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Abstract

Assessing the Effect of Climate Change in Vascular Plants with Disjunct Populations †

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Abstract: Many species exhibit intraspecific ecological variation and to not consider this ecological differentiation can confound predictions made with species distribution models (SDMs). This problem may be particularly relevant for species where there are few populations with potential local adaptations. To increase the performance of niche models and provide more solid basis for conservation plans, it is recommended to apply a subdivision criterion with biological significance. In this study, we examined twelve species with disjunct populations and created models of both the entire species and each group of populations. In addition, we considered as "aggregate model" for the species the area predicted to be suitable by at least one of each group of populations. In general, highest range contractions were identified by the species model. The species model forecasted a similar trend as the aggregate model in the majority of species, but in four cases they predicted opposite trends. In summary, our results suggest that the inclusion of intraspecific variability does not significantly improve the overall accuracy of SDMs based on all species occurrences but may lead to substantially different conclusions about future range changes. Furthermore, they suggest that intraspecific variability alone may provide a buffer against environmental change, even if the niche is conserved among different intraspecific groups. Consideration of intraspecific differences may ultimately allow us to highlight potential resilience units that can act as potential buffers against the adverse effects of climate change, and to develop targeted conservation strategies accordingly.

Keywords: ecological niche models; disjunct populations; intraspecific differences

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