Nymphaeaceae (Waterlily Family) Traits, Keys, & Comparison Charts

Nymphaeaceae Traits (for species in NL)

- Perennial aquatic herbs, arising from **submerged rhizomes** bearing adventitious roots.
- **Leaves are cauline, alternate, and simple,** with **long petioles** (± equal in length to the water depth) **and floating blades**; stipules are absent**.**
- Petioles are long and attached to the lower blade surfaces, at or near the centre of the blade.
- Blades are **oval to nearly orbicular in outline**, and cordate or deeply cleft at the base; margins are entire.
- Flowers are **bisexual** with **regular** (actinomorphic) **symmetry**.
- Flowers are **solitary and axillary**, on long peduncles. Flowers are **diurnal, opening and closing each day** over a 3–4 day period in *Nymphaea*, or a 4–5 day period in *Nuphar*. Flowers open in the morning and close during the afternoon. Stigmas are pollen-receptive during the first day of flowering (1st to 2nd day in *Nuphar*); on the late 2nd to 5th day of flowering, anthers shed pollen and stigmas are no longer pollen-receptive; this strategy facilitates cross-pollination.
- **Sepals 6, petaloid**, occurring in 2 whorls of 3; the outer 3 sepals are green and yellow, the inner 3 sepals are yellow (*Nuphar*); **or sepals 4 and green to purple-tinged** (*Nymphaea*).
- **Petals yellow, 15–50, small, thick, obovate, and truncate at the apex** (*Nuphar*), **or petals white, 17–43, thin, elliptic, and transitional to stamens** (*Nymphaea*).
- **Stamens numerous (35–120), anthers dehiscing by longitudinal slits.**
- Pistils have either **a superior or half-inferior ovary of 8–30 fused carpels**; style are thick and ridged (*Nuphar*), or absent (*Nymphaea*); **stigmatic tissue is arranged in radiating linear rows (rays) from the centre of a circular stigmatic disk**.
- Fruits are ovoid to depressed-globose, **leathery berries or berry-like capsules** that dehisce (split open) irregularly.

Key to the Nymphaeaceae (Waterlily Family) of Newfoundland and Labrador

1a. Leaves are oblong to ovate, 13–36 cm long × 10–24 cm wide, with a deeply cordate base; basal lobes are rounded, the sinus (space between the basal lobes) is narrow and incised about 1/3 the length of the blade; flowers are ± globose, 2.5–4.5 cm across, with 6 concave, petaloid sepals in 2 whorls; the outer sepals are mostly green on the outer surface, the inner surface is yellow above, maroon to green at the base; the 3 inner sepals are usually yellow throughout; stamens are numerous and laminar (flat), in several whorls, attached below the circular, stigmatic disk, but above the 15–50 yellow petals, which are small, 7–9 mm long × 4–5 mm wide, ± obovate, with a thickened, truncate apex; the petals are usually not visible without cutting open the flower. .... ***Nuphar variegata*** (yellow pondlily)

1b. Leaves are orbicular or nearly so, 5–40 cm long and wide, the base is cleft nearly to the petiole, with straight sides to the outer edge of the blade; flowers are bowl-shaped, 6–19 cm across, with 4 green to purple-tinged sepals and 17–43 white, elliptic petals, which intergrade with the numerous stamens (i.e., inner whorls of petals are smaller and bear pairs of anthers on their inner surface); the stigmatic disk is concave, bordered by fleshy, carpellary appendages; a small ovoid knob protrudes from the centre. .... ***Nymphaea odorata*** subsp. ***odorata*** (fragrant waterlily)

Note: There are 3 other plant families in NL that have species with broad, floating leaves: the **Alismataceae** (Water-Plantain Family), with *Sagittaria cuneata* (northern arrowhead); the **Menyanthaceae** (Buckbean Family), with *Nymphoides* spp. (floatingheart); and the **Cabombaceae** (Watershield Family), with *Brasenia schreberi* (watershield).

There are separate keys posted on this website for species in the Alismataceae and the Menyanthaceae. But as the sole member of the Cabombaceae occurring in NL, *Brasenia schreberi* is mentioned only in Key 4 (*Key to Angiosperm Families*). Plants in the Cabombaceae were previously placed in the Nymphaeaceae, but both belong to the Order Nymphaeales, a primitive group of angiosperms (flowering plants) that evolved prior to the diversification of monocots and dicots. Due to their close relationship and to facilitate identification, *Brasenia schreberi* is included in the Comparison Chart here with species of the Nymphaeaceae.

