

35. BATRACHIUM (de Candolle) Gray, Nat. Arr. Brit. Pl. 2: 720. 1821.

水毛茛属 shui mao gen shu

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Ranunculus sect. *Batrachium* de Candolle, Syst. Nat. 1: 233. 1817.

Herbs perennial or annual, aquatic or semiterrestrial, with stems and leaves often submersed. Leaves alternate, subsessile to long petiolate, leaf blade usually submersed, 2–5 × dissected, ultimate segments filiform or narrowly linear, sometimes floating and then blade 3-lobed, not finely dissected. Inflorescence a solitary, leaf-opposed flower. Flowers bisexual, actinomorphic. Receptacle conical or subulate. Sepals (4 or)5, caducous. Petals (4 or)5, usually white, with yellow base, rarely entirely yellow, obovate, base shortly clawed, with a nectary pit above claw, apex rounded. Stamens few or numerous; anthers latrorse. Carpels numerous; ovule 1 per carpel. Style with adaxial stigmatic surface. Aggregate fruit ovoid or globose; achenes obovoid, slightly bilaterally compressed, transversely rugose.

About 20 species: S Africa, Asia, SE Australia, Europe, North and South America; eight species (one endemic) in China.

The separation of *Batrachium* from *Ranunculus* is not clear-cut and many botanists prefer to include the former genus within the latter. All species are aquatic or grow on wet mud.

- 1a. Leaves dimorphic: submerged leaves 3–4 × sect with filiform segments, floating leaves ca. 2 × sect with linear-lanceolate segments 1. *B. pekinense*
- 1b. Leaves all similar, usually submerged, with filiform segments.
 - 2a. Receptacle glabrous 2. *B. kauffmanii*
 - 2b. Receptacle puberulent.
 - 3a. Receptacle subulate in fruit 8. *B. rionii*
 - 3b. Receptacle conical in fruit.
 - 4a. Ultimate leaf segments soft, collapsing out of water 4. *B. bungei*
 - 4b. Ultimate leaf segments rigid, ± divaricate out of water.
 - 5a. Leaf blade orbicular in outline 7. *B. foeniculaceum*
 - 5b. Leaf blade flabellate or semiorbicular in outline.
 - 6a. Herbs terrestrial or growing in shallow water, not submersed, ± erect; stems 1.5–14 cm 6. *B. eradatum*
 - 6b. Herbs submerged; stems up to 40 cm.
 - 7a. Stem and petiole sheath glabrous 3. *B. divaricatum*
 - 7b. Stem usually sparsely puberulent; petiole sheath abaxially strigose 5. *B. trichophyllum*

1. *Batrachium pekinense* L. Liou in W. T. Wang, Fl. Reipubl. Popularis Sin. 28: 363. 1980.

北京水毛茛 bei jing shui mao gen

Ranunculus pekinensis (L. Liou) Lufarov.

Herbs perennial, submersed. Stems 30 cm or more, branched, glabrous or sparsely puberulent on nodes. Petiole 3.5–14 mm, glabrous or sheath abaxially sparsely puberulent, base narrowly vaginate; leaf blades dimorphic: submerged blades finely 3 or 4 × divided with filiform segments; floating leaves flabellate or broadly cuneate, 1–3 × 1.2–3.5 cm, glabrous, 3-partite or 3-sect, segments 1–3(–4) × partite, ultimate lobules lanceolate-linear. Flower 1–1.3 cm in diam. Pedicel 2–4 cm, glabrous. Receptacle conical in flower and fruit, puberulent. Sepals 5, ovate-elliptic, 3.5–4 mm, glabrous. Petals 5, white with yellow base, obovate, 5–6.5 × 3–5 mm, apex rounded. Stamens 22–25; anthers oblong, ca. 1 mm. Aggregate fruit broadly ovoid, 3–4 × 4–5 mm; achenes obliquely obovoid, 1–1.2 × ca. 0.8 mm, with 7 transverse wrinkles. Persistent style ca. 0.1 mm. Fl. May–Aug, fr. Jul–Sep.

• Streams in valleys; 100–500 m. Beijing.

2. *Batrachium kauffmanii* (Clerc) Kreczetowicz, Fl. URSS. 7: 343. 1937.

