

COMMELINACEAE

鸭跖草科 ya zhi cao ke

Hong Deyuan (洪德元)¹; Robert A. DeFilipps²

Herbs annual or perennial, sometimes woody at base. Stems with prominent nodes and internodes. Leaves alternate, distichous or spirally arranged, sessile or petiolate; leaf sheath prominent, open or closed; leaf blade simple, entire. Inflorescence usually of cincinni in panicles or solitary, sometimes shortened into heads, sometimes sessile with flowers fascicled, sometimes axillary and penetrating enveloping leaf sheath, rarely flowers solitary and terminal or axillary. Flowers bisexual, rarely unisexual, actinomorphic or zygomorphic. Sepals 3, free or connate only at base, often boat-shaped or carinate, sometimes galeate at apex. Petals (2 or)3, free, sometimes connate and tubular at middle and free at 2 ends (*Cyanotis*), sometimes clawed. Stamens 6, free, all or only 2 or 3 fertile; filaments glabrous or torulose villous; anthers parallel or slightly divergent, longitudinally dehiscent, rarely dehiscent by apical pores; staminodes 1–3; antherodes 4-lobed and butterflylike, 3-sect, 2-lobed and dumbbell-shaped, or entire. Ovary 3-loculed, or reduced to 2-loculed; ovules 1 to several per locule, orthotropous. Fruit a loculicidal, 2- or 3-valved capsule, rarely baccate and indehiscent. Seeds few, large; endosperm copious; hilum orbicular or linear.

About 40 genera and 650 species: mainly in tropical regions, fewer species in subtropical and temperate regions; 15 genera (two introduced) and 59 species (12 endemic, three introduced) in China.

Hong Deyuan. 1997. Commelinaceae. In: Wu Kuo-fang, ed., Fl. Reipubl. Popularis Sin. 13(3): 69–133.

- 1a. Inflorescence penetrating leaf sheath, sessile, capitate; fertile stamens 6.
 - 2a. Herbs erect, sometimes procumbent proximally, simple; anthers dehiscent by longitudinal slit 5. *Amischotolype*
 - 2b. Herbs climbing, branched; anthers dehiscent by apical pore 6. *Porandra*
- 1b. Inflorescence neither penetrating leaf sheath nor sessile nor capitate; stems sometimes with lateral branches penetrating leaf sheaths; fertile stamens 6 or fewer.
 - 3a. Climbers; involucral bracts large, spathe-like; flowers in basal and middle cincinni of panicles bisexual, others male.
 - 4a. Cincinni all involucral; lateral branches with an inflorescence at every node; ovules 2 per locule 1. *Streptolirion*
 - 4b. Only basal cincinni involucral; branches without an inflorescence at most nodes; ovules 8 per locule 2. *Spatholirion*
 - 3b. Herbs erect or prostrate; involucral bracts spathe-like or not; flowers all bisexual.
 - 5a. Fruits baccate, indehiscent; inflorescence terminal 10. *Pollia*
 - 5b. Fruits capsular; inflorescence terminal or not.
 - 6a. Inflorescence terminal, broomlike, with extremely numerous small flowers; capsule small, 2-valved, with 1 seed per valve 7. *Floscopa*
 - 6b. Inflorescence terminal or not, not broomlike; capsule 3-valved, rarely 2-valved when fertile stamens 3.
 - 7a. Involucral bracts spathe-like (except in *Cyanotis axillaris*, which has inflorescence enveloped in leaf sheath; fertile stamens 6; petals connate at middle).
 - 8a. Petals connate, tubular, with 2 ends free; fertile stamens 6; bracts falcate-curved, imbricately arranged in 2 rows 4. *Cyanotis*
 - 8b. Petals wholly free; fertile stamens 3 or 6; bracts not imbricately arranged in 2 rows.
 - 9a. Flowers zygomorphic; fertile stamens 3, inserted on 1 side; antherodes 4-lobed, butterflylike; capsule usually 2-valved, posterior valve often indehiscent 13. *Commelina*
 - 9b. Flowers actinomorphic; fertile stamens 6; capsule 3-valved 14. *Tradescantia*
 - 7b. Involucral bracts present or absent, spreading or sheathlike, never spathe-like.
 - 10a. Inflorescence sessile or extremely shortly pedunculate, flowers nearly in axillary heads or fascicled; fertile stamens usually 6, less often 1–3.
 - 11a. Petals pink, blue, or purple; filaments bearded, connectives narrow; stigma capitate ... 3. *Belosynapsis*
 - 11b. Petals white; filaments glabrous, connectives broad, square, deltoid, oblong, rarely narrow; stigma mostly penicillate 15. *Callisia*
 - 10b. Inflorescence obviously pedunculate, terminal or also axillary; fertile stamens 2 or 3.
 - 12a. Staminodes apically entire and sagittate, or 3-sect; fertile stamens 3 (sometimes 1 or 2 aborted), all inserted opposite sepals 8. *Murdannia*
 - 12b. Staminodes apically dumbbell-shaped; fertile stamens 2 or 3, inserted in posterior or anterior position.

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- 13a. Fertile stamens anterior; capsule cylindrical, 2–3 × longer than wide; seeds 4–8 per valve 9. *Tricarpelema*
 13b. Fertile stamens posterior; capsule globose; seed 1 per valve.
 14a. Fruit glabrous; petals not clawed, usually white 11. *Dictyospermum*
 14b. Fruit adhesive to touch with glandular, hooked hairs; upper petals shortly clawed, pale lilac 12. *Rhopalephora*

1. STREPTOLIRION Edgeworth, Proc. Linn. Soc. London 1: 254. 1845.

竹子子属 zhu ye zi shu

Herbs perennial, climbing. Rhizomes absent. Lateral branches penetrating leaf sheaths. Leaves alternate. Inflorescences borne at each node, opposite leaves, emerging from mouth of leaf sheath, each a large panicle of numerous cincinni; cincinni each subtended by an involucre bract; bracts similar to leaves, becoming smaller toward apex of cincinnus. Flowers actinomorphic, those of basal cincinnus bisexual, others male or bisexual. Sepals free, boat-shaped, galeate at apex. Petals free, linear-spatulate, white. Stamens 6, all fertile, equal; filaments densely torulose-hairy; anther locules parallel, ellipsoid, longitudinally dehiscent. Ovary 3-loculed; ovules 2 per locule. Capsule 3-valved, ellipsoid, beaked; seeds 2 per valve, rugose; hilum linear.

One species: Bhutan, China, India, Japan, Korea, Laos, Myanmar, Sikkim, Thailand, Vietnam.

1. *Streptolirion volubile* Edgeworth, Proc. Linn. Soc. London 1: 254. 1845.

竹子子 zhu ye zi

Herbs mostly climbing, rarely erect. Stems 0.5–6 m, often glabrous, or covered with yellow or brown, multicellular hairs. Petiole 3–11.5 cm; leaf blade cordate-orbicular, less often cordate-ovate, 5–15 × 3–15 cm, adaxially ± pubescent, apex often caudate. Cincinni with 1 to several flowers, in panicles, rarely cymes. Proximal bracts leaflike, 1.5–6 cm; distal ones smaller and ovate-lanceolate, rarely linear or lanceolate and boat-shaped. Pedicels absent. Sepals 3–5 mm, apex acute. Petals white or pale purple first, then turning white, linear or rarely filiform, 6–7 × (0.3–)1 mm, slightly longer than sepals. Capsule 4–7(–10) mm, with awn-shaped beak. Seeds gray-brown, 2.5(–4) mm. Fl. Jul–Aug, fr. Sep–Oct.

Tropical and subtropical forests, mountain slopes, subalpine areas; near sea level to 3200 m. Gansu, NW Guangxi, Guizhou, Hebei, W Henan, W Hubei, W Hunan, Liaoning, S Shaanxi, Shanxi, Sichuan, SE Xizang, Yunnan, W Zhejiang [Bhutan, India, Japan, Korea, Laos, Myanmar, Sikkim, Thailand, Vietnam].

- 1a. Stems usually very long and climbing, to 6 m, sometimes erect or suberect, not climbing, 12–50 cm; stems and leaves mostly glabrous, rarely stems villous with brown, multicellular hairs or petioles yellowish hirsute 1a. subsp. *volubile*
 1b. Stems all climbing; stems and leaves densely hirsute with brown, multicellular hairs 1b. subsp. *khasianum*

1a. *Streptolirion volubile* subsp. *volubile*

竹子子(原亚种) zhu ye zi (yuan ya zhong)

Streptolirion cordifolium (Griffith) Kuntze; *S. duclouxii* H. Léveillé & Vaniot; *S. lineare* Fukuoka & N. Kurosaki; *S. mairei* H. Léveillé; *S. volubile* subsp. *subalpinum* C. Y. Wu; *Tradescantia cordifolia* Griffith.

Stems usually very long and climbing, to 6 m, sometimes erect or suberect, not climbing, 12–50 cm. Stems and leaves mostly glabrous, rarely stems villous with brown, multicellular hairs or petioles yellowish hirsute.

Mountain slopes; near sea level to 2000 m (to 3200 m in Xizang and NW Yunnan). Gansu, NW Guangxi, Guizhou, Hebei, W Henan, W Hubei, W Hunan, Liaoning (Qian Shan), S Shaanxi, Shanxi, Sichuan, SE Xizang, Yunnan, W Zhejiang (Chun'an Xian, Tianmu Shan) [Bhutan, India, Japan, Korea, Laos, Myanmar, Sikkim, Thailand, Vietnam].

1b. *Streptolirion volubile* subsp. *khasianum* (C. B. Clarke) D. Y. Hong, Acta Phytotax. Sin. 12: 463. 1974.

红毛竹子子 hong mao zhu ye zi

Streptolirion volubile var. *khasianum* C. B. Clarke in A. de Candolle & C. de Candolle, Monogr. Phan. 3: 262. 1881.

Stems all climbing. Stems and leaves densely hirsute with brown, multicellular hairs.

Tropical and subtropical forests; 1000–3000 m. SW Guizhou (Pu'an Xian), SE Xizang (Mêdog Xian), Yunnan [Bhutan, E India, Vietnam].

2. SPATHOLIRION Ridley, J. Bot. 34: 329. 1896.

竹叶吉祥草属 zhu ye ji xiang cao shu

Herbs perennial, climbing or suberect. Rhizomes absent. Lateral branches penetrating leaf sheaths. Leaves alternate. Inflorescence borne opposite leaf and exerted from mouth of leaf sheath, but not penetrating sheath, a long pedunculate panicle of numerous cincinni; basal cincinnus with a leaflike involucre bract at base, with bisexual flowers, others without involucre bracts, with only male flowers. Flowers actinomorphic. Sepals free, boat-shaped, herbaceous, galeate at apex. Petals free, purple or white, broadly linear or oblanceolate. Stamens 6, all fertile, equal; filaments lanate; anther locules parallel, ellipsoid, longitudinally dehiscent. Ovary 3-loculed; ovules 8 per locule. Capsule 3-valved, ovoid, trigonous; seeds 4–8 per valve, polygonal, reticulate; hilum linear.

