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An Agenda of Avifaunal Diversity and Their Current Status in Aligarh Region of Uttar Pradesh, India

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Abstract

Avifauna is important to the ecological balance of our ecosystem by being a good indicator of environmental health. This study is undertaken to evaluate avifaunal diversity, status, and ecological characteristics of bird species in Aligarh, Uttar Pradesh, India. The study was done from Jan 2024 to August 2024 at four study locations that represented both urban and rural environments: Shekha Bird Sanctuary, Aligarh Fort, Jawahar Park, and an open forest patch. Data was collected on avian diversity using point count methods, random sampling, and direct field observations with binoculars and identifying birds based on their morphological features. The study recorded 88 different bird species (16 Orders, 33 Families). The bird's feeding habits included omnivorous, carnivorous, insectivorous, piscivorous, granivorous, frugivorous, nectarivorous, and scavenging. Most of the birds were considered Least Concern (LC) according to the International Union for Conservation of Nature (IUCN) Red List; however, the Egyptian Vulture (Endangered) and the Sarus Crane (Vulnerable) demonstrate the need for further support of conservation efforts. Wetlands, forested areas, and urban green spaces are ecologically important for supporting bird diversity in the Aligarh region. These areas require continuous monitoring, habitat protection and ecological education programs to protect and sustain the region's avifaunal diversity.

Keywords*:* Avifaunal Diversity; Bird Species Richness; Aligarh Region; Habitat Distribution; Conservation Ecology

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Introduction

Birds represent a unique category of animal. Their beauty and attractiveness in nature lead many individuals to appreciate both their external beauty and the pleasantness of their vocal sounds. Birds play a significant role in ecosystems and maintaining the food web. They constitute the primary component of the terrestrial ecosystem or Forest land ecosystem. In addition to their many streams of ecological activity, birds serve as dispersers, pollinators, consumers, predators, and pointers that serve functionally as biological indicators, (Roopha *et al*., 2022). One of the most amazing types of animal on earth is a bird. Approximately 11,000 separate bird types, each of which has a distinct outward appearance and way of life (Bird Life international (2024). India is an area with diverse avian life. At least 1389 different types of birds exist in India, which includes 84 that exist solely in India and 3 of which breed only in India (Lepage, Denis (2024) Avibase bird checklists of the world. The national bird of India is the Indian peafowl (Pavo cristatus). Diversity of the avian fauna is one of the most critical ecological factors to evaluate the condition of an ecosystem. A decline in avian diversity exists due to human-related disturbances and degradation of their natural habitats. (Puri and Virani 2016). Bird species diversity in the Aligarh region will be documented and evaluated along with their current condition, diversity and demographic trends, number of species that reside there, number of individuals, distribution pattern, IUCN classification, diet, species evenness and richness and how this information can be used in bird conservation and management and maintaining ecological balance (Harisha & Hosetti 2009). There are two primary measures used to evaluate species diversity in any area are richness and evenness based on the combined total of these indices is the assessment of the value of that area for conserving birds (Dey *et al*. 2021). Aligarh district is rich in avian biodiversity. A lot of flora and fauna are found in it which acts as a favourable environment for birds. During this study we find out 88 bird number of species in four rural and urban sites of Aligarh region. These species are belongs to 33 families and 16 orders in which one species is categorized as Endangered and three species are categorized as Vulnerable according to the IUCN Red List. Before this present study, many studies have been conducted on Avifaunal diversity on nationwide level but some regions of Aligarh received less attention by researchers. We will accomplish that through this study by selecting four sites of both rural and urban areas of Aligarh region which would be helpful in further studies of biodiversity of wildlife.

Material and Methods

Study Area: The Aligarh district of Uttar Pradesh, India is situated between the Yamuna (north-west) and Ganga (north-east) rivers. Aligarh district covers a total area of 3691.50 km2 with latitude and longitude of (27035'-28011'N) and (77029'-78026'E) respectively.

