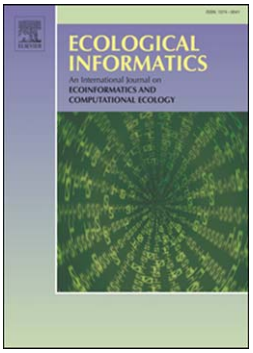

Beyond species distribution modelling: A landscape genetics approach to investigating range shifts under future climate change

Orly Razgour

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Beyond species distribution modelling: a landscape genetics approach to investigating range shifts under future climate change

Orly Razgour*

* Biological & Environmental Sciences, University of Stirling, Stirling FK9 4LA, Scotland, UK.
Phone number: (44) 01786-467809; Email: Orly.Razgour@gmail.com

Abstract

Understanding how biodiversity will respond to future climate change is a major conservation and societal challenge. Climate change is predicted to force many species to shift their ranges in pursuit of suitable conditions. This study aims to use landscape genetics, the study of the effects of environmental heterogeneity on the spatial distribution of genetic variation, as a predictive tool to assess how species will shift their ranges to track climatic changes and inform conservation measures that will facilitate movement. The approach is based on three steps: 1) using Species Distribution Models (SDMs) to predict suitable ranges under future climate change, 2) using the landscape genetics framework to identify landscape variables that impede or facilitate movement, and 3) extrapolating the effect of landscape connectivity on range shifts in response to future climate change. I show how this approach can be implemented using the publicly available genetic dataset of the grey long-eared bat, *Plecotus austriacus*, in the Iberian Peninsula. Forest cover gradient was the main landscape variable affecting genetic connectivity between colonies. Forest availability is likely to limit future range shifts in response to climate change, primarily over the central plateau, but important range shift pathways have been identified along the eastern and western coasts. I provide outputs that can be directly used by conservation managers and review the viability of the approach. Using landscape genetics as a