

NYMPHAEACEAE WATERLILY FAMILY

Jon Ricketson
Missouri Botanical Garden
P. O. Box 299
St. Louis, MO 63166

Freshwater aquatic perennial herbs, usually glabrous, with thick adventitious roots. STEMS horizontal rhizomes or shortened erect caudexes. LEAVES large, simple, alternate, stipulate, usually floating; blades often peltate, orbicular to cordate; petioles elongate. FLOWERS axillary, solitary, large and conspicuous, long-peduncled, floating or elevated above the water surface, actinomorphic, hypogynous, perfect, usually complete; sepals 3-many, green, often petaloid; petals 0-many, often in many series, often passing into petaloid staminodes, usually with nectaries; stamens 3-many, free or adnate to the petals; pistil of 3-many usually united carpels; stigmas united into a disk-like structure of 3-many radiating rays; style absent; ovary 3-many locular, the ovules 2-many per locule. FRUITS follicles or leathery berries, irregularly splitting. --6 genera (*Barclaya*, *Euryale*, *Nuphar*, *Nymphaea*, *Ondinea* and *Victoria*) with 60-70 spp., worldwide.

1. Leaf venation pinnate; sepals 6, greenish-yellow; petals inconspicuous, yellow, scale-like or stamen-like, not spreading *Nuphar*
- 1' Leaf venation mostly palmate; sepals 4, green; petals conspicuous, showy, white, yellow, pink to blue, similar in size and shape to the sepals, spreading *Nymphaea*

Nuphar Sm. Spatterdock, Yellow Pondlily, Yellow Waterlily, Cowlily

STEMS of branching rhizomes. LEAVES lanceolate to orbicular, deeply cleft, entire, pinnately veined, glabrous above and glabrous to densely pubescent below; petiole terete, flattened or winged, glabrous to pubescent. FLOWERS usually floating; sepals 5-14, greenish, yellow- or red-tinged, persistent; petals numerous, inconspicuous, scale- or stamen-like, oblong to spatulate, often emarginate; stamens numerous, yellow- or red-tinged; pistils with 5-many, mostly united carpels; stigmatic disk broad, concave or flat, with 5-many rays; ovary multi-locular, each locule with numerous ovules. FRUIT a leathery berry, ovoid to columnar, usually ripening above the water surface. SEEDS narrowly to broadly ovoid, yellow to brown, with a more or less conspicuous raphe. $x = 17$. --1-3 sp., mostly temperate, subarctic to subtropical areas of the n hemisphere. (From the Arabic name, Naufar, for some unknown waterlily). Taxonomically difficult and not well understood. Beal, E. O. 1956. *J. Elisha Mitchell Sci. Soc.* 72:317-346.

Nuphar luteum (L.) Sibth. & Sm. (yellow). Yellow Waterlily. --LEAVES with broadly rounded to acute tips, the basal lobes overlapping to widely divergent. FLOWERS with anthers 1-8 mm long. FRUITS with stigmatic disk dentate to entire, slightly to narrowly constricted below. SEEDS to 6 mm long. --As many as 9 subspp., throughout the n hemisphere.

Subsp. *polysepalum* (Engelm.) E. O. Beal (many sepals). Yellow Pondlily. --LEAVES usually floating, sometimes emersed, broadly ovate to oblong, glabrous; petioles terete. FLOWERS to 12 cm in diameter when fully open; sepals 7-9(-12); petals small, usually concealed by the stamens, usually yellow, sometimes red-tinged; stamens with yellow to deeply red-tinged anthers, the filament often extending 1-4 mm beyond the anther; stigmatic disk entire to deeply crenate, usually deeply umbilicate, with (9-)20-25(-36) rays. SEEDS narrowly ovoid, 2.5-3.2 mm wide and 3.5-5 mm long. [*N. polysepalum* Engelm.]. --Ponds, lakes and still to slow-moving water: Coconino, Navajo cos.; 2000-2250 m (6600-7500 ft); Apr-Sep (fr. Jun-Oct); Eurasia, but long-established in N. Amer.; Rocky Mt. region and w N. Amer.: AL and Yukon Terr. s to CA, AZ, and NM. Seeds and rhizomes a source of food.

Nymphaea L. Waterlily, Pondlily, Nymphaea, Fragrant Waterlily

STEMS ovoid to cylindric rhizomes, often sprouting freely. LEAVES glabrous or pubescent, elliptic-sagittate to orbicular, entire to spinose-dentate, the apices acute-tapered to truncate, the bases cordate to sagittate, the venation mostly radiate with a prominent midvein, glabrous or pubescent. FLOWERS floating or raised above the water surface, strongly to faintly odorous; sepals 4 (rarely 3 or 5), green or streaked with red; petals 7-40, showy, white, blue, red or yellow, in various shades; stamens numerous (20-700), multiseriate, the outer ones with broad petaloid filaments, the inner ones slender to filiform; staminodes present; pistils with 5-47 carpels, united or partially united; stigmatic disk broad, concave or almost flat, radiate; ovary multi-locular, ovules numerous in each locule. FRUIT a berry-like capsule, fleshy or spongy, ripening under water. SEEDS small, with a floating membranous bell-shaped aril. $x = 14$. --40-50 spp., nearly cosmopolitan. (Name from the classical water nymph, Nymphé). Wiersema, J. H. 1987. Syst. Bot. Monogr. 16:1-112.

