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# Maladaptive evolutionary shifts in life history in a changing climate

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## Abstract

Populations confronted to a changing environment, as occurs under climate change, must adapt fast enough to persist. Several theoretical models have formalized such demographic and evolutionary challenges and predicted the critical speed of climate change, or the critical amount of genetic variance, above or below which, respectively, the population is doomed. Many species confronted to climate change have complex life cycles, with individuals in different stages differing in their ecology, their sensitivity to a changing climate and their contribution to population growth. Building on theoretical tools from evolutionary demography, we used quantitative genetics models to predict the dynamics of adaptation in a stage-structured population confronted to climate change. We show how the adaptive challenges associated with climate change may result in maladaptive shifts in life history, such as accelerated aging or modified trade-offs between fecundity and survival.

**Keywords:** adaptation, life history, climate change

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