Three species: China, Thailand, Vietnam; two species in China.

Spatholirion differs from *Streptolirion* mainly in having involucre bracts on only the basal cincinnus of the panicles, not all nodes of the lateral branches bearing an inflorescence, and an ovary containing 4–8 ovules per locule.

- 1a. Stems climbing, to 3 m; leaf blade lanceolate or ovate-lanceolate, 10–20 × 1.5–6 cm; ovary cylindrical, glabrous 1. *S. longifolium*
1b. Stems suberect, 15–20 cm; leaf blade broadly oblong or broadly lanceolate, 3–10 × 2–5 cm; ovary conical, densely hirsute 2. *S. elegans*

1. *Spatholirion longifolium* (Gagnepain) Dunn, Bull. Misc. Inform. Kew 1911: 162. 1911.

竹叶吉祥草 zhu ye ji xiang cao

Streptolirion longifolium Gagnepain, Bull. Soc. Bot. France 47: 334. 1900; *Politia dielsii* H. Léveillé; *Spatholirion scandens* Dunn.

Stems climbing, to 3 m. Petiole 1–3 cm; leaf blade lanceolate to ovate-lanceolate, 10–20 × 1.5–6 cm, subglabrous or pubescent on both surfaces, apex acuminate. Panicles with peduncle ca. 10 cm, subglabrous or pubescent; involucre bracts ovate-orbicular, 4–10 cm. Pedicels absent. Sepals ca. 6 mm, subglabrous or pubescent. Petals purple or white, slightly shorter than sepals. Ovary cylindrical, glabrous. Capsule ovoid, trigonous, beaked at apex. Seeds 6–8 per valve, brown-black. Fl. Jun–Aug, fr. Jul–Sep.

Dense forests in ravines, mostly on tree trunks, rarely in sparse forests or grassy ravine slopes; near sea level to 2700 m. W Fujian (Taining Xian), N Guangdong (Renhua Xian, Ruyuan Yao Zu Zizhixian), Guangxi, Guizhou, SW Hubei (Hefeng Tujia Zu Zizhixian, Xianfeng Xian), Hunan, W Jiangxi (Anfu Xian, Yifeng Xian),

Sichuan, Yunnan [Vietnam].

2. *Spatholirion elegans* (Cherfils) C. Y. Wu, Fl. Yunnan. 3: 685. 1983.

矩叶吉祥草 ju ye ji xiang cao

Streptolirion elegans Cherfils in Lecomte, Fl. Indo-Chine 6: 847. 1937.

Stems suberect, 15–20 cm. Petiole 1.5–2.5 cm; leaf blade broadly oblong or broadly lanceolate, 3–10 × 2–5 cm, densely hirsute adaxially, sparsely hirsute or subglabrous abaxially, apex acuminate. Panicles with peduncle 5–8 cm, densely pubescent; involucre bracts ovate, 3.5–4 cm. Pedicels absent or extremely short. Sepals ca. 8 mm in female flowers, ca. 4.5 mm in male, hirsute. Petals purple or white, equaling sepals. Ovary conical, densely hirsute. Capsule ovoid, trigonous, beaked at apex. Seeds ca. 4 per valve, brown-black. Fl. May–Jun.

Humid places in forests, 400–1200 m. SE Yunnan (Hekou Yao Zu Zizhixian, Maguan Xian) [Vietnam].

3. BELOSYNOPSIS Hasskarl, Flora 54: 259. 1871.

假紫万年青属 jia zi wan nian qing shu

Herbs perennial, creeping. Rhizomes long. Leaves alternate. Cincinni terminal or axillary, with several flowers, rarely flowers solitary; peduncle short; involucre bracts leaflike, not spatelike. Flowers actinomorphic. Sepals ± free, slightly connate only at base. Petals free, blue or purplish, linear. Stamens 6, all fertile, equal; filaments lanate; anther locules longitudinally dehiscent. Ovary 3-loculed; ovules 2 per locule. Capsule 3-valved, ellipsoid, 3-grooved. Seeds 2 per valve, cylindrical-subangular, reticulate; hilum orbicular.

Three species: S Asia; one species in China.

Belosynopsis is distinguished from *Cyanotis* in having involucre bracts neither spatelike nor imbricate, and petals wholly free.

1. *Belosynopsis ciliata* (Blume) R. S. Rao, Notes Roy. Bot. Gard. Edinburgh 25: 187. 1964.

假紫万年青 jia zi wan nian qing

Tradescantia ciliata Blume, Catalogus, 61. 1823; *Cyanotis kawakamii* Hayata; *T. capitata* Blume.

Rhizome and stems together more than 50 cm long. Stems prostrate, branched, rooting at nodes, glabrous or pubescent along a line. Leaf with sheath ca. 0.3 mm, membranous, pilose; leaf blade lanceolate to broadly ovate, 1.5–6 × 0.8–2.3 cm, margin ciliate, elsewhere glabrous or abaxially hirsutulous. Cincinni axillary, with (1 or) 2 to several flowers; involucre

bracts leaflike, wider than leaves; bracts obovate-spatulate or lanceolate, 5–10 × 2–3 mm, margin ciliate. Pedicels 1–2 mm. Sepals lanceolate or ovate-lanceolate, 4–6 × ca. 1.3 mm, pilose. Petals pink, blue, or blue-purple, obovate, ca. 5 × 2.6 mm. Filaments bearded. Ovary hirsute distally. Capsule oblong or ellipsoid, 2.5–3.5 mm, with 3 longitudinal grooves, apex hirsute. Seeds gray, cylindrical, ca. 1.6 × 0.8 mm, angled, rugose. Fl. Jun–Jul.

Rocks in forests; near sea level to 2300 m. S Guangdong, S Guangxi (Longzhou Xian, Rong Xian), Hainan, Taiwan, Yunnan [India, Indonesia, Japan, Laos, Malaysia, New Guinea, Philippines, Thailand, Vietnam].

4. CYANOTIS D. Don, Prodr. Fl. Nepal. 45. 1825, nom. cons.

蓝耳草属 lan er cao shu

Amisochphacelus R. S. Rao & Kammathy.

Herbs annual or perennial, erect or creeping. Rhizomes absent. Leaves alternate. Cincinni sessile, subtended by spathe-like involucre bracts; bracts imbricate, 2-seriate, falcate-curved. Flowers actinomorphic. Sepals free or connate only at base. Petals connate and tubular in middle, free at both ends, purple, blue, or white, linear-lanceolate. Stamens 6, all fertile, equal; filaments lanate, rarely glabrous; anther locules longitudinally dehiscent. Ovary 3-loculed; ovules 2 per locule. Capsule 3-valved, obovoid- or broadly oblong, trigonous. Seeds 1 or 2 per valve, cylindrical or quadrangular, reticulate or pitted; hilum at adjoining end of 2 seeds.

About 50 species: tropical and subtropical Africa and Asia to N Australia; five species in China.

The petals are often described as connate basally; they are actually connate only in the middle part, but free at both ends.

- 1a. Cincinni much reduced, with 3–6 flowers, enveloped in leaf sheath 5. *C. axillaris*
1b. Cincinni with more flowers, subtended by spathe-like bracts.
2a. Basal leaves rosulate; leaves, involucre bracts, and bracts usually densely arachnoid; roots 1–1.5 mm in diam. 2. *C. arachnoidea*
2b. Basal leaves not rosulate; leaves, involucre bracts, and bracts hirsute or pubescent, rarely sparsely arachnoid; roots much thinner.
3a. Leaf blade usually narrowly oblong; cincinni numerous flowered, semicircular, obviously cristate; bracts to 7 mm wide, sparsely multicellular ciliate 3. *C. cristata*
3b. Leaf blade linear or linear-lanceolate; cincinni not cristate; bracts much narrower, not ciliate.
4a. Plants with bulbs; seeds obviously striate and also finely reticulate 1. *C. vaga*
4b. Plants without bulbs; seeds only finely reticulate 4. *C. loureiroana*

1. *Cyanotis vaga* (Loureiro) Schultes & J. H. Schultes in Roemer & Schultes, Syst. Veg. 7: 1153. 1830.

蓝耳草 lan er cao

Tradescantia vaga Loureiro, Fl. Cochinch. 1: 193. 1790; *Cyanotis barbata* D. Don; *C. bulbosa* H. Léveillé; *C. nobilis* Hasskarl.

Herbs perennial, bulbiferous. Bulbs globose. Stems amply branched usually from base, or distally, or few branched, 10–60 cm. Leaves all cauline; leaf blade linear to lanceolate, 5–10 (–15) cm × 3–10 (–15) mm, abaxially glabrous or sparsely pubescent. Cincinni solitary, rarely terminal and also with flowers in axillary heads; peduncle present or absent; bracts 5–10 mm. Sepals connate at base, oblong-lanceolate, ca. 5 mm, abaxially white hirsute. Petals purple or blue-purple, 6–8 mm. Filaments blue lanate. Capsule obovoid, trigonous, ca. 2.5 mm, hirsutulous at apex. Seeds gray-brown, striate and finely reticulate. Fl. Jul–Sep, fr. Oct.

Forests or grassy slopes; near sea level to 3300 m. Guangdong (Guangzhou Shi), Guizhou, W Hainan (Dongfang Xian), S Sichuan, Taiwan, S Xizang, Yunnan [Bhutan, India, Laos, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

2. *Cyanotis arachnoidea* C. B. Clarke in A. de Candolle & C. de Candolle, Monogr. Phan. 3: 250. 1881.

蛛丝毛蓝耳草 zhu si mao lan er cao

Cyanotis bodinieri H. Léveillé & Vaniot; *C. labordei* H. Léveillé & Vaniot.

Herbs perennial; roots fibrous. Main stem undeveloped, short; fertile stems arising from beneath leaf rosette, diffuse, creeping, 20–80 cm. Leaves in a basal rosette and cauline; rosulate leaf blade linear, 8–35 × 0.5–1.5 cm; cauline leaf blade on fertile stems much shorter, to 7 cm, abaxially rather densely arachnoid. Cincinni often several, forming both terminal and axillary heads, sessile or on peduncle to 4 cm; bracts 7–8 mm. Sepals connate at base, linear-lanceolate, ca. 5 mm, abaxially arachnoid. Petals blue-purple, blue, or white, ca. 6 mm. Filaments blue arachnoid. Capsule broadly oblong, trigonous, ca.

2.5 mm, densely hirsutulous at apex. Seeds gray-brown, pitted. Fl. Jun–Sep, fr. Oct.

By streams, humid ravines and rocks; near sea level to 2700 m. Fujian, Guangdong, Guangxi, SW Guizhou, Hainan (Baoting Xian, Chengmai Xian), SW Jiangxi (Longnan Xian), Taiwan, C and S Yunnan [India, Laos, Myanmar, Sri Lanka, Thailand, Vietnam].

The roots are used as medicine for stimulating blood circulation, as a muscle and joint relaxant, and for relieving rheumatoid arthritis.

3. *Cyanotis cristata* (Linnaeus) D. Don, Prodr. Fl. Nepal. 46. 1825.

