Studies on Diversity and Impact of Climate Change on Orthoptera Fauna of Pakistan

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ABSTRACT

Introduction: Grasshoppers, locusts, crickets, and katydids are all examples of insects that are classified within the order Orthoperta. Many ecosystems depend on grasshoppers and locusts as prey and predators, but their ability to reproduce swiftly and create swarms can trigger agricultural crises that threaten livelihoods and food security (Baloch *et al.,* 2023; Panhwar *et al.,* 2024). Locusts and grasshoppers are essential herbivores in grasslands worldwide. They aid food chains, plant growth, and nutrient cycling. Grasshopper and locust outbreaks are global issues. They can entirely destroy crops and grasslands and economically damage rangelands and crops (Zhang & Hunter, 2017; Zhang *et al.*, 2019; Yasin *et al.,* 2024).

Objective: The objective of the present study is to find the impact of climate change on the Orthopteran diversity of Pakistan.

Methodology: Some grasshopper species are ecological markers of ecosystem health due to their sensitivity to temperature and land use. To collect Orthopteran diversity, thorough field surveys were conducted in diverse ecological zones of Pakistan. Approximately 5,320 specimens were collected between 2018 and 2024.

Result: The specimens were categorised into Dericorythidae, Acrididae, Tetrigidae, Pyrgomorphidae, Gryllidae, and Tettigoniidae. The Family Acrididae had the most diversity, followed by Gryllidae and Pyrgomorphidae. The least diverse family was Dericorythidae, followed by Tettigoniidae and Tetrigidae. Additionally, Sindh and Balochistan flood-affected areas exhibited decreased Family Tettigoniidae variety. Family Tettigoniidae was diverse in Khyber Pakhtukhwa and Punjab. Several Orthopteran species were also affected by the quick climate change. Digital photos, line drawings of genitalia, species distribution data, and taxonomic keys for families, genera, and species are also provided. This study should serve as a foundation for Pakistani Orthoptera taxonomy and biodiversity researchers.

Conclusion: The present study concludes that the climate change has great impact on the diversity of Orthopterans. Beside this, change in morphometry, coloration, feeding habitats might be due to the fluctuations in climate of the region.

Keywords: Climate Change, Diversity, Impact, Orthoptera.

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