Zooplankton in a Tropical Reef System: Physical-biological Coupling and Crosshabitat Linkages

P8

Zooplankton in a Tropical Reef System: Physical-biological Coupling and Cross-habitat Linkages

Kate M. Hanson , James J. Leichter

Scripps Institution of Oceanography, La Jolla, CA 92037

Pelagic zooplankton represent a direct link between water column primary production and consumption at higher trophic levels in a wide variety of marine and aquatic systems, including coral reefs. Plankton transported over reefs are rapidly consumed by populations of planktivorous fish and benthic suspension feeders and may be a significant source of allochthonous nutrition to reef-associated consumers. However, our understanding of oceanographic mechanisms governing the availability and transport of zooplankton near reefs and of the spatial and temporal patterns of plankton consumption in these environments is far from complete. As coral reefs frequently exist at the interface between inshore and open ocean water masses, zooplankton can play an important role in trophic coupling between adjacent marine, reef and nearshore habitats.

In Moorea, a high volcanic island in the Society Archipelago of French Polynesia, nearshore zooplankton assemblages vary considerably in both the overall density of organisms and in taxonomic composition. On the island scale, these spatial gradients in zooplankton overlay gradients in terrestrial runoff and stream discharge, proximity to areas of exchange with the open ocean, as well as heterogeneous nearshore bathymetry ranging from shallow reef flats of less than 2 m depth to fjord-like bays averaging 30 m depth. In this study, we examine gradients in mesozooplankton on the scale of 100s of meters. Our sampling is focused on the north shore of Moorea where dense, holoplankton-dominated assemblages in the twin Pao Pao and Opunohu Bays transition to sparse, meroplankton-rich assemblages near the lagoons and reef flats. Here we present hydrographic and biological data obtained from paired zooplankton tows and CTD casts. Sampling was conducted over a grid spanning the transition between Pao Pao Bay, the adjacent lagoons, and Avarao Pass, a site of exchange with the open ocean. Exploring the exchange of water between the open ocean, lagoons, and in-shore bays will allow an understanding of the biological and physical processes that create and sustain the strong observed gradients in plankton distribution. Data such as these concerning the nature of physical and biological water-column transitions form a necessary foundation from which to investigate patterns of trophic exchange between pelagic zooplankton and reef-associated consumers.