

Changes in the Distribution of Plant Species in the Ecological Niche in Various Stages of Succession

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Abstract

Variation along the successional stage of a plant community is not limited to plant composition and diversity but also related to nutrient resources and plant species abundance distribution. Therefore, the use of models that consider the distribution of ecological niches in addition to the relative frequency of species in the distribution of species is also important. The object of current study was to investigate the species abundance distribution using ecological niche models in a successional stage of plant community in semi-steppe rangelands. To do so, first we selected three regions with different succession stage including 3-5, 10-15, and 30-50 years and a control site. In each region, we used 10 plots of 1 m² along four 100 m transects to record the vegetation cover. Then Monte-Carlo test using data simulation was used to test fitness of each niche apportionment model. The results showed that frequency of species in both 3-5 and 10-15 successions fitted the random fraction model while MacArthur fraction model only accepted the model which fitted species frequency distribution in 30-50 years and control site. The results indicated that the niche occupation pattern in early stage of succession might be attributed to the random process of pioneer species. However, the chance of random niche occupation decreased by the end of succession due to nutrient availability and competition.

Keywords: Abundance distribution, MacArthur fraction, Random fraction, Succession.

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