

2. NYMPHAEA Linnaeus, Sp. Pl. 1: 510. 1753, nom. cons.

睡莲属 shui lian shu

Herbs perennial. Rhizomes erect, ascending, or repent, branched or unbranched. Leaves mostly floating; leaf blade venation primarily palmate, base cordate to sagittate, margin entire to dentate, sometimes slightly peltate. Flowers perigynous, floating or emersed, perianth spreading. Sepals 4, greenish, not petaloid, inserted at base of ovary, sometimes persistent. Petals 8 to many, large and showy, inserted on lateral surface of ovary, often grading into stamens. Stamens shorter than sepals and petals, inserted on lateral surface of ovary; filament linear to ovate or obovate; anther connective appendaged or unappendaged. Carpels partially or completely united. Style absent or modified into abaxially projecting carpellary appendages. Stigma sessile, radiate on cup-shaped stigmatic disc rimmed by carpellary appendages. Fruit irregularly dehiscent. Seeds globose, ovoid, or ellipsoid, smooth or longitudinal ridges pubescent, arillate.

About 50 species: widespread in temperate and tropical regions; five species in China.

Many species of the genus *Nymphaea* are cultivated as ornamentals. In China, in addition to the native species, both *Nymphaea mexicana* Zuccarini and *N. alba* Linnaeus var. *rubra* Lönnroth are cultivated.

- 1a. Leaf blade abaxially densely pubescent, margin dentate and teeth acute to subspinose 4. *N. lotus*
- 1b. Leaf blade abaxially glabrous, margin entire, subentire, or deeply crenate.
 - 2a. Petals white tinged with purple, blue, or purple-red; anther connective apically appendaged; leaf blade margin subentire to deeply crenate; sepals persistent 5. *N. nouchali*
 - 2b. Petals white; anther connective apically unappendaged; leaf blade margin entire; sepals caducous or decaying after anthesis (persistent in *N. tetragona*).
 - 3a. Flowers 3–6 cm in diam. when fully open; mature leaf blades mostly less than 10 cm; carpellary appendages ovate 3. *N. tetragona*
 - 3b. Flowers more than 6 cm in diam. when fully open; mature leaf blades mostly more than 10 cm; carpellary appendages triangular-tapered.
 - 4a. Rhizomes repent; insertion of calyx on receptacle circular; filaments of inner stamens ± as wide as anthers 1. *N. alba*
 - 4b. Rhizomes erect or ascending; insertion of calyx on receptacle ± tetragonous; filaments of inner stamens wider than anthers 2. *N. candida*

1. *Nymphaea alba* Linnaeus, Sp. Pl. 1: 510. 1753.

白睡莲 bai shui lian

Rhizomes repent, sparsely branched, but not stoloniferous. Leaf blade suborbicular, 10–25 cm in diam., papery, abaxially glabrous, scarcely peltate, base deeply cordate and basal lobes subparallel or spreading, margin entire. Flower floating, (7–) 10–20 cm in diam. Calyx insertion on receptacle circular; sepals lanceolate, 3–5(–8) cm, obscurely veined, caducous or decaying after anthesis. Petals (12–)20–25(–33), white, ovate-oblong, 3–5.5(–8) cm, transition to stamens gradual. Filament of inner stamens ± as wide as anther; connective apically unappendaged. Carpels completely united, walls between locules of ovary single. Stigma rays (8–)14–20(–25); carpellary appendages triangular-tapered. Fruit semiglobose, 2.5–3 cm. Seeds ellipsoid, 2–3(–5) mm, smooth. Fl. Jun–Aug. $2n = 56, 84, 112$.

Cultivated and naturalized in ponds. Hebei, Shaanxi, Shandong, Zhejiang [Kashmir, Russia (Caucasus)]; Africa, SW Asia, Europe].

This species is cultivated in additional Chinese provinces.

2. *Nymphaea candida* C. Presl in J. Presl & C. Presl, Delic. Prag. 224. 1822.

