zizhixian), NE and SW Guizhou (Xingren Xian, Yinjiang Xian), SE Hunan (Yizhang Xian), C and S Sichuan, NE Yunnan (Daguan Xian, Songming Xian) [E India].

The original description of *Floscopa cavaleriei* (Mem. Soc. Natl. Acad. Cherbourg 35: 383. 1906) describes a plant with stems glabrous; leaves clasping, leaf blade narrowly lanceolate, glabrous; panicles large, divaricate; bracts minute; flowers numerous; and capsule 3-valved. These features are in accordance with those of *Murdannia hookeri*, and the type locality (Pingfa in Guizhou) is also within the distribution area of that species. Therefore, *F. cavaleriei* is probably conspecific with *M. hookeri*.

15. *Murdannia nudiflora* (Linnaeus) Brenan, Kew Bull. 7: 189. 1952.

裸花水竹叶 luo hua shui zhu ye

Commelina nudiflora Linnaeus, Sp. Pl. 1: 41. 1753; *Aneilema nudiflorum* (Linnaeus) R. Brown; *Tradescantia malabarica* Linnaeus.

Herbs annual. Roots fibrous, slender, less than 0.3 mm in diam., glabrous or tomentose. Rhizomes absent. Stems numerous, diffuse, creeping proximally, simple or branched, 10–50 cm, glabrous. Leaves nearly all cauline, sometimes 1 or 2 basal; leaf sheath mostly less than 10 mm, hirsute throughout, sometimes glabrous except for a hirsute line along mouth slit; leaf blade linear or lanceolate, 2.5–10 × 0.5–1 cm, glabrous or sparsely hispid on both surfaces, apex obtuse or acuminate. Cincinni several, in terminal panicles, or solitary, with several densely arranged flowers; peduncle slender, to 4 cm; proximal involucre bracts leaflike but smaller than leaves, distal ones less than 10 mm; bracts caducous; pedicels slender, straight, 3–5 mm. Sepals ovate-elliptic, ca. 3 mm. Petals purple, obovate-orbicular. Fertile stamens 2; filaments bearded proximally; staminodes 2–

4; antherodes 3-sect. Capsule ovoid-globose, trigonous, 3–4 mm. Seeds 2 per valve, yellow-brown, deeply pitted, or shallowly pitted and radiate white verrucose. Fl. and fr. (Jun–)Aug–Sep(–Oct).

Wet places by water, rarely among grass; low elevations (to 1500 m in Yunnan). C Anhui (Shucheng Xian), Fujian, Guangdong, Guangxi, S Henan (Tongbai Xian), WC Hunan (Xuefeng Shan), N and S Jiangsu, Jiangxi, C and E Shandong (Laoshan Xian, Tai Shan), C Sichuan (Emei Shan, Guanghan Xian), S and W Yunnan [Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, New Guinea, Philippines, Sikkim, Sri Lanka; Indian Ocean and Pacific Islands].

16. *Murdannia loriformis* (Hasskarl) R. S. Rao & Kammathy, Bull. Bot. Surv. India 3: 393. 1961.

牛鞭草 niu e cao

Aneilema loriforme Hasskarl in Miquel, Pl. Jungh. 2: 143. 1852; *A. angustifolium* N. E. Brown; *A. nudiflorum* (Linnaeus) R. Brown var. *rigidior* Benthams; *A. terminale* Wight.

Herbs perennial. Roots fibrous, 0.5–1 mm in diam., glabrous or tomentose. Rhizomes absent. Main stem undeveloped; fertile stems several, arising from rosette, diffuse or ascending, 15–50(–100) cm, glabrous or puberulent on 1 side, very rarely densely hirsute. Basal leaves with blade linear, 5–15(–30) cm × 6–9 mm, margin ciliate only proximally; cauline leaves shorter, ciliate only on 1 side of sheath mouth, glabrous elsewhere, very rarely densely hirsutulous. Cincinni terminal, solitary or 2 or 3 forming a panicle, subcapitate, of several densely arranged flowers; proximal involucre bracts leaflike but smaller than leaves, distal ones very small, less than 10 mm; peduncle ca. 2.5 cm; bracts ca. 4 mm, caducous; pedicels slightly curved, 2.5–4 mm in fruit. Sepals ovate-elliptic, ca. 3 mm, herbaceous. Petals purple-red or blue, obovate-orbicular. Fertile stamens 2; filaments pubescent; staminodes 3; antherodes 3-sect. Capsule ovoid-globose, trigonous, 3–4 mm. Seeds 2 per valve, yellow-brown, radiate striate, finely white reticulate, neither pitted nor verrucose. Fl. May–Oct.

