

Small-plot evaluations of aquatic pesticides for control of starry stonewort (*Nitellopsis obtusa*) in Lake Koronis, Minnesota

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ABSTRACT

Nitellopsis obtusa (Desv.) J. Groves (starry stonewort) is a green macroalga native to Eurasia in the family Characeae. It has become an invasive species in much of the Midwestern United States. Starry stonewort is difficult to control due to its rapid and dense growth, and its ability to produce underground structures called bulbils. These bulbils act as a method of asexual reproduction that can serve to recolonize previously managed locations. There has been a lack of research on the efficacy of chemical treatments and combinations of chemical treatments on starry stonewort. Therefore, treatments of copper, diquat, and copper + diquat combinations were evaluated in small plots in Lake Koronis, MN, during the summers of 2020 and 2021. In 2020, applications of copper reduced aboveground biomass at 8 wk after treatment by > 90%. Copper treatments in 2020 had no effect on bulbil densities. Diquat was not effective at reducing starry stonewort biomass or bulbil density at 4 and 8 wk after treatment. Bulbil densities in diquat plots ranged from 33.3 ± 33.3 to $4,266.7 \pm 3,963.3$ bulbils m^{-2} depending upon sample time and site. The estimated diquat half-life in Lake Koronis was < 2 h among all treated plots, which was a factor in the lack of diquat efficacy. In 2021, copper treatments resulted in a 78 and 27% reduction in aboveground biomass at 4 and 8 wk after treatment, respectively. Copper treatments also reduced bulbil density by 4 wk after treatment. Plots treated with the copper + diquat had aboveground biomass reductions of 76 and 65% at 4 and 8 wk after treatment, respectively. Bulbil densities did not show a reduction in the combination plots. Regrowth was evident in all plots regardless of treatment by 8 wk. Additional strategies are needed to target bulbil production, induce bulbil mortality, or gain longer-term control of aboveground biomass.

Key words: algae, aquatic plant management, bulbil, concentration exposure time, copper, diquat, thalli.

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