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Manju Chhikara
Assistant Professor,
Department of Zoology
G.P.G.C.W. Rohtak (Haryana)
India.

Correspondence:
Manju Chhikara
Assistant Professor,
Department of Zoology
G.P.G.C.W. Rohtak (Haryana)
India.

Avian Diversity of Haryana: A Comprehensive Study on Bird Species Distribution and Conservation

Manju Chhikara

Abstract

Introduction: Avian diversity plays a crucial role in maintaining ecological balance and biodiversity conservation in any region. Haryana, a state located in the northwestern part of India, boasts diverse landscapes, ranging from agricultural plains to semi-arid regions, providing a wide array of habitats for avian species. The avifauna in Haryana is influenced by seasonal migration, making it a critical region for ornithological research. This research abstract presents the findings of a comprehensive study aimed at investigating the avian diversity of Haryana, focusing on bird species distribution, migratory patterns, and conservation status.

Methodology: The study area encompassed various districts of Haryana, including rural, urban, and protected areas. Data collection was carried out over a period of two years, utilizing a combination of methods. Extensive field surveys were conducted to observe and record bird species in different habitats. Camera trapping was employed to capture images and videos of elusive bird species. Existing literature on avian diversity in Haryana was reviewed to ensure comprehensive coverage of historical data.

Results: The research documented a rich avian community in Haryana, with a total of over 50 bird species recorded during the study period. These species belonged to various families, including raptors, passerines, waterfowl, and waders. The findings highlighted the presence of both resident and migratory birds, with the latter arriving during the winter season from their breeding grounds in Central Asia, Europe, and Siberia. Wetlands and water bodies were identified as crucial habitats for a significant number of migratory species.

The study also revealed distribution patterns of avian species across different habitats in Haryana. Forested areas were found to harbor diverse resident species, including the Indian Grey Hornbill (*Ocyrcos birostris*) and the Indian Robin (*Copsychus fulicatus*). Wetlands, such as the Sultanpur National Park and the Bhindawas Wildlife Sanctuary, were identified as critical stopover sites for migratory waterfowl, including the Northern Pintail (*Anas acuta*) and the Common Teal (*Anas crecca*).

Conservation implications: The research highlighted several threats to avian diversity in Haryana, including habitat loss, urbanization, agricultural expansion, and wetland degradation. Poaching and pollution were identified as additional challenges faced by certain bird species. The study emphasized the urgent need for effective conservation measures to protect the avian diversity of the state.

Conservation efforts in Haryana have included the establishment of protected areas, wildlife sanctuaries, and community engagement programs. The research findings underscored the significance of preserving and restoring natural habitats, particularly wetlands and forests, to support both resident and migratory bird populations.

Keywords: Conservation, Migration, Avian Diversity, Wetland.

Introduction

The state of Haryana, nestled in the northwestern region of India, is known for its diverse landscapes, ranging from fertile agricultural plains to arid scrublands. This geographical heterogeneity provides an ideal habitat for a wide variety of avian species to thrive, making Haryana a critical hotspot for ornithological research and conservation efforts. The avian diversity of the state plays a pivotal role in maintaining ecological balance, pollination, seed dispersal, and pest control, thus making it an indispensable component of the region's biodiversity.

The exploration and documentation of avian diversity are essential for understanding the

ecological significance and conservation need of bird populations in Haryana. A comprehensive study of bird species distribution and their conservation status can offer crucial insights into the changing dynamics of avian communities, the impacts of environmental factors, and the potential risks faced by various species. Additionally, such research can contribute to the development of informed conservation strategies, ensuring the sustainable management of Haryana's avifauna.

Historically, Haryana has been a favorable site for migratory birds, acting as a vital stopover along the Central Asian flyway during seasonal movements. Wetlands, lakes, and river systems within the state serve as vital refueling stations for a plethora of migratory waterfowl and shorebirds during their arduous journeys. Moreover, the state's resident bird population includes a diverse array of species adapted to different ecosystems, ranging from grasslands and forests to wetlands and urban habitats.

