Comparisons of Secondary Production, Life History, and Mouthpart Functional Morphology Between Two Populations of the Amphipod *Gammarus minus*

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(ABSTRACT)

In this study, features of ecology, behavior, and functional morphology related to feeding activity of two populations of the amphipod *Gammarus minus* were compared. The two populations occupied different habitats, and I attempted to determine whether differences observed between the two populations were related to habitat. Annual production and life history of the populations were compared and their relationship to factors such as temperature, water-chemistry, and quantity of available organic matter were examined. Mouthpart and foregut morphology were compared between the two populations and between immature and mature amphipods with light and scanning electron microscopy. Measurements of structure were analyzed by linear regression. A behavioral study, comparing feeding of immature and mature *G. minus*, was conducted in the laboratory.

Annual production of *G. minus* occupying a habitat characterized by the presence of watercress, gravel substrate, and constant temperature (Site 1) was 3.9 g/m^2 (95% C.I.: 3.2-4.5), while that in the habitat characterized by leaf detritus and fluctuating temperatures (Site 2) was 1.8 g/m^2 (95% C.I.: 1.6-2.1). Breeding occurred throughout the year at Site 1, but there was a yearly cycle at Site 2. The greatest numbers of the smallest size classes of amphipod were present at Site 2 when the quantity of ash-free dry mass (AFDM) of wood and bark was greater than AFDM of leaf detritus.

Of nine mouthpart and foregut structures studied, three, the number of cuspidate setae on outer plates of maxillipeds, the length of the dactyl on maxilliped palps, and the number of hook setae on the foregut ampullae, were found to be correlated with body length. Of these, rates of increase in maxilliped setae numbers and hook setae numbers were greater for immature than mature animals, and the number of hook setae for a given sized animal was generally greater for animals at Site 1 than Site 2. Animals presented with ground-up leaf material in the laboratory exhibited twenty-one recognizable behaviors. The frequencies of six behaviors were found to be statistically different between immature and mature animals. The differences suggest that immatures may prefer a food type or size other than that provided in the experiment.

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