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Original Article

Conservation status, species composition, and distribution of Avian Community in Bhimbandh Wildlife Sanctuary, India

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ABSTRACT

Birds are among the best indicators of environmental changes. Given the significance of birds for conservation planning and environmental assessments, there is a need to develop a better ecological understanding of avian community structure. In southeast Asia, the association among tropical birds with their habitat is poorly studied. To investigate the influence of different habitats on the avifauna, we studied the composition of local bird communities along habitat gradients characterized by environmental factors such as vegetation type and extent of anthropogenic pressure, using the open-radius point count method. This is the first attempt to document the status, composition, and distribution of avifauna in Bhimbandh Wildlife Sanctuary, Bihar, India. A total of 147 avian species belonging to 58 families and 20 orders were recorded during the study. It was found that the forest range Lakhisarai, with 50% of habitat heterogeneity, supports the highest avian density (6,428 individuals/km^2) in the sanctuary, whereas the lowest bird density was recorded from the Munger forest range i.e. 3,847 individuals/km^2, which also has the least habitat heterogeneity (i.e. 20%). The forest range Dharara ($p = 0.006$), and habitat categories degraded bamboo forest ($p = 0.005$) and forest edge with cultivation ($p < 0.001$) were found to support significantly higher bird diversity.

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Introduction

Compared to other wildlife species, the conservation status, distributions, and population trends of Indian birds are particularly well known. However, there has been little research on the ecological basis of utilizing avian community structure as indicator of the health of their respective habitats. Birds being eye-catching and sensitive towards environmental changes seem most suitable biological indicators for monitoring the ecosystem health (Gregory et al 2003). In contrast to chemical or radiological monitoring of environmental health, a simple bird survey (biological monitoring) can tell simply the condition of ecosystems in a landscape of interest. Such knowledge is more direct and integrative than information which comes from chemical or physical testing that reflects merely site contamination status (Khan et al 2013). Given the significance of birds for conservation planning and environmental assessments, there is a need for a better ecological understanding of the role of bird diversity patterns and avian community structure in conservation decision-making (Kati and Sekercioglu 2006). However, in southeast Asia, the association among tropical birds with their habitat is poorly studied (Bhatt and Joshi 2011; Naithani and Bhatt 2012; Sultana and Khan 1999; Sultana et al 2007), the habitat type and structural complexity are known to influence avian diversity and composition (MacArthur and MacArthur 1961). Further, the information on the ecological effects of anthropogenic disturbance on avian community structure is also very limited (Shahabuddin and Verma 2003).

In order to fill some of these gaps of knowledge and to enable the local managers to make informed decisions, a study was conducted in Bhimbandh Wildlife Sanctuary (BWS) Bihar, India. Across the investigated gradient, the following questions were addressed: (1) how does the community structure of the birds differ among different habitats of BWS; and (2) does the habitat heterogeneity of forest management units (such as forest ranges) exhibit a clear relationship with the community structure of the birds of BWS?

The present study is the first attempt to document the status, composition, and distribution of avifauna in BWS, India.

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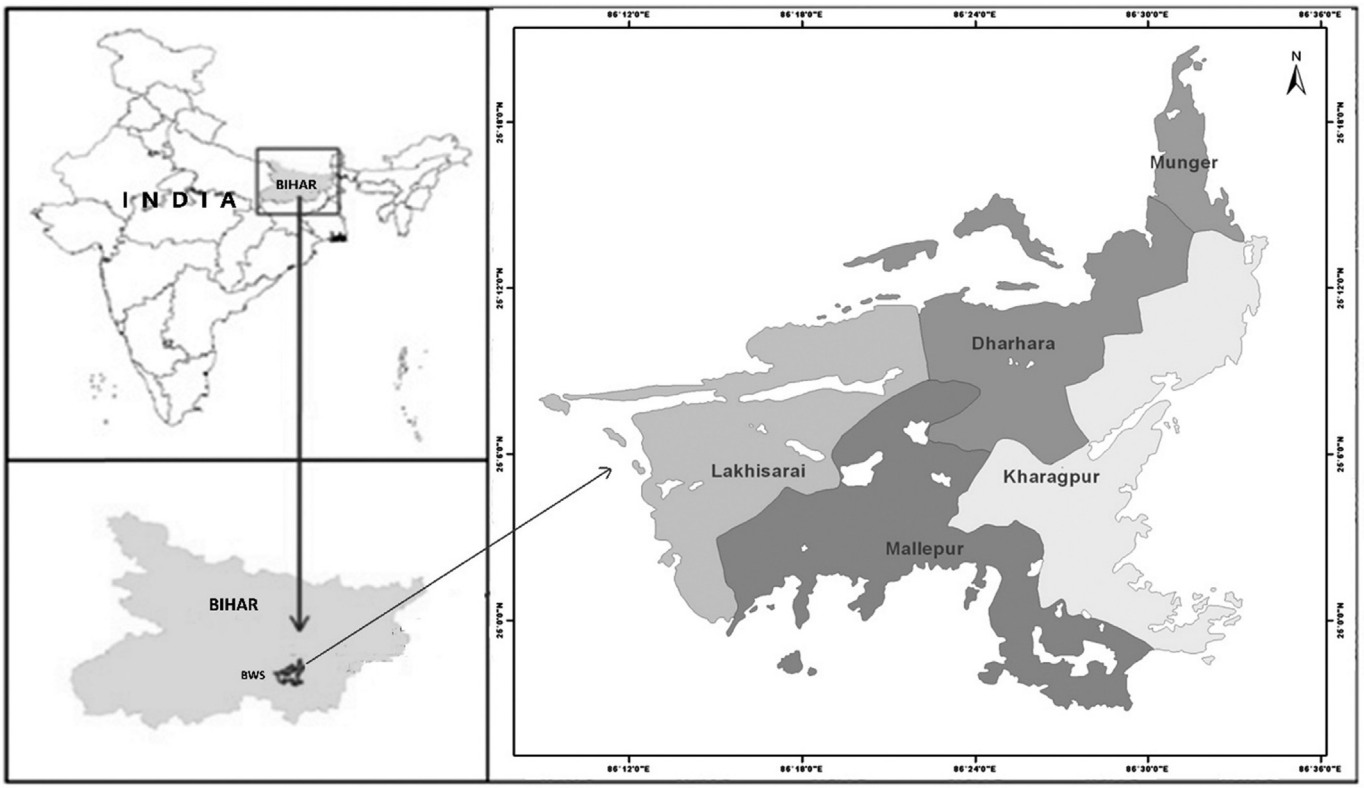

