THE OHIO STATE UNIVERSITY

Environmental Science Graduate Program Student Seminar Series

Understanding toxic bloom-forming cyanobacteria community dynamics: harnessing key players to act as a biocontrol for diverse environmental matrices

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Abstract

Toxin-producing cyanobacterial harmful algal blooms (HABs) is an increasing threat to both drinking and recreational waters, especially in Lake Erie. HABs are fed by increasing eutrophication in shallow, warm waters. HABs become toxic when cyanobacteria decay and release toxins, a health concern for both animals and humans. Microcystis aeruginosa is one of the most toxic, most prevalent and most studied cyanobacteria around the world. However, filamentous Planktothrix agardhii (P. agardhii) is another common toxic bloom-causing cyanobacterium, particularly in Lake Erie. These microbial communities are complex environments, made up of cyanobacteria and also viruses that play a key role in their proliferation and survival. In recent years, these viruses (called cyanophage) have become an increasingly popular area of study. Little is known about freshwater cyanophages, particularly Planktothrix-targeting cyanophage, and their host-virus interactions. In this ongoing study, potential cyanophage have been isolated from Lake Erie bloom-affected waters and drinking water treatment residuals (WTR). These cyanophages have shown targeting specificity to P. agardhii, and host lysis was imaged under microscopy. Identification via whole genome sequencing of these cyanophage was also completed. This study will be the first to isolate and identify Planktothrix-targeting cyanophage from bloom-affected WTR to enhance our understanding of host-virus interactions. There is potential for further applications in harmful algal bloom control and environmental public health.

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