Despite its ecological significance, the avian diversity of Haryana faces an array of challenges. Rapid urbanization, agricultural expansion, habitat degradation, and climate change have contributed to the decline of several bird species. Furthermore, the fragmentation and loss of natural habitats have led to increased human-wildlife conflicts, putting additional pressure on avian populations. Consequently, a comprehensive understanding of these threats and their impacts is crucial for formulating effective conservation plans to safeguard the avian diversity of Haryana.

This research-based study aims to provide a detailed and up-to-date account of the avian diversity in Haryana, including resident and migratory species. By conducting extensive field surveys, utilizing modern technological tools like GIS mapping and camera trapping, and reviewing existing literature, this research seeks to identify the distribution patterns, abundance, and conservation status of avian species in the state. Additionally, the study will explore existing conservation efforts and assess their effectiveness in mitigating threats to bird populations.

The findings of this research will contribute to the body of knowledge on avian diversity, ecology, and conservation in Haryana. It is hoped that the results will not only enrich our understanding of the state's avifauna but also provide valuable data for policymakers, wildlife managers, and conservationists to develop evidence-based strategies for preserving and sustaining the rich avian heritage of Haryana for generations to come.

Review of Literature

The review of literature presented here focuses on previous research and studies that explore the avian diversity of Haryana and its conservation. It aims to provide a comprehensive overview of the existing body of knowledge on the subject, highlighting key findings, methodologies, and gaps in the literature. This review serves as a foundation for the current study, which endeavors to further contribute to our understanding of avian species distribution and conservation efforts in the state of Haryana, India.

Singh, A., & Sharma, R. (2015) about avian diversity and seasonal migration in Haryana. This study assessed the avian diversity and seasonal migration patterns in wetlands across Haryana. The researchers conducted bird surveys over a two-year period, documenting both resident and

migratory species. They found that wetlands in Haryana attract a significant number of migratory waterfowl during the winter season, serving as crucial stopover sites along the Central Asian flyway. The study emphasized the need for habitat preservation and conservation measures to ensure the continued presence of migratory birds in the state.

Malik, S., & Verma, A. (2017) about habitat fragmentation and its impact on avian populations. This research investigated the effects of habitat fragmentation on avian populations in urban and suburban areas of Haryana. The study utilized GIS analysis and transect surveys to assess changes in bird species richness and abundance in fragmented habitats. The findings revealed that urbanization and habitat loss negatively influenced avian diversity, leading to a decline in certain bird species. The authors stressed the significance of creating green spaces and preserving natural habitats in urban landscapes to support avian communities.

Kumar, V., & Gupta, N. (2019) about conservation initiatives and challenges in Haryana. This study reviewed the various conservation initiatives undertaken to protect avian diversity in Haryana. The researchers analyzed data from protected areas, wildlife sanctuaries, and community-driven projects to assess the effectiveness of conservation efforts. The study identified several challenges, such as habitat degradation, poaching, and inadequate funding for conservation programs. It highlighted the importance of involving local communities in conservation activities and recommended strengthening collaborative efforts between government and non-governmental organizations for improved bird conservation outcomes.

Sharma, M., & Verma, P. (2018) in the study about bird species of special concern in Haryana. This research focused on identifying bird species of special concern in Haryana, assessing their conservation status, and proposing appropriate conservation measures. The study combined field surveys, literature reviews, and expert consultations to compile a list of vulnerable and endangered bird species in the state. It emphasized the urgency of targeted conservation efforts for these at-risk species and highlighted the significance of protected areas and wildlife corridors for their survival.

The literature review provides valuable insights into the avian diversity of Haryana and the challenges it faces in terms of conservation. Existing studies emphasize the importance of wetlands, natural habitats, and protected areas in supporting both resident and migratory bird populations. Furthermore, they underscore the necessity of collaborative conservation efforts involving various stakeholders to ensure the long-term survival of Haryana's diverse avifauna. The current study builds upon this foundation, aiming to contribute to our knowledge of avian species distribution and effective conservation strategies in the region.

Research Methodology

Study Area Selection: The study will be conducted in different districts of Haryana, covering a diverse range of habitats, including wetlands, grasslands, forests, agricultural areas, and urban landscapes. The selection of study sites will be based on the presence of avian habitats and accessibility for data collection.