Four distinct sites (**Table-1**) from Aligarh city have been selected for the study

Site 1	Shekha Bird Sanctuary	(Protected Rural area)
Site 2	Aligarh fort	(Protected Urban area)

Site 3	Jawahar Park	(Reserved Urban area)
Site 4	Open forest Patch (Ahrauli Village)	(Reserved Rural area)

Methodology- The current investigation was conducted in four distinct locations within the Aligarh district. For the purpose of study, two sites were protected rural and urban area and other two were reserved urban and rural area. This study was conducted from January to August 2024 and these sites were visited every morning and evening. Data on avifaunal diversity was gathered by Point count Method, Random Sampling and Direct field observation by binoculars or naked eyes depending on condition and distance. Birds were identified with the help of morphological characters like size, shape, colour, shade, eyes, beak, wings, feathers, legs and other body parts. Species diversity was calculated by using Shannon & Weiner index (Shannon & Weiner, 1949) and Simpson's diversity index (Stone & Pence, 1978). We categorised the observed species based on their observation type, abundance, population trend, dietary pattern, IUCN's status and conservation status.

Fig.1: Map showing sampling sites of Aligarh district

Result

In this study, 88 bird species from 16 orders and 33 families were identified, exhibiting eight different types of dietary patterns. The analysis of recorded avifauna revealed variations in population trend, conservation status, abundance, dietary pattern, resident status, and observation type among the recorded species. Most bird species have stable or unknown population trends; however, there are some which exhibit a decreasing trend (e.g. Sarus crane (*Antigone antigone*) and white-necked stork (*Ciconia episcopus*), potentially representing ecological pressures within the local area. In regard to IUCN Red list status, the majority of species recorded during the survey were classified as least concern (LC); however, a few species were classified as near threatened, vulnerable, or endangered (i.e., the Egyptian Vulture (*Neophron percnopterus*) is globally threatened). According to the abundance pattern, some bird species were indicated as being abundant or very abundant (common or frequent). Others, however, were recorded as being either infrequent/rare, which suggests differing habitat preferences and the species ability or inability to adapt to various habitats. The study also illustrated the existence of several different feeding guilds represented within the study area, such as omnivores, carnivores, insectivores, piscivores, granivores, frugivores, and nectarivores. These different guilds indicate that there are numerous types of food that are available in the study area. The majority of all species originally coded as birds in this study were considered to be resident birds; although, other species had a migratory pattern (winter migrants, partial migrants and local migrants). Each sample site had multiple species that were represented across all four sampling sites (i, ii, iii, and iv) based on observation type analysis. The distribution of species across multiple sampling sites suggests overlap of habitat among some bird species and the ability of some species to adapt and be flexible ecologically.

	Common Name	**Scientific Name**	**Order**	**Family**	**Trend**	**IUCN Status**	**Abundance**	**Dietary Pattern**	**Resident Status**	**Observation type**
1	Purple Moorhen	*Porphyrio porphyrio*	Gruiformes	Rallidae	Unknown	LC	Frequent	O	Local Migrant	I
2	Common Moorhen	*Gallinula chloropus*	Gruiformes	Rallidae	Stable	LC	Frequent	O	Partial Migrant	I
3	Watercock	*Gallicrex cineria*	Gruiformes	Rallidae	Decreasing	LC	Rare	O	Migrant	I
4	White Breasted Waterhen	*Amourornis phoenicurus*	Gruiformes	Rallidae	Unknown	LC	Frequent	O	Non Migrant or Resident	I
5	Sarus Crane	*Antigone antigone*	Gruiformes	Gruidae	Decreasing	Vulnerable	Uncommon	O	Non Migrant or Resident	I
6	Black Eagle	*Ictinaetus malaiensis*	Accipitriformes	Accipitridae	Decreasing	LC	Uncommon	C, S	Non Migrant or Resident	IV
7	Black Kite	*Milvus migrans*	Accipitriformes	Accipitridae	Unknown	LC	Frequent	C, S, I, P	Resident & Winter Migrant	I,II,III
8	Shikra	*Accipiter badius*	Accipitriformes	Accipitridae	Stable	LC	Rare	C, I	Resident	II,III

