

Convergent local adaptation in size and growth rate but not metabolic rate in a pair of parapatric Orthoptera species.

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Local adaptation is inferred for many morphological and physiological traits but determining the role of natural selection in shaping geographic variation relies on evidence such as provided by fitness estimates or transplantation experiments. In addition, habitat-specific convergent (or parallel) evolution provides a powerful means of testing adaptive hypotheses. Here we contrast size, growth rate and metabolic rate in a pair of Orthoptera species collected from high and low altitude locations and raised in identical environments. We find that two related insects (tree weta: *Hemideina crassidens* and *Hemideina thoracica*) have the same (convergent) pattern of larger adults and faster growth rates in populations from a high altitude location compared to conspecifics from low altitude. However, variation in metabolic rate was detected only between species and not among altitudes. The high and low altitude populations of each species were collected from the same location therefore selection pressures on the two species are likely to be similar or identical. Thus the independent evolution of larger adults and faster growth rate at high altitude suggests an adaptive role for both these traits in tree weta.