1. Rhizomes erect; leaf margins slightly to greatly crenate; upper leaf surface green, blotched with brown, the lower surface purple to green with black dots; petals yellow *N. mexicana*
- 1' Rhizomes horizontal; leaf margins entire; upper leaf surface green, the lower surface green to purplish without blotches nor black-dotted; petals white *N. odorata*

Nymphaea mexicana Zucc. (of Mexico). Yellow Waterlily. --STEM with erect rhizomes, 1.9-30 cm long, 1.4-6 cm wide, densely covered between the leaf bases with long, light-colored hairs; plants reproducing asexually by stolons that in autumn become geotropic and bury their tips 20 cm or more in the mud, forming "brood bodies" (consisting of a row of 3-7 buds on one side, and a cluster of 12 or more fleshy roots 1.3-3.8 cm long on the other). LEAVES 10-20 cm in diameter, glabrous, orbicular to ovate, narrowly peltate, the upper surface of blades bright-green, blotched with brown (at least when young), the lower surface of blades deep purple or purplish green (green in aerial leaves), marked with black dots; margins crenate, wavy at base, nearly entire at apex; sinus slightly open, or the basal lobes overlapping; primary veins on lower surface scarcely visible. FLOWERS 6-13 cm diameter, faintly scented or odorless; peduncles 3-6 mm diameter, 16-150 cm long; receptacle with four swollen ridges; sepals 4, 3-7 cm long, 0.8-2 cm wide, elliptic, ovate to lanceolate, acute or obtuse, the inner surface yellow; petals 12-23, 2-7 cm long, 1.2-2.2 cm wide, elliptic, the apices rounded, bright-yellow, slightly purplish outside; stamens 50-60, stout, bright golden yellow, the petaloid staminodes mostly 2-2.5 cm long, 1-2.5 mm wide; carpels 7-10; styles short; stigma funnel-shaped, deeply curved. FRUITS spherical to ovoid, 2-2.5 cm in diameter. SEEDS globose, 2-3 mm long, 4-5 mm wide, very fine dull greenish-black appressed-hairy. [*N. flava* Leitn.]. $2n = 56$. --Lakes, ponds and slow streams: Cochise, Pima, Pinal, Yavapai cos.; 1050-1150 m (3500-3700 ft); Apr-Sep (fr. Sep-Oct); FL, LA, TX; Mex., New Zealand. Production of "brood-bodies" is a vegetative reproductive method solely characteristic of *N. mexicana*.

Nymphaea odorata Aiton (odor, from the scented flowers). White Waterlily, Fragrant Waterlily, Pondlily, Nymphaea. --STEMS stout, horizontal, elongate, sometimes tuberous, rhizomes, mostly 2.5-3 cm thick, with a few stout persistent branches, pale in color, covered with a dense, short, black pubescence, the internodes 2-5 cm long. LEAVES 12-25 cm diameter, mostly glabrous, orbicular to oval, never peltate, coriaceous, entire or slightly emarginate at apices, the sinus usually narrow, the blade green, waxy above, green-tinged to purplish-tinged beneath; veins evident but not prominent beneath; petioles smooth or slightly pubescent, greenish-purple. FLOWERS 7-25 cm diameter, very sweet-scented; peduncles smooth, to 3 m long, greenish-purple, coiling 5-9 times in fruit; receptacle short, round, scarcely evident; sepals 4, 2-8 cm long, 1.5-2.5 cm wide, elliptic to ovate or ovate-lanceolate, usually purplish-green or purple on back; petals 17-32, 2-9 cm long, 1.5-3.5 cm wide, ovate to elliptic-lanceolate, slightly broadened upward, the apices obtuse or rounded, gradually tapering to subacute tips, white; stamens 55-106; petaloid staminodes 1-4 cm long, 2.5-3 cm wide, the outermost staminodes oblanceolate, acute, with one short anther cell; carpels 13-25; styles short linear. FRUIT leathery, 2.5-3.5 cm in diameter. SEEDS ellipsoid, 1.4-4.4 mm long, 1.6 mm wide, dark olive, smooth, shining, aril one-fourth longer than the seed. $2n = 56, 84$. --Ponds, lakes and

slow streams: Cochise, Coconino, Maricopa, Navajo, Yavapai cos.; 350-2100 m (1100-6900 ft); Apr-Oct (rarely producing fruits in our area); New World origin; throughout most of N. Amer., introduced into Eur. in the late 1700's. The White Waterlily group is very complex, and in need of work. Grown as an ornamental. Rhizomes a good food source. Williams, G. R. 1970. Michigan Bot. 9:72-86. More information is needed concerning the large pink- and white-flowered specimens collected along Arivaca Creek at Ruby Road (Pima co.); these are not *N. odorata*, but of an unknown introduced species.

NOTE FOR COLLECTORS

Preparation of complete collections including flowers (with notes of color), ovary cross-sections, fruits when possible, as well as upper and lower leaf surfaces and especially rhizomes is important for proper identification.