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Abstract

Freshwater mussels are the most imperiled group of freshwater invertebrates globally. Recent research suggests a better understanding of mussel feeding ecology may facilitate and improve conservation efforts. The use of stable isotopes is becoming an increasingly common method to study aquatic food webs. Carbon (C) and nitrogen (N) are two of the most frequently employed elements in food web studies. Differences in natural abundance of $^{13}C/^{12}C$ can indicate which food sources are the basal sources of carbon incorporated into a consumer's tissue, while the ratio of $^{15}N/^{14}N$ provides a method of assessing trophic position within a food web. Attached macroalgae, including the genus *Cladophora*, may be the dominant primary producers in running water systems. *Cladophora*, however, has not yet been indicated as a prominent assimilated food source for freshwater mussels. The overall purpose of this study was to assess if the diet of two common Green River mussel species, *Amblema plicata* (Say) and *Elliptio dilatata* (Rafinesque) were influenced by the seasonal change in availability of *Cladophora* during a summer-autumn rapid growth period. Two specific questions were asked: 1) Are the assimilated diets different between control and treatment areas, and 2) are the assimilated diets influenced by differing *Cladophora* levels across the study period? A mesocosm approach was employed in order to manipulate *Cladophora* levels within a treatment area. Seventy-two mussels, 36 each species, were sampled across four months, twice between control (= reach-scale, heavy *Cladophora* cover) and treatment (= local-scale removal of *Cladophora*) areas. The freeware program, IsoSource, a concentration-weighted linear mixing model, was used to determine the potential contribution of potential food sources to the diet of both mussel species. IsoSource revealed that *Cladophora* was the primary assimilated food source for both species across the study period. Although assimilated diets were not different between control and treatment areas, diets were, however, influenced by *Cladophora* availability across time. The results of this study indicate that, during bloom conditions, *Cladophora* is the primary carbon source for both *A. plicata* and *E. dilatata* and may form the base of food webs in the upper Green River.