



Top-down and bottom-up controls on periphyton biomass and productivity in Lake Tanganyika

McIntyre, Peter B., Ellinor Michel, Michelle Olsgard

Limnol. Oceanogr., 51(3), 2006, 1514-1523 | DOI: 10.4319/lo.2006.51.3.1514

ABSTRACT: We studied the effects of nutrient availability and grazers on periphyton in the littoral zone of Lake Tanganyika. Using a combination of dissolved nutrient ratios, nutrient diffusing substrates, and benthic productivity responses to nutrient supplementation, we evaluated whether nitrogen (N) or phosphorus (P) limited periphyton productivity near Kigoma, Tanzania, during the dry seasons of 2001 and 2002. The relative effects of grazers and nutrients on periphyton were quantified by manipulating grazer access to nutrient diffusing substrates. We found very low ambient concentrations of inorganic N and soluble reactive P, but generally higher concentrations of dissolved organic nutrients. Nutrient diffusing substrates indicated a shift from P limitation in 2001 to co-limitation by N and P in 2002, probably as a consequence of unusual coastal upwelling in 2002. Productivity responses of natural epilithic algae to nutrient supplementation also indicated N-P co-limitation in 2002. However, fish and other large grazers had much stronger effects on periphyton than nutrients. Grazers strongly suppressed periphyton biomass, but had weaker negative effects on area-specific gross primary productivity as a result of large increases in biomass-specific gross primary productivity. We conclude that littoral nutrient availability influenced periphyton productivity, but that top-down control predominated.

Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles