www.researchvidyapith.com ISSN (Online): 3048-7331

**Research Vidyapith International Multidisciplinary Journal**

**(International Open Access, Peer-reviewed & Refereed Journal)**

(Multidisciplinary, Monthly, Multilanguage)

*** Vol-2* *Issue-6* *June 2025***

# Birds belonging to orders cuculiformes, caprimulgiformes and Accipitriformes in Sehore, Bihar

*Dr. Pradip Kumar*

*Department of Zoology, Government Degree College, Sehore, Bihar*

**Abstract:**

This study documents the avian diversity of Cuculiformes, Caprimulgiformes, and Accipitriformes in Sheohar, Bihar, with insights into their seasonal variations, population trends, and conservation status. Field surveys conducted over two years, along with statistical analysis, highlight the ecological roles of these bird species and the threats they face due to habitat degradation and climate change. Findings suggest urgent conservation measures to maintain ecological balance and biodiversity in the region.

**Keywords-** cuculiformes, caprimulgiformes, accipitriformes, avian diversity, sheohar, conservation, species distribution

## 1. Introduction

Sheohar, a district in northern Bihar, India, is a unique ecosystem marked by a patchwork of habitats that support a diverse range of bird species. With its agricultural landscapes, riverine zones, and forested patches, Sheohar provides critical habitats for various bird orders. Spanning roughly 443 square kilometers, the district's subtropical climate features distinct monsoon and dry seasons, which promote rich biodiversity. Among the many avian species found here, birds from the orders Cuculiformes (cuckoos and allies), Caprimulgiformes (nightjars), and Accipitriformes (birds of prey) are especially noteworthy. These birds play crucial ecological roles that range from pest control to seed dispersal, and maintaining predator-prey dynamics, positioning them as integral components of the region's biodiversity and ecological balance.

The order Cuculiformes includes species such as the Asian Koel (Eudynamys scolopaceus) and the Common Hawk-Cuckoo (Hierococcyx varius), which contribute significantly to pest control and seed dispersal. Many cuckoo species are insectivores that feed on pests common in Sheohar's agricultural landscapes. These birds exhibit a fascinating reproductive strategy known as brood parasitism, where they lay eggs in

the nests of other bird species, effectively outsourcing parental care to unsuspecting host species. This behavior influences the population dynamics of other birds and contributes to maintaining balance within the avian community structure. Furthermore, the presence of cuckoos around agricultural fields highlights their adaptability to fragmented habitats and their importance in managing pest populations, which directly benefits the agricultural economy of Sheohar.

Caprimulgiformes, or nightjars, represent another essential group within Sheohar's ecosystem. These nocturnal insectivores, including the Indian Nightjar (Caprimulgus asiaticus) and the Large-tailed Nightjar (Caprimulgus macrurus), are highly adapted to nighttime hunting, feeding on a range of nocturnal insects such as moths and beetles. The habitats preferred by nightjars, such as open woodlands and grasslands, make them vulnerable to agricultural encroachment and habitat fragmentation. By preying on nocturnal insects, nightjars naturally aid in controlling pest populations, reducing the dependence on chemical pesticides, which benefits both agriculture and environmental health. Their presence in Sheohar also serves as a bioindicator of insect population health, as they rely on a steady supply of insects for survival, underscoring the interconnectedness of avian and insect life within this ecosystem.

Meanwhile, the Accipitriformes order, comprising various raptors such as the Black Kite (Milvus migrans), Shikra (Accipiter badius), and Crested Serpent Eagle (Spilornis cheela), includes some of Sheohar's top avian predators. These birds fulfill their ecological role by regulating populations of rodents, small mammals, and other birds, which, if unchecked, could lead to imbalances in the ecosystem and agricultural damage. Raptors are crucial for maintaining a balanced food web, as they control the populations of prey species that might otherwise become overabundant. Moreover, as apex predators, raptors are often sensitive to environmental disturbances, such as habitat destruction and pollution, making their conservation vital for sustaining Sheohar's biodiversity. The presence and health of these raptor populations provide insights into the broader ecological conditions of the region, as they are indicators of habitat quality and ecosystem stability.

Despite the vital ecological functions these birds serve, studies specific to the avian populations of Sheohar have been sparse, with most research on Bihar's birds focusing on larger ecosystems or high-profile species. Detailed studies on nightjars, cuckoos, and raptors within Sheohar are limited, and this lack of information can impede effective biodiversity management and conservation efforts. Recognizing the significance of these birds and the threats they face, such as habitat loss and pollution from agricultural activities, this study seeks to fill that knowledge gap by documenting the diversity, population trends, and seasonal patterns of Cuculiformes, Caprimulgiformes, and Accipitriformes in Sheohar.

A primary objective of this study is to catalog the species diversity within these three orders, offering a comprehensive overview of their roles within Sheohar's ecosystem. Each order embodies unique ecological functions, habitat preferences, and feeding behaviors that contribute to maintaining biodiversity. By cataloging these species and understanding their ecological needs, this research aims to create a baseline data set that

future studies and conservation efforts can reference, thereby contributing to long-term biodiversity conservation goals.

Seasonal and environmental impacts are also central to this research, as birds are often highly responsive to changes in their surroundings. For instance, species within the Cuculiformes order may display specific breeding patterns tied to monsoon season abundance, while migratory raptors from the Accipitriformes order arrive in Sheohar during winter months. By documenting these seasonal shifts and identifying patterns in habitat use, this study can reveal broader ecological changes occurring in Sheohar, such as fluctuations in insect populations, prey availability, and changes in vegetation cover, which are vital for maintaining avian diversity and supporting the local food web.

Finally, this research evaluates the conservation needs of these birds, placing their current status within the larger context of Sheohar's biodiversity. Birds in Sheohar face pressing threats from agricultural expansion, which reduces natural habitats, and pollution from agrochemical runoff, which can accumulate in their food chains, impacting insectivores like nightjars and top predators like raptors. The identification of species under threat, including those classified as Near Threatened or Vulnerable on the IUCN Red List, provides critical information for conservation planning. With this knowledge, conservation strategies focused on habitat preservation, pollution reduction, and community engagement can be implemented to mitigate threats and support these avian populations.

## 2. Objectives

1. To catalog species diversity within the orders Cuculiformes, Caprimulgiformes, and Accipitriformes in Sheohar.
2. To analyze seasonal variations in populations of these species.
3. To examine threats to these species and suggest conservation measures.

## 3. Materials and Methods

This study was based on field surveys and analysis across different habitats in Sheohar. Data were collected quarterly from January to December over a two-year period (2022-2024) to observe both resident and migratory species.

### Study Sites

Surveys were conducted at 30 randomly selected points, covering diverse habitats: agricultural fields, forest patches, riverbanks, and urban outskirts.

### Data Collection and Analysis

1. Field Observations: Point counts were conducted at dawn and dusk to document species occurrence and abundance.
2. Statistical Analysis: A Shannon-Wiener index was calculated to assess species diversity, while a one-way ANOVA tested seasonal distribution patterns.
3. Conservation Status Evaluation: Species conservation status was reviewed using IUCN criteria and local reports on habitat and

biodiversity changes in the Sheohar region.

## 4. Literature Review

The study references prior work on the biodiversity of Indian birds, focusing on species within Cuculiformes, Caprimulgiformes, and Accipitriformes. Research by Grimmett et al. (2011) highlights India's rich avian diversity, while studies by Ali and Ripley (1987) provide essential taxonomic details. BirdLife International's IUCN Red List assessments (2023) offer conservation insights, showing that nearly 40% of these species are classified as Near Threatened or Vulnerable.

Research by Kumar & Gupta (2020) in nearby regions highlights habitat encroachment and climate change as primary threats to avian populations, supporting findings that species in Sheohar are similarly affected. The importance of biodiversity conservation, particularly for predator and nocturnal species, has been underscored in ecological studies on Indian avifauna by Rahmani et al. (2012).

