



Assessment of Migratory Bird Diversity in Key Wetlands and Forest Reserves of Lakhimpur District, Assam, India

Siddhartha Suman Bora ^{a*}, Lakhijyoti Saikia ^b,
Jyotimoiee Hatiboruah ^c and Partha Pratim Bora ^d

^a Department of Zoology, Tripura University, North Lakhimpur, Assam, India.

^b Department of Zoology, Nowgong College, Gauhati University, North Lakhimpur, Assam, India.

^c Department of Zoology, Dibrugarh University, Dibrugarh, Assam, India.

^d Department of Environmental Science, Tezpur University, Assam, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Lakhimpur district of Assam has a rich biodiversity and is home to many birds and has good breeding, resting and feeding grounds for migratory birds as well. However, there is little information available regarding the diversity of migratory birds in the district's various locales. A study was conducted in different locations to document the diversity of migratory birds visiting the district. To better understand the diversity of migrating birds in the district, six locations were selected- Kakoi RF, Ranga RF, Pabha RF, Satajan wetland, Bordoibam-Bilmukh Bird Sanctuary and Ghagor Ghat. Data were gathered through surveys, conducted for 218 days from January 2022 – May 2024. A

*Corresponding author: Email: siddharthasumanbora@gmail.com;

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total of 80 migratory bird species were recorded under 26 families of which Anatidae was most diverse. Out of the 80 species, 56 were winter visitor, 18 were local migrants and 6 were summer visitors. Among the migratory birds, Palla's Fish Eagle (*Haliaeetus leucoryphus*) is listed as endangered species in IUCN Red List. Three species viz. Ferruginous duck (*Aythya nyroca*), Falcated duck (*Mareca falcata*) and Greater Adjutant (*Leptoptilos dubius*) are listed as near threatened species in IUCN Red List. Out of all the recorded species, insectivorous species are found to be highest (39%) as compared to species with other feeding habits. The Shannon diversity index was highest for Satajan wetland ($H' = 3.86$) and lowest for Bordoibam-Bilmukh BS ($H' = 2.79$). Jaccard similarity index showed highest similarity between Ranga RF and Kakoi RF (0.312) and the lowest value between Ranga RF and Bordoibam-Bilmukh BS (0.069). The Satajan wetland, Ranga RF, Kakoi RF, Pabha RF, Bordoibam-Bilmukh BS, and Ghagor Ghat are vital habitats that require conservation to continue supporting diverse resident and migratory birds, as well as other wildlife.

Keywords: Bird sanctuary; Lakhimpur; migratory birds; reserve forest; wetland.

1. INTRODUCTION

Birds are some of the most attractive and diverse creatures that exist on Earth. Birds provide vital links in the food chains and they play a key role in nutrient cycling in wetlands and marine ecosystems [1]. They are also bio-indicators, alerting us about changes in the environment. Scientists and other observers have long been interested by the phenomenon of bird migration. In regions where data is limited or insufficient, bird surveys have emerged as a standard tool for evaluating the health of ecosystems [2]. An estimated 1,855 bird species (19% of extant species) are migratory, making regular cyclical movements beyond their breeding distribution, with predictable timing and destinations [3]. The purpose of migration is to escape the extreme cold of the temperate zones and spend the winter in warmer regions like India, where food is abundant [4].

Assam is home to about 950 bird species, out of these, 17 species are endemic to Assam and around 280 species are winter migrants [5]. The bird hotspots of the state of Assam comprise 55 IBAs (Important Bird and Biodiversity Areas), which also cover National Parks and Wildlife Sanctuaries of the state [6]. Many literatures are available reporting the resident and migratory birds of the state. In a study, conducted in Dibru-Saikhowa National Park and Biosphere Reserve, 173 migratory bird species have been reported [7]. Another study, conducted in Kaziranga National Park, reported a total of 127 migratory bird species [8]. From Jhanjimuk-Kokilamuk IBA Complex of Jorhat, a study recorded 69 migratory bird species [9]. Panidihing Bird Sanctuary of Sivasagar also has a record of 69 species of winter migrants [10]. In Loharghat Forest Range, 67 migratory bird species have

been recorded [11]. Bornodi Wildlife Sanctuary has a record of 62 migratory bird species [12]. 60 species of winter migrants have been recorded from Orang National Park [13]. From Nameri National Park, 50 migratory bird species have been recorded [14]. Raimona National Park has a record of 44 migratory bird species [15]. In IIT Guwahati Campus, a study conducted on its avian diversity recorded a total of 39 migratory bird species [16]. Another study conducted among 22 beels (wetlands) of Goalpara district also recorded 39 migratory bird species [17]. Dheer beel of Kokrajhar district of Assam has a record of 38 migratory bird species [18]. In another study conducted in wetlands of Majuli, 16 species migratory bird were recorded [19].

