

NOMENCLATURAL NOTES IN NYMPHAEACEAE FOR THE NORTH AMERICAN FLORA

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ABSTRACT

In conjunction with a study of the Nymphaeaceae in North America, the taxonomy and nomenclature of three taxa is reviewed. Two new combinations are provided at subspecific rank for two taxa sometimes treated as species, one for *Nymphaea tuberosa* Paine and one for *Nuphar rubrodisca* Morong, and both are lectotypified. A neotype is selected for *Nymphaea advena* Aiton which serves to maintain usage of Aiton's epithet for a widespread taxon of *Nuphar*.

Key Words: *Nuphar*, *Nymphaea*, water-lilies, cow-lilies, spatterdock

Research on the genera *Nymphaea* and *Nuphar* of the Nymphaeaceae has revealed that the following nomenclatural adjustments are necessary for a flora of North America treatment.

Nymphaea odorata Aiton subsp. *tuberosa* (Paine) Wiersema & Hellquist, *comb. nov.*

Nymphaea tuberosa Paine, Annual Rep. State Cabinet Nat. Hist. New York 18: 184 (Cat. pl. Oneida Co. 132). 1865. TYPE: UNITED STATES. New York: S. shore of Lake Ontario, 1865, *Paine s.n.* (LECTOTYPE: K). See discussion.

Nymphaea odorata, which is distributed throughout eastern North America, is a polymorphic species. In and around the Great Lakes region, where the plants here designated as subsp. *tuberosa* are found, two predominate forms can be observed. In the southern part of the range of subsp. *tuberosa* where subsp. *odorata* is absent, e.g., in Iowa, Illinois, Indiana, Ohio, and somewhat to the north and east, plants of subsp. *tuberosa* are easily distinguished morphologically from subsp. *odorata* (see accompanying key). Further north where their ranges overlap occasional populations are intermediate in morphology or more rarely populations may include plants referable to both subspecies as well as intermediate plants. The intermediates exhibit a range of variation spanning the morphological gap between the two subspecies and, in some cases at least, display no evidence of reduced fertility. Although traditional treatments distinguished the two forms at specific rank, several recent floristic works (e.g., Voss, 1985; Gleason

son and Cronquist, 1991) have combined them into one variable species without further distinction. While calling attention to this taxonomic problem, field studies from within this region (Monson, 1960; Williams, 1970; Bayly and Jongejan, 1982) have not sufficiently accounted for the observed variation. These studies suggest that some variability may be induced by environmental conditions; however, we have observed both extremes growing together under seemingly identical conditions. Such populations require more detailed study before this variation is fully understood. Artificial hybridization studies and/or molecular approaches may also aid in clarifying this relationship.

Based on existing knowledge, we believe the geographic patterning of the overall variation and the usefulness of retaining a separate status for those forms previously classified as *Nymphaea tuberosa* justifies the recognition of two subspecies, as distinguished below. While useful in separating the two extremes in this morphological continuum, the key is of limited use in identifying intermediate plants. Compounding the problem of identification is the fact that key characters are often poorly represented on herbarium material. Populations containing intermediate plants are known from Minnesota, Wisconsin, Michigan, New York, Vermont, and southern Ontario and Quebec and until better understood are best treated as *Nymphaea odorata* without regard to subspecies.

- 1. Petioles not striped; blades usually reddish-purple (occasionally green) abaxially; seeds 1.5–2.5 mm long subsp. *odorata*
- 1. Petioles with brown-purple stripes; blades green or faintly purple abaxially; seeds mostly 2.8–4.5 mm long subsp. *tuberosa*

Paine (1865) cited a number of localities for *Nymphaea tuberosa* but failed to designate a holotype. To fix the application of his name it is appropriate to select a lectotype. Conard's (1905) listing of "*Nymphaea tuberosa* Paine (1865), fid. specimen coll. Paine on S. shore of Lake Ontario, from hb. A. Gray, in hb. Kew" is considered not to represent an effective lectotypification as it does not satisfy the requirements of Article 8.3 of the International Code of Botanical Nomenclature (Greuter et al., 1988). The spec-

imen at Kew contains a leaf, two flowers, and a developing fruit and matches our concept of subsp. *tuberosa*; it is here formally designated as lectotype.

Nuphar lutea (L.) Smith subsp. *rubrodisca* (Morong) Hellquist & Wiersema, *comb. nov.*

Nuphar rubrodiscum Morong, Bot. Gaz. 11: 167–168. 1886. TYPE: UNITED STATES. Vermont: at the mouth of Lewis Creek, Lake Champlain, Ferrisburgh, 5 Aug 1885, *Morong s.n.* (LECTOTYPE: NY). See discussion. *Nymphaea rubrodisca* (Morong) E. Greene, Bull. Torrey Bot. Club 15: 84. 1888.

