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Conference Abstract

Which processes are behind the relationship between species abundance and environmental suitability? Monte Albo cave salamander as model species

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Abstract

Species can show a strong variation of local abundance across their ranges. Recent analyses suggested that variation in abundance can be related to environmental suitability, as the highest abundances are often observed in populations living in the most suitable areas. However, there is limited information on the mechanisms through which variation in environmental suitability determines abundance. We analyzed populations of the microendemic Monte Albo cave salamander *Hydromantes* (*Speleomantes*) *flavus* Stefani, 1969 (Plethodontidae), and tested several hypotheses on potential relationships linking environmental suitability to population parameters. For multiple populations across the whole species range, we assessed suitability using species distribution models and measured density, activity level, food intake, and body condition index. In high-suitability sites, the density of salamanders was up to 30 times higher than in the least suitable ones. Variation in activity levels and population performance can explain such variation of

abundance. In high-suitability sites, salamanders were active close to the surface and showed a low frequency of empty stomachs. Furthermore, when taking into account seasonal variation, body condition was better in the most suitable sites. Our results show that the strong relationship between environmental suitability and population abundance can be mediated by the variation of parameters strongly linked to individual performance and fitness. Furthermore, we highlighted the potential use of cave animals as model species to answer macroecological questions.

Keywords

Biospeleology, modelling, environmental suitability, body condition, Sardinia, amphibia

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