Abstract

Increasing concentrations of nutrients in aquatic ecosystems are resulting in increases in cyanobacterial harmful algal blooms (cyanoHABs). With the rise of agricultural and nutrient runoff, we have seen an increase in cyanoHABs around the globe. Microcystin is a common toxin produced by cyanobacteria, which is known to have adverse effects on humans and wildlife. Aeration has been used as a tool to try and control cyanoHABs, primarily by increasing dissolved oxygen (DO) content throughout the water column to prevent sediment release containing various elements (Phosphorus (P), Iron (Fe), Ammonium (NH_4^+)). The use and effects of aerators have been studied to see how effective they are in controlling HABs and often, there are conflicting results. The objective of this work is to shed more light on the impact aeration can have on influencing microcystin production. To test this, nutrient addition experiments were conducted in Missouri at Crow Pond, a non-aerated pond, and Stephen's Lake, an aerated pond. Nutrient amendments of nitrate (NO_3^-), P, NH_4^+, Urea and an addition containing all the treatments were added to the lake water. Phosphorus was added to all the samples excluding the control to ensure phosphorus would not be a limiting nutrient. Lake water was collected into 1 L cubitainers and was incubated under ambient light and temperature for nine days to allow for the growth of phytoplankton. Along with microcystin and chlorophyll, the concentrations of the nutrient additions were analyzed. The project is still ongoing. The results and conclusions will be presented at the spring forum. This experiment will add more insights and perspectives to the role aerators play in alternating water chemistry that may either perpetuate or alleviate the effects of cyanoHABs.