四孔草 si kong cao

Commelina cristata Linnaeus, Sp. Pl. 1: 42. 1753; *Cyanotis cavalieri* H. Léveillé & Vaniot; *C. racemosa* C. B. Clarke.

Herbs annual; roots fibrous. Stems creeping, often branched, 10–35 cm. Leaves all cauline; leaf blade oblong, lanceolate, ovate-lanceolate, or narrowly elliptic, 2–8 × 0.8–2 cm, abaxially glabrous or sparsely arachnoid. Cincinni often solitary, terminal or also axillary if 2 together; peduncle absent or to 9 cm; bracts 1–1.5 cm. Sepals connate at base, linear-lanceolate or oblanceolate, ca. 5 mm, abaxially hirsute along midvein and at margin. Petals blue or purple, 4–5 mm. Filaments blue lanate. Capsule columnar, trigonous, ca. 2.5 mm, hirsutulous at apex. Seeds gray-brown, pitted. Fl. Jul–Aug, fr. Sep–Oct.

By streams in ravines or open humid places; near sea level to 2000 m. W Guangdong (Xinxing Xian), Guangxi, SW Guizhou, Hainan, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sikkim, Sri Lanka, Thailand, Vietnam].

The root is used as a medicine for the relief of swelling and snakebite.

4. *Cyanotis loureiroana* (Schultes & J. H. Schultes) Merrill, Lingnaam Agric. Rev. 1: 61. 1923.

沙地蓝耳草 sha di lan er cao

Tradescantia loureiroana Schultes & J. H. Schultes in Roemer & Schultes, Syst. Veg. 7: 1178. 1830, based on *T. geniculata* Loureiro, Fl. Cochinch. 1: 193. 1790, not Jacquin

(1760); *Cyanotis geniculata* C. B. Clarke.

Herbs annual; roots fibrous. Stems branched and twisting, red. Leaves all cauline; leaf blade linear-lanceolate or lanceolate, abaxially glabrous or sparsely pubescent. Cincinni solitary, terminal; peduncle 2.5–6 cm; bracts 5–13 mm. Sepals connate at base, lanceolate, 5–6 mm, abaxially lanate. Petals blue or blue-purple, 6–8 mm. Filaments blue lanate. Capsule trigonous, ca. 2 mm, hirsutulous at apex. Seeds gray-brown, finely reticulate. Fl. winter.

Open places. SW Guangdong (Xuwen Xian), Hainan [Vietnam].

The concept of *Cyanotis loureiroana* has not been well understood, and Clarke (in A. de Candolle & C. de Candolle, Monogr. Phan. 3: 250. 1881) treated it as a doubtful species. It is similar in appearance to *C. papilionacea*, in which the rosulate, basal leaves are smaller or absent, but to *C. cristata* in capsule features.

5. *Cyanotis axillaris* (Linnaeus) D. Don ex Sweet, Hort. Brit. 430. 1826.

鞘苞花 qiao bao hua

Commelina axillaris Linnaeus, Sp. Pl. 1: 42. 1753; *Amis-chophacelus axillaris* (Linnaeus) R. S. Rao & Kammathy.

Herbs annual; roots fibrous. Stems erect or creeping, branched, 30–40 cm. Leaves all cauline; leaf blade linear, 20–80 × 5–8 mm, abaxially glabrous or sparsely pubescent. Cincinni reduced, in axillary fascicles of 3–6 flowers; peduncle absent; bracts ca. 10 mm. Sepals free, linear-spatulate, 6–9 mm, abaxially hirsute. Petals blue, ca. 12 mm. Filaments blue lanate. Capsule oblong, trigonous, 4–5 mm, hispid at apex, with 6 horned projections. Seeds gray-black or gray-brown, pitted. Fl. spring, autumn.

Humid sandy places. W Hainan (Changjiang Xian), Hong Kong [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; Oceania].

5. AMISCHOTOLYPE Hasskarl, Flora 46: 391. 1863.

穿鞘花属 chuan qiao hua shu

Forrestia A. Richard (1834), not Rafinesque (1806).

Herbs perennial. Stems erect, sometimes procumbent in basal part. Rhizomes long. Leaves alternate. Inflorescences borne at each node of middle part of stem, shortly pedunculate, penetrating leaf sheaths, each consisting of several cymes, usually capitate and sessile, sometimes corymbose or paniculate. Flowers nearly actinomorphic. Sepals free, carinate, herbaceous. Petals free, purplish, oblong or obovate-orbicular. Stamens 6, all fertile, subequal; filaments torulose villous; anther locules parallel, ovoid, longitudinally dehiscent. Ovary 3-loculed; ovules 2 per locule, sometimes 1 in posterior locule. Capsule 3-valved, globose or ovoid, trigonous. Seeds (1 or)2 per valve, cylindrical, trigonous, rugose, reticulate; hilum linear.

About 20 species: tropical Africa and Asia; two species in China.

1a. Capsule conical-tapered at apex, 10–15 mm, much longer than sepals 1. *A. hookeri*
1b. Capsule obtuse at apex, obovoid, trigonous, ca. 7 mm, much shorter than sepals 2. *A. hispida*

1. *Amischotolype hookeri* (Hasskarl) H. Hara, Fl. Eastern Himal. 1: 399. 1966.

尖果穿鞘花 jian guo chuan qiao hua

Forrestia hookeri Hasskarl, Flora 47: 629. 1864.

Stems erect distally, procumbent proximally, 1–3 m × ca. 1 cm. Leaf sheaths overlapping in distal part of stem, densely brownish yellow hirsute; leaf blade elliptic, ca. 30 × 5–10 cm, adaxially sparsely hispid or glabrous, abaxially yellow hirsute along veins or throughout, base cuneate, apex caudate-acuminate. Heads with up to 10 flowers, to 3 cm in diam. in fruit. Sepals ovate-oblong, ca. 6 × 4 mm, subglabrous. Petals pale purple-red. Capsule ovoid, trigonous, 10–15 × ca. 5 mm, much longer than persistent sepals, sparsely brown-hirsutulous, conical-tapered at apex. Seeds ca. 4 × 2.5 mm, rugose. Fl. Jun–Jul.

Evergreen broad-leaved forests; near sea level to 1200 m. SE Xizang (Médog Xian), S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [Bangladesh, Bhutan, India, Laos, Myanmar, Nepal, Vietnam].

2. *Amischotolype hispida* (A. Richard) D. Y. Hong, Acta Phytotax. Sin. 12: 461. 1974.

穿鞘花 chuan qiao hua

Forrestia hispida A. Richard in Dumont d'Urville, Voy.

Astrolabe 2: t. 1. 1834; *F. chinensis* N. E. Brown; *Tupistra cavaleriei* H. Léveillé.

Stems erect, to more than 1 m × 0.5–1.5 cm. Leaf sheaths to 4 cm, densely brownish yellow hirsute; leaf blade elliptic, 15–50 × 5–10.5 cm, brownish yellow hirsute near margin on both surfaces and below middle of abaxial major veins, base cuneate, apex acuminate. Heads with 25 or more flowers, 4–6 cm in diam. in fruit. Sepals obovate, ca. 5 mm at anthesis, to 13 mm in fruit, abaxially densely brown hirsute along midvein, rarely subglabrous, elsewhere glabrous or very sparsely hairy. Petals white. Capsule ovoid-globose, trigonous, ca. 7 mm, much shorter than persistent sepals, sparsely hirsutulous near obtuse apex. Seeds ca. 3 × 2 mm, rugose. Fl. Jul–Aug, fr. Sep.

Forests or streamsides in ravines; near sea level to 2100 m. S Fujian (Nanjing Xian), Guangdong, Guangxi, Guizhou, Hainan, Taiwan, SE Xizang (Médog Xian), Yunnan [Cambodia, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, New Guinea, Philippines, Thailand, Vietnam].

The indumentum on the sepals and capsule varies greatly in density.

6. PORANDRA D. Y. Hong, Acta Phytotax. Sin. 12: 462. 1974.

孔药花属 kong yao hua shu

Herbs perennial, climbing. Rhizomes absent. Stems long, branched, climbing, basally woody. Leaves alternate. Inflorescences borne near apex of branches, penetrating leaf sheaths, each a sessile head usually with several flowers. Flowers actinomorphic. Sepals free, imbricate, carinate. Petals free, pink, green, or white, elliptic or oblong. Stamens 6, all fertile, subequal; filaments lanate; anther locules oblong or deltoid-ovoid, connate for most of their length, dehiscent by apical pores. Ovary 3-loculed; ovules 2 per locule. Capsule 3-valved, ellipsoid or ovoid-globose, trigonous. Seeds 2 per valve, cylindrical, trigonous, rugose, reticulate; hilum linear.

Three species: China, Laos, Thailand, Vietnam; three species (two endemic) in China.

Porandra is similar and related to *Amischotolype*, from which it differs in having stems long, branched, climbing, and basally woody, and anther locules dehiscent by apical pores rather than longitudinal slits.

- 1a. Anthers drip-shaped; sepals and capsule hirsute; leaves often abaxially hairy 1. *P. ramosa*
1b. Anthers oblong or subglobose; sepals and capsule glabrous or puberulent; leaves often glabrous.
2a. Leaves 18–23 × 3–4.7 cm, with a line of hirsute hairs along margin 2. *P. scandens*
2b. Leaves 6–12 × 1.5–3 cm, with a line of white hirsute hairs near margin of adaxial surface 3. *P. microphylla*

1. *Porandra ramosa* D. Y. Hong, Acta Phytotax. Sin. 12: 462. 1974.

孔药花 kong yao hua

Stems to 4 m, climbing, branched distally, glabrous; internodes 5–20 cm. Leaf sheaths 2.5–6 cm, hirsute when young, glabrescent, mouth hirsute-ciliate; petiole 5–7 mm; leaf blade elliptic to lanceolate, 8–16 × 2–4.5 cm, abaxially ± hirsute, base rounded to broadly cuneate, apex acuminate or caudate-acuminate. Heads with several flowers; bracts ovate-orbicular, ca. 3 mm. Sepals oblong, carinate, 5–7 × ca. 3 mm, abaxially hirsute. Petals pink, oblong, ca. 7 × ca. 3 mm. Filaments ca. 7 mm; anthers drip-shaped, ca. 2 × 1.5 mm, dehiscent by apical pores. Ovary ca. 1 mm, hirsute. Style ca. 4 mm. Capsule ovoid-globose, trigonous, 7–9 × 5–6 mm, hirsute. Seeds 2 per valve, 3–4 mm. Fl. Apr–Aug.

• Forests; 400–2400 m. W Guangxi, SW Guizhou (Anlong Xian, Xingyi Xian), Yunnan.

2. *Porandra scandens* D. Y. Hong, Acta Phytotax. Sin. 12: 462. 1974.

攀援孔药花 pan yuan kong yao hua

Stems 4–7 m, climbing, branched distally; internodes 5–15 cm. Leaf sheaths ca. 3 cm, puberulent, mouth hirsute-ciliate; petiole extremely short; leaf blade long ovate to lanceolate, 18–23 × 3–4.7 cm, with a line of hirsute hairs along margin, base cuneate to rounded, apex acuminate to caudate-acuminate. Heads with several flowers; bracts ovate-orbicular, ca. 2 mm.

