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Acoustic Behavior of Southern Hill Myna (Gracula indica)

Arunima Lux

M.Sc. Forestry (Wildlife Management), MVR Institute of Life Science and Research Studies, Kerala, India

Abstract
Bird vocalizations are vital for communication, territory defense, and social interactions. This study investigates the acoustic behavior of the Southern Hill Myna *(Gracula indica)* in Kerala, India, focusing on variations in call structure and frequency using spectrographic analysis. Two distinct call types were identified with significant differences in frequency and duration. Call-1 exhibited higher frequencies and shorter duration, while Call-2 was characterized by lower frequencies and longer duration. These findings suggest functional divergence in vocalization, contributing to the understanding of avian communication and individual call variability in the species.

Keywords: Acoustic behavior, Southern Hill Myna, spectrogram, frequency, Raven Pro, vocalization

1. Introduction
Birds use vocalizations for a range of ecological and social functions. The Southern Hill Myna, endemic to the Western Ghats, is known for its complex vocal repertoire. Vocalization in birds is influenced by factors such as anatomy, habitat acoustics, and social context. This study aims to analyze vocal call structures in *Gracula indica* and understand intra-species variations through spectrographic patterns.

2. Materials and Methods
2.1 Study Area
The study was conducted at the Kerala Forest Research Institute (KFRI), Peechi, Thrissur. The site lies within the Western Ghats, offering a rich mix of evergreen and moist deciduous forests. Two locations were selected: the Medicinal Garden and Guest House area both habitats with regular Myna presence.
2.2 Data Collection
Vocal data were collected between January–March 2025 during peak activity hours. Recordings were made using Zoom H1n and Roland R-26 handheld recorders with shotgun microphones. WAV files were analyzed with Raven Pro 1.6 to visualize and measure acoustic features.
2.3 Spectrogram Analysis
Spectrograms were used to extract:
- Call Duration (s)
- Frequency Range (Hz)
- Peak Frequency
- Call Modulation

Calls were categorized and compared across individuals for variation.

3. Results

3.1 Call Typing

Two call types were consistently identified:

Call-1: Higher frequency (avg. 5550.57 Hz), shorter duration (avg. 0.59 s)
Call-2: Lower frequency (avg. 5109.67 Hz), longer duration (avg. 0.69 s)

3.2 Individual Variation

Each call type showed individual-specific variation in both frequency and duration, suggesting possible vocal signatures.

Table 1: Frequency and Duration of Call-1 and Call-2

Call Type	Frequency Range (Hz)	Duration Range (s)	Mean Frequency	Mean Duration
Call-1	5050–6125	0.46–0.83	5550.57	0.59
Call-2	4663–5630	0.51–0.93	5109.67	0.69

4. Discussion

The differences in frequency and duration indicate functional divergence in calls. Call-1 may be used for short-range communication, while Call-2 could serve long-distance alert or contact functions. Variability among individuals suggests influence of age, environment, or social dynamics.

5. Conclusion

The Southern Hill Myna exhibits distinct vocal behaviors with identifiable call types differing in frequency and duration. These calls likely serve separate functions within the species' communication system. This study contributes to avian bioacoustics and may support future work on vocal plasticity, mate communication, and habitat-driven acoustic adaptation.

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