The Lakhimpur district of Assam is rich in biodiversity, offering essential breeding, resting, and feeding grounds for migratory birds. A few literatures are available reporting the avifauna of some parts of the district. From the Satajan wetland a total of 87 bird species has been reported of which 34 were migratory [20]. 23 species of migratory birds (from a total of 133) has been reported from Bordoibam-Bilmukh Bird Sanctuary [21]. In a study conducted in Ranga Reserve Forest, out of 197 bird species that had been recorded, 35 were migratory [22]. But there are more sites where many migratory birds visit each year and have not been properly documented. The primary objective of this study is to document the diversity of migratory birds in Lakhimpur district, Assam, India.

2. MATERIALS AND METHODS

2.1 Study Area

The present study was conducted on three reserve forests- Kakoi, Pabha and Ranga; two

wetlands- Satajan and Bordoibam-Bilmukh Bird Sanctuary (one of the IBAs of Assam, India) and Ghagor Ghat (a sand bank of the river Subansiri) of the Lakhimpur district of Assam, India (Fig. 1). The geographical extension of Ranga Reserve Forest is 27°07'04.50"N - 27°19'21.02"N and 93°47'37.48"E - 94°01'12.75"E with an area of 85.28 square km. A significant portion of this land, about approximately 88.14% is covered by dense and open forests [23]. Kakoi Reserve Forest is located between 27°18'51.90"N - 27°25'17.32"N and 93°59'09.13"E - 94°09'32.32"E, covering a total area of 44.15 square km. It is situated approximately 22.2 km away from North Lakhimpur. The Pabha Reserve Forest covers an area of 46.26 square km between 27°00'04.42"N - 27° 04'38.54"N and 94°00'22.16"E - 94°07'14.19"E. The Satajan wetland is situated between the latitudes 27°12'23.7"N - 27°12'40"N and longitudes 94°03'08.5"E - 94°03'08.8"E and has an area of 39 acres. The Bordoibam-Bilmukh Bird Sanctuary is a larger riparian wetland with 11.25 square km area and is geographically located in between 27°19'25"N - 27°21'06"N and 94°19'52"E - 94°20'15"E. Ghagor Ghat has an area of around 95 acres. It is situated between 27°13'41"N - 27°15'15"N 94°11'25"E -

94°12'19"E. The district has maximum and minimum temperatures of 31°C and 7°C, respectively, and has annual rainfall of 300 cm on average [24].

2.2 Methodology

The purpose of the survey was to compile a checklist of migratory birds in the areas of study and to measure their diversity. Surveys were conducted using the Randomized Walk [25], Visual Encounter Survey [26] and Point Count Method [2]. Diversity was measured for each study area using the Shannon Diversity Index [27]. Shannon Diversity Index (H') assumes that all species are evenly distributed in a sample and that the sample is randomly obtained. Shannon Diversity Index:

$$H' = - \sum_{i=1}^s pi \ln pi$$

Here, pi is the proportion of individuals found of the i^{th} species, \ln is the natural logarithm, and s represents the number of species.

