

The Role of Zooplankton Grazing on Noxious Cyanobacteria Blooms in Vancouver Lake, WA

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Cyanobacteria blooms in lake systems are an increasing problem worldwide, and may be due to a multiplicity of factors, including variable grazing by zooplankton. However, substantial disagreement exists as to the role of planktonic grazers in mediating cyanobacteria bloom dynamics. We conducted a two-year field and experimental study to investigate the role of both protist grazers (“microzooplankton”) and crustacean zooplankton, specifically cyclopoid copepods, in influencing the timing, magnitude and decline of cyanobacteria blooms in a large, shallow and highly eutrophic lake (Vancouver Lake, WA). Over the course of summer cyanobacteria blooms in 2008 and 2009, separate sets of incubation experiments with microzooplankton and the copepod *D. thomasi* feeding on the natural assemblage of plankton from Vancouver Lake demonstrated: 1) microzooplankton have substantial grazing impact on cyanobacteria and algae, particularly during and immediately following the cyanobacteria peaks; and 2) *D. thomasi* often preferentially consumed microzooplankton taxa (ciliates and dinoflagellates) and to a lesser degree consumed cyanobacteria. Our results suggests that *D. thomasi* grazing on ciliates may have indirectly kept cyanobacteria abundance low prior to the bloom, by reducing microzooplankton consumption of algal prey and thus increasing algal competition for resources with cyanobacteria. However, *D. thomasi* grazing impact on both cyanobacteria and algae was moderate to low during and following the cyanobacteria bloom. We therefore conclude that cyclopoid copepods may have an important role in modulating the timing of cyanobacteria bloom development in shallow, turbid lakes, and that microzooplankton grazers may drive the decline of these blooms.