Why theory in island biogeography needs to integrate within-island heterogeneity and non-neutral species

Manuel Steinbauer*†[1]

[1]Geozentrum Nordbayern, Department of Geography and Geosciences, Friedrich-Alexander University of Erlangen-Nürnberg (FAU) – Loewenichstr. 28, 91054 Erlangen, Germany

Abstract

Most established theories in island biogeography are neutral as all species are treated equally and each island is integrated as one unit. MacArthur & Wilson already acknowledged this unrealistic aspect of their theory in 1967. However, it is only now that trait availability and computational power allow testing species pool concepts that account for species-specific differences. In addition, as potential island colonisers vary in their adaptation to environmental conditions, different ecozones within islands should differ in establishment probabilities of focal species. The objective of this talk is to outline the potential of a non-neutral theory of island biogeography. Using dispersal and plant growth strategy related trait patterns within islands I will show that ecozones within islands can be quantified as distinct biogeographical units. The evolutionary dynamics within the island should be influenced by these differences. Analyses of the distribution pattern of endemic species within islands provide strong support for this expectation. Further highlighting the potential of within-island studies, I will use the convergent evolution of secondary woodiness to show that the differences in environmental conditions within islands can be used to test fundamental questions in biogeography. Integrating within-island heterogeneity into theories in island biogeography is thus a crucial step forward.

Keywords: dispersal, island biogeography, plant growth stategies, secondary insular woodiness, theories in island biogeography

*Speaker

†Corresponding author: Manuel.Steinbauer@fau.de