

Anthropogenic and climate constraints on diversity and structure of terrestrial vertebrate communities

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Abstract

Land use and climate change interact to impact functional and phylogenetic diversity globally, but this pattern is largely unknown in Eastern Himalayas. Using data comprising 45 mammal species and 336 bird species, we investigated the response of taxonomic, functional, and phylogenetic diversity and structure to land use and climate variables in the Himalayan biodiversity hotspot of Bhutan. Community diversity and structure in both groups were lower than expected by chance and decreased with land-use change resulting in clustering of distinct assemblages in different land-use settings, but climate produced mixed results. Functional and phylogenetic overdispersion for mammals were best explained by precipitation while temperature did so in birds. Overall, the mammal community better tolerated extreme climates than did birds. However, the nuances in individual responses were variable across the phylogenetic tree. Our results highlight the importance of land use and climate gradients in shaping the regional terrestrial biodiversity in a fragile and dynamic conservation landscape.

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