While working with the genus *Nuphar* Smith, we became aware of the need for a new combination in addition to those at subspecific rank previously made by Beal (1956). *Nuphar lutea* subsp. *rubrodisca*, which Beal treated under the hybrid formula *N. lutea* subsp. *pumila* (Timm) E. O. Beal \times *N. lutea* subsp. *variegata* (Durand) E. O. Beal and most likely of hybrid origin, is producing viable seed and is found in areas far removed from either of the probable parents. It differs from the other two subspecies in a number of characteristics, as detailed in our flora treatment, and in accordance with Article H.3.4 Note 1 and Example 3, we prefer to treat this as an additional subspecies. As no name at subspecific rank exists for this taxon, Morong's epithet, which has most commonly been applied to it, can be retained.

As Morong failed to designate a holotype, a lectotype is selected. In his original publication, Morong discussed his study of this taxon during the summer of 1885 along Lake Champlain at Ferrisburgh, Vermont near the mouths of Lewis and Little Otter creeks. Following the description, he lists "Lake Champlain, Vt." as the type locality. Three sheets of this taxon from Morong's original herbarium now at NY pertain to this study. One sheet stamped "MORONG HERBARIUM" contains 3 leaves and 3 mounted and several unmounted fruits and bears two labels: 1) "lvs. of *N. rubrodiscum*, Ferrisburgh, Vt., Aug. 5, 1885" and 2) "*N. rubrodiscum* fruit, Ferrisburgh, Aug. 11." A second sheet stamped "MORONG HERBARIUM" and "BRITTON HERBARIUM" contains 4 leaves, 1 mounted flower, and 3 mounted and some unmounted fruits and bears 4 labels: 1) "Leaves of *N. rubrodiscum*, Lewis Creek, Ferrisburgh, Vt."; 2) identical with 1;

3) “*N. rubrodiscum* Morong, Lewis Creek, Ferrisburgh, Vt.; Aug. 6, 1885”; and 4) “*N. rubrodiscum*, Lewis Creek, Ferrisburgh, Vt., Aug. 11, 1885.” On all the above labels the epithet *luteum* has been overwritten with *rubrodiscum*. The third sheet stamped “MORONG HERBARIUM, property of BARNARD COLLEGE” contains 1 leaf, 1 flower, and 2 fruits and bears a single label: “*Nuphar rubrodiscum* Morong, *N. luteum* Sm.?. At the mouth of Lewis Creek, Lake Champlain, Ferrisburgh, Vermont. Leg. T.M. 18 5/8 85.” This sheet is accompanied by a lengthy note written by Morong the content of which is entirely reproduced in the protologue. On this sheet the provisional name *Nuphar rubrum* has been replaced with *N. rubrodiscum* both on the label and the note. While all three sheets match the original description, this third sheet is the only one which appears to represent a single gathering. It is also the most completely labelled and contains both flowers and fruits. It has been selected as lectotype.

Nuphar lutea (L.) Sm. subsp. *advena* (Aiton) Kartesz & Gandhi, *Phytologia* 67: 463. 1989, “*advenum*.”

Nymphaea advena Aiton, Hort. kew. 2: 226. 1789. TYPE: UNITED STATES. Pennsylvania: Philadelphia, tidal marsh along Darby Creek in John Heinz National Wildlife Refuge at Tinicum, 24 July 1993, J. H. Wiersema & A. E. Schuyler 2372 (NEOTYPE: PH; ISONEOTYPES: US, BM). See discussion. *Nuphar advena* (Aiton) W. T. Aiton, Hort. kew. ed. 2, 3: 295. 1811.

In conjunction with this study, we have been investigating the typification of *Nymphaea advena* Aiton, which has commonly been applied to a taxon of North American *Nuphar*, as *Nuphar advena* (Aiton) W. T. Aiton or *Nuphar lutea* subsp. *advena* (Aiton) Kartesz & Gandhi. The original publication (Aiton, 1789) is a “catalogue of the plants cultivated in the Royal Botanic Gardens at Kew.” As is typical of most early botanical publications, no specimens were directly cited in the protologue of *Nymphaea advena*. The native distribution was given as “North America,” the phrase name *Nymphaea floribus flavis* Clayton in Gronovius, *Flora virginica* 164. 1743 was cited, and it was said to have been introduced by Mr. William Young in 1772. According to Stafleu and Cowan (1976), type material for both Hortus kewensis and

Flora virginica is deposited at BM. However, from correspondence with the herbaria of both Kew (G. L. Lucas, pers. comm.) and British Museum (R. Vickery, pers. comm.) it is clear that no material of the Kew cultivation or the John Clayton collection, which served as the basis for the Gronovius phrase name, can be located.