长叶水毛茛 chang ye shui mao gen

Ranunculus kauffmanii Clerc, Zap. Ural'sk. Obsch. Lyubit. Estestv. 4: 107. 1878.

Herbs perennial, submersed. Stems ca. 25 cm, branched, glabrous. Petiole 5–12 mm, glabrous, base broadly vaginate; leaf blade flabellate in outline, 3–6 × 3–7 cm, glabrous, 3-sect; segment 3–4 × sect; ultimate lobules filiform, soft, collapsing out of water. Flower 0.8–1 cm in diam. Pedicel 2–9 cm, glabrous. Receptacle conical in flower and fruit, glabrous. Sepals 5, elliptic, ca. 3 mm, glabrous. Petals 5, white with yellow base, apex rounded. Stamens ca. 11; anthers oblong, ca. 0.8 mm. Aggregate fruit subglobose, ca. 4 mm in diam.; achenes obliquely narrowly obovoid, ca. 1.5 × 1 mm, glabrous, with 6 or 7 transverse wrinkles. Persistent style ca. 0.1 mm. Fl. Jun–Sep, fr. Jul–Oct.

Streams, rivers, swamps; ca. 900 m. Heilongjiang, E Jilin, Nei Mongol [Mongolia, Russia (Far East, Siberia); Europe].

3. *Batrachium divaricatum* (Schrank) Schur, Enum. Pl. Transsilv. 12. 1866.

歧裂水毛茛 qi lie shui mao gen

Ranunculus divaricatus Schrank, Baier. Fl. 2: 104. 1789.

Herbs perennial, submersed. Stems ca. 40 cm, branched, glabrous. Petiole 8–12 mm, glabrous, base vaginate; leaf blade flabellate in outline, ca. 1.5 × 2.8 cm, glabrous, 3-sect, segments ca. 3 × sect; ultimate lobules filiform, ± collapsing out of water. Flower ca. 1.2 cm in diam. Pedicel 2.5–5 cm, glabrous. Receptacle conical in flower and fruit, puberulent. Sepals 5, elliptic, ca. 3.5 mm, glabrous. Petals 5, white with yellow base, obovate, ca. 5.5 × 3.5 mm, apex rounded. Stamens ca. 12; anthers oblong, ca. 0.8 mm. Aggregate fruit subglobose, ca. 5 mm in diam.; achenes obliquely narrowly obovoid, 1.2–1.8 × 1–1.2 mm, sparsely puberulent above or glabrous, with 5–7 transverse wrinkles. Persistent style ca. 0.1 mm. Fl. May–Jun.

Lakes. Xinjiang [Kazakhstan, Russia (Siberia); Europe].

4. *Batrachium bungei* (Steudel) L. Liou in W. T. Wang, Fl. Reipubl. Popularis Sin. 28: 341. 1980.

水毛茛 *shui mao gen*

Herbs perennial, submersed. Stems ca. 30 cm or more, branched, glabrous or sparsely puberulent on nodes. Petiole 4–12(–18) mm, glabrous or sheath abaxially sparsely puberulent; leaf blade flabellate or semiorbicular in outline, 1–2.5 × 1.8–3.5 cm, glabrous, 3-sect; segments 4 or 5 × sect, ultimate lobules filiform, soft, ± collapsing out of water. Flower 0.5–1.8 cm in diam. Pedicel 2.2–3.5 cm, glabrous. Receptacle conical in flower and fruit, puberulent. Sepals (4 or)5, elliptic, 1.6–5.5 mm, glabrous. Petals (4 or)5, white with yellow base or yellow throughout, obovate, 2.5–10 × 1.4–7 mm, apex rounded. Stamens 5–20; anthers oblong, ca. 1 mm. Aggregate fruit subglobose or broadly ovoid, 4–5 × 4–5 mm; achenes obliquely obovoid, 1.2–1.4 × ca. 1 mm, glabrous, with ca. 6 transverse wrinkles. Persistent style ca. 0.1 mm.

Ponds, lakes, streams, swamps; near sea level–4900 m. Gansu, N Guangxi, Hebei, SW Hubei, Hunan, N and S Jiangsu, Liaoning, E Qinghai, Shanxi, W and NW Sichuan, Xizang, NW Yunnan, Zhejiang [Kashmir].