Sepals oblong, carinate, 5–15 × ca. 3 mm, glabrous. Petals green, elliptic, ca. 6 × 2.5 mm. Filaments ca. 7 mm; anthers oblong, ca. 2.5 × 1 mm, dehiscent by apical pores. Ovary ca. 1 mm in diam., sparsely puberulent. Style ca. 9 mm. Capsule ovoid-globose, trigonous, 8–11 × ca. 6 mm, glabrous. Seeds 2 per valve, 4–6 mm. Fl. Apr–Jun, fr. Aug–Nov.

Forests; 600–1100 m. S Yunnan [Laos, Thailand, Vietnam].

3. *Porandra microphylla* Y. Wan, Bull. Bot. Res., Harbin 6(4): 153. 1986.

小叶孔药花 xiao ye kong yao hua

Stems to 5.5 m, climbing, branched distally; internodes 2–18 cm. Leaf sheaths 1.5–4.5 cm, puberulent, mouth hirsute-ciliate; petiole 3–10 mm; leaf blade narrowly elliptic, 6–12 × 1.5–3 cm, with a line of white-hirsute hairs near margin of adaxial surface, abaxially glabrous, base cuneate or obtuse, apex caudate-acuminate. Heads with 2–6 flowers; bracts broadly ovate, ca. 2.5 mm. Sepals oblong, carinate, 5–6 × 2–3 mm, sometimes puberulent or pubescent-ciliate. Petals white, broadly elliptic, 5–6 × ca. 3 mm. Filaments ca. 7 mm, lanate with white, multicellular hairs distally; anthers oblong or subglobose, 1–1.2 × ca. 1 mm, dehiscent by apical pores. Ovary sparsely puberulent, ca. 1.2 mm. Style ca. 1 cm. Capsule ellipsoid, trigonous, ca. 9 × 6–7 mm, glabrous. Seeds 1 or 2 per valve, 3–6 mm. Fl. and fr. summer.

• Forests, scrub. W Guangxi (Long'an Xian, Longzhou Xian).

7. FLOSCOPA Loureiro, Fl. Cochinch. 1: 189, 192. 1790.

聚花草属 ju hua cao shu

Herbs perennial. Rhizomes long. Leaves alternate. Inflorescences solitary or several, terminal or axillary in axils of apical leaves, each a broomlike panicle of numerous cincinni; bracts often small. Flowers actinomorphic. Sepals free, shallowly to strongly boat-shaped, leathery, persistent. Petals free, blue or purple, sometimes white, obovate, clawed. Fertile stamens 3 or 6, equal; filaments glabrous; anther locules connate, slightly divergent proximally, ellipsoid, longitudinally dehiscent. Ovary 2-loculed; ovules 1 per locule. Capsule 2-valved, slightly flattened, 1-grooved on each side. Seeds 1 per valve, hemispheric, reticulate or striate; hilum linear.

About 20 species: pantropical; two species (one endemic) in China.

- 1a. Panicles several, densely long glandular, peduncle nearly absent; fertile stamens 6; seeds gray-blue, semiellipsoid, shallowly radiate striate; leaves sessile 1. *F. scandens*
1b. Panicle solitary, puberulent, peduncle 4–5 cm; fertile stamens 3; seeds gray-brown, hemispheric, reticulate; leaves with petiole 1–1.5 cm 2. *F. yunnanensis*

1. *Floscopa scandens* Loureiro, Fl. Cochinch. 1: 193. 1790. 464. 1974.

聚花草 ju hua cao

云南聚花草 yun nan ju hua cao

Floscopa scandens var. *vaginivillosa* R. H. Miao.

Stems 20–70 cm, simple, prostrate proximally. Plants glandular pubescent throughout with multicellular hairs, or hairy only on leaf sheaths and inflorescences, sometimes sheaths hairy only on 1 side. Leaves usually sessile or with short, winged petiole; leaf blade elliptic to lanceolate, 4–12 × 1–3 cm, adaxially with scaly processes. Inflorescences several, terminal and axillary, each a broomlike panicle to 8 × 4 cm, densely glandular with long hairs; peduncle nearly absent; pedicels very short. Sepals shallowly boat-shaped. Petals blue or purple. Fertile stamens 6; filaments glabrous. Capsule ovoid, compressed, ca. 2 × 2 mm. Seeds gray-blue, semiellipsoid, ca. 1.5 mm, shallowly radiate striate. Fl. and fr. Jul–Nov.

Grassy ravines, forests, by water; near sea level to 1700 m. Fujian, Guangdong, Guangxi, Hainan, WC Hunan (Xuefeng Shan), Jiangxi, SC Sichuan (Yongchuan Xian), SE Xizang (Mêdog Xian), S and W Yunnan, SW Zhejiang (Longquan Xian) [Bhutan, India, Laos, Myanmar, Sikkim, Thailand, Vietnam; Oceania].

Used medicinally as a febrifuge and for relieving pyodermas, abscesses, and acute nephritis.

2. *Floscopa yunnanensis* D. Y. Hong, Acta Phytotax. Sin. 12:

Stems to more than 40 cm, simple, glabrescent proximally, puberulent distally with hooked hairs. Leaves with petiole 1–1.5 cm; leaf blade narrowly elliptic, 11–18 × ca. 3.5 cm, adaxially scabrid with prickly hairs along veins. Panicle solitary, terminal, 10–12 × 2.5–3.6 cm, densely puberulent; peduncle 4–5 cm; pedicels ca. 7 mm in fruit. Median sepal strongly hooded at apex; lateral ones not or slightly hooded. Petals blue or purplish. Fertile stamens 3; filaments glabrous; antherodes 2-lobed. Capsule ovoid-globose, ca. 3 mm. Seeds gray-brown, hemispheric, ca. 2.5 mm, reticulate. Fr. Nov.

• Dense forests; ca. 800 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou).

Floscopa yunnanensis differs from other members of the genus as follows: inflorescence with hooked (vs. glandular) hairs; bracts cupular; fertile stamens 3; staminodes 3, 2-lobed; seeds large. Based on these characters, Faden (Doctoral Dissertation, Washington University, St. Louis, 1975) observed that this species probably belongs to another genus. Wu Zhengyi (editor's note) believes that it may belong to *Rhopalephora*.

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, subobtuse 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 involucral bracts distant, only 2 or 3 on each stem; capsule with 1 seed per valve 7. *M. vaginata*
- 7b. Roots fusiform thickened; sheathlike involucral 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; involucral 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; involucral 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, ses-

sile; 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. Cytandr. 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.

疣草 you cao

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; stami-

nodes 3; antherodes 3-sect. Capsule broadly ovoid, trigonous, 5(–6) mm, apex obtuse, apiculate. Seeds up to 7 per valve, uniseriate, 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 (Yuntai 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 cincinnati 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 involucral 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 involucral 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 involucral 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 undeveloped, 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 (Lüchun 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, sometimes 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.

9. TRICARPELEMA J. K. Morton, J. Linn. Soc., Bot. 59: 436. 1966.

三瓣果属 san ban guo shu

Herbs perennial, erect, or ascending proximally. Rhizomes long. Leaves alternate. Panicles terminal, pyramidal, consisting of cincinni, involucre bracts and bracts caducous. Flowers actinomorphic. Sepals free, boat-shaped. Petals free, anterior one narrower, all blue or purple, oblong, obovate, or elliptic. Fertile stamens 3, anterior, middle one inserted opposite petal, with slightly smaller anther and slightly shorter filament; filaments glabrous; staminodes 3, posterior; antherodes 2-lobed. Ovary 3-loculed; ovules 4–8 per locule. Capsule 3-valved, cylindrical. Seeds 4–8 per valve, rugose; hilum linear.

Seven species: from the Himalayas to Indonesia (Borneo) and the Philippines; two species (endemic) in China.

- 1a. Posterior 2 petals orbicular, clawed; style to 15 mm; pedicels 3–5 mm at anthesis, 5–10 mm in fruit; leaves 15–30 × 4–7 cm 1. *T. chinense*
1b. Posterior 2 petals ovate-elliptic, not clawed; style less than 10 mm; pedicels ca. 7 mm at anthesis, maintaining length throughout anthesis; leaves 9–14 × 2.2–4.5 cm *T. xizangense*

1. *Tricarpelema chinense* D. Y. Hong, Acta Phytotax. Sin. 12: 475. 1974.

三瓣果 san ban guo

Stems ascending proximally, erect distally, branched, to 1 m, pubescent with multicellular hairs. Leaf sheaths 1–2 cm, densely multicellular pubescent; leaf blade elliptic, 15–30 × 4–7 cm, sparsely hispidulous, base cuneate-attenuate into short petiole, apex acuminate. Inflorescence sparsely pubescent with glandular, multicellular hairs; peduncle 8–11 cm; cincinni 2.5–5 cm. Pedicels 3–5 mm at anthesis, sparsely pubescent with glandular, multicellular hairs. Posterior sepal ovate-orbicular, ca. 7 mm; other 2 sepals oblong, shallowly boat-shaped, ca. 5 mm, sparsely pubescent with glandular, multicellular hairs along veins. Posterior 2 petals orbicular, anterior one obovate, all blue-purple or pale blue, ca. 8 mm, shortly clawed. Filaments glabrous, those of 2 fertile stamens (inserted opposite sepals) to 15 mm, others shorter; anthers oblong. Ovary ellipsoid, trigonous. Style to 15 mm. Capsule 13–15 × 3–4 mm; pericarp grayish yellow, ± shiny when mature. Seeds 4 or 5 per valve, pale gray, 1.5–2.5 mm. Fl. Jul–Aug.

• Forests in ravines; ca. 1500 m. SC Sichuan (Leshan Shi, Mabian Xian).

2. *Tricarpelema xizangense* D. Y. Hong, Acta Phytotax. Sin. 19: 529. 1981.

西藏三瓣果 xi zang san ban guo

Stems erect, simple, ca. 60 cm, glabrous. Leaf sheaths ca. 2.5 cm, ciliate at mouth; leaf blade lanceolate, 9–14 × 2.2–4.5 cm, apex acuminate; proximal leaves smaller and attenuate into a petiole, distal ones with shorter, winged petiole. Inflorescence ca. 17 cm, sparsely pubescent with multicellular, glandular hairs; peduncle ca. 4 cm. Pedicels ca. 7 mm at anthesis, subglabrous or sparsely pubescent with glandular, multicellular hairs. Sepals ovate-orbicular or oblong, boat-shaped, ca. 5 mm, sparsely pubescent with glandular, multicellular hairs along veins. Posterior 2 petals ovate-elliptic, anterior one nearly boat-shaped, not clawed, all blue, ca. 6 mm. Filaments glabrous, middle one (inserted opposite petal) 6–7 mm, others longer, ca. 12 mm; anthers oblong. Ovary narrowly ovoid. Style ca. 5 mm; ovules up to 8 per locule. Capsule and seeds unknown. Fl. Aug.

