

The Sound of Science: Acoustic Communication and Ecology of Orthoptera

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ABSTRACT

Introduction: The sounds of insects are universal and oldest components of world natural soundscape. Since Mesozoic era sound is used as communication pathway in insects by fossil evidence (Woodrow *et al.*, 2023; Senter, 2008). Orthopterans are well known due their diverse acoustic behavior that make them most dominant and sound driven in field of acoustic communication around the insect world (Panhwar *et al.*, 2025; Ghosh *et al.*, 2025). The bioacoustics proposes a sustainable opportunity for quick assessment of biodiversity and monitoring. The acoustics amongst Orthoptera provides taxonomic recognition and summarizes exploration of ecosystem and biodiversity hotspots (Tiwari & Diwakar, 2025).

Objectives: The objective of this study was to investigate the acoustic behavior and ecological data of Orthoptera species

Methodology: The rearing of Orthopterans required temperature and humidity was monitored and maintained and monitored regularly. HTC 2 hygrometer was used to calculate temperature and humidity within the rearing cages. Wet cotton swabs were kept to increase humidity and water spray was done to decrease temperature in insect rearing cages. Zoom Handy recorder was used to record the sound of species. Song analysis was made with help of Audacity software and methodology of Heller *et al.*, (2017) was adopted. Identification of taxa was done using (Cigliano *et al.*, 2025) nomenclature. Habitat preference and ecology data was analyzed with help of PAST statistical software version (4.03).

Key findings: The present study was carried out to investigate the bioacoustics amongst Orthopterans. The study revealed that complex songs of crickets and katydids along with rhythmic stridulation among grasshoppers mediate this behavior for the predatory avoidance, territorial defense and mate attraction. The acoustic communication shows adaptations in evolutionary perspectives and provide vision for habitat quality, ecological interaction and species diversity. Advances in bioacoustics help in automated sound analysis and digital recordings for the rapid recognition and monitoring of species. Furthermore, present study highlight the role of Orthopterans as ecosystem indicators, sensitivity to climate change and anthropogenic noises.

Conclusion: Present study concluded that acoustics in Orthoptera has taxonomic, ecological and evolutionary significance. This highlights the cultural resonance in human society. Cutting edge in acoustics technology, field study, indigenous knowledge can unlock novel scopes to Orthoptera exploration and can reinforce conservation strategies for the soundscape habitats and for the species itself.

Keywords: Bioacoustics, Diversity, Ecology, Orthoptera.

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