

MARSILEACEAE

蘋科 ping ke

Lin Youxing (林尤兴)¹; David M. Johnson²

Plants small, herbaceous, in shallow water or on shores of lakes and ponds. Rhizomes slender and creeping with a siphonostele, covered with short side-attached hairs or glabrous. Fronds linear or with 2–4 obtriangular or fan-shaped pinnae attached at top of stipe, these floating on water surface or emergent. Spores formed inside bean-shaped sporocarps attached to stipe by a short peduncle. Sporocarps containing 2–30 sori, each sorus including both megasporangia and microsporangia. Megasporangium with 1 large spore; microsporangium with 16–64 small spores.

Three genera and ca. 60 species: Africa and Australia are the centers of diversity; one genus and three species in China.

Lin Youxing. 2000. Marsileaceae. In: Lin Youxing, ed., *Fl. Reipubl. Popularis Sin.* 6(2): 336–339.

1. MARSILEA Linnaeus, Sp. Pl. 2: 1099. 1753, nom. cons.

蘋属 ping shu

Lemma Adanson; *Spheroidia* Dulac; *Zaluzianskia* Necker.

Fronds in deeper water with stipes lax and slender and pinnae floating upon water surface; fronds in shallow water or on land with erect stipes and pinnae oriented in various positions by action of basal pulvini; pinnae 4, obtriangular to fan-shaped, clustered at tip of stipe. Veins of pinnae forking dichotomously, anastomosing to form elongate areoles. Sporocarps 1 to many per frond, quadrate to elliptic in lateral view, leathery to woody when mature. Sori oblong, with few megasporangia and numerous microsporangia in each sorus. Megaspore ovoid-globose with a terminal papilla; spore wall thin, indistinctly reticulate. Microspores globose; spore wall thin, indistinctly sculptured. $x = 20$.

About 52 species: worldwide, with centers of diversity in tropical Africa and Australia; three species in China.

Dimensions of vegetative parts of all species can vary greatly in size depending upon water levels and season of the year; frond dimensions in the descriptions are from emergent or land fronds, not floating ones.

- 1a. Sporocarp quadrate in lateral view, concave on lateral sides 3. *M. aegyptiaca*
1b. Sporocarp elliptic in lateral view, convex on lateral sides.
2a. Sporocarps (1 or)2–5(–7) per fertile frond, attached to stipe up to 25 mm above stipe base; common
peduncle joining 2 or more peduncles to stipe 2–8 mm 1. *M. quadrifolia*
2b. Sporocarps 1 or 2(–4) per fertile frond, attached to stipe up to 5 mm above stipe base; common peduncle
joining 2 peduncles to stipe, if present then only 1 mm 2. *M. minuta*

1. *Marsilea quadrifolia* Linnaeus, Sp. Pl. 2: 1099. 1753.

蘋 ping

Rhizomes creeping, with internodes up to 4.8 cm, but internodes occasionally shorter and fronds then appearing tufted; roots arising both at nodes and 1 or 2 on internodes, short shoots 1–3 mm occasionally formed at nodes; main rhizome sparsely pubescent to glabrate. Fronds with stipes green to straw-colored, 10–18 cm, slender, glabrate; pinnae obtriangular to fan-shaped, 0.8–1.6 × 0.7–1.5 cm, margin entire, glabrate above, sparsely appressed-pubescent to glabrate below. Sporocarps (1 or)2–5(–7) per frond, attached at base of stipe where stipe joins rhizome or up to 25 mm up stipe, sometimes persistent after decay of frond and then appearing to arise directly from rhizome; peduncles 5–12.5 mm (when 2 or 3 sporocarps on a frond these attached to stipe by a common peduncle 2–8 mm), plus an additional 1.5 mm adnate to sporocarp, glabrate; sporocarp brown to black, elliptic in lateral view, 3.5–4 × 2.9–3.2 × ca. 2 mm, softly leathery, convex on lateral

sides, obtuse to rounded on perimeter, usually marked with a distinct tooth 0.3–0.4 mm above end of peduncle, densely appressed-pubescent when young, becoming thinly pubescent to glabrate with age.

Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi [Japan, Korea; Europe; introduced in NE North America].

2. *Marsilea minuta* Linnaeus, Mant. Pl. Altera, 308. 1771.

南国田字草 nan guo tian zi cao

Marsilea crenata C. Presl; *M. sinensis* Handel-Mazzetti.

Rhizomes creeping, with internodes up to 6.5 cm, but internodes frequently much shorter and fronds then appearing tufted; roots arising both at nodes and 1 or 2 on internodes, short shoots of 1–3 mm frequently formed at nodes; longer shoots sparsely pubescent to glabrate, short shoots often densely pubescent with pale reddish brown hairs ca. 1 mm. Stipes green to straw-colored, 6–16 cm, slender, glabrate; pin-

¹ Herbarium, Institute of Botany, Chinese Academy of Sciences, 20 Nanxincun, Xiangshan, Beijing 100093, People's Republic of China.

² Herbarium, Ohio Wesleyan University, Delaware, Ohio 43015, U.S.A.

nae obtriangular to fan-shaped, 0.5–1.9 × 0.4–1.5 cm, glabrate adaxially, sparsely appressed-pubescent to glabrate abaxially, margin entire, bilobed, or crenate. Sporocarps 1 or 2 per frond, attached at base of stipe where stipe joins rhizome or up to 5 mm up stipe, often persistent after frond decay and appearing to arise directly from rhizome; peduncle 2.8–9.3 mm (when 2 sporocarps on a frond occasionally joined by a common peduncle ca. 1 mm), plus an additional 1.3–2.2 mm adnate to sporocarp, sparsely pubescent to glabrate; sporocarp brown to black, elliptical in lateral view, 2–4.9 × 1.8–3.9 × 1.2–2.5 mm, soft leathery, convex on lateral sides, obtuse to rounded on perimeter, usually marked with a distinct tooth 0.1–0.5 mm above end of peduncle, densely appressed-pubescent when young, becoming thinly pubescent to glabrate with age.

Rice fields, ponds, ditches; 100–1400(–2000) m. Anhui, Fujian, Guangdong, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [paleotropics, plus sporadic introductions in the Americas and Caribbean (Brazil, Trinidad and Tobago, and SE United States)].

The whole plant is used for forage, and it is used medicinally for treating inflammation, edema, snakebites, and skin injuries.

3. *Marsilea aegyptiaca* Willdenow, Sp. Pl. 5: 540. 1810.

埃及蘋 ai ji ping

Rhizomes creeping, with internodes up to 10 mm, but internodes frequently much shorter and fronds then appearing tufted; roots arising both at nodes and on internodes, short shoots of 1–3 mm frequently formed at nodes; longer shoots sparsely pubescent to glabrate, short shoots often densely pubescent with whitish to stramineous hairs up to 1 mm. Land fronds only seen, these with stipes green to straw-colored, 3.9–6.8 cm, slender, sparsely pubescent to glabrate; pinnae broadly clavate to obtriangular, 0.7–1.2 × 0.5–1 cm, sparsely pubescent to glabrate adaxially, appressed pubescent abaxially, margin entire or shallowly bilobed. Sporocarp 1 per frond, attached at base of stipe where stipe joins rhizome, but often persistent after frond decay and appearing to arise directly from rhizome; peduncle 5.7–8.3 mm, plus an additional 1–1.5 mm adnate to sporocarp, sparsely pubescent to glabrate; sporocarp brown, roughly quadrate in lateral view, 2.7–3.4 × 2.5–3.7 × 1.2–1.5 mm, soft leathery, concave on lateral sides, sulcate around perimeter, marked with a minute tooth ca. 0.1 mm above end of peduncle, densely appressed pubescent when young, especially in sunken lateral area, becoming thinly pubescent to glabrate with age.

Semi-dry *Phragmites* marshes by lakes; ca. 500 m. Xinjiang (Altay) [India, Russia; Africa, Madagascar].