9	Egyptian Vulture	*Neophron percnopterus*	Accipitriformes	Accipitridae	Rapid decline	EN	Rare	C, S	Partial Migrant (Resident and Winter Migrant)	I, II, III, IV
10	Little Grebe	*Tachybaptus ruficolis*	Podicipediformes	Podicipedidae	Decreasing	LC	Frequent	C, I, P	Resident	I
11	Great Cormorant	*Phalacrocorax carbo*	Suliformes	Phalacrocoracidae	Increasing	LC	Rare	C, P	Resident and Winter Migrant	I
12	Indian Cormorant	*Phalocrocorax fuscicollis*	Suliformes	Phalacrocoracidae	Unknown	LC	Rare	C, P	Resident	I
13	Little Cormorant	*Microcarbo niger*	Suliformes	Phalacrocoracidae	Unknown	LC	Rare	C, P	Resident	I
14	Darter or Snake bird	*Anhinga anhinga*	Suliformes	Anhingidae	Increasing	LC	Rare	I	Resident	I
15	Large Egret or Great Egret	*Ardea alba*	Pelecaniformes	Ardeidae	Unknown	LC	Rare	C, P	Resident	I
16	Purple Heron	*Ardea purpurea*	Pelecaniformes	Ardeidae	Decreasing	LC	Rare	C, P, I	Resident	I
17	Grey Heron	*Ardea cinerea*	Pelecaniformes	Ardeidae	Unknown	LC	Rare	C, P	Resident	I
18	Little Green heron	*Butorides virescens*	Pelecaniformes	Ardeidae	Decreasing	LC	Rare	C, P, I	Partial Migrant	I
19	Night Heron	*Nycticorax nycticorax*	Pelecaniformes	Ardeidae	Decreasing	LC	Uncommon	C, P	Resident	I
20	Cattle Egret	*Bubulcus ibis*	Pelecaniformes	Ardeidae	Increasing	LC	Common	C, I	Resident	I,II,III
21	Little Egret	*Egretta garzetta*	Pelecaniformes	Ardeidae	Increasing	LC	Frequent	C, P	Resident	I
22	Chestnut Bittern	*Ixobrychus cinnamomeus*	Pelecaniformes	Ardeidae	Decreasing	LC	Rare	C	Mainly Resident	I
23	Black Bittern	*Ixobrychus flavicollis*	Pelecaniformes	Ardeidae	Unknown	LC	Rare	C	Resident and Local Migrant	I
24	Painted Stork	*Mycteria leucocephala*	Ciconiiformes	Ciconiidae	Decreasing	Near Threatened	Rare	C, P	Resident	I
25	Asian Openbill Stork	*Anastomus oscitans*	Ciconiiformes	Ciconiidae	Unknown	LC	Rare	C	Migrant (Winter visitors)	I
26	White Necked Stork	*Ciconia episcopus*	Ciconiiformes	Ciconiidae	Decreasing	Vulnerable	Rare	C	Resident and Migrant (Winter visitors)	I
27	Black Necked Stork	*Ephippiorhynchus asiaticus*	Ciconiiformes	Ciconiidae	Decreasing	Near Threatened	Rare	C	Resident	I
28	Bronze Necked Jacana	*Metopidius indicus*	Charadriiformes	Jacanidae	Unknown	LC	Rare	O	Resident	I
29	Phesant Tailed Jacana	*Hydrophasianus chirurgus*	Charadriiformes	Jacanidae	Decreasing	LC	Rare	C	Resident	I
30	Indian Pond Heron	*Ardeola grayii*	Pelecaniformes	Ardeidae	Unknown	LC	Frequent	O	Resident	I
31	Greylag Goose	*Anser anser*	Anseriformes	Anatidae	Increasing	LC	Frequent	O	Winter Migrant	I
32	Bar headed	*Anser indicus*	Anseriformes	Anatidae	Decreasing	LC	Rare	O	Migrant	I

