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C:N:P Stoichiometry of Plant, Litter and Soil along an Elevational Gradient in Subtropical Forests of China

编号	010033405
推送时间	20220314
研究领域	森林生态
年份	2022
类型	期刊
语种	英语
标题	C:N:P Stoichiometry of Plant, Litter and Soil along an Elevational Gradient in Subtropical Forests of China
来源期刊	forest
期	第334期
发表时间	20220223
关键词	ecological stoichiometry; elevation; ecological factors; forest ecosystem;

摘要 The internal correlation of plant, litter and soil stoichiometric characteristics and their responses to the environment are helpful for revealing nutrient cycling mechanisms. However, few studies have assessed the nutrient relationship between plant, litter and soil and nutrient stock along elevational gradients, which limit the understanding of nutrient relationships in the ecosystem. To gain insight into the forces of nutrient stock and its stoichiometric ecological characteristics along the elevational gradients in forest ecosystem, we investigated the carbon (C), nitrogen (N) phosphorus (P) contents and stoichiometric ratios of dominant plants, litter and soil layers at different elevations (900–1600 m) in Daiyun Mountain. The results showed the following: (1) C, N and P contents showed an increasing order as plant > litter > soil in each elevation of Daiyun Mountain. Dominant plants were limited by N each elevation. C, N and P contents of plants at high elevation were higher than those at low elevation and significant correlations were found between plant and litter TN, TP and air and soil temperature (negative), which conforms to the Temperature-Plant Physiological Hypothesis (TPPH). (2) Significant correlations were found between plant C:N and litter C:N (positive); between litter C:P and soil N:P (positive); and between litter C:P and soil C:N (negative). (3) Elevation and slope were essential environmental factors to the stoichiometric ratio of plant and litter, and pH was the main factor that correlated negatively to soil stoichiometry ratio. Litter provided a link between plant and soil, and there was a coupling among plant, litter and soil nutrients. The results could provide a theoretical basis for understanding the nutrient cycling for the subtropical forest ecosystem of China.

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