Submitted Abstract

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Abstract

In mountain ecosystems, on-going environmental changes are imposing multiple threats to plant populations. Despite a growing body of empirical research on plant redistribution dynamics in mountains, there has been no attempt to test simultaneously the effect of climate and land-use change on the response of threatened, common and alien species along complete elevational gradients. Using a high-resolution distribution dataset of native and alien plants throughout the Trento Province, NE Italy, we could reconstruct the response to global change of c. half of the plant species of the European Alps over the last 30 years (1990 – 2019). We found that most threatened natives have not been able to track climate warming and have experienced a strong erosion of rear margins. As a result, over the last 30 years, the overall range of threatened natives has contracted. By contrast, alien species have expanded their range by moving upwards at the leading edge at climate change speed. Contrary to previous results and climate change expectations, we showed that the current level of threat was higher for warm- than cold-adapted native species. In addition, the level of threat decreased with increasing species competitive ability to thrive under high-resource environments. These patterns suggest that intensive land-uses might be more important drivers of local extinction than temperature warming, at least in the short-term. Finally, we found that hotspots of occurrence of threatened native plants overlapped with hotspots of alien species, and were strongly associated with low elevations, stressing the urgent need of protecting low elevation areas. Opposite to the conclusions of similar studies, the comprehensive sampling in this dataset including threatened species showed that native plants at low elevations are those more at risk of local extinction, probably due to the compounded effect of climate warming and land use change.