Influence of Various Biotic and Abiotic Factors on Moss Diversity and Community Composition in the Himalaya

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Abstract

Mosses play various ecological roles in different ecosystems and thrive in diverse habitats. While previous studies in the Himalayas have explored moss diversity and community composition, they often overlooked the influence of factors like the type of substrate and other environmental conditions on moss species richness. This current study was conducted in different forest ecosystems of the North-Western Himalaya, encompassing four distinct forest types. Moss samples were collected using a standard quadrat method, and we examined both the overall species richness and the variation in moss species among these forest types. Additionally, we investigated how elevation gradients affected moss species richness. To understand the impact of environmental factors on moss diversity, we employed Canonical Corresponding Analysis (CCA). Our findings shed light on the significant role of various substrates and environmental factors in shaping moss richness. Notably, among all the forest types studied, mixed temperate deciduous forests exhibited the highest moss species richness, with a total of 87 species identified. Elevation emerged as a crucial factor influencing moss species richness, with statistically significant results ($P < 0.001$). When assessing environmental variables, elevation had the most substantial impact, as indicated by CCA scores. The substrate analysis revealed that tree species and rocks were the two key substrates that contributed significantly to maintaining moss richness in the area. Therefore, the conservation of these tree species and crucial substrates is essential for preserving moss diversity and composition in the region. Consequently, forest management practices should prioritize the protection and maintenance of these substrates to ensure the continued well-being of moss habitats.