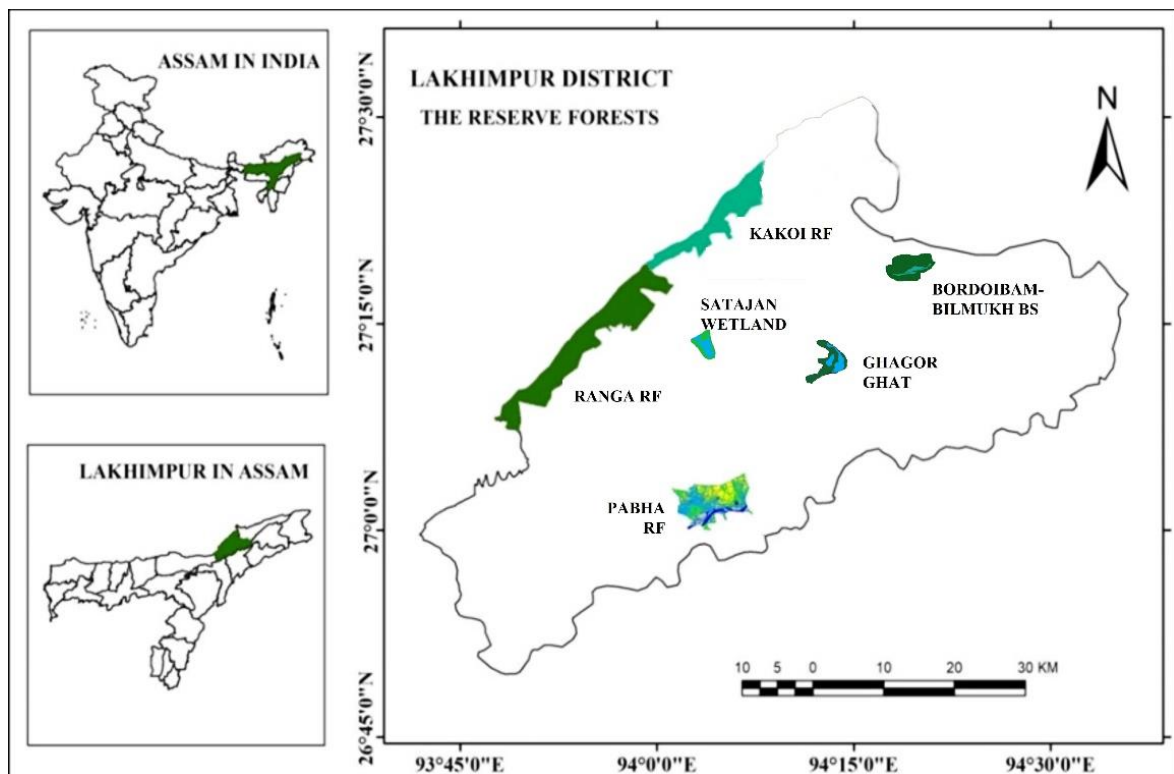


Fig. 1. Map of study areas of Lakhimpur district, Assam, India

The Jaccard Similarity Index [28] was used to measure of the similarity among the migratory birds of the six different study areas. The Jaccard similarity index, also known as the Jaccard coefficient, is a statistical measure used to quantify the similarity and diversity of sample sets. The index ranges from 0 to 1. The closer to 1, the more similar the two sets of data [29]. The formula to find the Index is:

$$\text{Jaccard Index} = \frac{\text{the number in both sets}}{\text{the number in either set}}$$

2.3 Study Design

A total of 218 days were spent for fieldwork in all six study areas, across all seasons, from January 2022 to May 2024, to document the migratory birds of these areas. The surveys were carried out through all the seasons: summer (March - May), followed by monsoon season (June - August), post-monsoon season (September - November), and winter season (December - February). The observations were conducted in the morning (0630 - 1100 hours) and in the evening (1430 - 1730 hours). Unfavourable weather conditions (rain, fog and high winds) were avoided considering their known impact on bird activity and detection [2].

2.4 Data Collection and Identification

The data collected from the surveys were systematically logged on a data sheet with date,

time and numbers of individuals of each species encountered. The birds were observed with Nikon Prostaff P3 8X30 binoculars and photographed with Nikon D3400. Despite of our full effort, we could not photograph some of the species observed during the study. For identification of the bird species, [28] was used in the field. [30] and [31] were consulted to confirm certain species. For the updated nomenclature, [32] were followed. All the recorded bird species were tabulated and characterised by the following characteristics: common name, scientific name, family, threat status: CR – Critically Endangered, EN – Endangered, VU – Vulnerable, NT – Near Threatened, LC – Least Concern; WV – winter visitor, SV – Summer visitor, LM – local migrant; Feeding habit: IN – Insectivorous, CR – Carnivorous, HB – Herbivorous, OM – Omnivorous, PC – Piscivorous.

3. RESULTS AND DISCUSSION

During the study period, a total of 80 migratory bird species were recorded under 26 families (Table 1, Photo Plate 1). With 17 species (21.25% of the total), Anatidae was the most diverse family. Out of the 80 species, 56 were winter visitor, 18 were local migrants and 6 were summer visitors. Percentage wise migratory status and family wise species richness are depicted in Figs. 2 and 3 respectively.