The original description appears to combine characteristics of two taxa, *Nuphar advena* and *Nuphar variegata* Durand, which we distinguish at the rank of subspecies following Beal (1956). The traits of semiterete petioles and purple-colored sepals and stamens best apply to *Nuphar lutea* subsp. *variegata* (Durand) E. O. Beal while the emergent leaves clearly indicate subsp. *advena*. Most early users of Aiton's name (Poiret, 1798; Willdenow, 1799, 1809; Michaux, 1803; Sims, 1803; Martyn, 1807; de Candolle, 1821; Torrey and Gray, 1838; Planchon, 1853; Morong, 1886) did not recognize the distinctions between the two taxa. Pursh (1814) distinguished the two, but misapplied the European *Nuphar lutea* to what was named *Nuphar variegata* in 1866. Bigelow (1824) and Hooker (1829), while noting the differences between the northern and southern plants, continued to treat both as a single taxon. Hooker's comment that "Dr. Graham and myself have long observed that the *N. advena*, as cultivated in our gardens, has the leaves sometimes floating, sometimes rising above the water" indicates that both taxa were introduced to Europe. Whether or not this was the case some 40 years earlier when the original description was published by Aiton is not known. In any event, none of these early authors succeeded in typifying *Nymphaea advena*.

The relationship between the two taxa was clarified by Miller (1902). Though he stated that the type locality of *Nymphaea advena* was probably Philadelphia, Miller failed to lectotypify the name. In their revision, Miller and Standley (1912) listed the type locality as "vicinity of Philadelphia, Pennsylvania" but cited no type specimen. Beal's 1956 revision accepted *Nuphar lutea* subsp. *variegata* for the floating-leaved northern taxon and *Nuphar lutea* subsp. *macrophylla* (Small) E. O. Beal for the emergent-leaved southern one, listing Aiton's name as a partial synonym of both. For nomenclatural reasons, Kartesz and Gandhi (1989) replaced subsp. *macrophylla* with subsp. *advena* (Aiton) Kartesz & Gandhi. To this day, however, Aiton's name has never been properly typified. Since Miller it has consistently been applied to the emer-

gent-leaved taxon and to preserve this usage the name must be typified on that element.

The supposition that the type locality should be Philadelphia was presumably based on that being the home of the William Young referred to by Aiton as having introduced the plant to England in 1772. According to Harshberger (1917), William Young, Jr. (1742–85) of Philadelphia, in his capacity as botanist to the Queen of England, departed Philadelphia for England in November of 1771, no doubt carrying the *Nuphar* material he is credited with having introduced the following year. A 1772 letter from Dr. John Fothergill of London to Humphrey Marshall of Philadelphia, reported by Rhoads (1916), reports receipt of material of *Nelumbo* from William Young, Jr. that same year. Young is known to have carried material from the Carolinas abroad but this was in 1768 and 1769 (Harshberger, 1917). As he did not apparently make any further trips to the southern states following his return to Philadelphia in 1770, his 1772 introductions to England would seem to have been collected near to his home in Philadelphia.

In his flora of the Philadelphia area, William Barton (1818) applied *Nuphar advena* to an emergent-leaved taxon which was said to be abundant “on the marshy shores of the Delaware, Schuylkill, and all other waters in our neighborhood, covering the shores for miles together in extent” and in terms of current usage this appears to be the desired application of the name. Young’s estate was reportedly adjacent to that of John Bartram, which bordered the Schuylkill River (Harshberger, 1917). A recent field trip in the company of A. E. Schuyler provided an opportunity to study *Nuphar* in the Philadelphia area on both sides of the Delaware River near the mouth of the Schuylkill. Large populations still exist in some protected areas, probably remnants of the formerly extensive distribution. Much of the area remains under tidal influence as would have been the case in Young’s time.

The populations consist of strongly emergent plants, almost completely so at low tide, which have flowers mostly with parts variously tinged with reddish-purple. Such coloration is lacking over most of the range of the taxon commonly referred to as *N. advena*, but is characteristic of *N. variegata*, which is found at nearby sites in southern New Jersey. A full range of intermediate plants for those characters which normally distinguish the two

taxa can be observed in other southern New Jersey localities. Though the populations in the immediate vicinity of Philadelphia display some degree of intermediacy, their overall morphology compares well with *N. advena* as the name has been applied by most authors. One of our collections near the mouth of the Schuylkill thus serves as a suitable neotype.

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