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Year: Senior

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Functional composition and diversity of three zooplankton communities of Santa Catalina Island

Understanding zooplankton communities is crucial to understanding the trophic ecology of marine ecosystems. Zooplankton ecosystem functions are diverse and can be defined with functional traits, such as diet, size, reproductive strategy, and trophic level. In coastal marine habitats, the environmental conditions that these animals inhabit vary greatly across space, but pelagic dispersal enables potential mixing between populations. It is not well understood how invertebrate zooplankton communities vary between inter-connected sites. I used a functional trait approach to analyze the difference in community composition between environmentally different sites off northern Santa Catalina Island in the California Channel Islands. I compared communities using the trait-based multidimensional functional diversity indices of functional richness, evenness, divergence, and dispersion, as well as standard taxonomic indices. Additionally, I evaluated how Marine Protected Area (MPA) designation, substrate type, and geographic position were correlated with community composition. Through hierarchical clustering, I found nine distinct functional groups. Our results show that functional group composition and functional diversity do not vary significantly between these communities. Taxonomic analyses revealed that Shannon diversity was significantly greater within MPAs while Simpson diversity did not show significant differences, suggesting the prevalence of rare species, which may have potential impacts on functional redundancy. These results expand our understanding of the invertebrate zooplankton community structure and function around Santa Catalina Island, CA. Future investigations would examine samples from different seasons and quantitatively measure environmental variables.