

SAME LOOKS, DIFFERENT PREFERENCES: SALINITY EFFECTS ON THE COEXISTENCE OF CRYPTIC SPECIES

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Behind the morphological similarity of many species, a substantial hidden genetic diversity can be found. This hidden or cryptic diversity leads to a significantly higher biodiversity in ecosystems than previously regarded and is important for estimating total diversity on earth. It has been well documented in the marine nematode, *Rhabditis (Pellioditis) marina* (Derycke *et al.*, 2008), where several cryptic species occur sympatrically (Pm I, Pm II, Pm III and Pm IV). This coexistence challenges traditional ecological competition theory, stating that competition will be most severe between closely related species, rendering coexistence unlikely. Niche partitioning, where species coexistence is explained by differences in phenotype is a possible way to achieve such coexistence. Closely related sympatric species, despite only minor differences in morphology, can display different preferences for abiotic conditions. So if cryptic species differ in their response to ecological heterogeneities, their coexistence may be facilitated and the outcome of competition will depend on fluctuations in the abiotic environment. Studying these preferences and more broadly the ecology of cryptic species can lead to a better insight in the origin of cryptic speciation and the geographical distribution of these cryptic species.

Rhabditis (Pellioditis) marina is a common bacterivore associated with decomposing macro-algae in the littoral zone of coastal and estuarine environments. One of the possible factors shaping the distribution patterns and coexistence of the cryptic species is salinity, one of the most conspicuous environmental factors causing heterogeneity in tidal environments. The effect of salinity on the coexistence of cryptic species was studied in a lab experiment, where population structure between competition cultures (with equal abundances of four cryptic species together) and monospecific cultures (where the four cryptic species cannot affect each other's population development) was compared at two different salinities. The results showed an effect of competition and salinity on the population structure with (1) an increased time-averaged abundance of Pm III at the low salinity in monospecific cultures, (2) a negative effect of competition on the abundance of two cryptic species (Pm II and Pm IV) and (3) stronger competition at lower salinity. Lower salinity has mostly an intensifying effect on the outcome of the competitive interactions and besides competition, complete exclusion (Pm IV) and facilitative interactions occurred (Pm I and Pm III at high salinity). These results show that changes in the abiotic environment (in casu salinity) can shift the outcome of competition between and hence the possibility of the coexistence of different cryptic species of *Rhabditis (Pellioditis) marina*.

References

Derycke S., G. Fonseca, A. Vierstraete, J. Vanfleteren, M. Vincx and T. Moens. 2008. Disentangling taxonomy within the *Rhabditis (Pellioditis) marina* (Nematoda, Rhabditidae) species complex using molecular and morphological tools. *Zoological journal of the Linnean Society* 152:1-15.