Response of cyanobacterial migration to alum treatment in Green Lake

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With 9 figures and 2 tables in the text

Abstract: The response of sediment-to-water migration of cyanobacteria to aluminum sulfate buffered with sodium aluminate treatment was studied in shallow Green Lake. A comparison of results from two summers before treatment and three summers after treatment indicates that migration of cyanobacteria was unaffected. Migration of Gloeotrichia echinulata continued to be highly variable from year-to-year which made isolation of the effects of treatment difficult. Migration of other species of cyanobacteria, particularly Coelosphaerium naegelianum, increased after treatment. The colonial phosphorus content of migrating G. echinulata was also unaffected by the treatment, indicating that alum did not interfere with phosphorus uptake from the sediments. Experimental results revealed that illumination at the sediment surface did not regulate migration of cyanobacteria under the study conditions. Although alum treatment did not affect the migration of cyanobacteria, sediment phosphorus release in anoxic cores was reduced to one-third of the pre-treatment rate.

Introduction

Anoxia at the sediment-water interface leads to internal loading in lakes due to phosphorus (P) release from the sediments. Treatment of lakes with aluminum sulfate (alum) has been used to reduce internal loading via this process. Alum treatments provide long-term control of sediment P release through P inactivation by forming an insoluble floc in the sediments (COOKE et al. 1993 a). In addition, alum initially reduces lake P content through precipitation of particulate matter that contains P. Successful alum treatments have resulted in an im-

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