1a. Petals yellow throughout 4c. var. *flavidum*

1b. Petals white with yellow base.

2a. Flowers 10–18 mm in diam.; stamens

(12–)15–20 4a. var. *bungei*

2b. Flowers 5–6 mm in diam.; stamens

5–7 4b. var. *micranthum*

4a. *Batrachium bungei* var. *bungei*

水毛茛(原变种) *shui mao gen* (yuan bian zhong)

Ranunculus bungei Steudel, Nomencl. Bot., ed. 2, 2: 432. 1841, based on *R. hydrophilus* Bunge, Enum. Pl. China Bor. 2. 1833, not Gaudichaud-Beaupré ex Mirbel (1825); *R. hydrocharis* f. *bungei* (Steudel) Hiern; *R. trichophyllum* var. *chanetii* H. Léveillé.

Flower 1–1.8 cm in diam. Sepals 5, 4–5.5 mm. Petals 5, white with yellow base, 5–9 × 4.5–7 mm. Stamens (12–)15–20. Fl. May–Sep.

• Ponds, lakes, streams; near sea level to 4800 m. Gansu, N Guangxi, Hebei, SW Hubei, S Jiangsu, Liaoning, E Qinghai, Shanxi, W Sichuan, Xizang, NW Yunnan, Zhejiang.

4b. *Batrachium bungei* var. *micranthum* W. T. Wang, Guihaia 15: 105. 1995.

小花水毛茛 *xiao hua shui mao gen*

Flower 0.5–0.6 cm in diam. Sepals 4 or 5, 1.6–2.4 mm. Petals 4 or 5, white with yellow base, 2.5–3.5 × 1.4–2.2 mm. Stamens 5–7. Fl. Apr–Jun.

• Ponds, streams; 200–2300 m. C Hunan, N Jiangxi, NW Yunnan (Lijiang Naxi Zu Zizhixian).

4c. *Batrachium bungei* var. *flavidum* (Handel-Mazzetti) L. Liou in W. T. Wang, Fl. Reipubl. Popularis Sin. 28: 341. 1980.

黄花水毛茛 *huang hua shui mao gen*

Batrachium flavidum Handel-Mazzetti, Acta Horti Gothob. 13: 168. 1939; *Ranunculus flavidus* (Handel-Mazzetti) C. D. K. Cook.

Flower 1–1.8 cm in diam. Sepals 5, 4–5 mm. Petals 5, yellow throughout, 7–10 × 4–7 mm. Stamens 19–22. Fl. Jun–Sep.

Streams, swamps; 1700–4900 m. Gansu, NW Sichuan, Xizang [Kashmir].

This is the only yellow-flowered *Batrachium*.

5. *Batrachium trichophyllum* (Chaix ex Villars) Bosch, Prodr. Fl. Bat. 7. 1850.

毛柄水毛茛 *mao bing shui mao gen*

Herbs perennial, submersed. Stems 10–40 cm, branched, sparsely puberulent or glabrous. Petiole 2–15 mm, sheath abaxially strigose; leaf blade nearly semiorbicular in outline, 0.5–1.5 × 1.4–3.5 cm, glabrous or sparsely puberulent, 3-sect; segments 3 or 4 × sect, ultimate lobules filiform, ± rigid, remaining divaricate out of water. Flower 0.4–1.5 cm in diam. Pedicel 1.6–4 cm, glabrous. Sepals (4 or)5, elliptic, 1.5–4 mm, glabrous. Petals (4 or)5, white with yellow base, obovate, 2–7 × 1–5 mm, apex rounded. Stamens 6–25; anthers oblong, 0.4–1 mm. Aggregate fruit globose-ovoid, 2–3 × 2.5–4 mm; achenes obliquely obovoid, 1–1.5 × 0.7–1 mm, sparsely puberulent above or glabrous, with 5–7 transverse wrinkles. Persistent style 0.1–0.2 mm.

Swamps, ponds, rivers; 100–3600 m. Gansu, Heilongjiang, W Liaoning, Nei Mongol, Qinghai, N Shaanxi, NW Sichuan, Xinjiang, Xizang [Kazakhstan, N Pakistan, Russia (Far East, Siberia)].

