Urban physiology: city ants possess high heat tolerance.

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Abstract: Urbanization has caused regional increases in temperature that exceed those measured on a global scale, leading to urban heat islands as much as 12 degrees C hotter than their surroundings. Optimality models predict ectotherms in urban areas should tolerate heat better and cold worse than ectotherms in rural areas. We tested these predications by measuring heat and cold tolerances of leaf-cutter ants from South America's largest city (São Paulo, Brazil). Specifically, we compared thermal tolerances of ants from inside and outside of the city. Knock-down resistance and chill-coma recovery were used as indicators of heat and cold tolerances, respectively. Ants from within the city took 20% longer to lose mobility at 42 degrees C than ants from outside the city. Interestingly, greater heat tolerance came at no obvious expense of cold tolerance; hence, our observations only partially support current theory. Our results indicate that thermal tolerances of some organisms can respond to rapid changes in climate. Predictive models should account for acclimatory and evolutionary responses during climate change.

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