	Goose									
33	Brahminy Shelduck	*Tadrona ferruginea*	Anseriformes	Anatidae	Unknown	LC	Rare	O	Migrant	I
34	Comb Duck	Sarkidiornis sylvicola	Anseriformes	Anatidae	Decreasing	LC	Rare	O	Migrant	I
35	Lesser Whistling Duck	*Dendrocygna javanica*	Anseriformes	Anatidae	Decreasing	LC		O	Migrant	I
36	Northern Pintail	*Anas acuta*	Anseriformes	Anatidae	Decreasing	LC		O	Migrant	I
37	Marbled Teal	*Marmaronetta angustirostris*	Anseriformes	Anatidae	Decreasing	NT		O	Migrant	I
38	Common Teal	*Anas crecca*	Anseriformes	Anatidae	Unknown	LC	Rare	O	Migrant	I
39	Spot-Billed Duck	*Anas poecilorhyncha*	Anseriformes	Anatidae	Decreasing	LC	Common	O	Resident	I
40	Mallard	*Anas platyrhynchos*	Anseriformes	Anatidae	Increasing	LC	Rare	O	Migrant	I
41	Gadwall	*Mareca strepera*	Anseriformes	Anatidae	Increasing	LC	Rare	H	Migrant	I
42	Eurasian Wigeon	*Mareca penelope*	Anseriformes	Anatidae	Decreasing	LC	Rare	H	Migrant	I
43	Garganey	*Spatula querquedula*	Anseriformes	Anatidae	Decreasing	LC		O	Migrant	I
44	Northern Shoveler	*Spatula clypeata*	Anseriformes	Anatidae	Decreasing	LC	Rare	O	Migrant	I
45	Common Pochard	*Aythya fernia*	Anseriformes	Anatidae	Decreasing	Vulnerable	Rare	O	Migrant	I
46	Ferruginous Pochard	*Aytha nyroca*	Anseriformes	Anatidae	Decreasing	NT	Rare	O	Migrant	I
47	Tufted Pochard	*Aythya fuligula*	Anseriformes	Anatidae	Stable	LC	Rare	O	Partial Migrant	I
48	Greater Scaup	*Aythya marila*	Anseriformes	Anatidae	Decreasing	LC	Rare	O	Migrant	I
49	Cotton Teal Or Cotton pygmy goose	*Nettapus coromandelianus*	Anseriformes	Anatidae	Unknown	LC	Rare	O	Migrant	I
50	Common Coot	*Fulica atra*	Gruiformes	Rallidae	Increasing	LC	Rare	O	Partial Migrant	I
51	Black winged Stilt	*Himantopus himantopus*	Charadriiformes	Recurvirostridae	Increasing	LC	Frequent	C	Resident and Local Migrant	I
52	River Lapwing	*Vanellus duvaucelii*	Charadriiformes	Charadriidae	Unknown	NT	Rare	C	Resident and Local Migrant	I
53	Bar Tailed Godwit	*Limosa lapponica*	Charadriiformes	Scolopacidae	Decreasing	NT	Uncommon	C	Migrant	I
54	Black Tailed Godwit	*Limosa limosa*	Charadriiformes	Scolopacidae		NT	Uncommon	C	Migrant	I
55	Common Sandpiper	*Actitis hypoleucos*	Charadriiformes	Scolopacidae	Decreasing	LC	Rare	C	Migrant	I
56	Eurasian Spoonbill	*Platalea leucorodia*	Pelacaniformes	Threskiornithidae	Decreasing	LC	Rare	C	Migrant	I

