

## PONTEDERACEAE

雨久花科 yu jiu hua ke

Wu Guofang (吴国芳 Wu Kuo-fang)<sup>1</sup>; Charles N. Horn<sup>2</sup>

Herbs annual or perennial, aquatic, floating or rooting in substrate. Roots fibrous. Vegetative stems short or creeping, thick. Leaves rosulate or distributed along stem, distichous; petiole mostly distinct, sometimes inflated; leaf sheath usually present; leaf blade emersed or submersed, broadly ovate, lanceolate, or broadly linear, sometimes completely reduced, stomata paracytic. Flowering stems erect, solid, terminating in a leaf, spathe, and inflorescence. Inflorescences paniculate, racemose, spicate, umbellate, or 1-flowered, subtended by a spathe-like or tubular leaf sheath; bracts minute or absent. Flowers bisexual, mostly actinomorphic, sometimes zygomorphic. Perianth segments 6, in 2 whorls, petaloid, free or basally connate into a tube. Stamens usually 6 in 2 whorls, rarely 3 or 1, inserted on perianth, often unequal or dissimilar; filaments slender, free; anthers 2-loculed, introrse, dehiscing by longitudinal slits or rarely by pores; pollen grains 2- or 3-nucleate, colpi 1 or 2(or 3), distal or subequatorial. Ovary superior, 3-loculed and placentation axile or 1-loculed and placentation parietal; ovules numerous per locule or 1 and pendulous, anatropous. Style 1; stigma capitate or minutely 3-lobed. Fruit a 3-valved capsule or indehiscent. Seeds small, longitudinally ribbed or smooth; endosperm copious, mealy; embryo central in seed, straight, terete.

Six genera and ca. 40 species: widespread in tropical and subtropical regions; two genera (one introduced) and five species (one introduced) in China.

Wu Kuo-fang. 1997. Pontederiaceae. *In*: Wu Kuo-fang, ed., *Fl. Reipubl. Popularis Sin.* 13(3): 134–141.

- 1a. Flowers distinctly pedicellate; perianth actinomorphic, segments free nearly to base, all essentially uniform in color; stamens 6, 1 usually longer than others; petiole not inflated ..... 1. *Monochoria*
- 1b. Flowers sessile; perianth zygomorphic, segments basally united into a tube, apical lobe with a discolorous blotch; stamens 6, 3 much longer than others; petiole inflated ..... 2. *Eichhornia*

### 1. MONOCHORIA C. Presl, Reliq. Haenk. 1: 127. 1827.

雨久花属 yu jiu hua shu

*Gomphima* Rafinesque.

Herbs paludose or aquatic, perennial or under unfavorable conditions annual. Stems erect or creeping. Leaves radical from vegetative stem, solitary from flowering stems, curvined. Inflorescences racemose or subumbelliform, enveloped in broad leaf sheaths when young; peduncle bracteate at base; bract large. Flowers subsessile or shortly pedicellate; perianth segments free nearly to base, spreading during anthesis and afterward spirally contorted, inner segments wider than outer. Stamens 6, inserted at base of perianth, dimorphic: 1 with filament long, laterally with an erect, oblique tooth, anther basifixed, blue, large; other 5 subequal, anthers basifixed, yellow, small. Ovary 3-loculed; ovules numerous per locule. Style filiform; stigma subentire or minutely 3-lobed. Capsule loculicidal, 3-valved. Seeds small, longitudinally winged, transversely striate.

Eight species: tropical and subtropical Africa, Asia, and Australia; four species in China.

- 1a. Flowering stems usually 12–35 cm; inflorescences reflexed after anthesis ..... 4. *M. vaginalis*
- 1b. Flowering stems usually 30–200 cm; inflorescences remaining erect after anthesis.
  - 2a. Leaf blade broadly cordate to ovate-cordate, 4–10 cm, basal lobes rounded ..... 1. *M. korsakowii*
  - 2b. Leaf blade sagittate or hastate to triangular-ovate, 5–35 cm.
    - 3a. Peduncle distinctly shorter than associated leaf petiole ..... 2. *M. hastata*
    - 3b. Peduncle longer than associated leaf petiole ..... 3. *M. elata*

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**1. *Monochoria korsakowii*** Regel & Maack in Regel, Mém. Acad. Imp. Sci. Saint Pétersbourg, sér. 7, 4(4): 155. 1861.