1a. Flowers 4–6 mm in diam.; sepals 4,

1.5–2 mm; petals 4, 2–3 mm;

stamens 6–8 5c. var. *jingpoense*

1b. Flowers 6–15 mm in diam.; sepals 5,

2–4 mm; petals 5, 3–7 mm; stamens

10–25.

2a. Stem nodes sparsely puberulent or glabrous; petiole sheath abaxially

sparsely strigose; leaf blade glabrous or very sparsely puberulent 5a. var. *trichophyllum*

- 2b. Stem puberulent; leaf sheath abaxially densely strigose; leaf blade sparsely puberulent 5b. var. *hirtellum*

5a. *Batrachium trichophyllum* var. *trichophyllum*

毛柄水毛茛(原变种) mao bing shui mao gen (yuan bian zhong)

Ranunculus trichophyllus Chaix ex Villars, Hist. Pl. Dauphiné 1: 335. 1786.

Stem nodes sparsely puberulent or glabrous. Petiole sheath abaxially usually sparsely strigose. Flower 0.6–1.5 cm in diam. Sepals 5, 2–4 mm. Petals 5, 3–7 mm. Stamens 10–25. Fl. Jun–Aug.

Swamps, ponds, rivers; 100–3600 m. Gansu, Heilongjiang, W Liaoning, Nei Mongol, Qinghai, N Shaanxi, Xinjiang, Xizang [Kazakhstan, N Pakistan, Russia (Far East, Siberia); N Africa, Europe, North America].

5b. *Batrachium trichophyllum* var. *hirtellum* L. Liou in W. T. Wang, Fl. Reipubl. Popularis Sin. 28: 363. 1980.

多毛水毛茛 duo mao shui mao gen

Stems sparsely puberulent. Petiole sheath abaxially densely strigose; leaf blade sparsely puberulent. Flower ca. 1.2 cm in diam. Sepals 5, ca. 4 mm. Petals 5, ca. 6 mm. Stamens ca. 20. Fl. Jun.

• Streams; ca. 3500 m. NW Sichuan (Hongyuan Xian).

5c. *Batrachium trichophyllum* var. *jingpoense* (G. Y. Chang) W. T. Wang, Phytologia 79: 387. 1996.

镜泊水毛茛 jing bo shui mao gen

Batrachium jingpoense G. Y. Chang, Bull. Bot. Res., Harbin 12: 241. 1992.

Stems sparsely puberulent at least on nodes. Petiole sheath abaxially densely strigose. Flower 0.4–0.6 cm in diam. Sepals 4, 1.5–2 mm. Petals 4, 2–3 mm. Stamens 6–8. Fl. Jun–Jul.

• Swamps. S Heilongjiang (Ning'an Xian; Jingbo Hu).

6. *Batrachium eradicatum* (Laestadius) Fries, Bot. Not. 1843: 114. 1843.

小水毛茛 xiao shui mao gen

Ranunculus aquatilis Linnaeus var. *eradicatus* Laestadius, Nova Acta Regiae Soc. Sci. Upsal. 11: 242. 1839; *Batrachium trichophyllum* (Chaix ex Villars) Bosch var. *paucistamineum* (Tausch) Handel-Mazzetti; *B. trichophyllum* var. *paucistamineum* f. *terrestre* (Grenier & Godron) Handel-Mazzetti; *R. paucistamineus* Tausch; *R. trichophyllum* Chaix ex Villars var. *terrestris* Grenier & Godron.

Herbs perennial, small, terrestrial or in shallow water. Stems 1.5–8(–14) cm, simple or branched, glabrous. Petiole 5–16 mm, glabrous, sometimes broad sheath abaxially sparsely strigose; leaf blade flabellate in outline, 4–13 × 7–25 mm, glabrous, 3-sect; segment 2 or 3(or 4) × sect, ultimate lobules filiform, ± rigid, remaining divaricate out of water. Flower 0.6–1.2 cm in diam. Pedicel 1–2 cm, glabrous. Receptacle conical in flower and fruit, puberulent. Sepals 5, elliptic, 2–4 mm,

glabrous. Petals 5, white with yellow base, obovate or narrowly obovate, 2.5–7.2 × 1.5–4 mm, apex rounded. Stamens 4–12; anthers oblong, 0.5–0.9 mm. Aggregate fruit broadly ovoid, ca. 2.5 × 4 mm; achenes obliquely narrowly obovoid, 1.2–1.5 × 0.8–1 mm, glabrous or sparsely puberulent, with ca. 6 transverse wrinkles. Persistent style ca. 0.2 mm. Fl. May–Sep.

