

3. LEMNA Linnaeus, Sp. Pl. 2: 970. 1753.

浮萍属 fu ping shu

Fronds free floating on water surface or submersed, 1 to many individual fronds coherent together, green on upper surface, sometimes red on lower surface, symmetric or asymmetric in shape, flat or sometimes gibbous on lower surface; 2 lateral pouches reproducing daughter fronds and flower present at base, bases of pouches not surrounded by a scale; veins 1–5(–7), splitting from node toward apex. Pigment cells absent. Root 1, sometimes dropped off or lacking (*Lemna trisulca*), surrounded by a short tubular sheath at base and enclosed by a cap at apex. Daughter fronds connected to mother frond by a thin white stipe or a green stalk (*L. trisulca*). Flower surrounded by small, utricular, membranous scale; stamens 2, 4-locular. Seeds 1–5, longitudinally ribbed.

Thirteen species: nearly cosmopolitan; five (possibly six) species in China.

- 1a. Fronds submersed (except when flowering or fruiting), often forming branched chains, at base narrowed into green stalk, margin denticulate distally 1. *L. trisulca*
- 1b. Fronds floating upon water surface, solitary or forming small groups, rounded at base, without green stalk, margin entire.
 - 2a. Frond with 1 vein *L. minuta*
 - 2b. Frond with 3–5 veins.
 - 3a. Root sheath winged at base; root shorter than 3 cm; fronds without reddish color 5. *L. aequinoctialis*
 - 3b. Root sheath not winged at base; root 0.5–15(–19) cm; fronds sometimes reddish, deep red, or with reddish spots on lower or upper surface.
 - 4a. Plants often with small, olive-brown, rootless turions, which sink to bottom 2. *L. turionifera*
 - 4b. Plants without distinct turions.
 - 5a. Fronds with mostly distinct papillae on midline of upper surface; greatest distance between lateral veins near or distal to middle 2. *L. turionifera*
 - 5b. Fronds with distinct papillae only above node and apex; greatest distance between lateral veins near or proximal to middle.
 - 6a. Fronds often reddish or red on lower surface (more intensely so than on upper), flat or slightly gibbous 3. *L. japonica*
 - 6b. Fronds always green on lower surface, sometimes reddish on upper surface, flat 4. *L. minor*

1. *Lemna trisulca* Linnaeus, Sp. Pl. 2: 970. 1753.

品藻 pin zao

Fronds (except when flowering or fruiting) submersed, 3–50 coherent in one group and often forming branched chains, attenuate at base into green connecting stalk 2–20 mm, green and subhyaline, sometimes purplish, narrowly ovate to elliptic, 3–15 mm (without stalk), 2–3.5 × as long as wide, flat, without papillae on upper surface, margin denticulate distally; veins 3, rarely 1, central vein approximating apex, lateral veins ca. 1/2 of frond length. Root 0.5–2.5 cm, often lacking, sheath not winged, apex mostly pointed. Turions absent. Flowering and fruiting fronds free floating on water surface, 1–5 coherent, 3–5 mm. Ovary with 1 ovule; utricular scale with narrow opening at apex. Fruit laterally winged toward apex. Seed with 12–18 distinct ribs. Fl. (rare) May–Sep. $2n = 20, 40, 42, 60, 63, 80$.

Lakesides, spring pools, ponds; in regions with cool temperate climate; sea level to 3000 m. Anhui, Hebei, Heilongjiang, Hubei, Jiangsu, Nei Mongol, Shaanxi, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [worldwide except South America].

2. *Lemna turionifera* Landolt, Aquatic Bot. 1: 355. 1975.

鳞根萍 lin gen ping

Fronds free floating on water surface, 1–8 coherent in one small group, without green stalk at base (but with a thin white stipe connecting fronds), shiny green, sometimes with reddish

spots on upper surface, red on lower surface (always deeper red on lower surface than on upper), obovate, 1.5–4 mm, 1–1.5 × as long as wide, flat, with distinct papillae on midline of upper surface, margin entire, base rounded; veins 3, nearly reaching apex, greatest distance between lateral veins near or distal to middle, lateral veins outcurved medially. Root 0.5–15 cm, sheath not winged, apex rounded (to pointed). Turions often present, rootless, olive-brown, 0.5–1.5 mm. Ovary with 1 ovule; utricular scale with narrow opening at apex. Fruit not winged toward apex. Seed with 30–60 indistinct ribs. Fl. (rare) Jun–Sep. $2n = 40, 42, 50, 80$.

Lakesides, spring pools, ponds, slow-flowing streams; in regions with continental cool-temperate climate; sea level to 3000 m. Anhui, Hebei, Heilongjiang, Nei Mongol [N Japan, Korea, Mongolia, Russia; C and SW Asia, North America; introduced in Europe].

3. *Lemna japonica* Landolt, Veröff. Geobot. Inst. E.T.H. Stiftung Rübel Zürich 70: 23. 1980.

日本浮萍 ri ben fu ping

Lemna leiboensis M. G. Liu & C. H. You.

