Daily temperature fluctuations alter interactions between closely related species of marine nematodes

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Global temperature has increased by approximately 0.6 °C over the past 100 years. This climate change has affected a broad range of organisms with diverse geographical distributions. In addition to an increase in mean temperature, climate change models also predict decreasing amplitudes of daily temperature fluctuations. In temperate regions, where daily and seasonal fluctuations are prominent, such decreases in daily temperature fluctuations can have a pronounced effect on the fitness of species and on the outcome of species interactions. In this study, the effect of a temperature regime with daily fluctuations versus a constant temperature on the fitness and interspecific interactions of three cryptic species of the marine nematode species complex of *Litoditis marina* (Pm I, Pm III and Pm IV), were investigated. In a lab experiment, different combinations of species (monospecific treatment: Pm I and Pm IV and Pm III alone; two-species treatment: Pm I + Pm IV and three-species treatment: Pm I + Pm IV + Pm III) were subjected to two different temperature regimes: one constant and one fluctuating temperature. Our results showed that fluctuating temperature only had minor or no effect on the population fitness of the three species in monocultures. In contrast, interspecific interactions clearly influenced the fitness of all three species, both positively and negatively. A competitively intransitive network, in which species' abilities cannot be ranked in a hierarchy, exists in this cryptic species complex. Temperature regime did have a substantial effect on the interactions between the species. In the two-species treatment, temperature regime altered the interaction from mutualism to commensalism. In addition, the strength of the interspecific interactions changed depending on the temperature regime in the three-species treatment. This demonstrates that interactions between the species can change depending on the abiotic environment. In view of the huge amount of climate change, these results show that it is important to incorporate the effect of fluctuations on interspecific interactions to predict the effect of climate change on biodiversity.