Universität Basel

Research Project

Effects of climate change on past, recent, and future biodiversity of alpine/arctic plants: Integrative evidence from phylogenies, population genetics, ecological niche modeling and new insights for conservation

Project funded by own resources

Project title Effects of climate change on past, recent, and future biodiversity of alpine/arctic plants: Integrative evidence from phylogenies, population genetics, ecological niche modeling and new insights for conservation
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Organisation / Research unit
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Project Website http://www.plantsciences.ch/research/fellowships/prodoc_fellowship/Projects /abstracts
Project start 01.01.2011
Probable end 31.12.2014
Status Completed

In Project 1 we use arctic islands to understand how climate change in the past may lead to a change in reproductive strategy: Did the ranges of the proposed parents of Primula sect. Aleuritia overlap at the time of allopolyploid origins, as predicted by the secondary contact model? We will produce a high-resolution, dated phylogeny, optimize the ecological preferences of the hypothesized progenitors onto the dated phylogeny, and project their past distributional ranges onto the fine-resolution climatic scenarios for the Pleistocene. Additionally, we will test whether island colonization by species with specialized breeding systems is associated with a shift of the ecological niche, reduction of genetic variation, and change of reproductive strategy.

Project 2 will focus on how small populations persisted on mountain tops in the past and how they are affected by current and future climate change. If current trends of global warming continue, the strict ecological adaptation of Saxifraga florulenta to siliceous substrates at the highest altitudes of the Maritime Alps may represent a serious extinction risk. We will investigate whether the phylogeographic history, genetic diversity, climatic niche and dispersal mode of S. florulenta can explain its long persistence in the Maritime Alps and predict its future survival or extinction on mountain tops. We will use a combination of genetic analysis and niche modeling to reconstruct changes in the niche, geographic distribution, and genetic diversity of this cold-adapted species.

Scientific objectives:
1) to contribute to developing a new theoretical framework for the influence of climate change on speciation mechanisms and reproductive strategies
2) to generate an improved modeling framework that incorporates critical population size and evolutionary processes into ENM projections

Policy related objectives:
To inform conservation strategies with sound knowledge of the evolutionary and ecological potential for adaptation
to changing environmental requirements in arctic/alpine plants

Financed by
Other funds

Add publication

Add documents

Specify cooperation partners