

Efficacy of decontamination strategies on the survivability of starry stonewort bulbils

Background

Numerous strategies exist for limiting the spread of aquatic invasive species. However, it is unclear how effective these existing strategies would be in controlling and preventing invasive starry stonewort (*Nitellopsis obtusa*). This study tested the effects of freezing, desiccation, steam and bleach on starry stonewort bulbils.

Starry Stonewort

Starry stonewort is a newly discovered non-native macroalgae species in Wisconsin, first verified in the state in 2014. It spreads via distinctive star-shaped vegetative reproductive structures called bulbils. This plant-like macroalgae has the potential to impact native species and recreational uses of inland waters. Starry stonewort is classified as a prohibited species under ch. NR 40.



Research Methods

- This project implemented a controlled laboratory study to examine the effects of different decontamination strategies on preventing the growth of starry stonewort bulbils.
- For different lengths of time bulbils were dried, frozen at -20°C or -6°C, steamed at 140°F, or soaked in a 5% bleach solution. To assess viability, bulbils were either checked for germination or incubated in tetrazolium (a chemical test for cell activity). Untreated bulbils were used as a control.

Summary of Results

- Tetrazolium activity was reduced to statistically undetectable levels after 24 hours (1 day) of freezing at either -20 °C or -6 °C, nor after 24 hours of desiccation under both high and low humidity conditions, suggesting that bulbils were no longer viable after these treatments.
- Steaming bulbils at 140° F between 10 and 30 seconds also eliminated bulbil viability.
- Chlorine bleach solution with a 10 minute exposure time was ineffective at eliminating bulbil viability.

Table 1. Effectiveness of decontamination treatments on starry stonewort bulbils

Treatment	Exposure time	Complete bulbil death
Freezing (-6°C)	24 hours	Yes
Freezing (-20 °C)	24 hours	Yes
Desiccation (low humidity)	24 hours	Yes
Desiccation (high humidity)	24 hours	Yes
Steam (140° F)	10-30 seconds	Yes
Bleach	10 minutes	No

Potential applications:

Because this species is so new to Wisconsin and options for controlling existing populations are limited, this type of research is critical to prevent potential impacts from its further spread in the state. Results from this study can help the department and its partners identify or improve best practices for decontaminating equipment in the field to prevent spreading starry stonewort to new areas. The New York Botanical Garden is currently conducting genetic analysis on archived specimens in order to help researchers better understand how this invader may have spread to Wisconsin. Knowledge gained about starry stonewort invasion history in North America through genetic analysis will support improved monitoring and management, and potentially help identify what areas may be most at risk of future invasions.

Related Publications and Resources

- Gottschalk S.D., and K.G. Karol. 2020. Survivability of starry stonewort bulbils using commonly available decontamination strategies. Journal of Aquatic Plant Management. 58:19-25. www.apms.org/wp/wp-content/uploads/japm-58-01-19.pdf
- Presentation by Robin Sleith and Ken Karol from the 2018 Wisconsin Lakes Partnership Convention, Stevens Point, WI.

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