

FOOD WEB STRUCTURE AND TROPHIC DYNAMICS OF A  
SUBTROPICAL PLANKTON COMMUNITY, WITH AN EMPHASIS ON  
APPENDICULARIANS

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## ABSTRACT

Food web structure and trophic dynamics of a subtropical plankton community were investigated to assess the ecological importance of metazoan organisms capable of feeding directly on the autotrophic and heterotrophic prokaryotes that dominate tropical waters. Particular emphasis was given to evaluating the efficiency of energy transfer in a short, appendicularian-mediated food chain, and the temporal and spatial variability of appendicularian impact on the microbial community. The feeding capabilities of warm-water appendicularians on natural plankton prey were investigated in Kaneohe Bay and along the northwestern coast of Oahu, Hawai'i. To provide a specific ecological context for this research, the temporal variability (vertical and spatial) of the plankton community (bacteria to zooplankton) in Kaneohe Bay was also investigated. Assessment of appendicularian rate capabilities and short and long-term variability in plankton community structure, abundance and biomass in Kaneohe Bay allowed for the evaluation of appendicularian importance in a subtropical ecosystem.

Appendicularians play a number of significant roles in the plankton assemblage of Kaneohe Bay – as grazers, competitors and prey – and their importance varies substantially in time and space. Appendicularian grazing impact approaches that of protozoans and is significantly greater than that of copepods. Evidence from long and short term sampling efforts indicates that bottom-up controls may be important, but that predators likely exert the most control on appendicularian populations. Calculations based on appendicularian grazing rates and plankton abundance and biomass in Kaneohe

Bay suggest that even intermittent blooms of appendicularians lead to their dominance of trophic transfer to higher-level consumers (chaetognaths and larval fishes) in these coastal tropical waters.