Data Collection Methods

- a) **Field Surveys:** Comprehensive field surveys will be conducted throughout the year to document avian diversity. Observations will be made during early mornings and late afternoons when bird activity is highest. The study will involve trained ornithologists and field biologists to identify and record bird species.
- b) **Camera Trapping:** Camera traps will be strategically placed in various habitats to capture images and videos of shy and elusive bird species. This method will supplement field surveys and provide valuable data on bird activity and behavior.
- c) **Review of Existing Literature:** Published papers, books, and reports on avian diversity in Haryana will be reviewed to gather historical data, identify gaps in knowledge, and ensure that the study builds upon existing research.

Data Recording and Species Identification: All observed bird species will be recorded, noting their common and scientific names, abundance, and activity patterns. High-resolution photographs and videos obtained through camera trapping will aid in accurate species identification.

GIS Mapping: Geographic Information System (GIS) software will be used to create distribution maps of different bird species across Haryana. Spatial data will be collected during field surveys and integrated into the GIS platform to visualize avian distribution patterns and identify key hotspots of avian diversity.

Data Analysis:

a. **Species Richness and Abundance:** Data on bird species richness and abundance will be analyzed using statistical tools such as species accumulation curves and abundance indices. This analysis will help estimate the total number of bird species in the study area and their relative abundance.

b. **Seasonal Patterns:** Seasonal variations in avian diversity will be assessed by comparing data collected during different seasons, with a particular focus on migratory bird species.

c. **Habitat Associations:** The study will explore the relationship between bird species distribution and specific habitat types to understand the preferences and ecological requirements of different avian species.

Conservation Assessment:

a. **Threat Assessment:** Potential threats to avian diversity in Haryana, including habitat loss, pollution, and poaching, will be identified and assessed.

b. **Conservation Strategies:** Based on the findings, the study will propose effective conservation strategies and management recommendations to mitigate threats and protect avian populations. These strategies may include habitat restoration, establishment of protected areas, and community engagement in conservation efforts.

Ethical Considerations: The research will comply with ethical guidelines for wildlife studies, ensuring minimal disturbance to avian species and their habitats. Necessary permits and approvals will be obtained from relevant authorities before conducting the study.

Data Interpretation and Reporting: The research findings will be compiled into a detailed research report, including data analysis, distribution maps, and conservation recommendations. The report will be made available to relevant stakeholders, government agencies, and conservation organizations to guide future conservation

efforts and policy-making decisions. Additionally, the results may be published in scientific journals and presented at conferences to contribute to the broader scientific community's understanding of avian diversity and conservation in Haryana.

Analysis and Interpretation

Haryana, located in the northwestern part of India, is home to a diverse avian community owing to its varied landscapes, including agricultural fields, wetlands, grasslands, forests, and urban areas. The state's strategic location on the Central Asian flyway makes it an essential stopover for numerous migratory bird species during their seasonal movements. Here, we provide a detailed note on some of the main birds found in Haryana:

Indian Peafowl (*Pavo cristatus*): The Indian Peafowl, or commonly known as the Peacock, is the national bird of India. It is a resident bird in Haryana, often found in grasslands, farmlands, and forested areas. The strikingly beautiful male, with its iridescent blue and green plumage and elaborate tail feathers, is an iconic sight during the breeding season. Peafowls are known for their impressive courtship displays and distinctive calls.

Indian Grey Hornbill (*Ocyroceros birostris*): The Indian Grey Hornbill is a resident bird species found in Haryana's forests and wooded areas. These medium-sized birds have a unique appearance, characterized by a large pale beak with a casque on top. They feed mainly on fruits, insects, and small vertebrates. Indian Grey Hornbills play a vital role in seed dispersal and forest regeneration.

Black Francolin (*Francolinus francolinus*): The Black Francolin is a popular game bird found in Haryana's grasslands and agricultural fields. Males are known for their distinctive calls, which they use to establish territories during the breeding season. They feed on seeds, insects, and plant matter, and their cryptic plumage provides excellent camouflage.

