

Assessing elevational shifts in the species-abundance distribution (SAD): a case study of vascular plants in the Alborz Mts., Iran

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Abstract

Species Abundance Distributions (SADs) describe the commonness and rarity of species in communities, but few studies explored the ecological factors influencing SAD patterns. Elevational gradients may provide useful opportunities to understand SAD variations in response to environmental characteristics. We investigated how plant SADs changed along a 2,500 m elevational gradient in the Alborz Mountains (Iran). We sampled plots at 100 m intervals from 2,000 to 4,500 m elevation to model SADs using several probability distributions. Most communities were best fitted by the exponential and gamma distributions as well as the Weibull distribution. Weibull parameters showed a unimodal pattern and identified different degrees of dominance and rarity along elevational gradient. Communities at lower elevations were characterized by the presence of many species with low dominance. At middle elevations, communities had many rare and many species with intermediate abundances. At high elevations, communities were characterized by reduced taxonomic diversity and low dominance. Less stressful climatic conditions that characterize lower elevations allow more species to coexist, but competition may constrain species abundances. Most species are unable to cope with harsher conditions of higher elevations, and are filtered out, leading to a reduced taxonomic diversity and dominance in these communities.

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