## Abstract

* Understanding seed germination phenology is crucial for predicting plant responses to environmental changes. However, a substantial gap persists regarding how microclimatic conditions influence germination in seasonal ecosystems.
* We conducted a continuous seasonal experiment with fresh seeds to investigate germination phenology in 54 species from temperate and Mediterranean alpine communities. Using field microclimatic data series, we mimicked fellfield and snowbed conditions in growth chambers and we carried out field sowing experiments.
* Both communities showed similar phenology responses to microclimatic variation, finding a consistent germination delay in snowbed compared to fellfield conditions. This effect was complemented by reduced dormancy and increased autumn germination in Mediterranean seeds.
* Our results suggest a predictable phenological shift in the germination of alpine plants along microclimatic gradients. In warmer conditions with reduced snow cover, alpine species are expected to anticipate germination 52 days on average, with potential disrupting effects on cold-adapted plant communities.