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Conference Abstract

Limited thermal acclimation capacity in cave beetles

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Abstract

Thermal tolerance is a key vulnerability factor for species that cannot cope with changing conditions by behavioural adjustments or dispersal, such as subterranean species. Previous studies of thermal tolerance in cave beetles suggest that these species may have lost some of the thermoregulatory mechanisms common in temperate insects, and appear to have a very limited thermal acclimation ability. However, it might be expected that both thermal tolerance and acclimation ability should be related with the degree of specialization to deep subterranean environments, being more limited in highly specialized species. To test this hypothesis, we use an experimental approach to determine the acclimation capacity of cave beetles within the tribe Leptodirini (family Leiodidae) with different degrees of specialization to the deep subterranean environment. For this, we acclimate groups of individuals at

1. a temperature close to their upper thermal limit (20ºC) or
2. a control temperature (approximately that of the cave in which they were found) for 2 or 10 days (short- *vs*. long-term acclimation).

Upper thermal limits (*heat coma* temperature, HC) are then measured for each individual using a ramping protocol (rate of increase of 1ºC/min) combined with infrared thermography and video recording. Preliminary results in a deep subterranean species (*Speonomidius crotchi,* with an intermediate degree of specialization) showed no significant effect of acclimation temperature in HC at any of the exposure times. Such reduced thermal plasticity could be also expected for other highly specialized subterranean species. The potential implications of these findings for subterranean biodiversity in a climate change context are discussed.

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