Universität Basel

Research Project

# PRO-Alp. Plant reproduction of the alpine zone: disentangling ecological drivers of trait evolution

## Third-party funded project

**Project title** PRO-Alp. Plant reproduction of the alpine zone: disentangling ecological drivers of trait evolution
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**Organisation** / **Research unit**
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**Department**
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How do plants adapt during major ecological transitions, such as evolutionary shifts between biomes? In particular, should we expect different plant species to adapt in similar ways to the same ecological challenges? And what specific aspects of ecological transitions drive phenotypic evolution? These are the motivating questions of the four-year project that addresses drivers of reproductive trait evolution in genera that radiated across elevational belts in multiple mountain systems.

By reconstructing evolutionary trees (phylogenies) of these species, the project will link shifts in climatic niches to the evolution of plant traits, in particular flowers and inflorescences. By including tropical alpine, temperate alpine, and lowland species, we can reveal what specific aspects of climatic niches drive the evolution of plant form and plant reproduction. Multiple genera allow for addressing the extent to which species from different evolutionary backgrounds evolve similarly (convergently) along the same environmental gradients, helping us to understand whether studies of adaptation on few species can be generalized.

That alpine species look different from lowland species is known to every Swiss person. Surprisingly, we still don't understand what specific aspects of high elevation ecosystems drive this striking trend in trait evolution. One problem in studying this problem is that the processes of adaptation are typically very slow, so experiments (e.g. transplant experiments or climatic modifications) may yield only limited information related to plasticity and evolution from standing genetic variation, ignoring trait evolution in deep evolutionary time. Therefore, this project uses plant diversity and radiations as "evolutionary experiments" by analyzing the phylogenies of species that are already adapted to diverse environments.

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**Add publication**

**Add documents**

**Specify cooperation partners**