Differential effects of resource diversity on taxis to food, population growth, and interspecific interactions of cryptic marine nematode species

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Resource partitioning has been central for understanding the dynamic changes of species composition and coexistence in biological communities. Based on the principle of competitive exclusion, species occupying the same ecological niche cannot coexist for a long time due to strong interspecific competition for resources. The approach to reduce competition is to diversify niches, for instance, through resource partitioning. This may seem unlikely for cryptic species, i.e., morphologically (nearly) identical but genetically different species, but previous investigations have shown that these closely-related species differ in ecological characteristics and may exhibit differential food preferences. However, the importance of resource diversity in facilitating coexistence of cryptic species remains poorly understood, particularly in marine ecosystems. Nematodes are one of the most abundant and species-rich taxa in marine environments and may play significant roles in ecosystem processes such as benthic mineralization and organic matter decomposition. They can perceive many attractive and repellent chemical cues in the environment, among others emanating from their food, which can be important in their foraging, reproduction and survival strategies. Litoditis marina is a bacterivore nematode species complex associated with macro-algae, with four cryptic lineages (Pm I-IV) that are often found to co-occur in the field. Here, we investigate food preference in the four cryptic species (Pm I-IV) of L. marina using taxis (i.e. a directed movement)-to-food assays, and explore population growth in monospecific and interspecific treatments (using qPCR) under different levels of resource (bacteria) diversity.

Keywords: Cryptic species; Coexistence; Resource partitioning; Resource diversity; Nematodes