

# 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**.



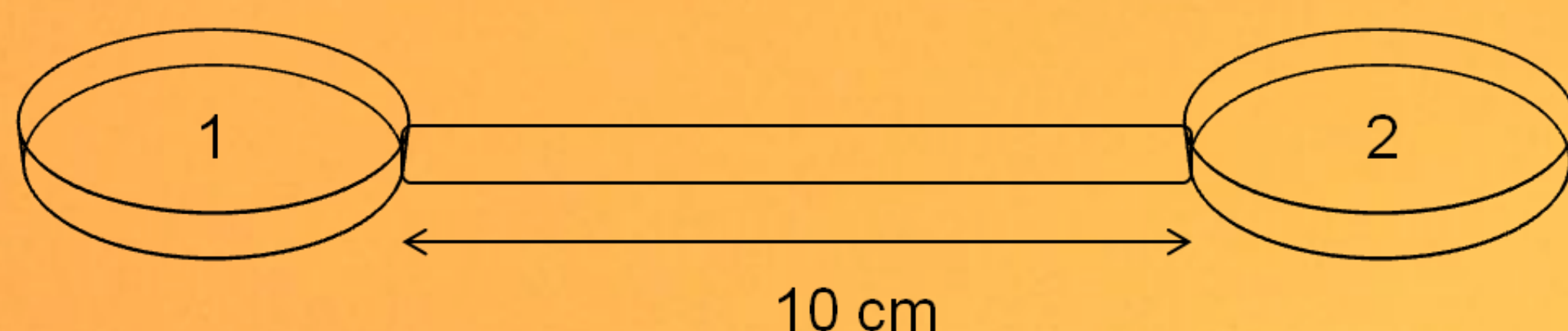
### Model

- *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**).

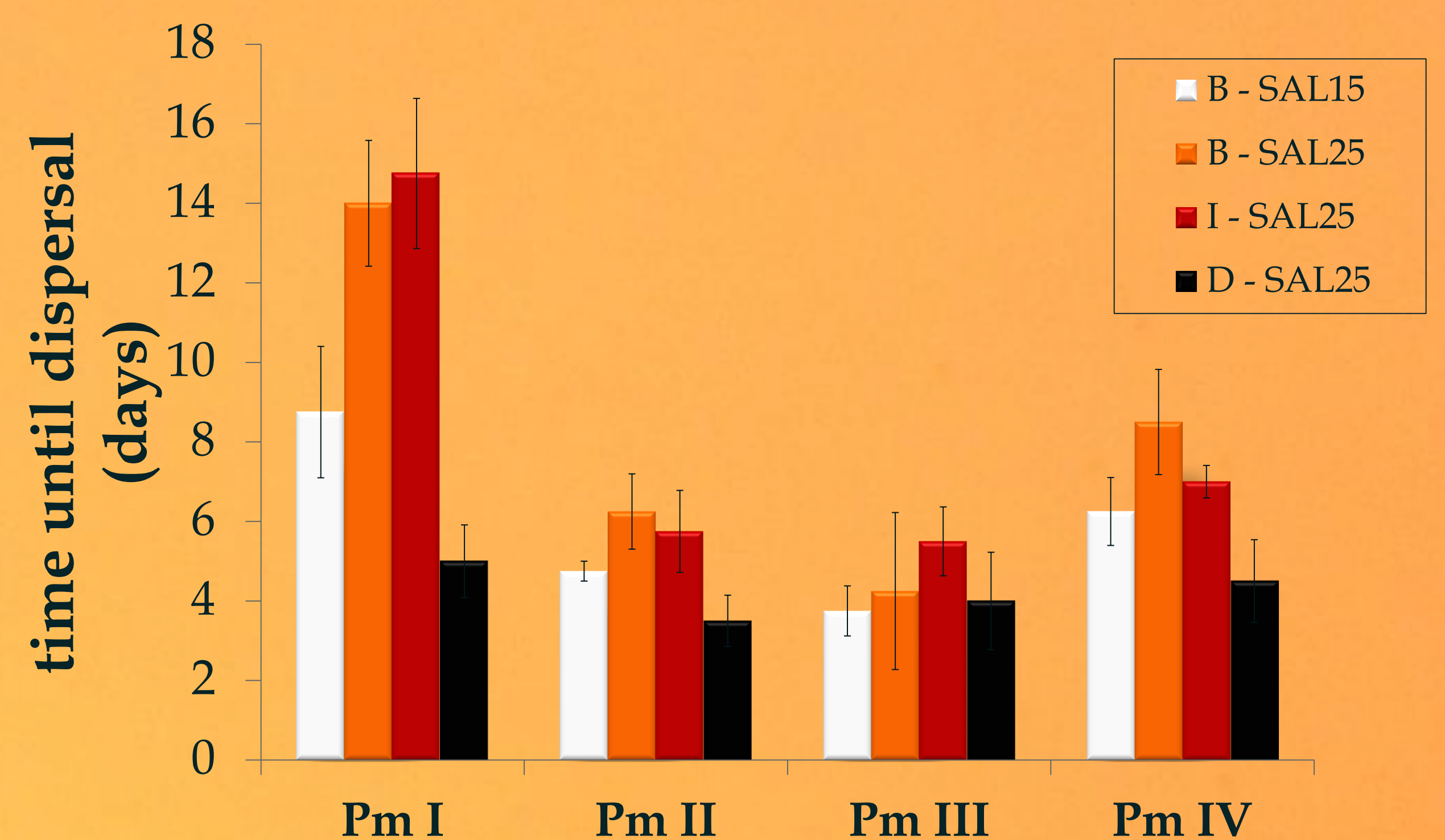
✓ **Monospecific** dispersal plates: 5 males and 5 females were placed at plate 1. Time until dispersal was measured when first organism arrived at plate 2. Nematode densities at plate 1 were counted at moment of first dispersal.



