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HYMENOPTERA BIODIVERSITY DYNAMICS IN IRAN ECOREGIONS: INSIGHTS FROM THREE DECADES OF OCCURRENCE DATA

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Abstract

Understanding biodiversity dynamics is critical for conservation, particularly in ecologically diverse regions like Iran. This study investigates changes in Hymenoptera family richness, turnover, and composition across Iran's ecoregions over three decades (1993–2022), using occurrence data from the Global Biodiversity Information Facility. After rigorous data filtering and georeferencing, temporal and spatial patterns were analyzed across 13 terrestrial ecoregions. Overall family richness increased over time but exhibited fluctuations, with notable peaks in 2010 and 2019 followed by declines. High family turnover occurred in years marked by increased sampling, suggesting both real biodiversity shifts and methodological influence. Ecoregional analysis revealed heterogeneous patterns: forested and mountainous regions, especially the Zagros Mountains, Caspian Hyrcanian forests, and the Central Persian deserts, consistently supported high family richness. Rare families such as Megalodontesidae and Orussidae showed restricted distributions in specific habitats, indicating important conservation value. In contrast, arid southern and southeastern ecoregions remained under-sampled and showed low richness, possibly reflecting true diversity patterns or sampling gaps. Family accumulation curves and GLMM analysis highlighted the strong influence of sampling effort on richness estimates, reinforcing the need for standardized, long-term monitoring. However, due to uneven sampling across time and space, these results should be interpreted with caution. The findings underscore the ecological significance of forest and transition zones, the vulnerability of under-sampled ecoregions, and the importance of maintaining consistent data collection to guide national biodiversity strategies.

Key words: biodiversity, family richness, Hymenoptera, Iran, turnover rates

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