Fronds free floating on water surface, 1–8 coherent in one group, without green stalk at base (but with a thin white stipe connecting fronds), shiny green, sometimes reddish or red on lower surface (always deeper red on lower surface than on upper), obovate to elliptic, 2–6(–7) mm, 1.3–1.8 × as long as

wide, flat or slightly gibbous on lower surface, with mostly distinct papillae on upper surface near apex and above node and indistinct ones along midline, margin entire, base rounded; veins 3(–5), nearly reaching apex, greatest distance between lateral veins near or proximal to middle, lateral veins outcurved medially. Root 0.5–15(–18) cm, sheath not winged, apex rounded (to pointed). Turions absent. Ovary with 1 ovule; utricular scale with narrow opening at apex. Fruit not known. Fl. (very rare) Jul–Oct. $2n = 40^*$, 50, 63.

Lakesides, pools, ponds, ditches; in regions with moderately temperate to warm-temperate climate; sea level to 2900 m. Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Japan, Korea].

Lemna japonica may have originated from hybridization between *L. minor* and *L. turionifera*.

Lemna leiboensis, described from S Sichuan, most likely is conspecific with *L. japonica*. It can only be distinguished by its larger fronds, conspicuous veins, and pointed root caps. However, these characters are shared by *L. japonica* as well.

4. *Lemna minor* Linnaeus, Sp. Pl. 2: 970. 1753.

浮萍 fu ping

Fronds free floating on water surface, 1–8 coherent in one small group, without green stalk at base (but with a thin white stipe connecting fronds), shiny green, sometimes reddish on upper surface, scarcely reddish on lower surface (always deeper red on upper surface than on lower), obovate to elliptic, 2–6(–10) mm, $1.3\text{--}2 \times$ as long as wide, flat, with mostly distinct papillae on upper surface near apex and above node, margin entire, base rounded; veins 3(–5), nearly reaching apex, greatest distance between lateral veins near or proximal to middle. Root 0.5–15 cm, sheath not winged, apex mostly rounded. Turions absent. Ovary with 1 ovule; utricular scale with narrow opening at apex. Fruit winged laterally toward apex. Seed with 10–16

distinct ribs. Fl. (rare) May–Sep. $2n = 20, 40, 42, 50, 63, 126$.

Lakesides, pools, ponds, ditches, slow-flowing streams; in regions with suboceanic cool- to moderately temperate climate; (sea level to) 2000–3000 m. W Xizang [Afghanistan, N India, Kazakhstan, Nepal, N Pakistan, W Russia, Turkmenistan; Africa, SW Asia, Europe, North America; introduced in Australia, Japan, and Pacific islands (New Zealand)].

5. *Lemna aequinoctialis* Welwitsch, Apont. 578. 1859.

稀脉浮萍 xi mai fu ping

Lemna paucicostata Hegelmaier; *L. perpusilla* Torrey var. *trinervis* Austin; *L. trinervis* (Austin) Small.

Fronds free floating on water surface, 1–8 coherent in one small group, without green stalk at base (but with a thin white stipe connecting fronds), shiny bright green, without reddish color, obovate to lanceolate, 1.5–4(–6.5) mm, $1\text{--}3 \times$ as long as wide, flat, with distinct papillae on upper surface near apex and above node, margin entire, base rounded; veins 3, nearly reaching apex, lateral veins outcurved at middle. Root 0.5–3 cm, sheath winged toward base, apex pointed. Turions absent. Ovary with 1 ovule; utricular scale with slit on one side. Fruit not winged. Seed with 8–24 distinct longitudinal ribs. Fl. (frequent) all seasons. $2n = 20, 40^*, 42, 50^*, 60, 70, 80, 84$.

Lakesides, pools, ponds, rice fields, ditches; in regions with warm-temperate to tropical climate; sea level to 2800 m. Anhui, Fujian, Guangdong, Guizhou, Hebei, Henan, Hubei, Jiangsu, Jiangxi, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Taiwan, Yunnan, Zhejiang [worldwide].

The plants with large thin fronds and conspicuous veins and without distinct papillae are often called *Lemna trinervis*. These characters, however, can be observed easily in most geographical races of *L. aequinoctialis*.

In FRPS (13(2): 210. 1979), the name *Lemna perpusilla* Torrey was misapplied to this species.

Species possibly occurring in China

Lemna minuta Kunth in Humboldt et al., Nov. Gen. Sp. 1, ed. 4^o: 372. 1816.

单脉萍 dan mai ping

Lemna minima Philippi; *L. minuscula* Herter.

Fronds free floating on water surface, 1–8 coherent in one small group, without green stalk at base (but with a thin white stipe connecting fronds), bright green, without reddish color, obovate, 0.8–4 mm, $1\text{--}2 \times$ as long as wide, flat to thickish (but not gibbous on lower surface), with or without indistinct papil-

lae on midline of upper surface, margin entire, base rounded; vein 1, not longer than $2/3$ of distance between node and apex. Root 0.2–1.5 cm, sheath not winged, apex rounded to pointed. Turions absent. Ovary with 1 ovule; utricular scale with slit on one side. Fruit not winged. Seed with 12–15 distinct ribs. Fl. (very rare) May–Sep. $2n = 36, 40, 42$.

Lakesides, spring pools, ponds, ditches; in regions with suboceanic moderately temperate to warm-temperate climate; sea level to 3000 m [data from general distribution]. Not formally documented in China but expected from further investigation [native to America; introduced elsewhere].

Fl. China 23: 81–83. 2010.