• Broad-leaved forests; ca. 1800 m. SE Xizang (Mèdog Xian).

Tricarpelema xizangense is more similar to *T. giganteum* (Haskarl) H. Hara (from the E Himalayan region) than to *T. chinense*, but differs from *T. giganteum* in having inflorescence axis and pedicels with multicellular, glandular hairs and pedicels only ca. 7 mm at anthesis.

10. POLLIA Thunberg, Nov. Gen. Pl. 1: 11. 1781.

杜若属 du ruo shu

Aclisia E. Meyer.

Herbs perennial. Rhizomes horizontal, long. Stems erect or ascending, usually simple. Leaves alternate. Panicles terminal; cincinni with several flowers, proximal involucre bracts nearly leaflike, distal ones small; bracts enveloping inflorescence axis, membranous. Flowers actinomorphic. Sepals free, shallowly boat-shaped, often enlarging and persistent in fruit. Petals free, white, blue, purple, or greenish yellow, sometimes spotted, ovate-elliptic, ovate-orbicular, or obovate, sometimes clawed. Stamens 6, all fertile, equal or 3 smaller, or only anterior 3 fertile; filaments glabrous; anther locules oblong, longitudinally dehiscent; antherodes deltoid-lanceolate or sagittate. Ovary 3-loculed; ovules (1–)5–10 per locule. Fruit baccate, globose, 3-valved, indehiscent. Seeds (1–)5–8 per valve, purplish gray, polygonal, slightly flattened; hilum orbicular.

About 17 species: tropical, subtropical, and warm-temperate regions of the E hemisphere; eight species (one endemic) in China.

- 1a. Leaves with petiole 1–4 cm, leaf blade 5–15(–25) cm; inflorescences shorter than or nearly as long as distal leaves, cincinni usually several, not in whorls.
2a. Cincinni pendulous, umbel-like, much shorter than leaves 8. *P. subumbellata*
2b. Cincinni spreading or ascending, paniculate, nearly as long as distal leaves.
3a. Petiole 2–4 cm, leaf blade 10–25 cm; fertile stamens 3 6. *P. siamensis*

- 3b. Petiole less than 1.5 cm, leaf blade 5–15 cm; fertile stamens 6.
- 4a. Peduncle 2–6 cm; petiole wingless 5. *P. miranda*
- 4b. Peduncle less than 2 cm; petiole winged 4. *P. thyrsiflora*
- 1b. Leaves sessile or base attenuate into short, winged petiole, leaf blade more than (10–)15 cm (except in *P. macrobracteata*); inflorescences very short or very long, cincinni in whorls or, if not, flowers very dense or inflorescence branched.
- 5a. Peduncle extremely short, less than 2 cm; whole inflorescence less than 6 cm, densely flowered; sepals persistent, abaxially pubescent 4. *P. thyrsiflora*
- 5b. Peduncle more than 3 cm; whole inflorescence more than 8 cm, densely flowered or not; sepals persistent or not, abaxially puberulent or glabrous.
- 6a. Inflorescence branched, branches long, with several nodes and leaf sheaths; leaves abaxially rather densely pubescent; fertile stamens 3 7. *P. secundiflora*
- 6b. Inflorescence without such branches; leaves abaxially glabrous; fertile stamens 6.
- 7a. Leaf sheaths less than 1 cm; involucre bracts ovate, herbaceous, apically broadly acute 3. *P. macrobracteata*
- 7b. Leaf sheaths longer than 2 cm; involucre bracts lanceolate and apically acuminate if herbaceous, or apically emarginate if membranous.
- 8a. Inflorescence much longer than distal leaves, peduncle more than 15 cm, cincinni often in whorls; sepals persistent; petals ca. 3 mm 1. *P. japonica*
- 8b. Inflorescence shorter than distal leaves, peduncle less than 10 cm, cincinni dense, often not in whorls; sepals caducous; petals ca. 5 mm 2. *P. hasskarlii*

1. *Pollia japonica* Thunberg, Fl. Jap. 138. 1784.

杜若 du ruo

Herbs perennial. Stems erect or ascending, 30–50 cm × 3–8 mm, puberulent. Leaves sessile or base attenuate into winged petiole; leaf sheaths glabrous; leaf blade narrowly elliptic, 10–30 × 3–7 cm, subglabrous and scabrous adaxially, glabrous abaxially. Inflorescence much longer than distal leaves; peduncle 15–30 cm, puberulent; cincinni numerous, 2–4 cm, often in several distant whorls, some in panicles, puberulent; involucre bracts lanceolate, puberulent; bracts membranous. Sepals ovate-orbicular, ca. 5 mm, glabrous, persistent. Petals white, obovate-spatulate, ca. 3 mm. Stamens 6, all fertile, rarely staminodes 1 or 2 with shorter filaments. Fruit globose, ca. 5 mm in diam. Fl. Jul–Sep, fr. Sep–Oct.

Forests in ravines; near sea level to 1200 m. SE Anhui (Huang Shan, Xiuning Xian), Fujian, N Guangdong, Guangxi, Guizhou, SW Hubei (Laifeng Tujia Zu Zizhixian, Xuan'en Xian), Hunan, Jiangxi, SE Sichuan (Pengshui Xian), Taiwan, Zhejiang [Japan, Korea].

A little over half the plants in N Guangdong have only several cincinni, which are not in whorls, and 1 or 2 of the stamens are reduced, with depauperate anthers. Such plants are easily misidentified as *Pollia siamensis*.

The root has sedative, stimulant, and carminative properties, and is used for the treatment of colds and vertigo.

2. *Pollia hasskarlii* R. S. Rao, Notes Roy. Bot. Gard. Edinburgh 25: 188. 1964.

大杜若 da du ruo

Herbs perennial. Stems ascending, to 1 m × 1 cm, glabrous. Leaves sessile or base attenuate into short petiole; leaf sheath 3–5 cm, glabrous; leaf blade elliptic or obovate-oblancoate, 15–35 × 4–9 cm, glabrous on both surfaces. Inflorescence usually shorter than distal leaves; peduncle 5–10 cm, densely whitish glandular; cincinni numerous, ca. 2 cm, usually not in whorls, densely whitish glandular; involucre bracts ca. 10 mm, densely whitish glandular, caducous; bracts membranous. Sepals subovate, shallowly boat-shaped, 3–4 mm, abaxi-

ally puberulent glandular, caducous. Petals white or pale purple, obovate, ca. 5 mm. Stamens 6, all fertile. Fruit globose, 4–5 mm in diam. Fl. Mar–Jun.

Shaded places in ravines or dense forests; near sea level to 1700 m. N and SW Guangdong (Lianshan Zhuang-Yao Zu Zizhixian, Xinyi Xian), Guangxi, SW Guizhou (Anlong Xian), SW Sichuan (Miyi Xian), SE Xizang (Mêdog Xian), S and W Yunnan [Bhutan, E India, Laos, Myanmar, Thailand, Vietnam].

3. *Pollia macrobracteata* D. Y. Hong, Novon 7: 252. 1997.

大苞杜若 da bao du ruo

Herbs perennial. Stems ascending, to more than 35 cm × 5 mm, glabrous. Leaves sessile; leaf sheath ca. 6 mm, sparsely puberulent on side opposite leaf blade, glabrous elsewhere; leaf blade elliptic, 7–12.5 × ca. 3 cm, glabrous on both surfaces. Inflorescence nearly as long as leaves; peduncle ca. 4.5 cm, puberulent; cincinni numerous, in 6 whorls or nearly so, ca. 2 cm, puberulent with hooked hairs; involucre bracts ovate, ca. 13 × 7.5 mm, distal ones slightly smaller, puberulent; bracts membranous; pedicels ca. 4 mm at anthesis. Sepals ovate-orbicular, boat-shaped, ca. 6 mm, sparsely puberulent abaxially, often persistent. Petals white, purple spotted, ovate-orbicular, ca. 6 mm. Stamens 6, all fertile. Fruit not seen. Fl. May–Jun.

- Forests on mountain summits. SW Guangxi (Longzhou Xian).

Pollia macrobracteata is related to *P. hasskarlii* and *P. japonica*, and all have 6 fertile stamens. It differs from *P. japonica* in having inflorescence and peduncle much shorter, and involucre bracts ovate, larger, and apically broadly acute; from *P. hasskarlii* in having involucre bracts larger and herbaceous, cincinni, peduncle, and pedicels longer, and roots that arise from stem nodes thicker; and from both species in having much smaller leaves with shorter leaf sheaths.

4. *Pollia thyrsiflora* (Blume) Endley ex Hasskarl in Miquel, Pl. Jungh. 2: 150. 1852.

密花杜若 mi hua du ruo

Tradescantia thyrsiflora Blume, Enum. Pl. Javae 1: 6. 1827.

Herbs perennial. Stems ascending, 12–25 × 0.5–1 cm,

sparsely hispidulous. Leaves sessile or with winged petiole to 3 cm; leaf sheath ca. 2 cm, rather densely hispidulous; leaf blade oblanceolate or narrowly elliptic, 15–25 × 3–5 cm, glabrous adaxially, hispidulous abaxially. Inflorescence shorter than distal leaves; peduncle absent or to 1 cm, glabrous or hispidulous; cincinni numerous, ca. 2 cm, not in whorls, glabrous or hispidulous; involucre bracts deltoid-orbicular, basal one ca. 1.5 × 1.5 cm, glabrous or hispidulous; bracts membranous, very short at anthesis, to 4 mm in fruit, persistent. Sepals ovate-elliptic, shallowly boat-shaped, ca. 5 mm, puberulent abaxially. Petals white, ovate-orbicular, ca. 6 mm. Stamens 6, all fertile. Fruit ovoid-globose, 4–5 mm in diam. Fl. Mar–Apr.

Humid soils in ravine forests. Hainan, S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [India, Indonesia, Laos, Malaysia, Philippines, Thailand, Vietnam].

5. *Pollia miranda* (H. Léveillé) H. Hara, J. Jap. Bot. 59: 182. 1984.

小杜若 xiao du ruo

Tovaria miranda H. Léveillé, Mem. Pontif. Accad. Romana Nuovi Lincei 23: 361. 1905; *Pollia japonica* Thunberg var. *minor* (Honda) E. H. Walker; *P. japonica* var. *miranda* (H. Léveillé) Kitamura; *P. minor* Honda; *P. omeiensis* D. Y. Hong.

Herbs perennial. Stems ascending, 20–50 cm × less than 3 mm, glabrous or subglabrous. Leaves with petiole nearly absent or to 1.5 cm; leaf sheath 1–2 cm, puberulent; leaf blade elliptic or ovate-elliptic, 5–15 × ca. 2.5 cm, granulate-scabrous adaxially, sparsely hispidulous or glabrous abaxially. Inflorescence nearly as long as distal leaves; peduncle 2–6 cm, hirsutulous; cincinni 2 to several, 1–3.5 cm, alternate, not in whorls, hirsutulous; proximal involucre bracts 5–8 mm, distal ones much smaller, sheathlike and enveloping cincinnus axis, hirsutulous; bracts membranous; pedicels short, ca. 4 mm in fruit. Sepals ovate-orbicular, boat-shaped, ca. 2.5 mm, glabrous, persistent. Petals white, pink spotted, ovate-orbicular, ca. 4 mm. Stamens 6, all fertile. Fruit globose, ca. 5 mm in diam. Fl. Jun–Aug.

