TO STAY OR GO: DIFFERENTIAL DISPERSAL RATES IN CRYPTIC SPECIES OF A MARINE NEMATODE

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INTRODUCTION

Problem

- Biodiversity is significantly higher than previously thought due to cryptic genetic diversity.
- Coexistence of cryptic species challenges competition theory. It can be achieved in environments with fluctuating dynamics, where competitively inferior species can avoid competition through dispersal.
- Dispersal is triggered partially by the intrinsic condition of organisms and partially by environmental conditions.

Model

-Litoditis marina is a common bacterivorous nematode comprising several cryptic lineages. Four of these (Pm I to IV) co-occur along the southwest coast of The Netherlands.
-Dispersal in nematodes is mostly considered to be passive, but active lateral migration through sediments also occurs.

MATERIALS & METHODS

Species and gender-specific dispersal rates of 4 cryptic species of L. marina are investigated as a function of two environmental factors (salinity and food distribution).

- Monospecific dispersal plates: 5 males and 5 females were placed at plate 1. Time until dispersal was measured when first organism arrived at plate 2. Nematode densities at plate 1 were counted at moment of first dispersal.

- Food (E. coli) distribution (salinity of 25):
  - B treatment: equal amounts of food at plate 1 and 2
  - I treatment: only food at plate 1
  - D treatment: only food at plate 2

- Salinity:
  - B treatment at a salinity of 25 and of 15
  All treatments in 4 replicates

RESULTS & DISCUSSION

Species-specific dispersal:
- Pm I was the slowest disperser, dispersing almost 1 week later than Pm III.

Gender-specific:
- Pm I and Pm III: only one dispersive female at the time of first dispersal, next days also males
- Pm II and Pm IV: always dispersed with a higher number of organisms, both sexes.
  ➔ Fitness rather than gender-specific dispersal

Food effect:
- D treatment: Dispersal was no longer species-specific and occurred around day 4 in all species
  ➔ When densities in plate 1 become too high, Pm I, Pm II and Pm IV disperse anyway, regardless of the conditions elsewhere.

Salinity effect:
- A more rapid dispersal at the lower salinity over the four cryptic species.
  ➔ Differences very subtle

CONCLUSIONS

- Species-specific dispersal: Pm I: slowest disperser
- Environmental dependent dispersal behaviour: food availability and salinity change time until first dispersal event.

➔ Time until dispersal is species- and environment-specific in the L. marina cryptic species complex. These differences can lead to differential behaviour in competitive interactions and can help to explain coexistence between the species.