Nymphaeaceae and Cabombaceae Comparison Chart			
Species:	***Nymphaeaceae***		***Cabombaceae***
	Nuphar variegata	***Nymphaea odorata***	***Brasenia schreberi***
	yellow pondlily	fragrant waterlily	watershield
Plants	aquatic perennial herbs with floating leaves, spreading by **thick, creeping rhizomes, oblong in cross-section, 2.5–7 cm thick**	aquatic perennial herbs with floating leaves, spreading by **elongate, branched, rhizomes, 2–3 cm thick**	aquatic perennial herbs with floating leaves; **submersed parts and young vegetative parts are heavily coated with mucilage**
Petioles	attached to the lower surface of the blade, just above the sinus between the basal lobes; petioles are long, glabrous, green, 4–10 mm wide, **flat on the upper surface, rounded beneath, and narrow at both edges to a marginal wing**	attached to the center of the blade's lower surface; petioles are long, **finely pubescent near the rhizome, often reddish**, terete (circular) in cross-section, **with 4 air canals, each about ¼ the width of the petiole**	attached to the center of the blade's lower surface; petioles are long, glabrous, terete (circular) in cross-section, and **heavily coated in mucilage**
Leaf Blades	mostly floating (submersed only when emerging), glabrous, **oblong to ovate, 13–36 cm long × 10–24 cm wide; apex obtuse to rounded; base deeply cordate, basal lobes rounded; sinus about 1/3 the length of the blade, narrow**; margins entire; upper blade surface green, lower surface reddish-purple	floating, glabrous, **orbicular or nearly so, 5–40 cm long and wide**; **apex rounded** (rarely retuse); **base cleft nearly to the petiole, with straight sides; the sinus narrow;** margins entire; upper blade surface green to dull purple; lower surface reddish-purple	floating, glabrous, **peltate** (with the petiole attached at the centre of the lower surface), **broadly elliptic to diamond-shaped**, **3.5–13.5 cm long × 2–8 cm wide, with blunt to rounded corners,** lacking basal lobes; margins entire
Flowers	solitary, **2.5–4.5 cm across, on long, stiff petioles that often elevate the flowers above the water surface**; buds are globose; flowers bloom over a 4–5 day period**; first- and second-day flowers receive pollen; late second- to fifth-day flowers shed pollen**	solitary, **fragrant**, **6–19 cm across, floating**; buds are lanceoloid; flowers bloom over a 3-day period; **first-day flowers receive pollen; second- and third-day flowers shed pollen**	solitary, **about 2 cm across,** borne at or above water surface; flowers bloom over a 2 day period; **first-day flowers receive pollen; second-day flowers shed pollen**
Sepals	**usually 6, in 2 whorls**, **petaloid, firm, and concave**; outer sepals broadly ovate, mostly green on the outer surface; **inner surface is yellow above, maroon to green basally; 3 inner sepals are larger, broadly obovate to orbicular**, **mostly yellow**	**4, green to purple-tinged, lanceolate, 2.8–8 cm long × 1–2.5 mm wide near the base, obtuse at the apex**	**3, dull purple, not petaloid, linear-oblong to narrowly ovate, 1–2 cm long × 0.2–0.7 mm wide**

Nymphaeaceae Comparison Chart – *continued*			
- page 2 -	***Nuphar variegata***	***Nymphaea dorata***	***Brasenia schreberi***
	yellow pondlily	fragrant waterlily	watershield
Petals	**15–50, thick, yellow, obovate, slightly wider at the truncate apex**; 7–9 mm long × 4–5 mm wide, attached below the stamens and ± hidden from view	**17–43, thin, white, showy, elliptic to lanceolate, 1–2.2 mm wide; apices obtuse to acute; inner petals intergrade into stamens**	**3 or 4,** linear, alternate with the sepals, **linear-oblong, slightly longer and narrower than the sepals**
Stamens	**numerous**, yellow, attached below the ovary; **anthers are 3–9 mm long, rectangular, and arch downward after pollen in released**; filaments are about half the length of the anthers; **pollination is primarily by beetles**	**35–120,** yellow, **outer stamens are wide and petaloid; inner stamens are narrow**, with anthers wider than the filaments; **pollination is primarily by beetles**	**stamens 18–36**; filaments are filiform; anthers dehisce by longitudinal slits; **pollination is by wind**
Pistils	solitary, with **a superior ovary of 8–30 carpels; a thick, red-orange style**, vertically ridged, and about 10–15 mm wide; and a **circular, yellow, stigmatic disk, 9–20 mm across, with 10–24 narrow lines of stigmatic tissue** (stigmatic rays) radiating out from near the centre; margins of the stigmatic disk are entire to crenate	solitary, with **a half-inferior ovary of 10–25 carpels; the top of the ovary is concave with a small ovoid knob at the centre; lines of stigmatic tissue radiate outward from the centre,** and several linear, incurved, **carpellary appendages, 3–8 mm long, are borne along the upper margin of the ovary**	**4–18**, with **superior ovaries**; each of the **distinct carpels with a linear, decurrent stigma** extendind along the side; **nectaries are absent**
Fruit	**a single, fleshy, ovoid, green to purplish berry-like capsule, vertically ridged, and concave at the apex,** 2–4.1 cm long × 1.7–4 cm wide; **usually maturing above water** and dehiscing irregularly between the carpels	**a single, leathery, depressed-globose berry**, to 2.5–3 cm long and wide, maturing under water and dehiscing irregularly	**an aggregate of 4–18 indehiscent, achene-like, leathery fruits, fusiform to clavate** (club-shaped), and **0.6–1 cm long**; maturing under water

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