Ravine forests; near sea level to 1600 m. Guangxi, EC and S Guizhou, Sichuan, Taiwan, SE Yunnan (Malipo Xian, Xichou Xian) [Japan].

Pollia miranda has been misidentified by many authors as *P. zollingeri* (Hasskarl) C. B. Clarke (from Indonesia), to which it is similar in habit. However, *P. zollingeri* has only 3 fertile stamens and 3 smaller staminodes.

6. *Pollia siamensis* (Craib) Faden ex D. Y. Hong in K. F. Wu, Fl. Reipubl. Popularis Sin. 13(3): 89. 1997.

长柄杜若 chang bing du ruo

Aneilema siamense Craib, Bull. Misc. Inform. Kew 1912: 415. 1912.

Herbs perennial. Stems erect or ascending, 30–100 cm × 4–10 mm, glabrous or subglabrous. Leaves with petiole 2–4 cm; leaf sheath 2–4 cm, glabrous or sparsely puberulent; leaf blade elliptic to narrowly ovate, 10–25 × 2.5–8 cm, glabrous or subglabrous adaxially, glabrous or nearly so abaxially. Inflorescence nearly as long as distal leaves; peduncle 5–10 cm, densely glandular with short hairs; cincinni numerous, 2–4 cm,

usually alternate, sometimes partly in whorls, densely glandular with short hairs; proximal involucre bracts leaflike, but much smaller than leaves, distal ones lanceolate, only ca. 10 mm, densely glandular with short hairs; bracts membranous, often persistent. Sepals ovate-orbicular, boat-shaped, ca. 3 mm, glabrous. Petals white, ovate-elliptic, shallowly boat-shaped, ca. 4 mm. Stamens 6; fertile stamens 3, anterior; staminodes 3, with shorter filaments. Fruit globose, ca. 5 mm in diam. Fl. Apr–Aug.

Forests or humid sandy soils; near sea level to 1200 m. SW Guangxi (Longzhou Xian, Pingxiang Shi), Hainan, S Yunnan [Indonesia, Laos, New Guinea, Philippines, Thailand, Vietnam].

Pollia siamensis has been considered conspecific with *P. secundiflora*. However, the two species seem distinct in Chinese material.

7. *Pollia secundiflora* (Blume) R. C. Bakhuizen van den Brink in Backer, Bekn. Fl. Java 10, Fam. 211, 10. 1949.

长花枝杜若 chang hua zhi du ruo

Commelina secundiflora Blume, Enum. Pl. Javae 1: 3. 1827; *Aclisia gigantea* Hasskarl; *A. indica* Wight; *A. sorzogonensis* E. Meyer; *Pollia sorzogonensis* (E. Meyer) Endley.

Herbs perennial. Stems erect, to 20 cm × 7 mm, sparsely white-pubescent. Leaves sessile; leaf sheath ca. 2.5 cm, rather densely pubescent; leaf blade elliptic, ca. 20 × 5 cm, verrucose adaxially, densely puberulent abaxially. Inflorescence longer than distal leaves; proximal inflorescence branches with peduncle to more than 20 cm, densely brown-yellow hooked hirsute; cincinni numerous, ca. 2 cm, in whorls or not, densely brown-yellow hooked hirsute; proximal involucre bracts leaflike, nearly as large as leaves, distal ones much smaller, to 5 mm, densely brown-yellow hirsute; bracts membranous. Sepals ovate-orbicular, boat-shaped, ca. 3 mm, glabrous, persistent. Petals white, obovate, shallowly boat-shaped, ca. 5 mm. Stamens 6; fertile stamens 3, anterior; staminodes 3, with shorter filaments. Fruit globose, ca. 6 mm in diam. Fl. Apr.

Dense forests on low mountains. NE Guangxi (Longsheng Ge Zu Zizhixian), S Guizhou, Hainan, Hong Kong, EC Hunan (Nanyue), S Yunnan (Jinping Xian) [India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

8. *Pollia subumbellata* C. B. Clarke, J. Linn. Soc., Bot. 11: 451. 1871.

伞花杜若 san hua du ruo

Herbs perennial. Stems erect or ascending, 20–30 cm × 3–5 mm, sparsely puberulent. Leaves mostly aggregated at apex of stems; leaf sheath 0.5–2.5 cm, sparsely puberulent, mouth ciliate; petiole 1–2.5 cm; leaf blade elliptic to narrowly ovate, 8–15 × 3–6 cm, glabrous adaxially, glabrous or puberulent abaxially. Inflorescence much shorter than leaves; peduncle extremely short or absent, puberulent; cincinni numerous, not in whorls, ca. 3 cm, puberulent; involucre bracts small, less than 10 mm, puberulent; bracts membranous; pedicels straight or arcuate, ca. 4 mm in fruit. Sepals ovate-orbicular, shallowly boat-shaped, ca. 3 mm, persistent. Petals blue, white, or greenish yellow, ovate-orbicular, ca. 2 mm. Stamens 6; fertile stamens 3; staminodes 3, with shorter filaments. Fruit globose, 4–5 mm in diam. Fl. Jun–Jul.

Ravine forests; near sea level to 1400 m. W Guangxi (Napo Xian, Pingguo Xian), S Yunnan [Bhutan, NE India, Sikkim].

11. DICTYOSPERMUM Wight, Icon. Pl. Ind. Orient. 6: 29. 1853.

网籽草属 wang zi cao shu

Pileocarpus Hasskarl.

Herbs perennial. Rhizomes long. Stems erect or ascending. Leaves alternate, mostly aggregated at apex of stems. Cincinni long, with numerous flowers, forming terminal panicles; involucre bracts small. Flowers actinomorphic. Sepals free, boat-shaped. Petals free, white. Fertile stamens 3, equal, middle one inserted opposite petal; filaments glabrous, posterior; anther locules longitudinally dehiscent; staminodes 3; antherodes 2-lobed, horizontally divergent. Ovary 3-loculed; ovules 1 per locule. Capsule 3-valved, globose, trigonous. Seeds 1 per valve, oblong, reticulate or not; hilum linear.

Four or five species: tropical Asia; one species in China.

1. *Dictyospermum conspicuum* (Blume) Hasskarl, Commelin. Ind. 22. 1870.

网籽草 wang zi cao

Commelina conspicua Blume, Enum. Pl. Javae 1: 4. 1827; *Aneilema conspicuum* (Blume) Kunth.

Roots very slender. Rhizomes horizontal, with brown-yellow sheaths at nodes; branches penetrating base of leaf sheaths. Stems ascending or erect, 10–35(–70) cm; proximal internodes to 14 cm, glabrous. Leaves mostly aggregated at apex of stems; leaf sheath brown or brown-yellow, to 2.5 cm, glabrous or ciliate; proximal leaf blades very small, distal ones larger, elliptic, 7–17 × 2–5 cm, glabrous on both surfaces, base attenuate into short petiole, apex shortly acuminate to caudate-acuminate. Panicle terminal, shorter than apical leaves, usually of several lax cincinni each to 5 cm; peduncle nearly absent or

to 2 cm; panicle axis densely hooked puberulent; involucre bracts brown, less than 10 mm; bracts small, caducous; pedicels 3–5 mm, usually slightly curved, glabrous. Sepals boat-shaped, 2.5–3 mm, glabrous, persistent. Petals white. Fertile stamens 3; filaments glabrous. Capsule ovoid-globose, subtrigonous, 5–6 × ca. 4 mm, apex acute; pericarp yellow, shiny, crustaceous. Seeds brownish gray, oblong, planoconvex, radiate verrucose, crossed by a striate sculpture at equator. Fl. May–Jul, fr. until next May.

Ravine forests or shaded and humid places; near sea level to 1200 m. Hainan, ?SW Yunnan (Jinghong Xian) [India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

The single collection from Yunnan, *C. W. Wang 79431*, has taller stems and larger leaves, but is sterile. It might be *Dictyospermum ovalifolium* Wight (from S and SE Asia and Australia), which differs in having only 2 fertile stamens.

12. RHOPALEPHORA Hasskarl, Bot. Zeitung (Berlin) 22: 58. 1864.

钩毛子草属 gou mao zi cao shu

Herbs perennial. Rhizomes absent. Stems creeping proximally, ascending distally. Leaves distichous or spirally arranged. Inflorescence corymbiform, umbel-like, of several to numerous elongate cincinni aggregated into inflorescence at apex of main stems and branches. Flowers zygomorphic. Sepals free, boat-shaped. Petals free, white to lilac, upper 2 shortly clawed. Fertile stamens 3, posterior, antepetalous stamen smaller than antesepalous 2; filaments glabrous; staminodes 3, or antesepalous one absent; antherodes 2-lobed. Ovary 1–3-loculed; ovules 1 or 2 per locule. Capsule subglobose, 1–3-valved; upper valve 1-seeded, indehiscent, sometimes deciduous; lower valves (when developed) seedless or 1(–20)-seeded, dehiscent. Seeds rugose; hilum linear.

Four species: Africa (Madagascar), S Asia and Pacific Islands (India to Fiji); one species in China.

1. *Rhopalephora scaberrima* (Blume) Faden, Phytologia 37: 480. 1977.

钩毛子草 gou mao zi cao

Commelina scaberrima Blume, Enum. Pl. Javae 1: 4. 1827; *Aneilema protensum* Wallich ex C. B. Clarke; *Dictyospermum scaberrimum* (Blume) J. K. Morton ex D. Y. Hong; *Floscopa bambusifolia* H. Léveillé.

Rhizomes long, branched. Stems creeping proximally, ascending distally, 50–100 cm; branches subglabrous proximally, glandular pubescent distally. Leaf sheaths 2–4 cm, pubescent; petiole short or absent; leaf blade ovate-lanceolate, (5–)10–18 × 2–4.5 cm, strigose adaxially, apex acuminate. Cincinni lax,

elongate, often several forming a terminal umbel; involucre bracts narrowly oblong or ovate-orbicular, less than 10 mm, glabrous; bracts small, membranous, enveloping cincinnus axis; pedicels slender, 1–1.5 cm. Sepals green, boat-shaped, ca. 2 mm, herbaceous, glabrous, persistent. Petals pale lilac or blue. Capsule subglobose, more than 3 mm in diam., densely covered with apically hooked, glandular hairs. Seeds gray-blue, rugose. Fl. and fr. (Jun–)Aug–Nov.

Ravine forests; 800–2100 m. Guangdong (Wentang Shan), E and W Guangxi (He Xian, Jingxi Xian), SW Guizhou (Ceheng Xian), Hainan (Baoting Xian, Qiongzong Xian), Taiwan, SE Xizang (Mêdog Xian), S and W Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sikkim, Sri Lanka, Thailand, Vietnam].

