and Oceanography





Home

Members

Libraries

Publications

Meetings

Employment

Activities

Search

Patterns and controls of lotic algal stable carbon isotope ratios

Finlay, Jacques C.

Limnol. Oceanogr., 49(3), 2004, 850-861 | DOI: 10.4319/lo.2004.49.3.0850

ABSTRACT: Spatial and temporal variations in stable carbon isotope ratios (i.e., δ^{13} C) of primary producers are common but poorly understood features of isotopic characterizations of aquatic food webs. I investigated factors that control δ^{13} C of algae (concentration and δ^{13} C of inorganic carbon, algal fractionation, and growth rates) in riffle habitats across a gradient in stream size and productivity in northern California. There was considerable seasonal and spatial variation in δ^{13} C of the green alga *Cladophora glomerata*, microalgal-influenced epilithic biofilms, and their herbivores. Algal and herbivore δ^{13} C were depleted in '3C in small, unproductive tributary streams (-44% to -30%) compared with more productive sites downstream (-31% to -23%). The majority of variation in algal d13C of *Cladophora* and epilithic biofilms was determined by dissolved CO_2 (CO_{2aa}) via effects on δ^{13} C of CO_{2aa} and photosynthetic fractionation. In contrast, two other taxa (the cyanobacterium *Nostoc pruniforme* and the red alga *Lemanea* sp.) showed little variation in δ^{13} C or fractionation in response to varied inorganic carbon availability because of their distinct modes of inorganic carbon acquisition. Although variation in algal δ^{13} C might complicate use of δ^{13} C to resolve consumer diet sources under some circumstances, better understanding of such variation should improve the use of δ^{13} C techniques in aquatic food web studies.

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