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The impact of nutritional status on responses to climate change in the ant, *Aphaenogaster picea*

Abstract

Global warming will negatively impact arthropod communities because their activity is tied to the temperatures they experience. When organisms experience thermal stress, they produce heat shock proteins to refold denatured proteins and regain biological function. This heat shock response requires energy. The amount of energy an organism has is correlated with the amount of food intake, so individuals with higher nutritional status may allocate greater resources into eliciting the heat shock response. The purpose of this study was to determine how nutritional status impacts thermal tolerance in the ant *Aphaenogaster picea.* I tested the hypothesis that low nutritional status reduces the capacity for thermal tolerance by comparing the thermal tolerance and heat shock protein expression of experimentally starved versus fed ants. Starved individuals were found to be more sensitive to high temperatures than fed ants, and it is predicted that starved ants will have lower heat shock protein expression when analyzed using quantitative PCR (qPCR) because they will have less energy to allocate into heat shock protein induction. The findings of this experiment are important in predicting the capacity of *A. picea* populations to respond to climate change.