13. COMMELINA Linnaeus, Sp. Pl. 1: 40. 1753.

鸭跖草属 ya zhi cao shu

Herbs annual or perennial. Rhizomes absent. Stems creeping, ascending, or erect. Leaves alternate. Cincinni subtended by and included in spathe-like involucre bracts; involucre bracts open or proximal margins coherent and becoming funnel-form, often forming heads; cincinni dichotomously branched, flowers in 1 branch smaller, infertile, falling early, those in other branch fertile; bracts not falcate curved, usually extremely small or absent. Flowers zygomorphic. Sepals lanceolate or ovate-orbicular, sometimes shallowly boat-shaped, inner 2 often connate at base. Petals free, blue, spatulate or orbicular, inner (anterior) 2 larger and clawed. Fertile stamens 3, on 1 side, 2 inserted opposite sepals, 1 opposite petal; filaments glabrous; staminodes 3; antherodes 4-lobed, butterflylike. Ovary 2- or 3-loculed, posterior locule with 1 developed or abortive ovule or empty, anterior 2 locules each with 1 or 2 ovules. Capsule oblong, globose, or ellipsoid, 3- or most frequently 2-valved; posterior valve 1-seeded or seedless, often indehiscent; anterior 2 valves each seedless or 1- or 2-seeded. Seeds cylindrical or ellipsoid, reticulate or subsmooth; hilum linear.

About 170 species: mainly in tropical and subtropical regions; eight species in China.

- 1a. Proximal margin of involucre bracts open or folded but not basally connate, base cordate or rounded.
 - 2a. Capsule 3-valved; spathe-like involucre bracts lanceolate, base cordate or rounded 1. *C. diffusa*
 - 2b. Capsule 2-valved; spathe-like involucre bracts cordate.
 - 3a. Leaf blade 8–13 × 3–5 cm; valves 1-seeded; spathe obtuse at apex 3. *C. suffruticosa*
 - 3b. Leaf blade 3–9 × 1.5–2 cm; valves 2-seeded; spathe acute at apex 2. *C. communis*
- 1b. Proximal margin of involucre bracts connate, becoming funnel-form.
 - 4a. Capsule 3-valved; seeds 2 per valve; leaves obviously petiolate, leaf blade ovate to broadly ovate, less than 7 cm 4. *C. benghalensis*
 - 4b. Capsule 2- or 3-valved; seeds 1 per valve; leaves sessile (or petiolate and involucre bracts very small), leaf blade lanceolate to ovate-lanceolate, to 15 cm.
 - 5a. Spathe-like involucre bracts ca. 1 cm; plants often glabrous; leaves 2–4(–6) cm 8. *C. auriculata*
 - 5b. Spathe-like involucre bracts ca. 2 cm or more; plants hairy, less often glabrous; leaves more than 6 cm.
 - 6a. Plants robust, to 1 m tall; leaves 7–20 × 2–7 cm, leaf sheath mouth densely brown hirsute-ciliate; spathe-like involucre bracts 4–10 5. *C. paludosa*
 - 6b. Plants slender, short; leaves less than 12 × 2.5 cm, leaf sheath mouth glabrous or sparsely whitish hispid-ciliate; spathe-like involucre bracts 1 to several.
 - 7a. Plants usually creeping and branched; leaf blade ovate-lanceolate; spathe-like involucre bracts 2 or 3, ca. 2 cm, apex acute; capsule 3-valved 6. *C. maculata*
 - 7b. Plants erect or ascending, less often creeping and branched; leaf blade lanceolate, apex acuminate; spathe-like involucre bracts 1 to several, ca. 2.5 cm, apex shortly falcate-acuminate; capsule 2-valved, posterior valve falling with enclosed seed 7. *C. undulata*

1. *Commelina diffusa* N. L. Burman, Fl. Indica, 18. 1768.

节节草 jie jie cao

Herbs annual. Stems creeping, branched (sometimes at every node), to more than 1 m, glabrous or hispidulous throughout or in a line. Leaves subsessile; leaf sheath hispid or hispid-ciliate, with red lines; leaf blade lanceolate or proximal ones oblong, 3–12 × 0.8–3 cm, glabrous or hispid. Involucre bracts borne opposite leaves, folded, ovate-lanceolate, 1–4 cm, glabrous or hispidulous abaxially, base cordate or rounded, apex acuminate or shortly so. Cincinni dichotomously branched from base; 1 branch with 1.5–2 cm long peduncle and 1–4 long-exserted male flowers; other branch with much shorter peduncle and 3–5 bisexual flowers included in involucre bracts; pedicels thick and curved, ca. 3 mm, to 5 mm in fruit. Sepals 3–4 mm, membranous. Petals blue, 2 longer ones 4.2–6 mm. Capsule oblong, trigonous, ca. 5 mm, 3-valved; posterior valve with 1 seed, indehiscent; other 2 valves each with 2 seeds, dehiscent. Seeds black, ovoid-globose, ca. 2 mm, reticulate. Fl. May–Nov.

Forests, thickets, streamsides, humid open places; near sea level to 2100 m. Guangdong, SW Guangxi (Longzhou Xian, Pingxiang Shi), SW Guizhou (Anlong Xian, Wangmo Xian), Hainan, SE Xizang (Mêdog Xian), SE Yunnan [tropics and subtropics worldwide].

A medicinal herb with febrifugal and diuretic effects. The petal juice can be used as a dye for painting.

2. *Commelina communis* Linnaeus, Sp. Pl. 1: 40. 1753.

鸭跖草 ya zhi cao

Commelina coreana H. Léveillé & Vaniot.

Herbs annual. Stems creeping, diffuse, numerous branched, to more than 1 m, glabrous proximally, puberulent distally. Leaf sheaths glabrous; leaf blade lanceolate to ovate-lanceolate, 3–9 × 1.5–2 cm, glabrous. Involucre bracts borne opposite leaves, with 1.5–4 cm long stalk, cordate, folded, 1.2–2.5 cm, often hirsute-ciliate, apex acute. Proximal branch of cincinni with peduncle ca. 8 mm and 1 or 2 male flowers, distal branch with short peduncle and 3 or 4 bisexual flowers, nearly included in involucre bracts; pedicels ca. 3 mm at anthesis, curved and less than 6 mm in fruit. Sepals ca. 5 mm, membranous. Petals dark blue, 9–10 mm except proximal one ca. 5 mm. Capsule ellipsoid, 5–7 mm, 2-valved. Seeds 2 per valve, brown-yellow, semiellipsoid, 2–3 mm, flat on 1 surface, irregularly pitted, truncate at 1 end.

Humid places. Throughout China except for Qinghai, Xinjiang, and Xizang. [Cambodia, Japan, Korea, Laos, ?Malaysia, Russia (Far East), Thailand, Vietnam].

A medicinal herb with febrifugal, anti-inflammatory, and diuretic effects; also used for relieving sore throat and tonsillitis.

3. *Commelina suffruticosa* Blume, Catalogus 35. 1823.

大叶鸭跖草 da ye ya zhi cao

Herbs perennial. Stems erect or ascending, branched only distally, to more than 35 cm, glabrous. Leaf sheaths sparsely hirsute-ciliate and hirsute in a line on 1 side; petiole obvious, to 1 cm; leaf blade lanceolate to ovate-lanceolate, 8–13 × 3–5 cm, glabrous on both surfaces. Involucral bracts borne opposite leaves, broadly cordate, open, ca. 1.6 × 1.1 cm when folded, sparsely puberulent, apex obtuse. Cincinni 4-flowered; peduncle ca. 8 mm; pedicels ca. 3 mm, twisted in fruit. Sepals ca. 4 mm, membranous. Petals white, ca. 4 mm. Capsule subglobose, 3.8–5 mm, 2-valved. Seeds 1 per valve, light brown, ca. 2.8 mm (immature).

On tree bark; ca. 1000 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [Bangladesh, India, Indonesia, Thailand].

Only one Chinese specimen was seen by the present authors.

4. *Commelina benghalensis* Linnaeus, Sp. Pl. 1: 41. 1753, nom. cons.

饭包草 fan bao cao

Commelina cavaleriei H. Léveillé.

Herbs perennial. Stems mostly creeping, ascending distally, diffuse, numerous branched, to 70 cm, sparsely pubescent. Leaf sheaths sparsely hirsute-ciliate; petiole distinct; leaf blade ovate, 3–7 × 1.5–3.5 cm, subglabrous. Involucral bracts borne opposite leaves, often several, aggregated at apex of branches, very shortly stalked, funnelform, 0.8–1.2 cm, sparsely hairy, proximal margins connate, apex acute or obtuse. Proximal branch of cincinni with elongate peduncle and 1–3 exerted, infertile flowers, distal branch longer, with several included, fertile flowers. Sepals ca. 2 mm, membranous. Petals blue, 3–5 mm. Capsule ellipsoid, 4–6 mm, 3-valved; posterior valve 1-seeded or seedless, indehiscent; other 2 valves each 2-seeded, dehiscent. Seeds black, cylindric or semicylindric, ca. 2 mm, rugose, irregularly reticulate, truncate at 1 end. Fl. summer to autumn.

Wet places; near sea level to 2300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [tropical and subtropical Africa and Asia].

Cleistogamous flowers are formed in the smaller, funnelform involucral bracts on slender and creeping branches, which possess bladeless leaf sheaths and arise from the base of the plants. Capsules produced by such flowers are at the soil surface or in the soil, but only 1 or 2 valves are developed, each containing 1 or 2 seeds, which are larger than normal.

A medicinal herb with febrifugal, anti-inflammatory, and diuretic effects.

5. *Commelina paludosa* Blume, Enum. Pl. Javae 1: 2. 1827.

大苞鸭跖草 da bao ya zhi cao

Commelina obliqua Buchanan-Hamilton ex D. Don.

Herbs perennial. Stems often erect, simple or sometimes branched distally, to 1 m, glabrous or sparsely hispidulous. Leaves sessile; leaf sheath densely brown hispid at mouth and in a line on 1 side, sometimes either glabrous with only a few

hairs at mouth or hirsute throughout; leaf blade lanceolate to ovate-lanceolate, 7–20 × 2–7 cm, glabrous on both surfaces or adaxially granular hairy and abaxially hirsute. Involucral bracts often 4–10, forming terminal heads, sessile, funnelform, ca. 2 × 1.5–2 cm, glabrous, proximal margins connate, apex acute or shortly so. Cincinnus 1; peduncle ca. 1.2 cm; flowers 1 to several, nearly included in involucral bracts; pedicels ca. 7 mm, twisted. Sepals 3–6 mm, membranous. Petals blue, 4.5–8 mm. Capsule ovoid-globose, trigonous, ca. 4 mm, 3-valved. Seeds 1 per valve, dark brown, ellipsoid, ca. 3.5 mm, slightly flattened, finely reticulate. Fl. Aug–Oct, fr. Oct–Apr.

Forests, streamsides in ravines; near sea level to 2800 m. Fujian, Guangdong, Guangxi, SW Guizhou (Ceheng Xian), S Hunan, SW Jiangxi (Longnan Xian), SW Sichuan, Taiwan, SE Xizang (Mêdog Xian), Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

6. *Commelina maculata* Edgeworth, Trans. Linn. Soc. London 20: 89. 1851.

