TROPHIC STATE, WATERSHED USE, AND BLOOMS OF CYANOBACTERIA - A CHILEAN EXAMPLE

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There has been an increase in the distribution and frequency of cyanobacterial blooms worldwide; however, understanding the triggers for this increase is more difficult. In this study, we examined the variables that influence the abundance of planktonic cyanobacteria in temperate lakes of central and southern Chile. These lakes differed in trophic state and watershed use. Cyanobacteria dominated meso- and eutrophic systems and correlating to watershed use (tree plantations and urban areas). Ochrophyta and Bacillariophyta were dominant in oligotrophic lakes, where native forest dominated land usage. In these lakes, the maximum depth of the euphotic zone influenced community structure and cyanobacterial diversity. Dolichospermum was the most abundant, frequent, and widely distributed genus, found in oligotrophic and eutrophic lakes, forming blooms in eutrophic systems.

Total phosphorus and total nitrogen positively influenced cyanobacterial abundance and bloom formation, mainly by Aphanizomenon, Aphanocapsa, Aphanothece, Dolichospermum, and Microcystis.

In contrast to many reports in the northern hemisphere, these genera formed dispersive blooms at low temperatures in autumn and winter (10.8–15.6 °C). This shows that eutrophication is the main factor for bloom formation and these genera can form blooms independent of temperature. However, some genera, such as Microcystis, increased their abundance and formed thick blooms (scums) at high temperatures. Our study provides baseline data to document long-term changes in lentic systems of the western south-central area of South America, including genera that could increase with eutrophication and projected climatic changes.

PRESENTER BIO: Laughinghouse is a broadly trained phycologist working with basic and applied algal research. He has worked with systematics, ecology, HABs, cyanotoxins, phycoremediation, biofuels, and genomics of marine, freshwater and/or terrestrial algae from tropical to polar regions. Research in the Laughinghouse Lab focuses on diversity, ecology, toxicity and mitigation of cyanobacteria.