

PURPLE BLADDERWORTS IN QUEBEC: REDISCOVERING AN UNUSUAL GROWTH STRATEGY

DOUGLAS W. DARNOWSKI • Department of Biology • Indiana University Southeast • New Albany
• Indiana 47112 • USA • ddarnows@ius.edu

Keywords: bladderwort, *Utricularia*, deep, Quebec, Canada.

Received: 16 July 2021

<https://doi.org/10.55360/cpn512.dd112>

Introduction

This report describes the discovery of plants of the purple bladderwort, *Utricularia purpurea*, growing at surprising depths in a lake near Montreal, Quebec, Canada. While *U. purpurea* normally grows floating close to the surface in bright light, these plants were found affixed to the bottom of an inlet on a large lake in Quebec, growing in dim light in humic water up to 3-4 meters below the surface. This phenomenon has been seen before in the northern United States, reported in one paper from the literature from the early 1980's, so it seems worthwhile reviewing this interesting phenomenon, first by describing what was found and then by connecting to the one report in the literature (Moeller 1980).

Materials and methods

All plants were observed on site using field equipment such as a field light microscope. Depths were measured using a string, pulled to the bottom of the lake at various points, tied to a float which was then measured using a tape measure.

While travelling in Quebec during July, 2018, I visited a camp on Lac Maskinonge in Mandeville, Quebec, Canada, about one hour of travel from the city of Montreal. The lake is a large glacial lake of about 1100 hectares (source: Wikipedia entry on Lac Maskinonge, accessed 15 September 2018).

The camp includes a small sand beach on a natural hook-shaped inlet (Fig. 1, arrow). The inlet starts on its west with a depth of a few centimeters and proceeds eastward/southeastward to reach more than 5 meters in depth.

There is a small oval pond about 3 by 5 meters at the south western edge of the inlet which is no more than 70 cm in depth, sheltered from waves and separated from the inlet by about one meter. In July of both 2016 and 2018, the pond contained large, healthy plants of *Utricularia macrorhiza* in full bloom. Based on this, and the presence of a few plants of *U. macrorhiza* near the shore in the inlet, I expected to find more species of *Utricularia*, but was surprised to find no others near the surface, especially at the western end of the inlet.

This shallow, western portion of the inlet contains a range of typical emergent aquatic plants from eastern North America as well as floating genera, mostly from the Waterlily Family, such as *Nymphaea*, *Brasenia*, and *Nuphar*.

Underwater and proceeding eastward, once the water reaches a depth of 30-60 cm, one finds a carpet of a giant-celled stonewort alga, probably *Nitella*, which continues abundant to a depth of about 120 cm.

At that point, the *Nitella* becomes much more sparse, along with along other vegetation, and the dominant plant becomes *Utricularia purpurea*, which can be found down to a depth of 3-4 m. The area containing these carnivores is centered on the area where a floating dock/diving platform is anchored. These plants were growing affixed loosely to the substrate, along with a few plants of *U. macrorhiza*, similarly submerged and affixed.



Figure 1: Map of the site at which *Utricularia purpurea* was growing up to 3-4 m below the surface. The nearest town, St. Gabriel-de-Brandon, Quebec, Canada, is shown, and the site is indicated by an arrow. Map created at snazzymaps.com using Google Maps data.

Examination of submerged plants of *Utricularia purpurea* showed little or no prey captured.

The lake, and especially the inlet in question, has very clean water as seen in the abundance of large freshwater mussels as well as sponges, including *Spongilla lacustris* and *Ephydatia fluviatilis*.

Discussion

The discovery of this population extends the description of this phenomenon to a second country in North America. Further work is needed to determine the answers to several questions:

- Just how far north does *U. purpurea* grow in this way?
- Are these plants sufficiently different from more typically floating plants of *U. purpurea* to merit description as a new species?
- What are the rates of prey capture and various key metabolic processes (photosynthesis, photorespiration, etc.) in these plants and how does this relate to both submerged and floating plants of *U. macrorhiza* at the same site?
- How do these plants remain submerged?

Acknowledgements: The authors thank Indiana University Southeast for Student Assistant Grants and Research Support Grants. No permits were needed for this work as plants were observed on site using field equipment and returned to their habitat.

References

Moeller, R.E. 1980. The temperature-determined growing season of a submerged hydrophyte: tissue chemistry and biomass turnover of *Utricularia purpurea*. *Freshwat. Biol.* (10): 391-400. <https://doi.org/10.1111/j.1365-2427.1980.tb01214.x>