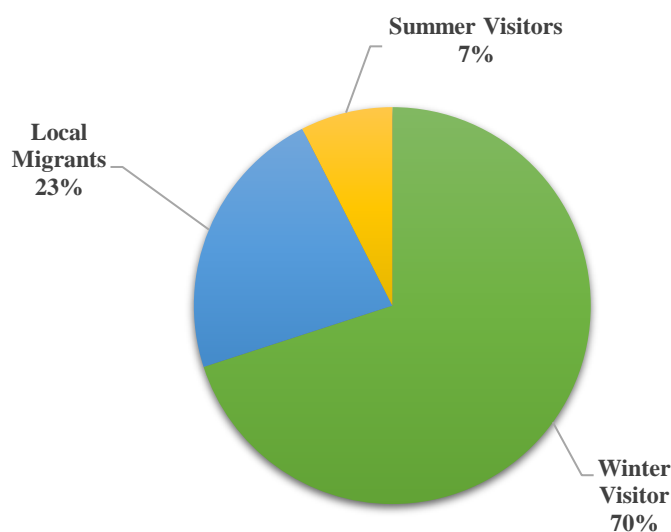


Fig. 2. Percentage wise migratory status of recorded species

Table 1. Checklist of all the recorded migratory bird species

Family	Scientific Name	Common Name	Migratory Status	IUCN Status	Feeding habit	Wild Life Protection Act	
ANATIDAE	<i>Aythya nyroca</i>	Ferruginous duck	WM	NT	OM	Schedule-II	
	<i>Anas strepera</i>	Gadwall	WM	LC	OM	Schedule-II	
	<i>Anas platyrhynchos</i>	Mallard	WM	LC	OM	Schedule-II	
	<i>Anser indicus</i>	Bar-headed Goose	WM	LC	HB	Schedule-II	
	<i>Anser anser</i>	Greylag Goose	WM	LC	HB	Schedule-II	
	<i>Anas crecca</i>	Common Teal	WM	LC	HB	Schedule-II	
	<i>Anas poecilorhyncha</i>	Indian Spot-billed Duck	LM	LC	OM	Schedule-II	
	<i>Anas clypeata</i>	Northern Shoveller	WM	LC	CR	Schedule-II	
	<i>Tadorna ferruginea</i>	Ruddy Shelduck	LM	LC	OM	Schedule-II	
	<i>Dendrocygna javanica</i>	Lesser whistling duck	LM	LC	OM	Schedule-II	
	<i>Mareca falcata</i>	Falcated Duck	WM	NT	OM	Schedule-II	
	<i>Dendrocygna bicolor</i>	Fulvous Whistling-duck	LM	LC	OM	Schedule-I	
	<i>Netta rufina</i>	Red-crested Pochard	WM	LC	OM	Schedule-II	
	<i>Aythya fuligula</i>	Tufted Pochard	WM	LC	OM	Schedule-II	
	<i>Anas acuta</i>	Northern Pintail	WM	LC	HB	Schedule-II	
	<i>Mareca penelope</i>	Eurasian wigeon	WM	LC	HB	Schedule-II	
	<i>Tadorna tadorna</i>	Common shelduck	WM	LC	OM		
	ACCIPITRIDAE	<i>Haliaeetus leucoryphus</i>	Pallas's Fish Eagle	WM	EN	CR	Schedule-I
		<i>Milvus migrans</i>	Black Kite	LM	LC	CR	Schedule-II
<i>Circus cyaneus</i>		Hen Harrier	WM	LC	CR	Schedule-I	
<i>Accipiter virgatus</i>		Besra	LM	LC	CR	Schedule-I	
ACROCEPHALIDAE	<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	WM	LC	IN	Schedule-II	
	<i>Acrocephalus arundinaceus</i>	Great Reed Warbler	WM	LC	IN		
	<i>Arundinax aedon</i>	Thick-billed warbler	WM	LC	IN	Schedule-II	
ANHINGIDAE	<i>Anhingaanhinga</i>	Darter or snake Bird	LM	LC	PC	Schedule-II	
ARDEIDAE	<i>Ardea alba</i>	Large Egret	LM	LC	PC	Schedule-II	
	<i>Ardea cinerea</i>	Grey Heron	LM	LC	PC	Schedule-II	
CETTIIDAE	<i>Cettia brunnifrons</i>	Grey-sided Bush Warbler	WM	LC	IN	Schedule-II	
CICONNIDAE	<i>Leptoptilos dubius</i>	Greater Adjutant Stork	LM	NT	CR	Schedule-IV	
COLUMBIDAE	<i>Streptopelia tranquebarica</i>	Red-Collared Dove	LM	LC	HR	Schedule-II	

