INDIVIDUAL-BASED MODELLING OF COEXISTING CRYPTIC NEMATODE SPECIES

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BACKGROUND

All

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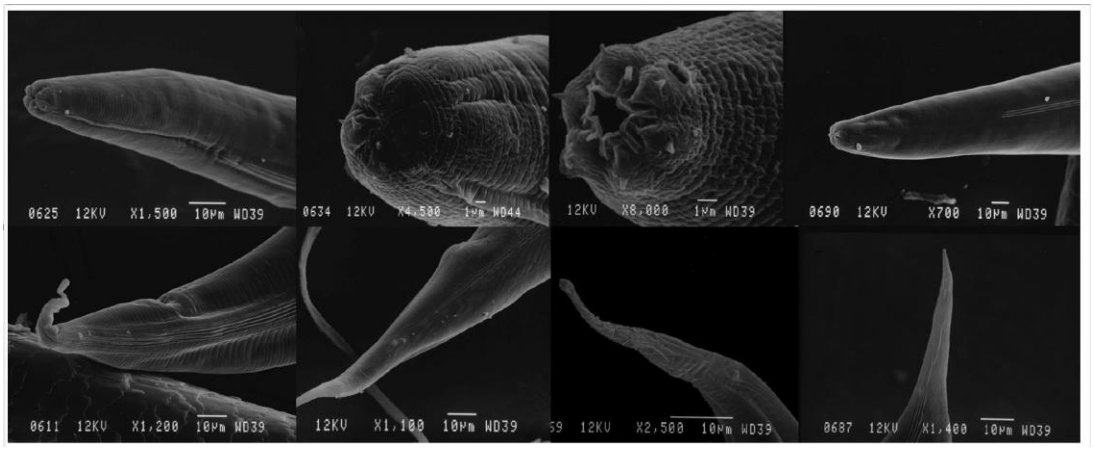
Background

Studies have suggested several possible mechanisms underlying the coexistence of cryptic species, including differences in resource use or in tolerances to environmental conditions. Recent experimental work has uncovered such coexistence in a community of four cryptic nematode species. Important differences in functionality and stress tolerance between the cryptic species were discovered, which are hypothesized to play a role in their coexistence. Experimental work on this system is ongoing, and mathematical modelling can be of important help in untangling the mechanisms governing the dynamics of this system.



Scope of the thesis

The goal of this thesis is to construct a model of the community of four cryptic nematode species, in order to gain more insights into the underlying mechanisms permitting their coexistence. Given the high inter- and intra-specific variability present in this system, an individual-based modelling approach will be used, allowing for the representation of both the individual variability of the system and its spatial heterogeneities, which are hypothesized to support coexistence.

The effect of changing environmental conditions will also be studied, since differences in the species' tolerance to such changes can play an important role in the dynamics of the system. The model will be parameterized with data characterizing the four species in terms of their growth rates, dispersal ability and competitive interactions, as well as their responses to changing environmental conditions.