Submitted Abstract

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Abstract

Human-driven species movement and species local losses are causing the homogenization of global biota is occurring at an unprecedented rate, with uncertain consequences for biodiversity and ecosystems at global, but also at local or regional scales. Biotic homogenization not only encompasses a change in species composition, but species additions and extinctions can modify not only the taxonomic diversity but also the phylogenetic structure of the community and the overall function of the ecosystem. Our project has aimed to understand current patterns of mountain biodiversity and how human-driven factors have affected these patterns, specifically we have studied the taxonomic, phylogenetic and functional homogenization of plant communities in the Chilean Andes from 32 to 53 degrees south latitude, from near sea level to 3,500 m.a.s.l. We used a standardized-systematic method of field data collection across two environmental gradients (elevation, latitude) to better understand how biological invasions are causing taxonomic homogenization and what are the current distribution patterns of non-native plants in the Andes. We based our approach on the Mountain Invasions Research Network (MIREN) T-survey protocol and constructed a comprehensive plant community dataset to address these questions. We hypothesized that, non-native plant richness and abundance decreases with elevation and latitude, with roads being the primary driver to explain the presence of non-native species in the Andes. Additionally, we hypothesized that along elevational and latitudinal gradients in mountain ecosystems, non-native species homogenize plant communities along taxonomic dimensions and that this process is driving disturbance and non-native lowland plant groups. The results showed that the richness and abundance of non-native species decreased with elevation and latitude, while when comparing disturbed and undisturbed sites, no significant differences were observed in the richness and abundance of non-native plants. While beta diversity (ß) increases with elevation but decreases when comparing disturbed and non-disturbed areas. These results show that disturbance (mainly the presence of the road) explains the distribution patterns of non-native plants in the Andes, in addition to favoring the homogenization of ecosystems. In terms of phylogenetic diversity, we have found a simplification of community structure caused by Eurasian non-native species. Functionally, non-native species add novel traits to native communities but in highly disturbed areas there is a decrease in functional diversity. Our results highlight the need for global studies that account for the multidimensional aspects of biotic homogenization in mountains. Funded by Fondecyt 1180205 and ANID/BASAL FB210006.