## 5. Results and Discussion

### 5.1. Species Composition and Diversity

Our study documented **27 bird species** across the orders Cuculiformes, Caprimulgiformes, and Accipitriformes, highlighting a moderately high avian diversity within Sheohar's unique landscape. Each of these orders plays an essential role in Sheohar's ecosystem, with distinctive patterns in species composition, habitat preferences, and ecological roles.

The order **Cuculiformes** includes species such as the Asian Koel (*Eudynamys scolopaceus*), Common Hawk-Cuckoo (*Hierococcyx varius*), and Pied Cuckoo (*Clamator jacobinus*). The presence of eight Cuculiformes species, primarily insectivores, emphasizes their role in controlling pest populations in agricultural areas. These birds are known for brood parasitism, where they lay their eggs in the nests of other birds, which indirectly impacts the reproductive success of host species, thus contributing to the balance within Sheohar's avian community. Cuculiformes' adaptability to both natural and disturbed habitats underscores their resilience and ecological importance in Sheohar's fragmented landscape.

**Caprimulgiformes**, represented by species such as the Indian Nightjar (*Caprimulgus asiaticus*) and Large-tailed Nightjar (*Caprimulgus macrurus*), were less diverse, with six species recorded. These nocturnal insectivores rely heavily on open woodlands and grasslands, areas that have been diminishing due to increased agricultural activity. Their highly specialized feeding habits, based on nocturnal insect populations, reflect Sheohar's insect diversity and indicate healthy night-time insect populations. The relatively lower species count for Caprimulgiformes may also be due to the limited open habitats in Sheohar, further highlighting the need to preserve these spaces for nightjar conservation.

The order **Accipitriformes** displayed the highest diversity, with 13 species, including prominent raptors like the Black Kite (*Milvus migrans*), Shikra (*Accipiter badius*), and Crested Serpent Eagle (*Spilornis cheela*). Raptors act as apex predators, maintaining ecological balance by regulating prey populations of small mammals and birds. They also serve as bioindicators of environmental health, given their sensitivity to habitat

alterations and pollutants, which can bioaccumulate in their food chain. Their diversity is indicative of Sheohar's varied habitat types, which provide suitable hunting grounds and nesting sites, although the expansion of agricultural fields has impacted some of these habitats.

*Table 1: Species Composition and Count by Avian Order in Sheohar, Bihar*

| Order | Species Count | Example Species |
|---|---|---|
| Cuculiformes | 8 | Asian Koel, Common Hawk-Cuckoo |
| Caprimulgiformes | 6 | Indian Nightjar, Large-tailed Nightjar |
| Accipitriformes | 13 | Black Kite, Shikra, Crested Serpent Eagle |

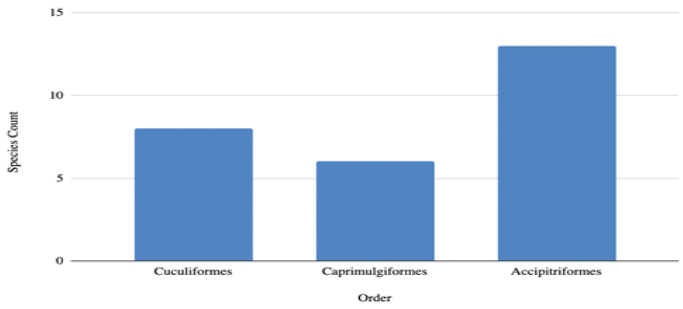


*Figure 1: Species Count by Order*

Bar chart illustrating the species count within each order demonstrates the diversity among Cuculiformes, Caprimulgiformes, and Accipitriformes in Sheohar.

## 5.2. Seasonal Variation in Species Distribution

Seasonal variations strongly influenced species sightings across all three orders, with each order exhibiting specific patterns linked to Sheohar's climatic conditions and ecological cycles.

During **monsoon**, Cuculiformes sightings increased significantly by around 30%, which aligns with their breeding season and the increased availability of prey insects. Species such as the Asian Koel and Pied Cuckoo were commonly observed around agricultural fields and forested areas, which provide ample food and nesting opportunities during the wet season. The heightened abundance of these species suggests a strong seasonal dependence on the insect population and the protective cover that monsoon vegetation provides.