57	Green Bee eater	*Merops orientalis*	Coraciiformes	Meropidae		LC	Frequent	C, I	Partial migrant	II,III
58	Indian Peafowl	*Pavo cristatus*	Galliformes	Phasianidae	Stable	LC	Frequent	O	Resident	II,IV
59	Black Francolin	*Francolinus francolinus*	Galliformes	Phasianidae		LC	Uncommon	O	Resident	IV
60	Red Wattled Lapwing	*Vanellus malabaricus*	Charadriiformes	Charadriidae	Unknown	LC	Common	C, I	Resident	I, IV
61	Blue Rock Pigeon	*Columba livia*	Columbiformes	Columbidae	Decreasing	LC	Abundant	O, G	Resident	II, III
62	Rose Ringed Parakeet	*Psittacula krameri*	Psittaciformes	Psittacidae	Increasing	LC	Common	H, G	Resident	II, III
63	Lesser Coucal	*Centropus bengalensis*	Cuculiformes	Cuculidae	Increasing	LC	Common	O	Resident	III, IV
64	Spotted Owlet	*Athene brama*	Strigiformes	Strigidae	Stable	LC	Rare	C	Resident	III
65	Lesser Pied Kingfisher	*Ceryle rudis*	Coraciiformes	Alcedinidae	Unknown	LC	Common	C	Resident	I
66	White Breasted Kingfisher	*Halcyon smyrnensis*	Coraciiformes	Alcedinidae	Increasing	LC	Common	C	Resident	I,II
67	Common Hoopoe	*Upupa epops*	Bucerotiformes	Upupidae	Decreasing	LC	Frequent	C	Migrant	III, IV
68	Indian Grey Hornbill	*Ocyceros birostris*	Bucerotiformes	Bucerotidae	Stable	LC	Frequent	O, F	Resident	IV
69	Black Drongo	*Dicrurus macrocercus*	Passeriformes	Dicruridae	Unknown	LC	Frequent	C	Resident	II, III, IV
70	Common Myna	*Acridotheres tristis*	Passeriformes	Sturnidae	Increasing	LC	Abundant	O	Resident	II, III
71	Common Starling	*Sturnus vulgaris*	Passeriformes	Sturnidae	Decreasing	LC	Frequent	O	Winter Migrant	II, III
72	Jungle Myna	*Acridotheres fuscus*	Passeriformes	Sturnidae	Decreasing	LC	Common	O	Resident	II, III
73	Bank Myna	*Acridotheres ginginianus*	Passeriformes	Sturnidae	Increasing	LC	Common	O	Resident	II
74	Asian Pied Starling or Pied myna	*Gracupica contra*	Passeriformes	Sturnidae	Increasing	LC	Abundant	O	Resident	II, III
75	Indian Treepie Or Rufous Treepie	*Dendrocitta vagabunda*	Passeriformes	Corvidae	Decreasing	LC	Frequent	O	Resident	IV
76	House Crow	*Corvus splendens*	Passeriformes	Corvidae	Stable	LC	Common	O & S	Resident	II, III
77	Jungle Crow	*Corvus macrorhynchos*	Passeriformes	Corvidae	Stable	LC	Common	O	Resident	III, IV
78	Babbler	*Argya caudata*	Passeriformes	Leiotrichidae	Stable	LC	Frequent	O	Resident	IV
79	Oriental Magpie Robin	*Copsychus saularis*	Passeriformes	Muscicapidae	Stable	LC	Common	O, I	Resident	III, IV
80	Indian Robin	*Saxicoloides fulicatus*	Passeriformes	Muscicapidae	Stable	LC	Common	O, I	Resident	III, IV

81	Red Vented Bulbul	*Pycnonotus cafer*	Strigiformes	Pycnonotidae	Increasing	LC	Common	O	Resident	II, III, IV
82	Asian Paradise Flycatcher	*Terpsihone paradisi*	Passeriformes	Monarchidae	Stable	LC	Common	C, I	Migrant	IV
83	White Wagtail	*Motacilla alba*	Passeriformes	Motacillidae	Stable	LC	Frequent	C, I	Migrant	I
84	Purple Sunbird	*Cinnyris asiaticus*	Passeriformes	Nectariniidae	Stable	LC	Frequent	O, N	Resident and Local Migrant	II, III
85	Red Munia	*Amandava amandava*	Passeriformes	Estrildidae	Stable	LC	Common	O, G	Resident	IV
86	Oriental White Ibis or Black headed ibis	*Threskiornis melanocephalus*	Pelecaniformes	Threskiornithidae	Unknown	LC	Uncommon	C	Resident	I
87	Black Ibis or red naped ibis	*Pseudibis papillosa*	Pelecaniformes	Threskiornithidae	Decreasing	LC	Frequent	O	Resident	IV
88	Glossy Ibis	*Plegadis Falcinellus*	Pelecaniformes	Threskiornithidae	Increasing	LC	Uncommon	C, I, P	Migrant	I