Family	Scientific Name	Common Name	Migratory Status	IUCN Status	Feeding habit	Wild Life Protection Act
CUCULIDAE	<i>Cuculus poliocephalus</i>	Lesser Cuckoo	SM	LC	OM	Schedule-II
	<i>Eudynamys scolopacea</i>	Asian Koel	LM	LC	OM	Schedule-II
	<i>Cuculus micropterus</i>	Indian cuckoo	SM	LC	OM	Schedule-II
DICRURIDAE	<i>Dicrurus leucophaeus</i>	Ashy Drongo	WM	LC	IN	Schedule-II
EMBERIZIDAE	<i>Emberiza pusilla</i>	Little Bunting	WM	LC	OM	Schedule-II
	<i>Emberiza spodocephala</i>	Black-faced Bunting	WM	LC	OM	Schedule-II
FALCONIDAE	<i>Falco severus</i>	Oriental Hobby	SM	LC	CR	Schedule-II
	<i>Falco naumanni</i>	lesser kestrel	SM	LC	CR	Schedule-II
	<i>Falco peregrinus</i>	Peregrine falcon	WM	LC	CR	Schedule-I
HIRUNDINIDAE	<i>Hirundo rustica</i>	Barn swallow	WM	LC	IN	Schedule-II
LANIIDAE	<i>Lanius cristatus</i>	Brown Shrike	WM	LC	IN	Schedule-II
	<i>Lanius schach</i>	Long -tailed Shrike	WM	LC	IN	Schedule-II
	<i>Lanius tephronotus</i>	Grey-backed Shrike	WM	LC	IN	Schedule-II
LOCUSTELLIDAE	<i>Locustella certhiola</i>	Pallas's Grasshopper-Warbler	WM	LC	IN	
	<i>Locustella thoracica</i>	Spotted Bush Warbler	WM	LC	IN	Schedule-IV
MEROPIDAE	<i>Merops philippinus</i>	blue-tailed bee-eater	SM	LC	IN	Schedule-II
MOTACILLIDAE	<i>Motacilla citreola</i>	Citrine Wagtail	WM	LC	IN	Schedule-II
	<i>Motacilla alba</i>	White Wagtail	WM	LC	IN	Schedule-II
	<i>Anthus roseatus</i>	Rosy Pipit	WM	LC	IN	Schedule-II
	<i>Anthus hodgsoni</i>	Olive-backed Pipit	WM	LC	IN	Schedule-II
	<i>Motacilla cinerea</i>	Grey Wagtail	WM	LC	IN	Schedule-II
MUSCICAPIDAE	<i>Saxicola maurus</i>	Siberian stonechat	WM	LC	IN	Schedule-II
	<i>Tarsiger rufilatus</i>	Himalayan Bluetail	WM	LC	IN	
	<i>Calliope calliope</i>	Siberian rubythroat	WM	LC	IN	Schedule-II
	<i>Ficedula albicilla</i>	Taiga Flycatcher	WM	LC	IN	Schedule-IV
	<i>Luscinia svecica</i>	Blue throat	WM	LC	IN	Schedule-II
	<i>Ficedula hyperythra</i>	Snowy-browed Flycatcher	SM	LC	IN	Schedule-II
MUSCICAPIDAE	<i>Phoenicurus auroreus</i>	Daurian Redstart	WM	LC	IN	Schedule-
	<i>Muscicapa muttui</i>	brown breasted flycatcher	WM	LC	IN	Schedule-II
	<i>Eumyias thalassinus</i>	Verditer flycatcher	WM	LC	OM	Schedule-II
	<i>Niltava macgrigoriae</i>	Small niltava	LM	LC	OM	Schedule-II
	PANDIONIDAE	<i>Pandion haliaetus</i>	Osprey	WM	LC	CR
PHALACROCORACIDAE	<i>Phalacrocorax carbo</i>	Great Cormorant	WM	LC	CR	Schedule-II