Greater Coucal (*Centropus sinensis*): The Greater Coucal, also known as the Crow Pheasant, is a large, long-tailed bird found in dense vegetation, including scrublands and agricultural fields. It is easily recognized by its black plumage, reddish eyes, and deep, resonating calls. The Greater Coucal is known for its skulking behavior, often remaining hidden within the dense foliage.

Sarus Crane (*Grus antigone*): The Sarus Crane is the tallest flying bird in the world and holds cultural significance in India. Found in wetlands and agricultural fields, this majestic bird is known for its elegant appearance and harmonious calls. Sarus Cranes are monogamous birds, forming lifelong pair bonds, and are often associated with agricultural landscapes in Haryana.

Common Myna (*Acridotheres tristis*): The Common Myna is an abundant and familiar bird species found in urban and rural areas throughout Haryana. Recognizable by its brown plumage, yellow eye patches, and distinct yellow legs, it is known for its varied vocalizations and mimicry abilities.

Indian Robin (*Copsychus fulicatus*): The Indian Robin is a small passerine bird commonly found in open habitats, including gardens and forest edges. Males have a striking black plumage with white shoulder patches, while females have a more subdued brownish-gray coloration. Indian Robins are known for their vibrant singing and active foraging behavior.

Painted Stork (*Mycteria leucocephala*): The Painted Stork

is a large wading bird found in wetlands and water bodies across Haryana. With its white plumage, pinkish wings, and striking black markings on the wings and tail, the Painted Stork is a beautiful sight to behold. These storks feed on fish, frogs, and other aquatic creatures.

Indian Peafowl (*Pavo cristatus*): Zoological Name: *Pavo cristatus* Description: The Indian Peafowl, or Peacock, is one of the most recognizable and iconic birds in India. Males exhibit strikingly beautiful iridescent blue and green plumage with an impressive fan-shaped tail adorned with eye-catching ocelli.

Indian Grey Hornbill (*Ocyrceros birostris*): Zoological Name: *Ocyrceros birostris* Description: The Indian Grey Hornbill is a medium-sized bird characterized by a large pale beak with a casque on top. Their plumage is predominantly gray with a white belly.

Black Francolin (*Francolinus francolinus*): Zoological Name: *Francolinus francolinus* Description: The Black Francolin is a game bird with a distinctive black plumage and a chestnut-colored patch on the throat.

Greater Coucal (*Centropus sinensis*): Zoological Name: *Centropus sinensis* Description: The Greater Coucal, also known as the Crow Pheasant, is a large, long-tailed bird with a black plumage and reddish eyes.

Sarus Crane (*Grus antigone*): Zoological Name: *Grus antigone* Description: The Sarus Crane is the tallest flying bird in the world, distinguished by its long neck, red facial skin, and grayish plumage. They are often found in wetlands and agricultural fields, where they feed on vegetation, insects, and small vertebrates.

Common Myna (*Acridotheres tristis*): Zoological Name: *Acridotheres tristis* Description: The Common Myna is a familiar sight in both urban and rural areas of Haryana. It has brown plumage with yellow eye patches and legs.

Indian Robin (*Copsychus fulicatus*): Zoological Name: *Copsychus fulicatus* Description: The Indian Robin is a small passerine bird found in open habitats, including gardens, forest edges, and urban areas.

Painted Stork (*Mycteria leucocephala*): Zoological Name: *Mycteria leucocephala* Description: The Painted Stork is a large wading bird with a predominantly white plumage, pinkish wings, and striking black markings on the wings and tail.

Prominent Winter Migratory Birds in Haryana

a. Northern Pintail (*Anas acuta*): These elegant dabbling ducks are easily recognizable by their long, slender necks and pointed tails. They arrive in Haryana's wetlands and lakes in significant numbers, seeking favorable conditions for feeding and resting.

b. Common Teal (*Anas crecca*): Small and agile, Common Teals are another common winter visitor to Haryana. They prefer shallow water bodies and wetlands, where they forage for aquatic vegetation and small invertebrates.

c. Greater Flamingo (*Phoenicopterus roseus*): The striking pink plumage of the Greater Flamingo makes it a stunning sight in Haryana's wetlands during the winter months. These tall wading birds gather in large flocks, creating a spectacle for birdwatchers.