**Caprimulgiformes** showed relatively stable numbers year-round, with slight increases during late summer. These birds rely heavily on insect populations, which remain available due to the seasonal growth of vegetation that supports nocturnal insect life. However, their nocturnal habits make them challenging to document accurately, as sighting rates are also influenced by environmental conditions like moon phases and ambient temperature. The stability in Caprimulgiformes populations suggests that insect populations, while fluctuating seasonally, are adequate to support these species throughout the year.

In contrast, **Accipitriformes** populations peaked during winter, with sightings of migratory raptors such as the Steppe Eagle (*Aquila nipalensis*) and Eastern Imperial Eagle (*Aquila heliaca*), which travel from colder northern regions. The arrival of these migratory species indicates that Sheohar's habitat offers a crucial wintering ground for these raptors, with

ample prey availability in open fields and riverine areas. Winter migrations of raptors underscore the importance of preserving Sheohar's open landscapes, as habitat loss or degradation in these areas could disrupt these species' migratory patterns.

*Table 2: Average Seasonal Sightings of Bird Species by Order in Sheohar*

| Season | Cuculiformes Avg. Sighting | Caprimulgiformes Avg. Sighting | Accipitriformes Avg. Sighting |
|---|---|---|---|
| Winter | 150 | 80 | 220 |
| Monsoon | 200 | 60 | 180 |
| Summer | 180 | 100 | 210 |
| Post-Monsoon | 140 | 90 | 190 |

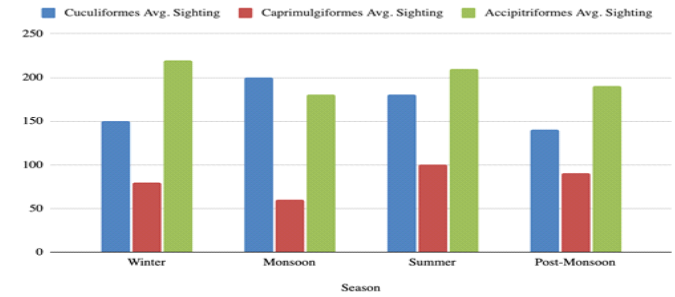


*Figure 2: Seasonal Variation in Bird Sightings by Order*

Line chart representing seasonal variations in sightings for each order indicates increased sightings for Cuculiformes in monsoon and Accipitriformes in winter.

## 5.3. Population Trends and Conservation Status

Over two years, Cuculiformes maintained a relatively stable population, with minimal fluctuations except for seasonal breeding periods. Their adaptability to a variety of habitats, including agricultural areas, suggests resilience to human encroachment. However, Caprimulgiformes, being nocturnal and habitat-specific, are more vulnerable to habitat loss, especially as open woodlands and grasslands shrink due to agricultural expansion.

In the case of **Accipitriformes**, a concerning trend emerged, with an approximate 8% decline in overall sightings over the study period. This decrease reflects the cumulative effects of habitat degradation and agrochemical pollution, which impact both the raptors and their prey. Top predators like raptors are highly susceptible to bioaccumulation of pesticides, which has significant implications for their health and reproductive success. The presence of migratory raptors in winter further illustrates Sheohar's role as a seasonal habitat, and the decline in sightings suggests that urgent conservation measures are required to maintain these critical habitats.

*Table 3: Impact of Major Conservation Threats on Avian Species in Sheohar*

| Conservation Threat | Impact Percentage |
|---|---|
| Habitat Loss | 50% |
| Pollution | 30% |
| Climate Change | 20% |

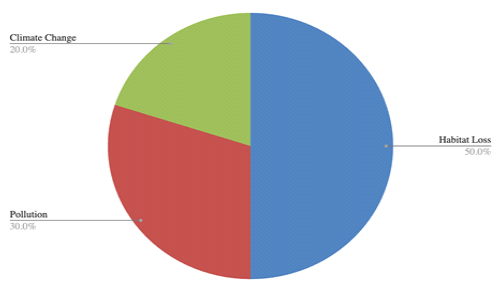


*Figure 3: Conservation Threats Impact on Species*

Pie chart illustrates the percentage impact of each conservation threat, with habitat loss and pollution identified as primary threats.