Family	Scientific Name	Common Name	Migratory Status	IUCN Status	Feeding habit	Wild Life Protection Act
PHYLLOSCOPIDAE	<i>Phylloscopus affinis</i>	Tickell's Leaf Warbler	WM	LC	IN	Schedule-II
	<i>Phylloscopus reguloides</i>	Blyth's Leaf Warbler	WM	LC	IN	Schedule-II
	<i>Phylloscopus fuscatus</i>	Dusky Warbler	WM	LC	IN	Schedule-II
	<i>Phylloscopus fuligiventer</i>	Smoky Warbler	WM	LC	IN	Schedule-
	<i>Phylloscopus whistleri</i>	Whistler's Warbler	LM	LC	IN	Schedule-II
RALLIDAE	<i>Fulica atra</i>	Eurasian Coot	WM	LC	OM	Schedule-II
	<i>Gallinula chloropus</i>	Common Moorhen	LM	LC	OM	Schedule-II
PSITTACIDAE	<i>Psittacula eupatria</i>	Alexandrine Parakeet	LM	LC	HB	Schedule-II
	<i>Psittacula krameri</i>	Rose-ringed parakeet	LM	LC	HB	Schedule-II
SCOLOPACIDAE	<i>Tringa stagnatilis</i>	Marsh Sandpiper	WM	LC	CR	Schedule-II
	<i>Tringa glareola</i>	Wood Sandpiper	WM	LC	CR	Schedule-II
	<i>Actitis hypoleucos</i>	Common Sandpiper	WM	LC	CR	Schedule-II
	<i>Tringa ochropus</i>	Green Sandpiper	WM	LC	CR	Schedule-II
	<i>Tringa nebularia</i>	Common Greenshank	WM	LC	CR	Schedule-I
	<i>Gallinago gallinago</i>	Common Snipe	WM	LC	CR	Schedule-II
STENOSTIRIDAE	<i>Culicicapa ceylonensis</i>	Grey-headed Canary Flycatcher	WM	LC	IN	Schedule-II
UPUPIDAE	<i>Upupa epops</i>	Common Hoopoe	LM	LC	OM	Schedule-II



Ferruginous Duck



Gadwall



Bar-Headed Goose



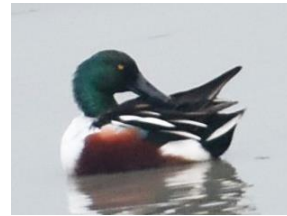
Greylag Goose



Common Teal



Indian Spot-Billed Duck



Northern Shoveler



Ruddy Shelduck



Lesser Whistling-Duck



Falcated Duck



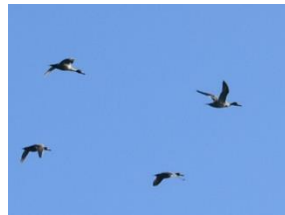
Red-crested Pochard



Northern Pintail



Eurasian Wigeon



Common Shelduck



Palla's Fish Eagle



Black Kite



Besra



Thick-billed Warbler



Darter



Large Egret



Grey Heron



Greater Adjutant



Red-collared Dove



Asian Koel



Ashy Drongo



Black-faced Bunting



Peregrine Falcon



Barn Swallow



Brown Shrike



Long-tailed Shrike



Grey-backed Shrike



Thick-billed Warbler



Blue-tailed Bee Eater



Citrine Wagtail



Whitee Wagtail



Rosy Pipit



Siberian Stonechat



Taiga Flycatcher



Daurian Redstart



Brown-breasted
Flycatcher



Verdite Flycatcher



Small Niltava



Osprey



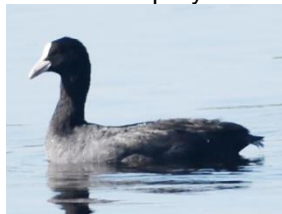
Tickell's Leaf Warbler



Dusky Warbler



Whistler's Warbler



Eurasian Coot



Common Moorhen



Rose-ringed Parakeet



Common Sandpiper



Grey-headed Canary
Flycatcher



Common Hoopoe

Photo Plate 1. Photographs of recorded migratory birds

Table 2. Summary of Species richness, abundance and diversity in different study areas of Lakhimpur District

Study Area	Species Richness	No. of Individuals	Shannon Diversity Index(H')
Ranga RF	39	328	3.69
Kakoi RF	25	212	3.51
Pabha RF	17	256	3.38
Satajan Wetland	47	678	3.86
Bordoibam-Bilmukh BS	4	79	2.79
Ghagor Ghat	12	237	3.08

Table 3. Value for jaccard's similarity index

Pairing of Study Area*	H'
1 and 2	0.312
1 and 3	0.178
1 and 4	0.220
1 and 5	0.069
1 and 6	0.078
2 and 3	0.261
2 and 4	0.194
2 and 5	0.103
2 and 6	0.081
3 and 4	0.140
3 and 5	0.095
3 and 6	0.137
4 and 5	0.078
4 and 6	0.163
5 and 6	0.125

