

Earthworm Abundance, Diversity, and Ecological Function in Relation to Soil Characteristics and Habitat Type in Jammu's Grassland and Forest Ecosystems

Mohd Hassan^{1,2} and Ravail Singh^{*1,2}

¹ICSIIR-Indian Institute of Integrative Medicine Jammu- 180001, India

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002, India

E-mail: * – rubail2010@gmail.com

Abstract—This study investigated the distribution patterns of earthworm communities in two different habitats (grassland and forest) in Jammu, based on their structural and functional traits, as well as the role of soil physico-chemical parameters in the distribution. The results showed that grassland habitat had higher abundance and diversity of earthworms, with *Eisenia fetida* being dominant in both habitats. Other species, such as *Millsonia anomala* and *Amyntas diffringens*, were found to be restricted to specific habitats. The dominance of different functional traits varied between habitats, with body length being dominant in the forest ecosystem, while other traits, such as pigmentation and setae shape, were predominately distributed in the forest. Soil texture, available nitrogen, and organic carbon were found to influence the diversity and abundance of earthworms in the habitats, as well as the distribution patterns of their functional traits. Earthworm traits dominance in different habitats is due to adaptations to the soil conditions and availability of resources. Grassland habitats have higher organic matter content, which supports a higher level of primary productivity, leading to earthworms evolving traits adapted to processing organic matter. Forest habitats have deeper soil layers, requiring longer bodies for feeding and burrowing, and thicker cuticles and setae to withstand abrasive leaf litter and woody debris. Earthworms play a crucial role in nutrient cycling, improving soil structure and water-holding capacity, supporting plant growth and biodiversity, thus, their distribution patterns and traits have important implications for the functioning of ecosystems and their overall health and resilience. The findings of this study could have implications for the conservation and management practices in these ecosystems, highlighting the importance of considering earthworms and their ecological functions in such efforts. Overall, this study provides insights into the relationship between earthworms and their environment and emphasizes the significance of understanding their ecological role in different habitats

Keywords: Earthworm, Traits, Functional, Taxonomic, Diversity, Ecosystem functioning.