(C=Carnivore, F=Frugivore, G=Granivore, I= Insectivore, N= Nectivore, O= Omnivore, P=Piscivore, S= Scavenger)
(LC= Least Concern, NT= Near Threatened, VU= Vulnerable, EN= Endangered, CR= critically endangered, EW= Extinct in the Wild, EX= Extinct)

Laughing Dove

White beasted Waterhen

Black winged stilt

Grey heron

Black winged stilt

Purple heron

Common Myna

Rock Pigeon

Darter or Snake bird

		
Indian Peafowl	Yellow-wattled Lapwing	White breasted Kingfisher
		
Oriental darter	Red Vented Bulbul	White Wagtail
		
Painted Stork	House Crow	Rose-ringed Parakeet

Figure 2 : Aves in Aligarh region

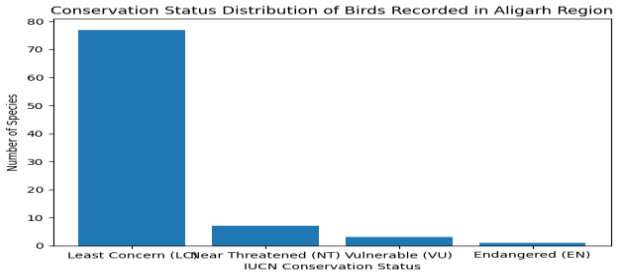

Figure 3. Distribution of bird species according to IUCN conservation status in the Aligarh region.

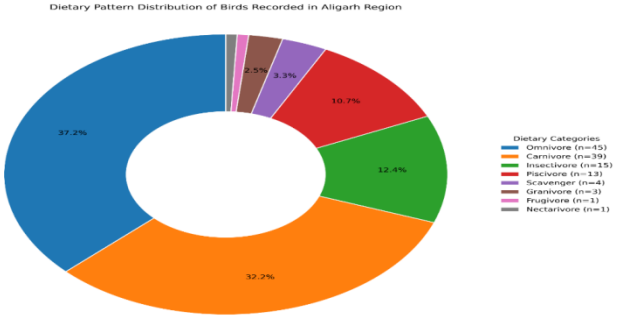

Figure 4. Dietary pattern distribution of bird species recorded in the Aligarh region, Uttar Pradesh.

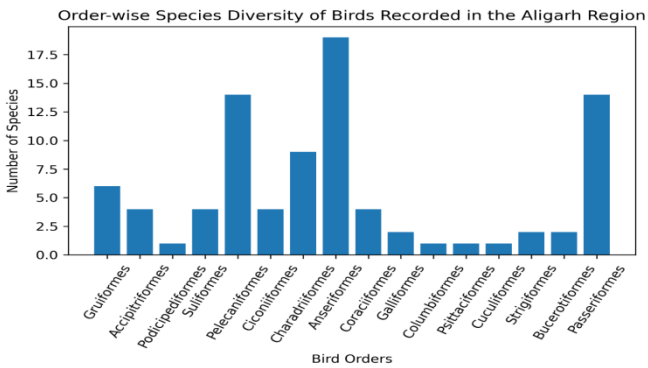

Figure 5. Order-wise distribution of bird species recorded from different habitats of the Aligarh region, Uttar Pradesh.

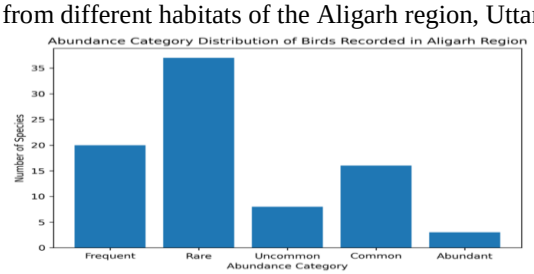

Figure 6. Bar chart showing the abundance category distribution of bird species recorded in the Aligarh region, Uttar Pradesh.

