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Environmental Covariates of Species Richness and Composition of Vascular Plants of Olangchung Gola and Ghunsa Valleys of Eastern Nepal

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ABSTRACT

Vascular plant diversity of any region is strongly affected by the environment. This study was done to understand the effects of climate, topography and land use on species richness and composition in two valleys in Eastern Nepal namely Olangchung Gola and Ghunsa. The study covered elevational gradients between 2200 and 3800 m a.s.l. along the two river valleys and included five elevation bands on both aspects of each valley. Four main land-use types, namely natural forest, exploited forest, meadow and crop land were studied in order to test the effects of human influence in a land-use gradient. In total, 515 species belonging to 104 families were recorded. Angiosperms included 477 species, followed by 30 pteridophyte species and 8 gymnosperms. Dicotyledonous plants were more species-rich (378 species) compared to monocotyledonous plants (99 species). Species composition on the plots was analyzed by Canonical Correspondence Analysis (CCA), and Generalized Linear Model (GLM) regression was carried out to test relative effects of environmental variables on the species richness of vascular plants. Species richness and composition were significantly affected by the combined effect of climatic and topographic variables. Species richness and composition also differed between land-use types. Species richness was particularly high in exploited forests where disturbance was at an intermediate level, i.e. less intensive than in the crop fields and meadows but higher than in the natural forests. The results confirm the intermediate disturbance hypothesis and indicate that the local, multifunctional forest management maintained a high species richness of vascular plants.

Keywords: Species Composition, Species Richness, Elevation Gradient, CCA, Climate, Land Use, Biodiversity, Himalaya