*Areas are tagged as: 1 – Ranga RF, 2 – Kakoi RF, 3 – Pabha RF, 4 – Satajan Wetland, 5 – Bordoibam-Bilmukh BS, 6 – Ghagor Ghat

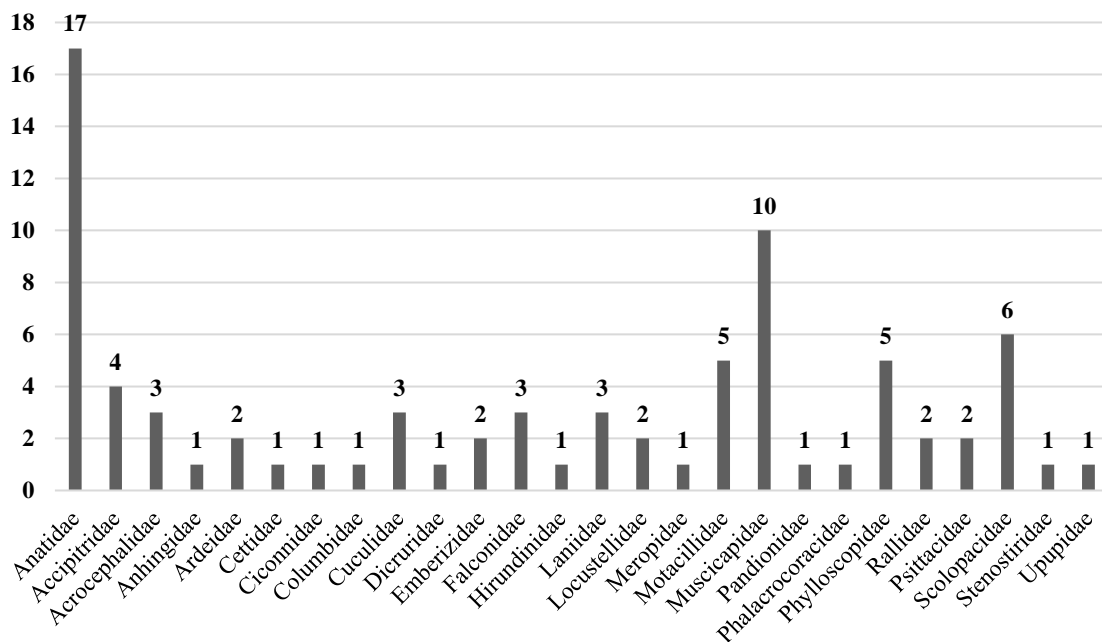


Fig. 3. Family-wise species richness

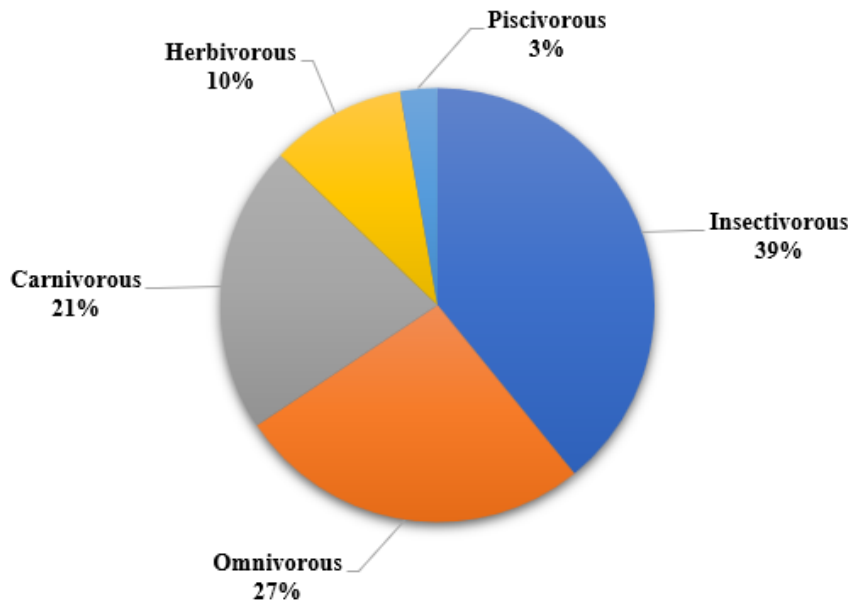


Fig. 4. Percentage wise feeding habit among the recorded species

Feeding habit of the birds were divided into five groups. Under Piscivorous, 3 species; Herbivorous, 8 species; Carnivorous, 17 species; Omnivorous, 21 species; Insectivorous, 31 species were recorded. Due to availability of food, diverse habitat and feeding behaviours the competition for food among the species were negligible. Percentage wise feeding habit among the species is depicted in Fig. 4.