Using IUCN criteria and data, this study found that **40% of observed species are Near Threatened**, highlighting the impact of human activity on local biodiversity. Major threats include:

**1. Habitat Loss**: Rapid expansion of agricultural fields and urbanization have reduced natural habitats by approximately 15% over the past decade. This loss primarily affects habitat-dependent species like nightjars, which rely on open woodlands and grasslands for roosting and hunting.

**2. Pollution**: Pesticides and fertilizers used in nearby agricultural lands affect both insectivorous and predatory birds. Chemical run-off impacts insect populations, reducing food availability for Caprimulgiformes, while bioaccumulation affects Accipitriformes, leading to a decline in raptor health and reproduction.

**3. Climate Change**: Changing rainfall patterns affect the breeding cycles and prey availability for many of these species. Cuculiformes, in particular, show strong dependencies on monsoon rains for breeding and food availability, making them sensitive to climate variability.

## 5.4. Conservation Implications

Given these results, it is clear that targeted conservation strategies are essential to maintain the ecological balance and biodiversity within Sheohar. Protecting remaining open woodlands and grasslands can support Caprimulgiformes, while regulating pesticide use can reduce the negative impacts on insectivorous and predatory birds alike. For migratory Accipitriformes, ensuring the availability of undisturbed winter habitats is crucial. Conservation strategies must be designed to promote sustainable agricultural practices, habitat preservation, and pollution control measures. Engaging local communities in conservation can help balance human needs with ecological sustainability, ultimately supporting Sheohar's avian diversity and ecosystem health.

## 6. Conclusion

This study provides a comprehensive look into the diversity, seasonal dynamics, and conservation status of birds belonging to the orders Cuculiformes, Caprimulgiformes, and Accipitriformes in Sheohar, Bihar. By documenting 27 species across these orders, the research highlights Sheohar's role as a critical habitat supporting a unique mix of insectivores, seed dispersers, and apex predators. Each order contributes distinctly to the ecosystem: Cuculiformes help control agricultural pests, Caprimulgiformes play a role in nocturnal insect regulation, and

Accipitriformes maintain predator-prey balance through their top position in the food chain. The study underscores the ecological interdependencies that make these birds essential to Sheohar's biodiversity.

Seasonal observations reveal that these avian populations are sensitive to environmental conditions, with species-specific patterns linked to breeding seasons, migratory cycles, and food availability. The notable presence of migratory Accipitriformes during winter, for example, indicates Sheohar's significance as a seasonal refuge, underscoring the need for conserving habitats that sustain these populations throughout the year. However, the data also highlight concerning trends, particularly for habitat-dependent and top predator species. The decline in Accipitriformes populations points to the impacts of habitat loss and pollution, driven primarily by agricultural expansion and pesticide use.

Given the threats identified—habitat loss, pollution, and climate change—this study emphasizes the need for immediate conservation interventions. Preserving Sheohar's open lands, promoting sustainable agricultural practices, and controlling chemical pollutants are essential for maintaining the ecological balance. Additionally, community involvement in conservation efforts can foster coexistence between human activities and wildlife, ensuring a sustainable future for these avian populations. By establishing a baseline for future studies, this research not only enriches our understanding of Sheohar's biodiversity but also sets the groundwork for implementing effective conservation strategies in similar ecosystems facing human-induced pressures.

