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THE WHITE WATERLILY OF IOWA.

HENRY S. CONARD.

Most of the known species of waterlily (*Nymphaea* Sm.) are extremely variable. The student feels obliged to recognize certain extreme forms as species. These are often restricted geographically. But where their habitats are connected by continuous land areas, the intermediate country is usually populated by a series of waterlilies which grade insensibly from one extreme to the other. The commoner white waterlilies of North America illustrate these conditions.

The basic species in the United States is *Nymphaea odorata* Ait. It is impossible sharply to demarcate Aiton's type form from the smaller and pinker variety, designated by Pursh as *Nymphaea odorata* var. *rosea* (commonly known as *N. odorata* var. *minor* Sims). In the Atlantic coastal plain the variety is the commoner form, from Nova Scotia to Delaware. At a few isolated stations the whole flower is pink, giving the *N. odorata rosea* of gardens. This plant may be designated as *N. odorata rosea* forma *rubra* (cf. Rev. Horticole 1881, p. 406). From Delaware to Florida the var. *gigantea* Tricker is the commoner plant. The typical *N. odorata* is found in the New England and Middle Atlantic states. The species ranges westward to Minnesota, Nebraska, Missouri and probably to Arkansas. Toward its western limits, however, it is much larger and coarser than in the east. And it seems to be this coarse form which runs on down into Mexico, and perhaps into Cuba and British Guiana.

In the region from Lake Champlain to Lake Michigan, *Nymphaea tuberosa* Paine is found. The species was first described from plants growing in central New York, and was so named on account of the many easily detached, tuber-like branches found on the rhizome. I have collected unmistakable, though miniature, specimens at Trenton, New Jersey, where they were discovered by C. C. Abbott. This is the extreme southeastern limit of the species. A kindred form, probably a hybrid with

N. odorata, occurs in Lake Hopatcong, New Jersey. MacMillan states that *N. odorata* and *N. tuberosa* occur together in Minnesota. Fitzpatrick and Shimek report *N. tuberosa* from Iowa.

Unfortunately the separation of *N. odorata* and *N. tuberosa* is extremely difficult without fresh material and very complete specimens or notes. Indeed, it may yet be proven that none of the supposed distinctions are constant, and that the two species cannot be maintained. The following table shows what the differences are said to be.

NYMPHÆA ODORATA Ait.

Flowers—7-15 cm. across, open from 6 a. m. to 12 m., very sweet scented.

Peduncle—purplish green, 0.3-0.5 cm. in diameter; coiled 5-9 turns in fruit.

Sepals—often purplish outside.

Petals—23-32, ovate to elliptic-lanceolate.

Stamens—becoming linear or filamentous at center of flower.

Seeds—0.23x0.16 cm.; aril one-fourth longer than seed.

Leaves—usually more or less purplish beneath; angles of sinus not at all produced.

Petioles—reddish green to dark purplish red, evenly colored.

Branches of rhizome—few, attached by a base 1.3-2 cm. in diameter.

Stipules?

Surface of pollen?

Relative length of stamens and petals?

NYMPHÆA TUBEROSA Paine.

Flowers—10-23 cm. across, open from 8 a. m. to 1 (or 2-3) p. m., odorless.

Peduncle—green, 0.5-0.9 cm. in diameter; coiled 3 turns in fruit.

Sepals—green.

Petals—obovate or almost spatulate.

Filaments—nearly all broader than anthers.

Seeds—0.44x0.28 cm.; aril about as long as the seed, or shorter.

Leaves—pure green beneath, angles of sinus slightly produced.

Petioles—green, with longitudinal red-purple stripes.

Branches of rhizome (tubers)—very numerous, attached by a slender neck 0.3-0.8 cm. in diameter and very readily detaching.

Stipules?

Surface of pollen?

Of all of these distinctions the most certain test is the presence or absence of tubers. Next best is the presence of stripes of red-purple on the petioles in *N. tuberosa*. I have never

known this to fail in unquestionably authentic fresh material. In my limited experience, the time of opening of the flowers has been highly characteristic. The large seeds with relatively small arils are easily recognized in *N. tuberosa*. But critical study of much material is necessary to ascertain to what extent these features are constant and diagnostic.

In the Gray Herbarium of Harvard University and in the private collection of Mr. J. R. Churchill I have examined material of these species, variously labelled as *N. odorata*, *N. tuberosa* or *N. reniformis*, from Iowa (Wabonsie Slough, Fremont county, coll. Fitzpatrick, No. 4426), Wisconsin, Minnesota, Missouri and Illinois. Of all of these only one (coll. E. E. Sherff, Wolf Lake, Chicago, June 10, 1911) has the form of flower of *N. tuberosa*. But a note attached to the specimen declares that the flowers are fragrant!

It seems highly desirable, therefore, that critical studies should be made of the white waterlilies of all of the Great Lake region, and the Central states. Every detail mentioned in the table given above should be carefully examined into. Only thus can the taxonomic value and the range of these plants be determined. At present I do not place entire confidence in any of the published names. I would be glad to serve as a medium of exchange for observations on this subject.

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