

Another side of the climate change coin: effects of fluctuating vs stable temperature regimes on the population dynamics and species interactions of marine nematodes

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The effects of average temperature increase on population dynamics and species interactions have been the subject of many studies. Nevertheless proper predictions of how species respond to climate changes depend on accurate records of their plasticity under realistic thermal regimes and not on a mere consideration of adaptation to changes in mean values. The present work focuses on the effects of temperature fluctuations on the fitness of marine nematodes. We examine whether daily temperature fluctuations affect a) fitness and population dynamics and b) interspecific interactions of two congeneric species: *Diplolaimelloides meyli* and *D. oschei*. The two species co-occur in nature and have shown strong competition under constant temperature conditions. Microcosm experiments were performed using mono-species and two-species combinations incubated under constant and daily fluctuating temperature. Measurements in time included total nematode abundance, species-specific numbers of eggs, juveniles and adult nematodes, sex ratio and fecundity. Several other life-cycle parameters related to development and generation time were recorded. Only small effects of temperature regime on the population fitness were revealed for the monospecific populations. Higher numbers of adults for both F1 and F2 generations were recorded as well as shorter minimum development time for *D. meyli* under fluctuating temperature compared to the control. Furthermore, our results showed that interspecific competition negatively affects the involved species' fitness under both stable and fluctuating temperature conditions, with fluctuating temperature showing a more pronounced effect. The outcome of the interaction is though dependent on thermal regimes. We conclude that apart from changes in mean values, temperature fluctuations are important for assessing the effects on species interactions.

Keywords: climate change, fitness, interspecific competition, free-living nematodes