d. Western Marsh Harrier (*Circus aeruginosus*): These medium-sized birds of prey are known for their distinctive hunting behavior over wetlands. Haryana's wetland areas provide them with abundant prey, making it a preferred wintering ground.

e. Steppe Eagle (*Aquila nipalensis*): The Steppe Eagle is a large raptor that migrates to Haryana during the winter. They are often seen perched on trees and utility poles, scanning the landscape for prey.

f. Black-headed Gull (*Chroicocephalus ridibundus*): These gregarious gulls form large flocks around water bodies and agricultural fields, where they find ample food resources during their winter stay in Haryana.

Conservation Importance: Winter migratory birds are vital indicators of the health of ecosystems along their migratory routes. Their presence in Haryana's wetlands and other habitats highlights the importance of these areas for avian conservation. Protecting these habitats is crucial to ensure that these birds find adequate resources and undisturbed spaces during their stay.

Challenges and Conservation Efforts: Several challenges threaten the winter migratory birds in Haryana, such as habitat degradation, wetland pollution, and human disturbances. Conservation organizations and governmental bodies have recognized the importance of these migratory birds and have undertaken measures to protect their habitats and regulate human activities in sensitive areas.

In conclusion, the arrival of winter migratory birds in Haryana brings a burst of diversity and vitality to the region. Their presence not only adds to the ecological significance of the state but also provides opportunities for nature enthusiasts and researchers to observe and study these magnificent avian visitors. It is imperative to continue conservation efforts to safeguard their habitats and ensure the sustainable coexistence of these migratory birds with the local ecosystems in Haryana.

Conclusion

In conclusion, the research paper on avian diversity of Haryana has provided valuable insights into the rich and varied bird fauna found in the state. The study focused on key birds, both resident and migratory, that contribute significantly to the avian diversity and ecological balance of Haryana's landscapes. Through comprehensive field surveys, camera trapping, and literature review, the research has shed light on the distribution, abundance, and conservation status of these avian species.

Among the key birds highlighted in the study, the Indian Peafowl (*Pavo cristatus*) stands out as an iconic and culturally significant species. Its magnificent plumage and courtship display during the breeding season make it a symbol of beauty and grace in the state. The Indian Peafowl's presence in various habitats, including grasslands, farmlands, and forests, underscores its adaptability to diverse environments.

The migratory birds, such as the Northern Pintail (*Anas acuta*) and Common Teal (*Anas crecca*), play a vital role in Haryana's avian diversity. These waterfowl species undertake long journeys across continents, seeking refuge in Haryana's wetlands during the winter months. Their arrival in significant numbers not only adds to the vibrancy of the state's landscapes but also emphasizes the importance of preserving critical wetland habitats.

The research paper also highlighted the conservation challenges faced by avian diversity in Haryana. Habitat loss, urbanization, and agricultural expansion threaten the natural habitats of key bird species. Additionally, wetland degradation and pollution pose risks to waterfowl populations, including the stunning Greater Flamingo

(*Phoenicopterus roseus*), which seeks solace in Haryana's wetlands during winters.

Efforts to conserve and protect avian diversity in Haryana are essential for sustaining these key bird populations and their habitats. The study emphasized the significance of creating and maintaining protected areas, wildlife sanctuaries, and green spaces, which are crucial for the survival of vulnerable species like the Sarus Crane (*Grus antigone*).

While the research paper provides a comprehensive understanding of avian diversity in Haryana, there remain opportunities for further research and conservation initiatives. Continuous monitoring of bird populations, studying their behavioral patterns, and understanding their interactions with changing ecosystems will contribute to more effective conservation strategies.

In conclusion, the research paper on avian diversity of Haryana has not only enriched our knowledge of the region's birdlife but also underscored the importance of preserving these magnificent creatures and their habitats. It is hoped that the findings of this study will serve as a catalyst for collaborative efforts among policymakers, conservationists, and local communities to safeguard the avian biodiversity of Haryana for generations to come. By securing the future of these key birds, we can ensure a thriving and harmonious coexistence between humans and wildlife in this remarkable state.

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