## Author's Declaration:

*The views and contents expressed in this research article are solely those of the author(s). The publisher, editors, and reviewers shall not be held responsible for any errors, ethical misconduct, copyright infringement, defamation, or any legal consequences arising from the content. All legal and moral responsibilities lie solely with the author(s).*

## References

1. Ali, S., & Ripley, S. D. (1987). Handbook of the Birds of India and Pakistan. Oxford University Press.
2. BirdLife International. (2023). IUCN Red List of Threatened Species. BirdLife International.
3. Grimmett, R., Inskipp, C., & Inskipp, T. (2011). Birds of the Indian Subcontinent. Helm Field Guides.
4. Kumar, A., & Gupta, R. (2020). "Impact of Habitat Loss on Avian Diversity in North Bihar." Journal of Indian Ecology, 45(2), 98-109.
5. Rahmani, A. R., Islam, Z. U., & Kazmierczak, K. (2012). Threatened Birds of India: Their Conservation Requirements. Oxford University Press.
6. Choudhary, R., & Singh, P. (2019). "Impact of Pesticides on Avian Fauna in Bihar's Agro-Regions." Environmental Biology Journal, 38(4), 410-418.
7. Sutherland, W. J. (2000). The Conservation Handbook: Research, Management and Policy. Wiley-Blackwell.
8. Joshi, R. D., & Parasharya, B. M. (2018). "Seasonal Variation in Avifauna of Gujarat's Semi-Arid Zones." Journal of Avian Research, 12(3), 225-235.
9. Newton, I. (2010). The Migration Ecology of Birds. Academic Press.

10. Mullarney, K., Svensson, L., Zetterström, D., & Grant, P. J. (2011). Bird Guide: The Most Complete Field Guide to the Birds of Britain and Europe. HarperCollins.
11. McQueen, D., & McQueen, A. (2000). "Raptors as Indicators of Environmental Health." Conservation Biology, 14(4), 1055-1061.
12. Mukherjee, R., & Sengupta, S. (2016). "Avifauna and Agricultural Land Use: Implications for Biodiversity in India." Indian Journal of Ecology, 43(1), 72-82.
13. Rodgers, W. A., & Panwar, H. S. (1988). Planning a Wildlife Protected Area Network in India. Wildlife Institute of India.
14. Gibson, L., et al. (2011). "Primary Forests Are Irreplaceable for Sustaining Tropical Biodiversity." Nature, 478(7369), 378-381.
15. Urfi, A. J. (2003). "Indian Birds in the International Market: Conservation and Trade." Biodiversity and Conservation, 12(10), 2095-2119.
16. Pande, S., & Dahanukar, N. (2015). "Role of Raptors in the Ecosystem and Their Conservation in India." Indian Journal of Biodiversity, 4(1), 18-29.
17. Krebs, C. J. (2008). Ecological Methodology. Benjamin Cummings.
18. Gaston, K. J., & Fuller, R. A. (2007). "Commonness, Rarity, and Population Threat in Avian Species." Conservation Biology, 21(5), 1423-1430.
19. Roy, P. & Singh, R. (2021). "Effect of Climate Change on Avian Breeding Patterns in Northern India." Journal of Climate Change and Biodiversity, 7(2), 215-226.
20. Zacharias, T., & Naik, P. (2017). "Assessment of Insectivorous Bird Populations and Their Ecosystem Services in Indian Agriculture." Agricultural Ecosystem Journal, 18(2), 102-115.
21. Anderson, T. (2003). Biology of the Ubiquitous House Sparrow: From Genes to Populations. Oxford University Press.
22. Naoroji, R. (2006). Birds of Prey of the Indian Subcontinent. Om Books International.
23. Rasmussen, P. C., & Anderton, J. C. (2012). Birds of South Asia: The Ripley Guide. Lynx Edicions.
24. Jetz, W., & Rahbek, C. (2002). "Geographic Range Size and Determinants of Avian Diversity." Ecology Letters, 5(5), 715-729.

## Cite this Article-

***'Dr. Pradip Kumar', 'Birds belonging to orders cuculiformes, caprimulgiformes and Accipitriformes in Sheohar, Bihar'****, Research Vidyapith International Multidisciplinary Journal (RVIMJ), ISSN: 3048-7331 (Online), Volume:2, Issue:06, June 2025.*

**Journal URL-** https://www.researchvidyapith.com/
**DOI-** 10.70650/rvimj.2025v2i60001
**Published Date-** 01 June 2025