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Symphony across latitudes: exploring the acoustic diversity of katydids (order: Orthoptera) across the latitudinal gradient in India

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INTRODUCTION & AIM

Katydids (family: Tettigoniidae) are nocturnal insects and are:

- An important part of the ecological food chain and produce species-specific calls for communication.
- Ecological indicators having narrow habitat range and exhibit site fidelity.

Very little is known about the biogeographic patterns of katydid communities from the biodiverse regions of the Indian subcontinent.

It is important to understand biogeographical patterns in the rapidly changing environment due to climate change and invasive species.

Aim: To understand the latitudinal patterns in acoustic assemblages of katydids from the Indian subcontinent.

METHOD

Field sites:

Western Ghats (WG): Bhagwan Mahavir Wildlife Sanctuary, Kolar
Central India (CI): Satpura and Ratapani Tiger Reserve
Western Himalaya (WH): Rajaji Tiger Reserve

Methodology: Night field sampling was carried out across seasons at different locations (years 2015-25, Fig.1a). Calls were recorded on Tascam MKIII (40Hz-20kHz), Anabat and Pettersson D1000x bat detector (Frequency response: 5-235kHz) (Fig. 1b)

Eight call types from previously described acoustic assemblage data were also added[1,2].

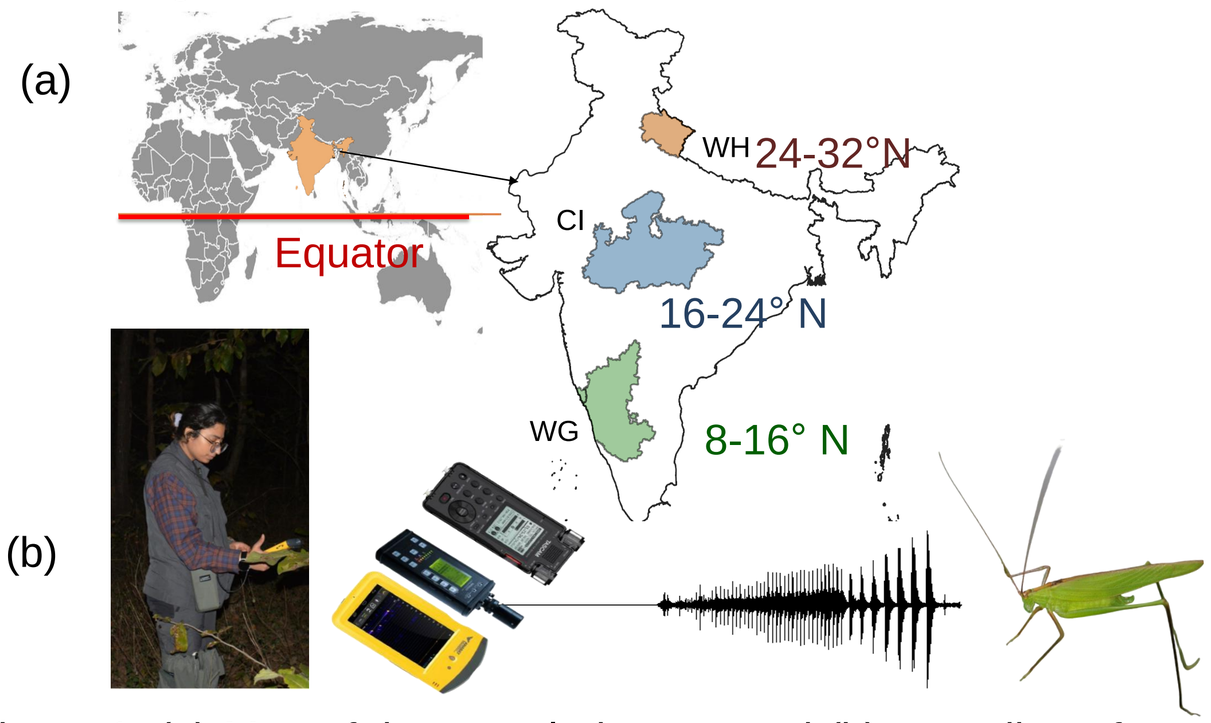

Figure 1: (a) Map of the sampled areas and (b) recording of an individual katydid in the field using sound recorders.