- ✓ **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:

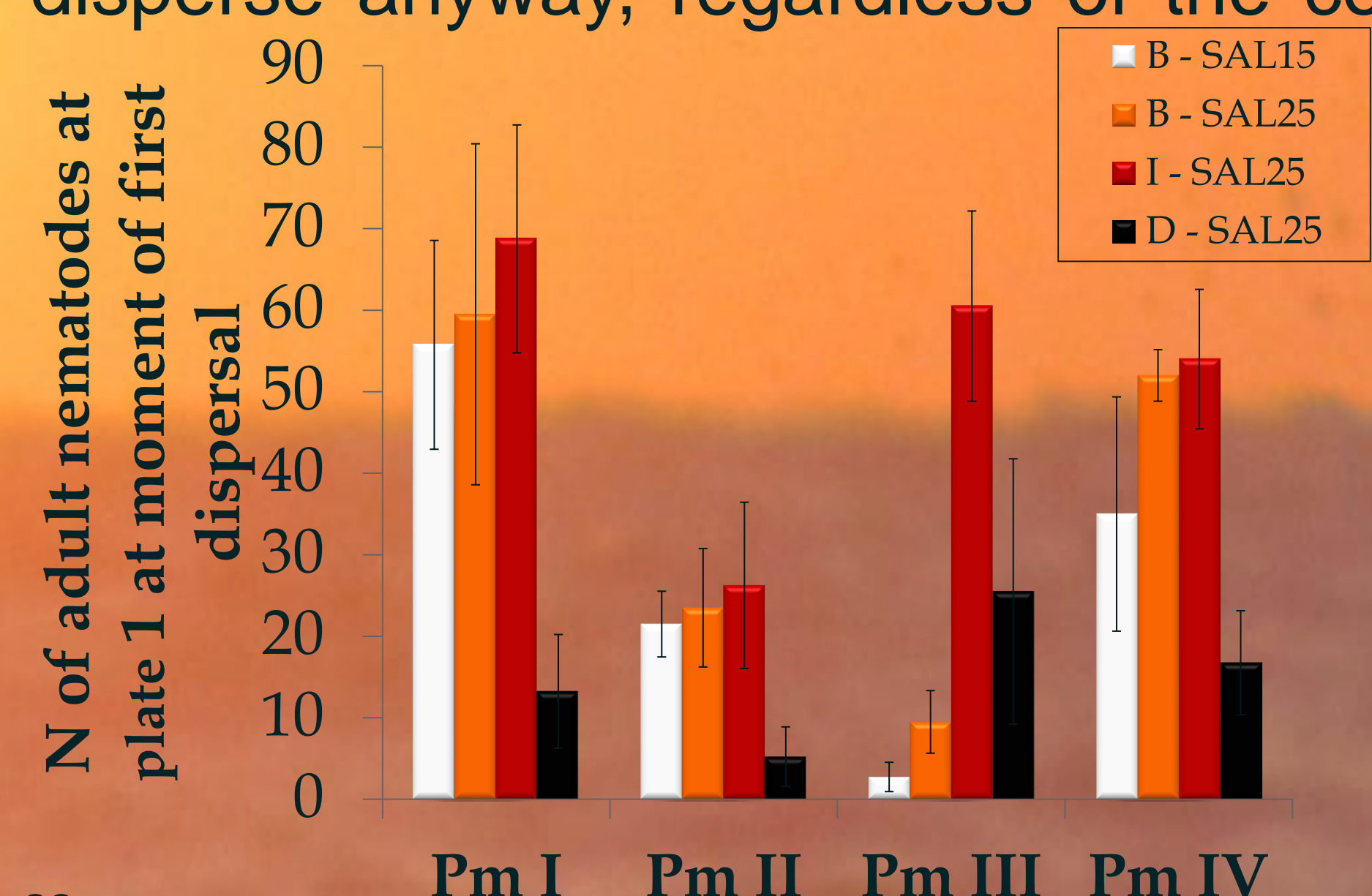
- Pm I and Pm III: only one dispersive female at the time of first dispersal, next days also males
- Pm II and Pm IV: always dispersed with a higher number of organisms, both sexes.

➔ Fitness rather than gender-specific dispersal

### ✓ Food effect:

- D treatment: Dispersal was no longer species-specific and occurred around day 4 in all species ,
- No differences between the I and B treatment

➔ 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.