The Wisconsin Flora

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A New Species Is Back

A new treatment of the bur reeds has revived an old species and added a new one to the Wisconsin flora. Full story on page 8.

Sparganium chlorocarpum Rydberg : an Old Name and a Renewed Concept of an Eastern North American Endemic.

Josh Sulman

There's a new species in our flora – or rather, an old species, returned: *Sparganium chlorocarpum* Rydb. *Sparganium* has long been a vexing and challenging genus, and botanists since Michaux and Muhlenberg have worked at solving the puzzle of this highly variable group of widespread aquatic plants, leading to a tangle of taxonomy. In recent years, phylogenetic analyses have led us to re-evaluate the species concepts. In a sense, we are returning to the morphological species concepts developed in an intensive period of *Sparganium* study around 100 years ago. Merritt Fernald in the U.S., and Wladislaw Rothert in Europe, among others, sorted out species concepts based on analysis of the notoriously variable morphological characters. Rothert died in 1917 in the purges of intellectuals that took place during the Russian Revolution (Fernald, 1922); however his correspondence with Fernald contributed to a richer understanding of the North American species, and many of Rothert's annotated specimens survive in American herbaria.

Figure 1: *Sparganium chlorocarpum*, Bluff Creek Fen, Walworth Co., WI

For several decades, we have worked under an assumption of "lumping" *Sparganium* into wide-ranging species with many subspecies and varieties, stemming from the work of CDK Cook, a European authority on *Sparganium,* and aquatic plants in general. Cook and Nicholls (1986, 1987) wrote the authoritative treatment of the genus. Their approach was to lump *Sparganium* into several variable, wide ranging species, which reduced the field botanist's headaches. They lumped eastern North American *S. chlorocarpum* with western-North American, Asian, and European *Sparganium emersum* Rehmann*,* based on a number of shared morphological features.

Twenty years later, DNA-based studies revealed that the "*S. emersum"* from eastern North America was unrelated to other

Figure 2: *Sparganium emersum*, Yellowstone National Park, WY

"*S. emersum"* and, in fact, was an eastern North American endemic. Once commonly called *S. chlorocarpum,* this plant is a highly variable, emergent species, with pistillate heads borne slightly above the subtending leaf (supra-axillary), a common marsh plant in central and northern Wisconsin. Its range extends from Newfoundland west to Manitoba, and south to New Jersey, western North Carolina, northern parts of Ohio, Indiana, and Illinois, Iowa and Nebraska. *Sparganium emersum,* on the other hand, is primarily a floating aquatic plant of western North America, northern Asia, and Europe, whose range does not appear to extend into the Great Lakes region. S. *chlorocarpum* shares in common with S. *emersum*, and several other species, the presence of supra-axillary heads: the spherical, composite flowering heads are sometimes attached above the leaf axil.

Recent DNA-based phylogenetic analyses of the genus (Sulman et al., 2013; Ito et al., 2016) have shown that *S. chlorocarpum* is closely related to *S. glomeratum* (Laest.) L. M. Newman, which is a rare species of boreal North America, listed as Threatened in Wisconsin, not *S. emersum*. *Sparganium emersum* on the other hand, was closely related to *S. angustifolium,* which is a floating aquatic, widespread in boreal regions, and found in lakes of northern Wisconsin.

There was disagreement on what to call the eastern North American endemic. Ito et al. (2016) identified it as *S. acaule* (Beeby) Rydb. *Sparganium chlorocarpum* Rydb., however, was the name in wide use prior to the 1990's, and is the name with priority, assuming that both represent the range of variation within the same species. Both names (*S. acaule, S. chlorocarpum)* were published simultaneously in Rydberg's North American Flora (1909), referencing type specimens from Prince Edward Island and Iowa (respectively) - representing the short and tall extremes of what has been confirmed, via DNA, as one species. Morphological studies have shown that the range of height is continuous, from short-statured plants only 3 inches tall, to comparative giants 3 ft. in height.

Figure 3. *Sparganium glomeratum,* Douglas County, WI

Dr. Anton Reznicek of the University of Michigan has determined that *S. chlorocarpum* has priority over *S. acaule*: while both names were simultaneously published in

Sparganium chlorocarpum growing in Monroe County. Photo by Josh Sulman.

the same volume, *S. acaule* was later reduced to a variety of *S. chlorocarpum* by Fernald (1922). According to the International Rules of Nomenclature, the name chosen by the first person to unite the two has priority, so *S. chlorocarpum was* established as the correct name by Fernald (A. Reznicek, pers. comm., 4/5/2018).

Based on the morphological, phylogenetic, and historical evidence, we should now confidently return *S. chlorocarpum* to the flora, and recognize this uniquely Eastern North American endemic species.

A treatment of Typhaceae (Sulman and S. Galen Smith, 2017), with a key and species descriptions for *Sparganium* and *Typha,* is now published as part of the *New Manual of Vascular Plants of Northeastern United States and Adjacent Canada.* If you'd like a copy, contact me at jdsulman@gmail.com.

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