Figure 1. Location map of Bhimbandh Wildlife Sanctuary, Bihar, India showing different forest ranges.

Material and methods

The present study was carried out during March–May 2014 in BWS, which lies between 25° 55' North and 25° 15' North (latitude) and between 86° 15' East and 86° 33' East (longitude) in the state of Bihar (India) and extends over an area of 680.94 km^2 (Figure 1). BWS is situated in the lower portion of the Gangetic plains near to the northeast biogeographical region, therefore, it shares the wildlife species of both the regions, which makes the sanctuary a unique ecosystem with a wide diversity of wildlife species. Unfortunately, the ecosystem of the sanctuary is vulnerable due to the high pressure of several illegal anthropogenic activities such as mining, deforestation, poaching, etc. The high density of human population around BWS further worsens the situation. In the present scenario, the sanctuary is almost an isolated patch of forest which is highly infested by the left wing extremism and facing a potential threat of habitat destruction. Instead of having exceptional biological importance, the sanctuary has never been explored with regards to avifauna diversity and status. The study was designed particularly to form the baseline data for conservation and management planning of the sanctuary.

The avian population was assessed through the open radius point count method for a fixed time of 20 min/point ($n = 180$). The

Table 1. Different habitat types of the Bhimbandh Wildlife Sanctuary and their codes used in data analysis and presentation.

Habitats categories	Code
Broad leaf forest	A
Degraded bamboo forest	B
Degraded scrubland & cultivation	C
Forest edge	D
Forest edge with cultivation	E
Old plantation	F
Open degraded forest	G
Plantation	H
Scrubland	I
Water body	J

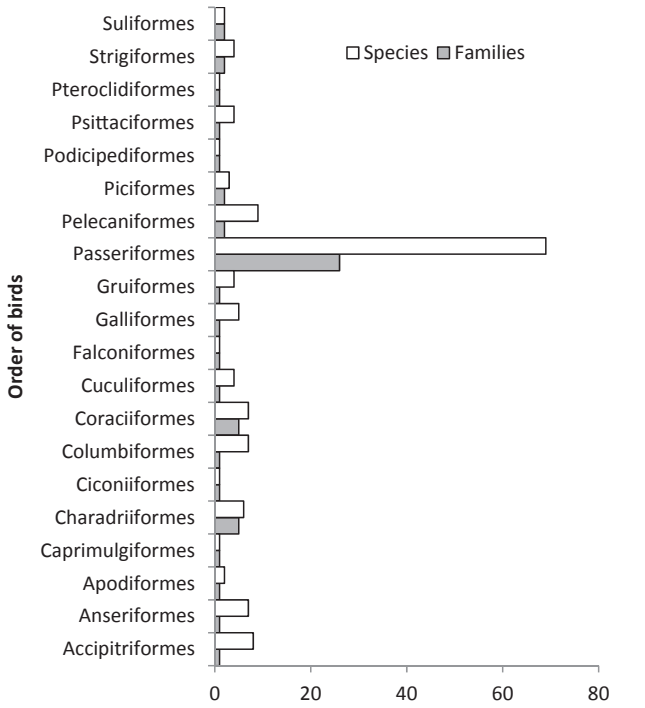

Figure 2. Avian community composition of Bhimbandh Wildlife Sanctuary, Bihar, India.

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