Among the migratory birds, Palla's Fish Eagle (*Haliaeetus leucoryphus*) is listed as endangered species in IUCN Red List as of latest assessment. Three species viz. Ferruginous duck (*Aythya nyroca*), Falcated duck (*Mareca falcata*) and Greater Adjutant (*Leptoptilos dubius*) are listed as near threatened species in IUCN Red List as of latest assessment. The rest 76 migratory birds are listed least concern species.

Highest species richness was observed in the Satajan wetland (47), followed by Ranga RF (39), Kakoi RF (25), Pabha RF (17), Ghagor Ghat (12) and Bordoibam-Bilmukh BS (4). Among specific abundances, Lesser Whistling Duck (*Dendrocygna javanica*) was most abundant in Satajan wetland as well as Pabha RF, White Wagtail (*Motacilla alba*) in both Ranga RF and Bordoibam BS, Grey-headed Canary Flycatcher (*Culicicapa ceylonensis*) in Kakoi RF and Greylag Goose (*Anser anser*) in Ghagor Ghat. The Shannon diversity index was highest for Satajan wetland ($H' = 3.86$) and lowest for Bordoibam-Bilmukh BS ($H' = 2.79$) (Table 2).

Jaccard similarity index showed highest similarity for migratory bird species composition (Table 3) between Ranga RF and Kakoi RF (0.312) and the lowest value between Ranga RF and Bordoibam-Bilmukh BS (0.069).

Lakhimpur district's diverse habitat types support a high diversity of migratory birds. The heterogeneity in farmlands, forests, and waterbodies provides abundant food sources, fulfilling the needs of various species and increasing bird richness [33]. The migratory bird species, recorded in the present study, represents 28.57% of all the migratory bird species known to occur in Assam [5]. Though the selected areas under study of Lakhimpur district are smaller in size as compared to the National Parks of Assam, they show a remarkable diversity of migratory birds. The present study also reveals that 70% of bird species in Lakhimpur district are winter visitors, 22.5% are local migrants and 7.5% were summer visitors. Among the winter visitors- White Wagtail (*Motacilla alba*) was most abundant. Among local migrants- Lesser Whistling Ducks (*Dendrocygna javanica*) and among summer visitors- Blue-tailed Bee-eater (*Merops philippinus*) were the most abundant bird species. In studies, their analogous findings highlight greater richness in forested habitats as forest interiors accommodate adequate food sources throughout the year with better nesting success [34,35]. Conversely, the present study shows that wetlands have a greater richness of migratory

birds as compared to the reserved forests under study.

Though the Bordoibam-Bilmukh Bird Sanctuary is one of the IBAs of Assam, due to its negligible maintenance, its diversity is declining drastically day by day. A study reported 23 migratory birds out of 133 (total) birds from Bordoibam-Bilmukh BS [21]. The authors were surprised to observe only four migratory bird species (from the total of 47 birds), out of which 3 were winter migratory and one was summer migratory. On the contrary, Satajan wetland, though is not an IBAs, has a great diversity. 87 bird species have been recorded so far [20] and the present study recorded highest number (47) of migratory birds from this wetland, which indicates that Satajan wetland is a good candidate for IBAs of Assam.

4. CONCLUSION

The present study is a first of a kind to report the diversity of migratory birds in Lakhimpur district of Assam. With 80 migratory avian species, the study shows that Lakhimpur district has a very rich avian biodiversity. It also shows that areas under study were able to provide enough food and shelter to the migratory birds, for which the species richness was high. But due to anthropogenic disturbances, Bordoibam-Bilmukh BS is rapidly losing its diversity. Necessary steps must be taken by the authorities and by the government to conserve this IBA. The Satajan wetland, Ranga RF, Kakoi RF, Pabha RF, Bordoibam-Bilmukh BS, and Ghagor Ghat are vital habitats that require conservation to continue supporting diverse resident and migratory birds, as well as other wildlife. Further research is needed in Lakhimpur district, as some unprotected areas show high migratory bird diversity.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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