Submitted Abstract

ID IMC22-FSAbstr- 753

First Author First Name Last Name	 Andrea (1,2) Cortegoso Galmán
Submitting Author First Name Last Name	 Andrea Cortegoso Galmán
Correspondence	andrea.cortegoso.g@gmail.com
Co-Authors >> E-Mails will be not listed	Alexander, Jake M. (3); Daehler, Curtis C. (4); Winter, Marten (2); Seipel, Tim (5); Cavieres, Lohengrin A. (6,7); Haider, Sylvia (1,2)
Organisations >> for readability limited to 5 >> full list can be found online	1: martin luther university halle-wittenberg, Germany 2: German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Germany 3: Department of Environmental Systems Science, ETH Zürich, Zürich, Switzerland 4: School of Life Sciences, University of Hawai'i at Mānoa, 3190 Maile Way, Honolulu, HI, USA 5: Department of Land Resources and Environmental Sciences, Montana State University, Bozeman, Montana, USA
Country	Germany
Region	Western Europe
Title	Global Assessment Of Darwin'S Naturalization Conundrum: Patterns Of Phylogenetic Relatedness Of Non-Native To Native Species Varies Along Elevations And Between Natural And Disturbed Habitats.
Keywords	Mountain Plant Invasion, Community Assemblaje, Phylogenetic Relatedness, Darwin
Type	List Of Focus Session
Focus Session ID	45

Abstract

Darwin's Naturalization Conundrum (DNC) states that non-native taxa closely related to the native community are either more likely to succeed because shared adaptations help them to overcome environmental filtering, or less likely to establish due to strong competition with their native relatives. However, studies conducted so far failed to find general patterns. One reason behind the inconsistencies might be that biotic competition and environmental filtering have been considered mutually exclusive forces, but these mechanisms can operate alternately depending on the environmental conditions. Elevational gradients are powerful tools to evaluate the relative role of both mechanisms for community assembly. At low-elevation environments characterized by stronger biotic interactions, competition should be the dominant structuring force, leading to patterns of phylogenetic overdispersion and favouring the establishment of phylogenetically distinct non-native species. Alternatively, in high-elevation environments with low productivity, community assembly should be mainly driven by environmental filtering leading to patterns of phylogenetic underdispersion and favouring the establishment of closely related species. Community assembly is also affected by human disturbances. Disturbance reduces competition favouring the establishment of closely related species. Along elevational gradients, reduced competition in disturbed habitats should have a stronger impact on community assembly at low elevations. To test these predictions, we performed a global evaluation of DNC studying phylogenetic relatedness of non-native plant species to the native community along elevation gradients comparing natural and disturbed (roadside) habitats. We recorded data for 4000 native and non-native species in plant communities across 17 regions worldwide. We constructed a phylogenetic tree for all species and measured phylogenetic distances from non-native to native species in each plant community. We found a global effect of elevation on the phylogenetic distance of non-native species to the native community: with increasing elevation, non-native species were more closely related to native species. In addition, we found an effect of disturbance on the phylogenetic relatedness, where non-native species were less similar to the native community in disturbed roadside plots. The elevational pattern in phylogenetic distance was stronger at the roadside habitats. Overall, we show that role of environmental filtering and competition for the establishment of non-native species depend on the environment and it is influenced by human disturbances. Our study provides new insights into the mechanisms driving the successful establishment of non-native species in plant communities, something paramount to counteract the negative effects of new invasions under global change.