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MONITORING ALGAL BLOOM THROUGH RELATIONSHIPS BETWEEN CHLOROPHYLL α AND PHYTOPLANKTON

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Abstract

Algal blooms in reservoirs used for both fish and drinking water production are a major water quality problem. The authors assessed data gathered from both published literature and from their own field enclosure experiments to analyze the relationships of phytoplankton chlorophyll α concentrations with biomass and algal cell count. Experimental data were collected from indoor locations, field enclosures, and natural water bodies. Under laboratory conditions, where the types of algae and the nutrients provided were well controlled, a significant positive correlation between chlorophyll α and biomass was found out in all cases except when the dominant species changed considerably. Field enclosure experiments, with higher biodiversity but allowing control over nutrients, also showed significant correlations between chlorophyll α concentration and biomass. However, complex natural water bodies showed either positive or no correlation depending on the particular conditions. Under all three sets of conditions, the cell count of algae showed significant correlations with chlorophyll α concentrations if a single species was cultured alone or if it became the overwhelmingly dominant species in the field studies. If the dominant species changed during the course of the experiment, sometimes a positive correlation was observed but often there was no strong correlation between chlorophyll α and biomass. The research indicates that phytoplankton chlorophyll α may be used as an indicator for monitoring algal blooms in reservoirs. However, this study underlines the limits of its use.

Key words: algal biomass, algal cell count, biomass, field enclosure, dominant species

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