DO ZEBRA MUSSELS (*DREISSENA POLYMORPHA*) ALTER THE WATER CHEMISTRY IN A WAY THAT FAVOURS *MICROCYSTIS*

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ABSTRACT

Many factors may contribute to cyanobacterial bloom formation. This study examined possible relationships between the presence of zebra mussels (*Dreissena polymorpha)* and *Microcystis spp*. abundance. Experiments were conducted in twelve microcosms designed to mimic shallow lake ecosystems. Zebra mussels significantly reduced nitrate, dissolved organic nitrogen, and total dissolved nitrogen concentrations, and had no effect on ammonia, phosphate levels, or dissolved organic carbon. Consequently, the N:P ratio was reduced in microcosms with zebra mussels to ~ 6:1, which is below the Redfield ratio of 16:1. Zebra mussels also increased the abundance of *Microcystis* and the *Microcystis* : *Pseudokirchneriella* biovolume. In experiments done without zebra mussels, nutrient ratios were manipulated and low N:P caused a similar increase in *Microcystis* and *Microcystis* : *Pseudokirchneriella* biovolume. The shift in N:P in the presence of zebra mussels was related to higher rates of nitrate flux into sediments and reduced flux of phosphate into sediments. It is this shift in N:P, and possibly some level of selective feeding, that is believed to have driven changes in the relative abundance of *Microcystis*. Finally, in order to compare the experimental results with changes caused by zebra mussel invasion in the natural environment, the data from 15 Wisconsin lakes before and after the zebra mussel invasions were analysed.