雨久花 yu jiu hua

*Monochoria vaginalis* (N. L. Burman) C. Presl ex Kunth var. *korsakowii* (Regel & Maack) Solms.

Herbs aquatic, glabrous. Vegetative stems stout. Leaves radical or alternate and cauline. Radical leaves to 30 cm; leaf blade broadly cordate to ovate-cordate, 4–10 × 3–8 cm, densely veined, base cordate with basal lobes rounded, margin entire, apex acute to acuminate. Flowering stems erect, 30–70 cm, base sometimes purplish red. Inflorescences remaining erect after anthesis, racemose to paniculate, 10–20-flowered or more. Pedicels 5–10 mm. Perianth segments blue, elliptic, 1.2–2 cm, apex obtuse. Larger stamen: filament appendaged; anther 4–5.2 mm. Smaller stamens: filament filiform; anthers 2.5–3.5 mm. Capsule narrowly ovoid, 1–1.8 cm. Seeds 1.1–1.4 mm; wings 8–10. Fl. Jul–Aug, fr. Sep–Oct.

Pools, rice fields, banks of lakes. Anhui, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Indonesia, Japan, Korea, Pakistan, Russia (Siberia), Vietnam].

The entire plant is frequently used as feed for poultry and livestock.

**2. *Monochoria hastata*** (Linnaeus) Solms in A. de Candolle & C. de Candolle, Monogr. Phan. 4: 523. 1883.

箭叶雨久花 jian ye yu jiu hua

*Pontederia hastata* Linnaeus, Sp. Pl. 1: 288. 1753; *Monochoria dilatata* (Buchanan-Hamilton) Kunth; *M. hastifolia* C. Presl, nom. illeg. (included *P. hastata*); *M. sagittata* (Roxburgh) Kunth; *P. dilatata* Buchanan-Hamilton; *P. sagittata* Roxburgh.

Herbs perennial, aquatic. Vegetative stems often long and robust. Radical leaves with sheath broadened at base; petiole 30–90 cm; leaf blade triangular or triangular-ovate, 5–15(–25) × 3–15 cm, base sagittate to hastate, apex acute to acuminate. Flowering stems erect or obliquely so, 50–90 cm; leaf petiole 7–10 cm. Inflorescences erect or suberect, remaining so after anthesis, subumbellate to shortly racemose, 10–40-flowered; peduncle distinctly shorter than associated leaf petiole. Pedicels 1–3 cm. Perianth segments bluish with green median vein and reddish blotch, ovate, 1–1.6 cm. Larger stamen: anther 5.3–6.5 mm. Smaller stamens: filaments filiform; anthers 3–4 mm. Style densely and shortly spreading hairy at apex. Capsule oblong, ca. 1 cm. Seeds brown, oblong; wings ca. 10. Fl. Aug, fr. Mar.

Pools, rice fields, ditches; 100–700 m. Guangdong, Guizhou, Hainan, Yunnan [Bhutan, Cambodia, India, Indonesia, Malaysia, Myan-

mar, Nepal, Sri Lanka, Vietnam].

**3. *Monochoria elata*** Ridley, J. Straits Branch Roy. Asiat. Soc. 79: 99. 1918.

高葶雨久花 gao ting yu jiu hua

*Monochoria valida* Wang & Nagamasu.

Herbs perennial, aquatic. Vegetative stems rhizomatous. Radical leaves with sheath broadened at base; petiole 0.4–1.7 m; leaf blade 10–35 × 1–15 cm, base sagittate to hastate with basal lobes to 11 cm, apex acuminate. Flowering stems erect, to 2 m; leaf petiole 4–18 cm; spathe ca. 4.5 cm. Inflorescences remaining erect after anthesis, racemose, 20–110-flowered; peduncle longer than associated leaf petiole. Pedicels to 3 cm. Perianth segments purplish blue, ca. 1.6 cm. Larger stamen: anther 6–10 mm. Smaller stamens: filaments filiform; anthers 3.5–6 mm. Style subequaling longest stamen. Capsule oblong, ca. 1.2 cm. Seeds brown, ovoid, 0.7–0.8 mm; wings ca. 10. Fl. Aug, fr. Mar.

Pools, rice fields, ditches. S China [Malaysia, Myanmar, Thailand].