地地藕 di di ou

Commelina obliqua Buchanan-Hamilton ex D. Don var. *viscida* C. B. Clarke; *C. paludosa* Blume var. *viscida* (C. B. Clarke) R. S. Rao & Kammathy.

Herbs perennial. Stems procumbent or creeping, branched, elongate, glabrous or sparsely hispidulous throughout or in a line. Leaf sheaths brown, white, or yellow ciliate at mouth, glabrous elsewhere or hairy in a line on 1 side; leaf blade ovate-lanceolate or lanceolate, 4–10 × 1.5–2.5 cm, villous on both surfaces. Involucral bracts 2 or 3 (or 4), forming heads at apex of branches, sessile or with stalks less than 5 mm, funnelform, 1.5–2 cm, glabrous or sparsely multicellular hispid, proximal margins connate, apex shortly acute. Cincinni with 3 or 4 (or several) flowers slightly exerted only at anthesis and included in fruit; pedicels ca. 3 mm. Sepals ca. 4 mm, membranous. Petals blue, 2 anterior ones to 10 mm, posterior one ca. 4 mm. Capsule globose, trigonous, ca. 4 mm, 3-valved, or 2-valved by abortion of 1 ovule. Seeds 1 per valve, gray-black, ellipsoid, ca. 3 mm, slightly flattened, subsmooth. Fl. Jun–Aug.

Humid forest margins, grasslands, roadsides, ditches; near sea level to 2900 m. SW Guizhou, SW Sichuan, S Xizang, Yunnan [Bhutan, India, Myanmar, Sikkim].

Commelina maculata is very similar to *C. paludosa*, from which it differs in having stems creeping proximally, numerous branched, slender, rooting at nodes; leaves smaller, 4–10 × 1.5–2.5 cm; and involucral bracts fewer and smaller, often only 2 or 3 forming heads.

7. *Commelina undulata* R. Brown, Prodr. 270. 1810.

波缘鸭跖草 bo yuan ya zhi cao

Commelina obliqua Buchanan-Hamilton ex D. Don var. *mathewii* C. B. Clarke; *C. paludosa* Blume var. *mathewii* (C. B. Clarke) R. S. Rao & Kammathy; *C. kurzii* C. B. Clarke; *C. striata* Edgeworth.

Herbs perennial. Stems erect or ascending, diffuse, numerous branched, to 60 cm, glabrous. Leaves sessile; leaf sheath usually ciliate; leaf blade lanceolate, 6–9 × 1.2–2.8 cm, glabrous or ± hirsute on both surfaces. Involucral bracts 2–4, in fascicles at apex of branches and opposite smaller leaves, ses-

sile, funnellform, 2–2.5 cm, glabrous or ± hirsute, proximal margins partly connate (2–3 mm free), apex retrorsely falcate-acuminate. Proximal branch of cincinni often abortive, sometimes with ca. 2 cm long peduncle but without flowers, distal branch with peduncle to 1 cm and with several flowers; pedicels twisting. Sepals 3.5–4 mm, membranous. Petals pinkish blue, to 1 cm. Capsule subglobose, 3–4 mm, 2- or 3-valved, sometimes only 1 valve containing seed and dehiscent; posterior valve indehiscent. Seeds 1 per valve, brown-black, oblong, ca. 4 mm, flat on 1 surface. Fl. and fr. Jul–Dec.

Humid mountain slopes. Guangdong, S Sichuan (Leibo Xian), Taiwan, E and S Yunnan [India, Indonesia, Philippines; tropical Oceania].

Commelina undulata is common in tropical Oceania, but scattered in Asia. It varies widely, with plants erect or diffuse, glabrous or hairy, and capsule (1 or)2- or 3-valved. The species is characterized by having apically falcate-acuminate involucre bracts only partly connate at the proximal margins, arising opposite the fascicled smaller leaves, and therefore resembling compound heads.

8. *Commelina auriculata* Blume, Enum. Pl. Javae 1: 2. 1827.

14. TRADESCANTIA Linnaeus, Sp. Pl. 1: 288. 1753.

紫万年青属 *zi wan nian qing shu*

Rhoeo Hance; *Zebrina* Schnizlein.

Herbs perennial. Rhizomes absent. Stems decumbent, ascending, or erect. Leaves distichous or spirally arranged. Cincinni pseudoterminal or lateral, solitary, fascicled, or forming a panicle, sessile; involucre bracts mostly spathe-like; bracts filiform. Flowers actinomorphic. Sepals free or connate at base, boat-shaped. Petals free or with claws fused at base, white or pink, ovate. Stamens 6, all fertile, subequal or antepetalous 3 shorter; filaments glabrous or bearded; anther locules ellipsoid or oblong, longitudinally dehiscent. Ovary 3-loculed; ovules 2 per locule. Capsule 3-valved, ovoid. Seeds (1 or)2 per valve, subpyramidal, rugose reticulate; hilum linear, minute.

About 70 species; mainly in tropical America; two species (introduced) in China.

1a. Sepals and petals free, not united into a tube; leaves not striped adaxially; petals white; stems erect, simple 1. *T. spathacea*

1b. Sepals and petals united at base into a tube; leaves silvery striped adaxially; petals pink; stems prostrate or decumbent, branched 2. *T. zebrina*

1. *Tradescantia spathacea* Swartz, Prodr. 57. 1788.

紫背万年青 *zi bei wan nian qing*

Rhoeo discolor (L'Héritier) Hance; *R. spathacea* (Swartz) Stearn; *Tradescantia discolor* L'Héritier.

Herbs perennial. Stems erect, often forming colonies, simple, glabrous. Leaves alternate, sometimes seemingly spirally arranged, sessile; leaf sheath sometimes pilose at mouth; leaf blade dark green adaxially, purple abaxially, oblong-lanceolate, 20–40 × 3–6 cm, glabrous, somewhat fleshy, base narrowed and semiclasping, apex acuminate. Flowers in axillary, pedunculate, simple or forked, many-flowered umbels subtended by 2 large, conduplicate, ovate bracts to 3 cm. Petals white, ovate, 5–8 mm, apex abruptly acute. Seeds rugose.

Naturalized. Hong Kong [native to Caribbean region and Central America].

Widely cultivated as an ornamental in S China. The flower is used medicinally for the treatment of dysentery, enterorrhagia, and hemoptysis.

耳苞鸭跖草 *er bao ya zhi cao*

Herbs perennial. Stems erect, to 1.4 m, glabrous except sparsely hairy in a line distally. Leaf sheaths hirsute-ciliate at mouth, ciliate in a line along 1 side, with red lines; petiole short, ca. 3 mm; leaf blade elliptic or lanceolate, 2–4(–6) × 1–2 cm, adaxially sparsely scabrid, abaxially sometimes pubescent, or glabrous on both surfaces. Involucral bracts borne opposite leaves, 1(–3) aggregated at apex of each branch, with ca. 5 mm long stalk, funnellform, ca. 1 cm, glabrous or slightly white hispid, proximal margins connate, apex acute. Cincinnus 1; proximal branch undeveloped; distal branch with 2–5 small, bisexual flowers. Sepals 3–4 mm, membranous. Petals white, 2 longer ones ca. 7 mm, proximal one ca. 3 mm. Capsule globose, trigonous, ca. 4 mm, 3-valved, or 2-valved with posterior valve indehiscent. Seeds 1 per valve, gray-brown, ellipsoid, ca. 3.5 mm, smooth, flat on 1 surface. Fr. Nov.

Hill forests, streamsides in ravines. S Fujian (Zhangpu Xian), Guangdong, Taiwan [Indonesia; W Oceania].

2. *Tradescantia zebrina* Bosse, Vollst. Handb. Blumengärtnererei 4: 655. 1846.

吊竹梅 *diao zhu mei*

Zebrina pendula Schnizlein.

Herbs perennial. Stems prostrate or decumbent, often forming dense mats or colonies, branched, rooting at nodes, glabrous or pilose. Leaves alternate, sessile; leaf sheath 8–12 × 5–8 mm, thin, membranous, long-ciliate at mouth, otherwise glabrous or sparsely villous; leaf blade with 2 longitudinal, silver stripes adaxially, purple abaxially, ovate, 3–10 × 1.5–3.2 cm, somewhat fleshy, glabrous or sparsely pilose on both surfaces, base rounded, apex acute or acuminate. Flowers in clusters subtended by 2 large, leaflike, narrow, ciliate bracts. Sepals lanceolate to oblong-lanceolate, ca. 5 × 1.5 mm. Petals rose pink, ovate, ca. 6 mm, apex obtuse. Seeds rugulose.

Naturalized. Fujian, SW Guangxi (Longzhou Xian), Hong Kong, SW Taiwan (Gaoxiong Shi) [native to tropical America].

Commonly cultivated in S China for its attractive flowers. The leaf is applied to reduce swellings.

15. *CALLISIA* Loefling, Iter Hispan. 305. 1758.

洋竹草属 yang zhu cao shu

Herbs perennial. Rhizomes absent. Stems creeping or decumbent proximally. Leaves distichous or spirally arranged. Cincinni terminal and/or axillary, paired or aggregated, less often solitary; involucre bracts not spathe-like; pedicels very short. Flowers actinomorphic. Sepals 2 or 3, free. Petals 2 or 3, free, lanceolate. Stamens (1–3 or) 6, all fertile, very rarely 1 or more becoming staminodes, subequal; filaments usually glabrous; anther locules rounded, longitudinally dehiscent, connectives broad and square, triangular, or oblong, rarely narrow. Ovary oblong, subtrigonal, 2- or 3-loculed; ovules 2 per locule. Capsule 2- or 3-valved. Seeds (1 or) 2 or 3 per valve, shortly cylindrical, trigonal, rugose or radially striate; hilum orbicular, minute.

About 20 species: America; one species (introduced) in China.

1. *Callisia repens* Linnaeus, Sp. Pl., ed. 2, 1: 62. 1762.

洋竹草 yang zhu cao

Herbs perennial. Stems prostrate, forming mats, much branched, rooting at nodes. Leaves distichous, gradually becoming smaller distally along flowering shoots; leaf blade ovate to lanceolate, 1–4 × 0.6–1.2 cm, glabrous except for scabrid margin and apex, base clasping, subcordate or obtuse, apex acuminate. Inflorescence of paired (sometimes solitary), sessile, dense cincinni in axils of distal leaves. Flowers bisexual or male. Sepals green, linear-oblong, 3–4 mm, hirsute along midvein, margin scarious. Petals white, lanceolate, 3–6 mm. Stamens 3; filaments long exserted; connectives broadly deltoid. Ovary oblong, subtrigonal, 2-loculed, apex pilose; ovules 2 per locule. Style filiform, long; stigma penicillate. Capsule oblong, ca. 1.5 mm, 2-valved. Seeds 2 per valve, brown, ca. 1 mm, rugose. $2n = 12$.

Naturalized on roofs of houses. Hong Kong [native to America, from S United States to Argentina].

