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NYBG-led Research Team Discovers a Rare Species of Freshwater Algae In Midwestern Lakes, its First Documented Occurrence in the Western Hemisphere

Discovery of *Lychnothamnus barbatus*, or Bearded Stonewort, Shows Even Well-studied Areas Can Still Yield Surprising Finds—But Is It a Newcomer or Was It Just Overlooked?

A NYBG-led research team has discovered the first known populations of *Lychnothamnus barbatus*, or bearded stonewort, in North America. Photo by Paul M. Skawinski

Bronx, NY—Demonstrating the wealth of biodiversity that remains to be identified in even well-studied areas, a team of researchers led by a New York Botanical Garden scientist has discovered the first known populations in North America of a rare species of freshwater algae previously thought to exist only in Europe, Asia, and Australia.

Lychnothamnus barbatus, commonly known as bearded stonewort, was found in 16 lakes in Wisconsin and Minnesota between 2012 and 2016, in some cases growing as dense mats. It is not yet known whether this green alga species in the Characeae family is native to the upper Midwestern United States and simply had not been discovered before or whether it is a recent introduction.

The discovery was reported in a new paper published online on July 27, 2017, by the *American Journal of Botany*. The lead author is Kenneth G. Karol, Ph.D., Associate Curator in the Botanical Garden's Lewis B. and Dorothy Cullman Program for Molecular Systematics.

"What's remarkable about this discovery is that it's an extremely rare species in our own backyard," said Dr. Karol, a specialist in the Characeae, or stoneworts, a family of large, freshwater algae with intricately branched plant bodies that can trace their evolutionary lineage back to roughly 430 million years ago. "We think we know what's in our backyard, but we don't. There's still so much to be discovered."

Often overlooked, algae play important but little-known roles in their habitats such as filtering water, providing food for birds, and serving as homes for invertebrates. Many researchers theorize that all land plants may have evolved from stoneworts millions of years ago.

Extensive Surveying of Lakes in Two States Followed Initial Discovery of Species

Co-author Paul M. Skawinski, an aquatic plants specialist at the University of Wisconsin-Stevens Point, found the plant growing in a lake and sent samples to Dr. Karol, who identified it based on its morphology, or physical characteristics.

Bearded stonewort mat in Wolf Lake, Wisconsin. Photo by Paul M. Skawinski

Subsequently, the paper's authors and teams from the Wisconsin Department of Natural Resources' Aquatic Invasive Species Program and the Minnesota Department of Natural Resources surveyed lakes in the region, leading to the discovery of the species in 15 other lakes. DNA sequencing confirmed the identification as *Lychnothamnus barbatus*.

Of the 16 lakes, 14 were in Adams, Sauk, and Waushara Counties in central Wisconsin and two were in Minnesota's Hennepin County, which includes Minneapolis. Until now, the plant—the only extant species in the genus *Lychnothamnus*—had only been recorded in scattered locations in Europe, Asia, and Australia and in fossils from Argentina; it is considered rare or endangered and in decline.

"The absence of extant *Lychnothamnus* from the New World seemed well-established given two centuries and more of collecting," the authors write. "Until its discovery in North America, it was presumed to have gone extinct in the New World. Thus, no one expected to find *L. barbatus* anywhere in the New World."

So why is it present in these 16 lakes? That remains an intriguing mystery. A related Eurasian species, *Nitellopsis obtusa*, or starry stonewort, has become an invasive species in the Great Lakes since it was first detected in 1978, most likely having arrived in ballast water that was emptied into the lake by cargo ships from Europe.

Unlike starry stonewort, however, it is unclear how bearded stonewort could have been introduced to these isolated, inland lakes that are far from any commercial shipping lanes. Boating, a common way for invasive species to move into new bodies of water, is not permitted on many of the lakes.

On the other hand, the authors say, it is plausible that bearded stonewort may be native to the region but went unnoticed until now. Further site studies and gene sequencing could help resolve what remains for now an unanswered question.

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The New York Botanical Garden, 2900 Southern Boulevard, Bronx, New York 10458

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