**4. *Monochoria vaginalis*** (N. L. Burman) C. Presl ex Kunth, Enum. Pl. 4: 134. 1843.

鸭舌草 ya she cao

*Pontederia vaginalis* N. L. Burman, Fl. Indica 80. 1768; *Boottia mairei* H. Léveillé; *Monochoria linearis* (Hasskarl) Merrill; *M. ovata* Kunth; *M. vaginalis* var. *pauciflora* (Blume) Miquel; *M. vaginalis* var. *plantaginea* (Roxburgh) Solms; *P. linearis* Hasskarl; *P. ovata* Hooker & Arnott (1837), not Linnaeus (1753); *P. pauciflora* Blume; *P. plantaginea* Roxburgh.

Herbs aquatic. Stems erect or obliquely so. Radical leaves with broad sheath; petiole 3–50 cm; leaf blade narrowly cordate, broadly or narrowly ovate, or lanceolate, 2–21 × 0.8–10 cm, apex acute to acuminate. Flowering stems 12–35 cm. Inflorescences soon reflexed after anthesis, 3–8(–12)-flowered; peduncle 1–3 cm, base bracteate; bract lanceolate. Flowers pedicellate. Perianth segments purplish, ovate-lanceolate to oblong, 0.8–1.5 cm. Larger stamen: filament appendaged; anther 1.8–4 mm. Smaller stamens: filaments filiform; anthers 1.5–3 mm. Capsule ovoid to ellipsoid, 0.7–1 cm. Seeds ellipsoid, ca. 1 mm; wings 8–12. Fl. Aug–Sep, fr. Sep–Oct.

Rice fields, ditches, ponds, swamps; near sea level to 1500 m. Throughout China [Bhutan, Cambodia, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Russia (Siberia), Sri Lanka, Thailand, Vietnam; Africa, Australia].

The stems and leaves are used as a vegetable.

## **2. EICHHORNIA** Kunth, *Eichhornia*, 3. 1842, nom. cons.

凤眼蓝属 feng yan lan shu

*Piaropus* Rafinesque, nom. rej.

Herbs annual or perennial, aquatic, floating or creeping, rooting from nodes. Leaves rosulate or alternate; petiole long, rarely inflated; leaf blade cordate, broadly ovate-rhomboidal, or linear-lanceolate. Inflorescences terminal, erect during anthesis but then reflexed, pedunculate, spiciform or paniculate, 2- to many flowered. Flowers zygomorphic or subactinomorphic. Stamens 6, inserted on proximal part of perianth, often 3 longer and 3 shorter; filaments filiform, hairy; anthers dorsifixed, oblong. Ovary sessile, 3-

loculed; ovules numerous per locule. Style filiform, curved; stigma slightly dilated or very shortly 3- or 6-lobed. Capsule ovoid, oblong, or linear-fusiform, included in marcescent perianth tube; pericarp membranous. Seeds numerous, longitudinally winged, cross striate.

Seven species: mainly in tropical America, one species in tropical Africa; one species (introduced) in China.

**1. *Eichhornia crassipes*** (Martius) Solms in A. de Candolle & C. de Candolle, Monogr. Phan. 4: 527. 1883.

凤眼蓝 feng yan lan

*Pontederia crassipes* Martius, Nov. Gen. Sp. Pl. 1: 9. 1823; *Eichhornia speciosa* Kunth; *Heteranthera formosa* Miquel.

Herbs floating, 0.3–2 m. Roots many, long, fibrous. Stems very short; stolons greenish or purplish, long, apically producing new plants. Leaves radical, rosulate; petiole yellowish green to greenish, 10–40 cm, spongy, usually very much swollen at or below middle; leaf blade orbicular, broadly ovate, or rhomboidal, 4.5–14.5 × 5–14 cm, leathery, glabrous, densely veined, base shallowly cordate, rounded, or broadly cuneate. Inflorescences bracteate, spirally 7–15-flowered; peduncle 35–45 cm. Perianth 6-parted, segments purplish blue, petaloid, ovate to elliptic, upper one larger with yellow blotch at center adaxially, others subequal but lower one narrower. Stamens 6, 3 long and 3 short; filaments curved, glandular hairy. Pistil heterostylic; stigma glandular hairy. Capsule ovoid. Fl. Jul–Oct, fr. Aug–Nov.

Naturalized, growing gregariously in pools, ditches, and rice fields; 200–500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [native to Brazil; widely introduced and naturalized in tropics and subtropics].

The entire plant is used for fattening livestock, and as green manure. The young leaves and petioles are sometimes used as a vegetable.

