

To stay or go: differential dispersal rates in cryptic species of a marine nematode

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Behind the morphological similarity of many species, a hidden genetic diversity can be found. This cryptic diversity has been well documented in the marine nematode *Rhabditis (Pellioiditis) marina*, a common bacterivore associated with decomposing macro-algae in the littoral zone of coastal and estuarine environments. Four cryptic species of *R. marina* (Pm I, Pm II, Pm III and Pm IV) co-occur along the south-western coast and estuaries of the Netherlands. This coexistence challenges traditional competition theory, which states that competition will be most severe between closely related species. A previous study showed that competition between the four cryptic species occurred, but interspecific interactions were affected by environmental conditions such as salinity. One of the most important mechanisms to react to competition is dispersal. Most organisms have at least one stage in which dispersal occurs over a specific spatial scale. Meiobenthic species, however, lack any pelagic stage. But, recent research shows more and more evidence that meiofauna is also able to actively disperse with lateral sinusoidal movements in the interstitial spaces as one of the most common modes of dispersal of nematodes over short distances.

Dispersal is a process triggered partially by the internal conditions of organisms and partially by environmental conditions. In the current experiment, species-specific differences in active dispersal rates and the effects of salinity and food distribution on dispersal behaviour were tested in four cryptic species of *R. marina* (Pm I, Pm II, Pm III and Pm IV). The results of the experiment showed that dispersal is a species-specific behaviour with Pm III being the most rapid disperser (first dispersal event occurred after an average of 3 days), and Pm I the slowest disperser (average of 10 days). An effect of food distribution on the dispersal rates of all cryptic species was found with the most rapid dispersal if no food was present at the start situation. Salinity also had an effect with a higher dispersal rate at lower salinity for all the species. Moreover, the number of dispersive organisms differed between the species, with only one female disperser in Pm I and Pm III and a mix of female and male dispersers for Pm II and Pm IV at the first dispersal event. This species-specific dispersal behaviour and the influence of external conditions on dispersal can influence the reaction on competition. In a future experiment the effect of competition on dispersal will be studied by using competition cultures, where all four cryptic species can influence each other, but the organisms have the chance to disperse away. These results are important to better understand the processes behind the coexistence of cryptic species.