



BIRD DIVERSITY IN RAJASTHAN: A PRELIMINARY STUDY

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Abstract

Rajasthan, India's largest state, presents a unique mosaic of arid, semi-arid, wetland, forest and grassland habitats that harbor significant avian diversity. This research synthesizes the existing literature on bird diversity across the region, highlighting taxonomic richness, distribution patterns, ecological drivers, conservation challenges and key sites such as the internationally renowned Keoladeo National Park and other landscapes like semi-arid sacred groves and protected areas. We discuss patterns of species richness and seasonal dynamics, the ecological significance of distinct habitats and the importance of long-term monitoring for conservation planning. The paper concludes with recommendations for research priorities and sustainable conservation strategies in Rajasthan.

1. Introduction

Birds are among the most conspicuous indicators of ecological health due to their sensitivity to environmental changes, broad geographic ranges and diverse ecological roles (Grimmett *et al.*, 2013). The Indian state of Rajasthan, covering nearly 342,239 km², spans desert, dry deciduous forests, wetlands and agricultural landscapes, creating a wide range of niches that support a high level of avifaunal diversity.

Avian diversity in Rajasthan reflects interactions between physical geography, climate and human land-use patterns. Understanding bird community patterns provides insights into ecosystem integrity and aids in setting conservation priorities within this ecologically fragile region (Manakadan and Pittie, 2001; Grimmett *et al.*, 2013). The objective of this study is to provide a comprehensive review of avian diversity research in Rajasthan, drawing from local and regional studies.

2. Overview of Rajasthan's Avifaunal Richness

Rajasthan forms part of India's northwest arid zone and semi-arid agroecosystems and has been reported to support a remarkable diversity of birds - approximately 473 to 510 bird species have been documented from different parts of the state across multiple surveys and checklists (Devarshi, 2004; Vyas and Rahmani, 2015). These records include residents, migrants and several globally threatened species, representing various ecological guilds.

Much of Rajasthan's documented diversity is due to heterogeneous habitats ranging from dry scrubland and grasslands to wetlands and riparian corridors. The region also lies on an important migratory corridor known as the Central Asian Flyway (CAF), which brings migratory waterfowl and shorebirds during winter months (Keoladeo National Park).

3. Key Avian Habitats in Rajasthan

3.1 Keoladeo National Park (Bharatpur)

Arguably Rajasthan's most iconic bird area, Keoladeo National Park - a UNESCO World Heritage Site and Ramsar wetland - supports one of India's richest avifaunas. It has recorded over 364–375 species of resident and migratory birds, drawing visitors and researchers globally (UNESCO). The park's wetlands, scrub forests, grasslands and woodlands provide habitat for waterfowl, waders, raptors and passerines. Seasonal variation in water levels drives changes in bird assemblages, with peak richness typically in winter due to large congregations of migrants.

Although historical changes in management (e.g., water scarcity and vegetation shifts) affect species composition, Keoladeo's avian community remains a cornerstone of Rajasthan's biodiversity. It plays a critical role for water birds like painted storks (*Mycteria leucocephala*), bar-headed geese (*Anser indicus*) and various ducks and cranes.

3.2 Semi-Arid Landscapes and Sacred Groves

Semi-arid regions, such as those in Udaipur and adjoining districts, support distinct bird communities influenced by vegetation structure and land use. A survey of sacred groves and adjacent habitats in Udaipur revealed 114 species inside groves and 100 in random landscape points, highlighting the conservation value of traditional ecological sites (sacred groves). These habitats often contain microclimatic refuges and remnant patches of natural vegetation, making them important for resident species and localized endemics.

3.3 Other Notable Areas

Other regions showing significant avian diversity include:

- **South Central Rajasthan** - A case study identified 270 species from 68 families, comprising resident and migratory birds, with a notable number of threatened taxa.

- **Jhunjhunu District** – Records 101 species, with long-term observations contributing baseline data on guild composition and conservation status.
- **Shergarh Wildlife Sanctuary** – Baran Atru region surveys document diverse habitat uses and multiple feeding guilds among birds.

Together these studies illustrate broad spatial variation in species composition across Rajasthan's landscapes.

4. Patterns of Species Diversity and Ecological Drivers

4.1 Seasonal Dynamics

Seasonality dramatically affects bird occurrence in Rajasthan due to migration and climatic variation. Cold winters attract waterfowl and passerine migrants, while hot dry summers see reduced numbers overall but increased detectability of resident arid species (Emlen, 1971).

4.2 Habitat Structure and Vegetation

Vegetation heterogeneity stands out as a primary driver of diversity. Wetlands with complex vegetation support numerous foraging niches, whereas scrublands and grasslands provide specialized habitats for desert and ground-nesting birds.

4.3 Feeding Guilds

Bird functional groups (insectivores, carnivores, omnivores, granivores) are often tied to resource availability. For instance, studies in South Rajasthan and Shergarh sanctuary show insectivorous and carnivorous birds dominate in certain habitats, reflecting prey abundance and ecological interactions.

5. Conservation Challenges

Despite rich diversity, several challenges threaten avian communities:

- **Habitat Loss and Alteration** – Landscape fragmentation and agricultural expansion affect habitat continuity.
- **Water Scarcity** – Especially in wetlands like Keoladeo National Park, where fluctuating water regimes influence bird use.
- **Endangered Species Declines** – Species like the lesser florican (*Sypheotides indicus*) and Great Indian Bustard (*Ardeotis nigriceps*) face critical declines due to habitat degradation and human pressures.

Multiple globally threatened species have been recorded in Rajasthan, underscoring the state's importance for conservation.

6. Conservation Strategies and Monitoring

- Effective conservation requires integrated strategies:
- Expanding protected areas and connecting remnant habitats.
- Maintaining hydrological regimes in key wetlands.
- Community involvement in bird conservation and eco-tourism.
- Long-term monitoring of populations and migratory patterns.
- Citizen science platforms like eBird contribute valuable data for trends and distributions.

7. Future Research Directions

Research priorities include:

- Standardized long-term monitoring across gradients of aridity and land use.
- Detailed studies on migratory pathways and climate effects.
- Functional and phylogenetic diversity analysis to understand ecosystem resilience.

8. Conclusion

Rajasthan hosts a remarkable array of avian diversity associated with its heterogeneous landscapes and climatic variability. From globally significant wetlands like Keoladeo National Park to scrub, grassland and semi-arid groves, the state exemplifies how habitat diversity shapes bird communities. Conservation efforts must build on existing baseline studies to safeguard this avifaunal richness in the face of anthropogenic change.

9. References

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