

Submitted Abstract

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Abstract

High mountain ecosystems contain 20% of the native flora of Europe and are hotspots of biodiversity, hosting a high number of cold adapted species, rich in endemic and rare plants. However, they are among the most threatened by global change, as they are exposed to a high risk of biodiversity loss.

As observed on several studies, climate change has a strong impact on species distribution in the high mountain alpine-nival ecological belts, with a general gain in species richness coming from the lower vegetation belts and a loss of cryophilous species. Such process, called thermophilization is mainly promoted by the increase in temperatures.

The present work aims to analyze temporal changes on plant species composition of high mountain vegetation occurred during the last 20 years in Central Apennines and to explore temporal trends on endemic species cover and richness

We analyzed the Maiella National Park (MNP) which, comprised in the LTER network of central Apennine, assures continuous and updated data describing the ecological effects of climate change on high mountains.

Specifically we studied temporal changes in species composition through a re-visitation study, using a set of 25 georeferenced historical relevés newly collected after 20 years on two high mountain calcareous grasslands: *Sesleria juncifolia* subsp. *juncifolia* community growing on steep slopes and the *Kobresia myosuroides* community growing on the windy ridges, both included in the 6170 EU Habitat (Alpine and subalpine calcareous grasslands).

We analyzed temporal changes on overall and endemic species richness and cover by the ANalysis Of SIMilarities (ANOSIM) through a one-way ANOSIM test. We used the nonparametric Kruskal-Wallis test for equal medians to determine the presence of significant differences over time. We also assessed the degree of change in the floristic composition by the Vegetation Turnover Index (Tveg).

Our results evidenced a decrease in the total number of species and in species cover and richness per plot in both high elevation plant communities. In the *Sesleria juncifolia* community we also registered a significant decrease in endemic species per plot (cover and richness). The Vegetation Turnover Index (Tveg) ranged between 0,29 for *Sesleria juncifolia* community and 0,36 on *Kobresia myosuroides* community.

These changes are partially in line with those observed in others Mediterranean calcareous summits, where similar reduction on species richness and endemic loss were explained by a combination of two climate parameters: the rise of temperatures and the decline of summer precipitations.