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RESULTS & DISCUSSION

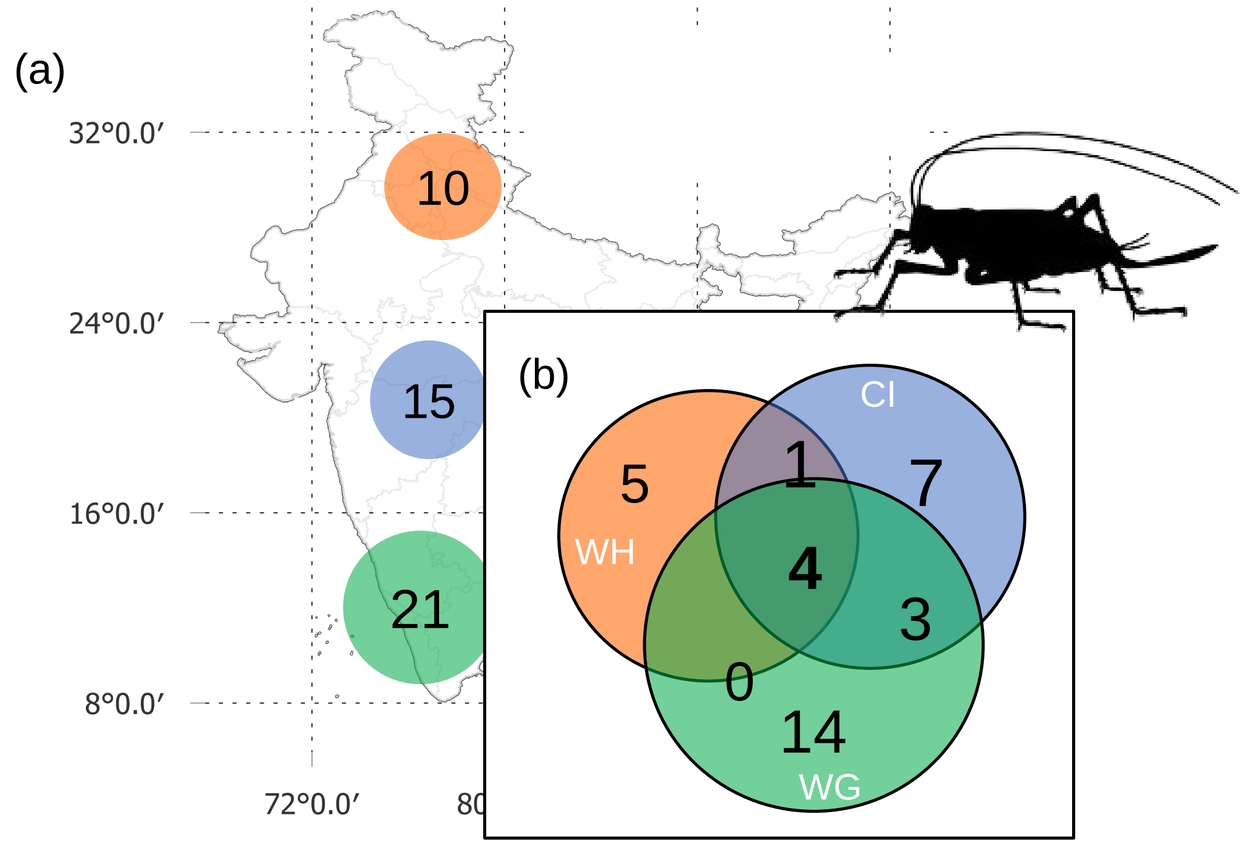

Figure 2: (a) Number of katydid call types found in the acoustic assemblage at three different latitude ranges. (b) Venn diagram of the acoustic assemblage from the three sites.

1. The latitude range closest to the equator had the highest katydid acoustic diversity (n=21) (Fig. 2a).
2. Four out of 34 total call types were found across all three latitude ranges (Fig. 2b, 3).

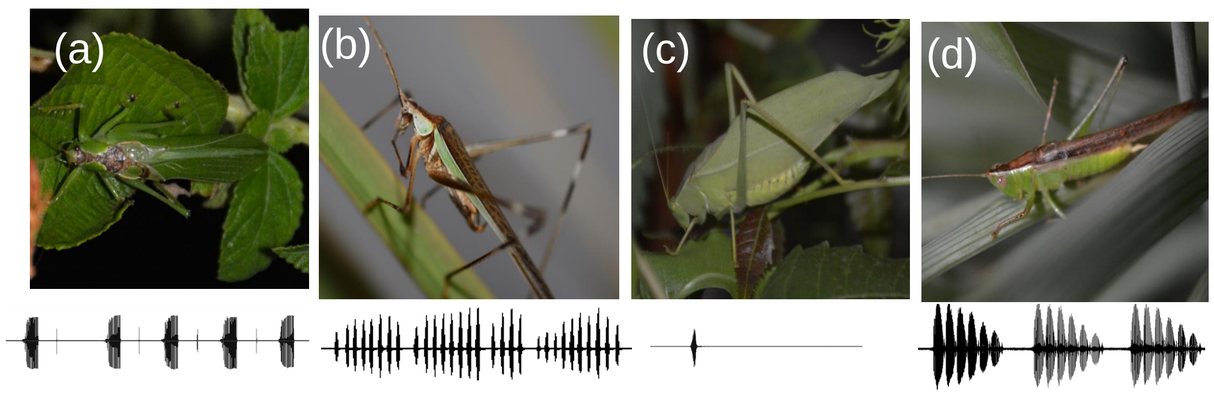

Figure 3: (a) *Hexacentrus unicolor,* (b) *Himertula kinnaeri*, (c*) Trigonocorypha unicolor*, (d) *Conocephalus maculatus*

CONCLUSION

- Acoustic diversity of katydids follows the general pattern of latitudinal biodiversity gradient.
- All latitudinal ranges are inhabited by distinct and unique katydid assemblages of vast acoustic diversity.

FUTURE WORK / REFERENCES

Future Work: Predicting the effect of anthropogenic changes on katydid species distribution and diversity through automated detection.

References:

1. Diwakar, S., & Balakrishnan, R. (2007). The assemblage of acoustically communicating crickets of a tropical evergreen forest in southern India: call diversity and diel calling patterns. Bioacoustics, 16(2), 113-135.
2. Tiwari, C., & Diwakar, S. (2023). The katydid country: bioacoustics and ecology of tettigoniid communities from the Indian subcontinent. *Bioacoustics*, *32*(1), 48-72.