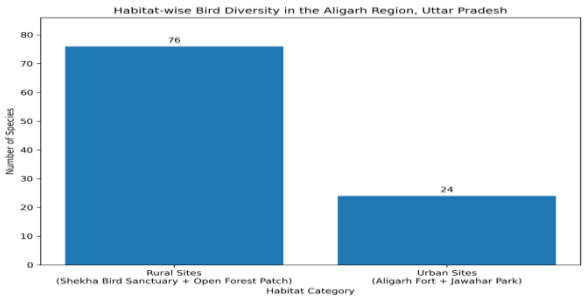

Figure 7. Habitat-wise bird diversity recorded from rural and urban sites of the Aligarh region, Uttar Pradesh.

Discussion

The findings of this research provide valuable information regarding the avifaunal (bird) diversity in the Aligarh region of Uttar Pradesh, India. Overall, 88 bird species from 16 orders and 33 families were found at four sites representing rural and urban habitat. Among the most dominant orders were Anseriformes (ducks), Passeriformes (sparrows, etc.), and Pelecaniformes (herons, etc.). These three groups of birds are representative of wetlands, agricultural fields, and urban green space; thus, indicating that these three types of habitats supports a significant number of birds. We recorded most of the bird species associated with wetland habitats from rural habitats, where we also noted that many of the recorded (waterfowl associated) birds inhabited water bodies and used them for feeding and nesting purposes. Similar results have been identified in prior studies, indicating that habitat heterogeneity is a major factor influencing bird species diversity and the distribution of avian species (Harisha & Hosetti, 2009; Dey *et al*., 2021). According to the current research, knowledge of the feeding guilds has yielded numerous dietary categories (omnivores, carnivores, insectivores, piscivores, granivores, frugivores and nectarivores) of birds present in that area. The abundance of both omnivorous and carnivorous species implies that there are ample food resources within this region to support the bird population. Other studies have demonstrated that birds are excellent indicators of the health of an ecosystem, as population changes and distribution changes are likely to correspond with ecological disruption and the quality of habitat conditions (Gregory & van Strien, 2010). The great majority of species recorded belong to the Least Concern (LC) category of the IUCN Red List; thus indicating that most species in that area are well established. However, both the Egyptian Vulture (*Neophron percnopterus*) and the Sarus Crane (*Antigone antigone*), each with its own endangered or vulnerable classification status, provides an excellent opportunity to evaluate the conservation importance of the area. Increasing urbanisation, habitat degradation and human activity may threaten that diversity in the future; therefore, there is a considerable need for the establishment of habitat protection and the implementation of conservation education programmes within the local area.

Conclusion

This research presents detailed information regarding the variety of birds found in the Aligarh district of Uttar Pradesh. A total of 88 species and 16 orders and 33 families of birds were documented at four sites, which represented both rural (agricultural) and urban areas (commercial). The findings indicate that the diversity of birds in Aligarh is substantial, and further demonstrate that wetland, forest, and urban green space habitats all provide critical resources necessary for the survival of birds. While the majority of the 88 birds were classified as Least Concern, there were many that were listed as Near Threatened, Threatened, and Endangered, including the Sarus Crane (*Grus antigone*), Egyptian Vulture (*Neophron percnopterus*), and White-necked Stork (*Mycteria cinerea*). Habitat preferences indicate the critical need for various types of habitats to enable birds to reside in those areas. Wetland birds in the rural areas of Aligarh, India are more abundant than in urban parks or non-urban areas. Urban development, habitat loss, industrial agriculture, and all other forms of human disturbance (noise, litter, developed areas, etc.) pose serious threats to wetland bird populations in Aligarh. In order to ensure the preservation of ecological diversity, "conservation" and "research" methods must be used to check ecological diversity, including (but not limited to) habitat protection, wetland preservation, education on sound ecological practices, and the use of organic farming. Additionally, field studies must be conducted over an extended period of time to allow researchers to continuously monitor bird populations and conserve the species in Aligarh.

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