Forests, grassy slopes. Anhui, E and N Fujian, Guangdong, Guangxi, SW Guizhou (Wangmo Xian), Hainan, SE Hunan (Yizhang Xian), Jiangxi, Sichuan, Taiwan, SE Xizang (Médog Xian), S Yunnan (Jianshui Xian), S Zhejiang (Longquan Xian, Pingyang Xian) [E India, Indonesia, Japan (Ryukyu Islands), New Guinea, Philippines, Sri Lanka, Thailand, Vietnam].

Murdannia loriformis was long treated as conspecific with *M. nudiflora*, and they are indeed very similar in habit, inflorescence, capsule, etc. However, *M. loriformis* differs as follows: main stem undeveloped; sheaths of cauline leaves ciliate only on 1 side of mouth; cincinni subcapitate; pedicels slightly curved; seeds finely white reticulate, neither pitted nor verrucose.

17. *Murdannia bracteata* (C. B. Clarke) J. K. Morton ex D. Y. Hong, Acta Phytotax. Sin. 12: 473. 1974.

大苞水竹叶 da bao shui zhu ye

Aneilema nudiflorum (Linnaeus) R. Brown var. *bracteatum* C. B. Clarke in A. de Candolle & C. de Candolle, Monogr. Phan. 3: 211. 1881; *A. bracteatum* (C. B. Clarke) Kuntze; *A. kuntzei* C. B. Clarke.

Herbs perennial. Roots fibrous, 0.5–1 mm in diam., rather densely tomentose. Rhizomes horizontal. Main stem undevel-

oped, very short; fertile stems usually 2, arising from rosette, long, creeping, ascending apically, 20–60 cm; internodes ca. 10 cm, pubescent throughout or only on 1 side. Basal leaves rosulate; leaf blade linear, 20–30 × 1.2–1.8 cm, glabrous on both surfaces or abaxially puberulent, margin ciliate proximally. Cauline leaves with sheath pubescent throughout or only hispid-ciliate at mouth; leaf blade ovate-lanceolate or lanceolate, 3–12 × 1–1.5 cm, glabrous on both surfaces or abaxially scabrid. Cincinni (1–)3–5, densely flowered, capitate; peduncle 2–3 cm; involucre bracts leaflike but smaller than leaves; bracts orbicular, 5–7 mm, caducous; pedicels very short, strongly curved, elongate to 2–3 mm in fruit. Sepals ovate-elliptic, ca. 4 mm. Petals blue, obovate-orbicular. Fertile stamens 2; filaments pubescent; staminodes 3; antherodes 3-sect. Capsule broadly ellipsoid, trigonous, ca. 4 mm. Seeds 2 per valve, yellow-brown, radiate striate, white reticulate, not pitted. Fl. May–Nov.

By water, sandy places in ravines. Guangdong, Guangxi, Hainan, S Yunnan (Lichun Xian, Xishuangbanna Dai Zu Zizhizhou) [Laos, Thailand, Vietnam].

18. *Murdannia simplex* (Vahl) Brenan, Kew Bull. 7: 186. 1952.

细竹篙草 xi zhu gao cao

Commelina simplex Vahl, Enum. Pl. 2: 177. 1805; *Aneilema sinicum* Ker Gawler.

Herbs perennial. Roots fibrous, robust, 2–3 mm in diam., densely lanate. Rhizomes absent. Main stem undeveloped, short, with basal, rosulate leaves; fertile stems 2–4 arising from base of main stems, usually erect, sometimes ascending, to 50 cm. Basal leaves with sheath hirsute only on 1 side; blade linear, 15–35 × 0.6–1.5 cm, glabrous. Cauline leaves often 2 or 3, rarely more; proximal leaf blades to 12 cm, distal ones shorter, sometimes only ca. 10 mm, glabrous. Cincinni several, to 2 cm, forming narrow panicles ca. 5 cm; peduncle ca. 10 mm; involucre bracts ovate or ovate-lanceolate, less than 10 mm, membranous, caducous; bracts subequaling sepals, caducous; flowers pendulous in bud, ascending at anthesis; pedicels straight, ca. 5 mm in fruit. Sepals elliptic, 4–5 mm. Petals purple, obovate-orbicular. Fertile stamens 2; filaments bearded; staminodes 3; antherodes 3-sect. Capsule ovoid-globose, trigonous, 4–5 mm. Seeds 2 per valve, brown-black, white radiate verrucose. Fl. Apr–Sep.

