Fluvial and epilithic organic matter dynamics in headwater streams of southwestern British Columbia, Canada

Peter M. Kiffney¹,², John S. Richardson² and Michael C. Feller²

With 4 figures and 4 tables

Abstract: To characterize organic matter dynamics in headwater streams of southwestern British Columbia, Canada, we monitored epilithic biomass and fluvial transport of organic matter. Fluvial organic matter was collected once to twice monthly from 7 streams: samples were processed as coarse particulate organic matter (CPOM), fine particulate organic matter (FPOM), and dissolved organic matter (DOM). Epilithon was collected monthly from unglazed, ceramic tiles in 12 stream reaches and measured for ash-free dry mass (AFDM) and chlorophyll-a. CPOM and FPOM concentrations were higher during the wet season (1 October–30 April) than the dry season (1 May–30 September). Averaged across sites, CPOM and FPOM concentrations were positively related to mean daily discharge averaged over the 7 days before sample collection. In contrast, discharge and DOM concentration were inversely related. DOM concentration was positively correlated to chlorophyll-a accrual. Seasonal variation in epilithic chlorophyll-a and AFDM accumulation was high. AFDM accumulation rates ranged from a low in January 1997 of 0.31 to a high of 3.6 µg cm⁻² d⁻¹ in May 1997. As with organic matter in stream water, discharge influenced the temporal dynamics of epilithic biomass accumulation; there was a negative correlation between discharge and epilithic AFDM.

Key words: organic matter, epilithic, fluvial, streams, headwater.

Introduction

Headwater streams (i.e., ¹st – order streams, sensu Strahler 1957) in temperate North America are important to the quality of downstream habitat because...