雪白睡莲 xue bai shui lian

Rhizomes erect or ascending, unbranched. Leaf blade suborbicular, 10–25 cm in diam., papery, abaxially glabrous, scarcely peltate, base deeply cordate and basal lobes contiguous or overlapping, margin entire. Flower floating, (6–)10–20 cm in diam. Calyx insertion on receptacle ± tetragonous; sepals lanceolate, 3–5 cm, obscurely veined, caducous or decaying after anthesis. Petals 20–25, white, ovate-oblong, 3–5.5 cm, transition to stamens gradual. Filament of inner stamens wider than anther; connective apically unappendaged. Carpels completely united, walls between locules of ovary single. Stigma rays (5–) 6–14(–20); carpellary appendages triangular-tapered. Fruit semiglobose, 2.5–3 cm. Seeds ellipsoid, 3–4 mm, smooth. Fl. Jun–Aug. $2n = 112, 160$.

Ponds. Xinjiang [Kashmir, Kazakhstan, Russia (Siberia)]; SW Asia, Europe].

3. *Nymphaea tetragona* Georgi, *Bemerk. Reise Russ. Reiche* 1: 220. 1775.

睡莲 shui lian

Rhizomes erect, unbranched. Leaf blade cordate-ovate to ovate-elliptic, 5–12 × 3.5–9 cm, papery, abaxially glabrous, scarcely peltate, base deeply cordate and basal lobes parallel to contiguous, margin entire. Flower floating, 3–6 cm in diam. Calyx insertion on receptacle prominently tetragonous; sepals broadly lanceolate to narrowly ovate, 2–3.5 cm, obscurely veined, persistent. Petals 8–15(–17), white, broadly lanceolate, oblong, or obovate, 2–2.5 cm, transition to stamens gradual. Filament of inner stamens wider than anther, connective apically unappendaged. Carpels completely united, walls between locules of ovary single. Stigma rays 5–8(–10); carpellary appendages ovate. Fruit globose, 2–2.5 cm in diam. Seeds ellipsoid, 2–3(–4) mm, smooth. Fl. Jun–Aug. $2n = 112$.

Ponds, lakes; near sea level to 4000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [India, Japan, Kashmir, Kazakhstan, Korea, Russia, Vietnam; North America, Europe].

The treatment of this species in E Asia is problematic. In North America and Europe *Nymphaea tetragona* is restricted to boreal regions above 50° N latitude, where the plants have a prominently tetragonous receptacle, flowers with a reddish to purplish center, and thinner leaves abaxially with raised veins. Plants in Korea, N Japan, and Russia, as depicted in Lee (Fl. Korea, 216. 1997) and Kadono (Aquatic Pl. Japan, 112. 1994), and observed on specimens, have these characteristics. Plants of N China and the Himalayas may belong here also, but to determine this will require further study of better material. However, plants of tropical and warm temperate China, Japan, and Vietnam appear to differ in having an only slightly tetragonous receptacle, flowers with a yellow center, and thicker leaves abaxially with impressed veins. Such plants are sometimes known in cultivation in Europe and North America as *N. tetragona* var. *angusta* Caspary, but were originally sent in 1805 by William Kerr from Guangdong Province and described under the name of *Castalia pygmaea* Salisbury (*N. pygmaea* (Salisbury) W. T. Aiton). Further study may indicate that much of the Chinese and Japanese material should be segregated as *N. pygmaea* or at some other rank. One might expect hybridization between the two taxa to occur where they coexist, as with other related *Nymphaea*, and the level of sterility displayed by such hybrids should be examined as evidence of the degree of their relationship.

An examination of the type of *Nymphaea esquirolii* H. Léveillé & Vaniot from Guizhou Province indicates that it belongs with *N. pygmaea*. The assignment of *N. crassifolia* (Handel-Mazzetti) Nakai (*Castalia crassifolia* Handel-Mazzetti; *N. tetragona* var. *crassifolia* (Handel-Mazzetti) Chu) to one of these two forms is unknown, as the type has not been examined. *Nymphaea acutiloba* de Candolle is of uncertain identity and lacks a type specimen. Although referred by Conard (Proc. Carnegie Inst. Wash. 4:170. 1905) to *N. tetragona*, the description cannot apply to this taxon and more closely matches *N. nouchali* or *N. lotus*.

4. *Nymphaea lotus* Linnaeus var. ***pubescens*** (Willdenow) J. D. Hooker & Thomson in J. D. Hooker, *Fl. Brit. India* 1: 114. 1872.

柔毛齿叶睡莲 rou mao chi ye shui lian

Nymphaea pubescens Willdenow, *Sp. Pl.* 2: 1154. 1799. Rhizomes erect, producing slender stolons. Leaf blade ovate-elliptic to suborbicular, 15–26(–50) cm, papery, abaxially densely pubescent, peltate more than 5 mm from base of sinus, base deeply cordate and basal lobes subparallel, margin dentate and teeth acute to subspinose. Flower emergent, (2–)5–8(–15) cm in diam. Calyx insertion on receptacle circular; sepals oblong, 5–8 cm, conspicuously veined, caducous or decaying after anthesis. Petals 12–14(–30), white, red, or pink, oblong, 5–9 cm, transition to stamens abrupt. Filament of inner stamens only slightly wider than anther; connective apically unappendaged. Carpels completely united, walls between locules of ovary single. Stigma rays 12–15(–30); carpellary appendages linear. Fruit ovoid to subglobose, 3.5–5 cm. Seeds ellipsoid to globose, 1–2 mm, with longitudinal ridges. Fl. Aug–Oct. $2n = 84$.

Ponds in hills. S and SW Yunnan [Bangladesh, India, Indonesia, Myanmar, New Guinea, Pakistan, Philippines, Sikkim, Sri Lanka, Thailand, Vietnam].

The relationship between the Asiatic *Nymphaea lotus* var. *pubescens*, often treated as *N. pubescens*, and the var. *lotus* of Africa is in need of further study. Cultivated forms of var. *pubescens* with red flowers, originating from India, are known from Guangdong Province and perhaps elsewhere in S China. Although they are reportedly sterile, they have sometimes been segregated as *N. rubra* Roxburgh ex Andrews.

5. *Nymphaea nouchali* N. L. Burmann, *Fl. Indica*, 120. 1768.

延药睡莲 yan yao shui lian

Nymphaea stellata Willdenow.

Rhizomes erect, unbranched. Leaf blade elliptic-orbicular to orbicular, 7–15(–45) cm in diam., papery, abaxially glabrous, peltate a few mm from base of sinus, base cordate, basal lobes parallel to spreading, margin subentire to deeply crenate. Flower slightly emergent, 3–15 cm in diam. Calyx insertion on receptacle circular; sepals lanceolate to oblong-lanceolate, 2.5–8 cm, slightly veined, persistent. Petals 10–30, white tinged with purple, blue, or purple-red, linear-oblong to lanceolate, 4.5–5 cm, transition to stamens gradual. Filament of inner stamens ± as wide as anther; connective apically appendaged. Carpels only partially united, walls between locules of ovary double. Stigma rays (8–)10–30; carpellary appendages triangular-tapered. Fruit globose, 1.5–4.5 cm in diam. Seeds ellipsoid-globose, 0.5–1.3 mm, with longitudinal rows of hairs. Fl. Jul–Dec. $2n = 28, 56, 84$.

Ponds. Anhui, Guangdong, Hainan, Hubei, Taiwan, Yunnan [Afghanistan, Bangladesh, India, Indonesia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Australia].

In FRPS and a number of other works this species is named *Nymphaea stellata*. An examination of the type of *N. nouchali* by Verdcourt (Kew Bull. 44: 179. 1989) indicated that the name should be applied to this species, not to *N. pubescens* as some have done.

Flora of China 6: 116–118. 2001.

Much work remains to be done to improve our understanding of this wide-ranging and highly variable taxon and its relationship to related taxa in Africa.

Flora of China 6: 116–118. 2001.