Ponds, shallow water, swamps; 500–3900 m. N Heilongjiang, N Nei Mongol, W Sichuan, N Xinjiang, SE Xizang, NW Yunnan (Lijiang Naxi Zu Zizhixian) [Kazakhstan, Russia (Siberia); Europe, North America].

7. *Batrachium foeniculaceum* (Gilibert) Kreczetowicz, Fl. URSS. 7: 338. 1937.

硬叶水毛茛 ying ye shui mao gen

Ranunculus foeniculaceus Gilibert, Fl. Lit. Inch. 5: 261. 1782; *Batrachium circinatum* (Sibthorp) Spach; *R. circinatus* Sibthorp.

Herbs perennial, submersed. Stems up to 50 cm, branched, glabrous. Petiole 2–4 mm, sheath abaxially sparsely puberulent or glabrous; leaf blade orbicular in outline, 1–2.5 cm in diam., glabrous, 3-sect; segments 2 or 3 × sect, ultimate lobules filiform, ± rigid, remaining divaricate out of water. Flower 1–1.8 cm in diam.

Pedicel 2.5–6.5 cm, glabrous. Receptacle conical in flower and fruit, puberulent. Sepals 5, elliptic, 3–4 mm, glabrous. Petals 5, white with yellow base, obovate, 5–10 × 4–6 mm, apex rounded. Stamens 17–25; anthers oblong, 0.7–1 mm. Aggregate fruit broadly ovoid, 3–4 × ca. 4 mm; achenes obliquely obovoid, ca. 1.2–1 mm, above sparsely puberulent or glabrous, with ca. 7 transverse wrinkles. Persistent style ca. 0.2 m. Fl. May–Sep.

Swamps, lakes; 300–3600 m. Gansu, Heilongjiang, Nei Mongol, N Shanxi, N Xinjiang, NW Yunnan (Zhongdian Xian) [Kazakhstan, N Mongolia, Russia (Siberia); Europe].

8. *Batrachium rionii* (Lagger) Nyman, Bot. Not. 98. 1852.

钻托水毛茛 zuan tuo shui mao gen

Ranunculus rionii Lagger, Flora 31: 49. 1848; *Batrachium trichophyllum* (Chaix ex Villars) Bosch subsp. *rionii* (Lagger) C. D. K. Cook; *R. flaccidus* Persoon var. *rionii* (Lagger) Hegi; *R. trichophyllum* Chaix ex Villars subsp. *rionii* (Lagger) Soó.

Herbs annual, terrestrial or aquatic. Stems ca. 20 cm, branched, glabrous. Petiole 5–18 mm, glabrous or sheath abaxially sparsely strigose; leaf blade flabellate in outline, 0.6–1 × 0.8–1.5 cm, glabrous, 3-sect; segments 2 or 3 × sect, ultimate lobules filiform, remaining divaricate out of water. Flower ca. 0.8 cm in diam. Pedicel ca. 1.5 cm, glabrous. Receptacle subulate in fruit, puberulent. Sepals 5, elliptic, ca. 2.5 mm, glabrous. Petals 5, white with yellow base, obovate, ca. 4 × 2 mm, apex rounded. Stamens ca. 15; anthers oblong, ca. 0.5 mm. Aggregate fruit subglobose, ca. 4.5 mm in diam.; achenes obliquely narrowly obovoid, 0.8–

1.2 × 0.6–0.8 mm, glabrous, with 4–7 transverse wrinkles. Persistent style ca. 0.1 mm. Fl. May.

Lakes; below 100 m. Beijing [Afghanistan, Kazakhstan, N Pakistan; S Africa, W Asia, Europe].

Cook (Mitt. Bot. Staatssamml. München 6: 142. 1966) reported that this species is distributed in Xizang and N China. However, we have seen only one specimen from Beihai Park in the city of Beijing collected by Liou Ying in 1936. The flower of this specimen has about 30 carpels but Cook (loc. cit.) stated that typical *Batrachium rionii* has 60–90 carpels per flower. Vegetatively this species is indistinguishable from *B. trichophyllum*.