Forests, marshes, humid grasslands; near sea level to 2700 m. Guangdong, Guangxi, SW Guizhou, S Hainan (Sanya), C and SW Sichuan, S and W Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam; E Africa].

19. *Murdannia stenothyrsa* (Diels) Handel-Mazzetti, Symb. Sin. 7: 1244. 1936.

树头花 shu tou hua

Aneilema stenothyrsium Diels, Notes Roy. Bot. Gard. Edinburgh 5: 297. 1912.

Herbs perennial. Roots fibrous, robust, 2–3 mm in diam., densely lanate. Rhizomes absent. Main stem undeveloped, short, with basal, rosulate leaves; fertile stems 2–4, arising from base of main stems, usually erect, sometimes ascending, to 50 cm. Basal leaves with sheath sparsely hirsutulous throughout, some-

times proximal ones hirsute only along mouth slit; blade linear, 15–35 × 0.6–1.5 cm, glabrous. Cauline leaves often 2 or 3, rarely more; proximal leaf blades to 12 cm, distal ones shorter, sometimes only ca. 10 mm, glabrous. Cincinni several, to 2 cm, forming narrow panicles ca. 5 cm; peduncle ca. 10 mm; involucre bracts ovate or ovate-lanceolate, less than 10 mm, membranous, caducous; bracts subequaling sepals, caducous; flowers pendulous in bud, ascending at anthesis; pedicels straight, ca. 5 mm in fruit. Sepals elliptic, 5–6 mm. Petals purple or blue, obovate-orbicular, ca. 8 mm. Fertile stamens 2; filaments lanate; staminodes 3; antherodes 3-sect. Capsule ovoid-globose, trigonous, 6–7 mm. Seeds 2 per valve, brown-black, white radiate verrucose. Fl. Jun–Oct.

• Open mountain slopes, forests, by rice fields; 1700–2700 m. C and SW Sichuan (Hanyuan Xian, Xichang Xian), C and W Yunnan.

Murdannia stenothyrsa may be better treated as a subspecies of *M. simplex* because they differ only in a few quantitative characters and seem to be altitudinally vicarious. In the protologue of *Aneilema stenothyrsium*, the capsule was described as having 1 seed per valve. Some specimens from Yunnan (including the type locality) and Sichuan, which are consistent with the protologue, have 2 seeds per valve.

20. *Murdannia kainantensis* (Masamune) D. Y. Hong, *Acta Phytotax. Sin.* 12: 474. 1974.

狭叶水竹叶 xia ye shui zhu ye

Aneilema kainantense Masamune, *Trans. Nat. Hist. Soc. Taiwan* 33: 27. 1943.

Herbs perennial. Roots fibrous, ca. 1 mm in diam., densely lanate. Rhizomes absent. Main stem undeveloped, with basal, rosulate leaves; fertile stems several, arising from base of main stem, suberect or ascending, rarely creeping proximally, 20–60 cm, densely hirsutulous or glabrous. Basal leaves with sheath hirsutulous throughout or only along mouth slit; blade 10–20 × 3–5 cm; cauline leaves much shorter, leaf blade less than 8 cm; all leaves subglabrous or hirsute only at margin and along midvein. Cincinni 2 or 3 on each stem, capitate at anthesis, slightly lax in fruit, several flowered, sometimes only 1 flower fertile; involucre bracts leaflike, distal ones often with sheath but no blade, much shorter than leaves; bracts ovate, 3–4 mm, caducous; pedicels straight, short at anthesis, 4–6 mm in fruit. Sepals elliptic, 3.5–4 mm, persistent. Petals blue or purple, obovate-orbicular. Fertile stamens 2; filaments pubescent; staminodes 3; antherodes 3-sect. Capsule broadly ellipsoid, trigonous, 4–5 mm. Seeds 2 per valve, brown-gray, radiate striate. Fl. Apr–May.

• ?Forests. E Fujian (Fuzhou Shi), Guangdong (Guangzhou Shi and islands), S Guangxi (Qinzhou Xian), Hainan (Ledong Xian).

Murdannia kainantensis is not fully understood. From the specimens available, it appears fairly similar to *M. loriformis* and *M. simplex*. It differs from *M. loriformis* in having roots more robust, fertile stems mostly erect or ascending, pedicels straight, and seeds without fine, white reticulate sculpturing; from *M. simplex* in having roots more slender and seeds not white radiate verrucose; and from both species in having leaves narrower, often hairy. The specimens from Fujian have slightly wider and subglabrous leaves.

