

How will the Antarctic terrestrial invertebrates respond to the change in the ambient temperature?

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Tardigrades are important members of the simple faunal assemblages found in the extreme terrestrial and freshwater environments of continental Antarctica. In lakes and pools, in particular, they are one of the major community components. The species *Acutuncus antarcticus* is often the most common and dominant species in these communities. Terrestrial ecosystems in parts of Antarctica currently experiencing sometimes drastic climatic and environmental changes. Understanding how individual species respond to these changes is recognized as a key research challenge in order to predict how ecosystem structure and function might alter. In this study, we set out to clarify aspects of the thermal responses of *A. antarcticus*. Cohorts of 20 juveniles of *A. antarcticus* hatched within a 24 h period were reared at either 20°C, 15°C, 10°C, 5°C in dark on agar plates with Volvic[®] water and the green alga *Chlorella* sp. Individual tardigrades were inspected daily for 220 d and their survival, egg production and subsequent egg hatching were recorded. Life span, age at first oviposition, oviposition intervals, clutch size, and hatching time and rate differed at each temperature. Generation time decreased as the temperature increased. The reproductive success was substantially high at 10°C and 15°C. These data indicate the optimum temperature range for growth and reproduction in *A. antarcticus* is around between 10°C and 15°C. This range is often higher than the actual ambient temperature of Antarctic terrestrial habitat where animals live in particularly in the freshwater environment. Only a relatively small change in habitat temperature may greatly affect the population growth of *A. antarcticus*.