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Community Composition and Status of Avifaunal Diversity in and Around Alania Dam of Kota, Rajasthan, India

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Abstract
The Alania wetland near Kota, Rajasthan, is a seasonal and ecologically important home for many bird species. Regular surveys using line and point transects methods recorded 89 species, including resident birds as well as summer and winter migrants from October, 2023 to September, 2024. Special sightings like Greater Flamingos (*Phoenicopterus roseus*) and Sarus Cranes (*Antigone antigone*) show how vital this wetland is for globally important birds. By comparing field data with the IUCN Red List, the study looked at conservation status. The area around the wetland is a mix of forests, grasslands, farms, streams, shrubs, and scattered trees, which creates diverse habitats for birds. However, farming in parts of the floodplain each year threatens nesting sites and habitat quality. Local observations with global conservation suggest that Alania could be recognized as an Important Bird Area (IBA) in future. This research provides a strong baseline for long-term monitoring, helping us understand migration, habitat use, and seasonal changes in bird communities. The study emphasizes the need for ongoing protection and monitoring to safeguard both migratory and resident bird populations in the region.

Keywords: Alania dam, Wetland ecosystem, Avian biodiversity, Birds, Kota, Rajasthan.

Introduction

India is very rich in avian biodiversity and its makes about 13% contribution to the total bird population on this globe (Sharma & Tripathi, 2024). Bird species are adapted to different type of environments during their migrations (Pratt *et al*., 2019; Kumar & Alam, 2023), which highlights the necessity for conservation and conservation strategies that account for the seasonal changes (Pratt *et al*., 2019), ensuring important habitats are preserved not only for the migrative stopovers; but also, for the breeding etc. (Zuckerberg *et al.*, 2016)

Wetland ecosystems are very important for supporting avian diversity (Dertien *et al*., 2020). They serve as an important habitat which provide resources for different bird species throughout the seasons in in a year (Lorenzón *et al*., 2019). The relationship between health of a wetland and avian diversity extends beyond providing habitat, it also plays a very important role in seasonal dynamics in the species distribution and structure of a community (Parimala & Nuzhat, 2022). For instance, the studies have shown that species richness functional diversity can change significantly with the season (Li *et al.*, 2025). This

understanding helps us to knew about the importance of ongoing research; monitoring of avian species to find out effective management practises), that help in sustaining avian populations during these rapid environmental changes (Bart, 2005; Jenouvrier, 2013). Effective conservation strategies for protecting the wetland habitats are the need of hour (Paul *et al*., 2011), especially during the seasons of autumn and winter. Bird diversity is more pronounced and important for migratory species during these times (Li *et al.*, 2025).

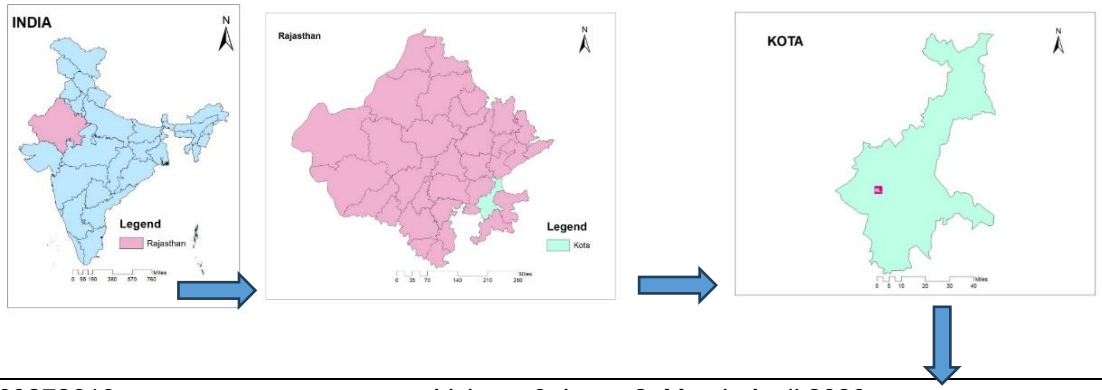
Research has indicated that wetlands serve as the vital stopover sites for the migratory birds (Xu *et al*., 2020; Cohen *et al*., 2021); highlighting the targeted conservation need during the key seasonal periods by understanding their overall functioning so that we can better protect bird's population and the ecological services which a wetland provides to mankind (Brawn *et al*., 2001; Li *et al.*, 2025).

The present study has focused on Alania wetland, situated at Kota (Rajasthan), Due to its unique location, it has very unique ecological features and diverse habitats in semi-arid climate. This wetland has also become a focal point for the studies related to the avian diversity. It also gives us conditions which may be helpful in studying wetland ecology and may help in framing the conservation efforts and strategies.

Materials and methods

Study area

Alania wetland is situated near the Kota Rajasthan with its geographical coordinates 25.0037" N & 75.8780" E. It is about 23 kilometre west of Kota on Kota-Jhalawar Road (Fig. 1). It is an ecological important site that offers a wide habitat for various species of plants and animals, particularly birds. This wetland is located around the Alania Dam which serve as a crucial reservoir for both resident and migratory birds playing an important role in maintaining the biodiversity of the of the region. Alania wetland is situated on the Alania River near Alania village in Kota district. It stands at a maximum height of 14.54 metres from its deepest point It is a masonry dam constructed with Surkhi mortar between 1961 and 1962. It primarily serves as irrigation reservoir. This dam is rich in both fish and bird life enhancing its ecological diversity. It is part of a larger hydrological system which is fed by seasonal rainfall and surface runoff of water from the surrounding areas. Water during the rainy season fills this dam and adjoining water bodies. This area experiences a typical monsoon pattern of rainfall and rainy season may extend from June to September and it replenishes the water level in the wetland every year. This wetland lies in lowland area that collects water from surrounding catchment areas. Alania Wetland is supported by seasonal and permanent water bodies which vary in size depending on the time of year and rainfall patterns. This variation in water availability creates a dynamic environment which support different type of habitats from shallow marsh areas to open water areas. These types of habitats are very important for supporting the diverse bird species that depends on this wetland for various activities such as foraging, nesting breeding etc.



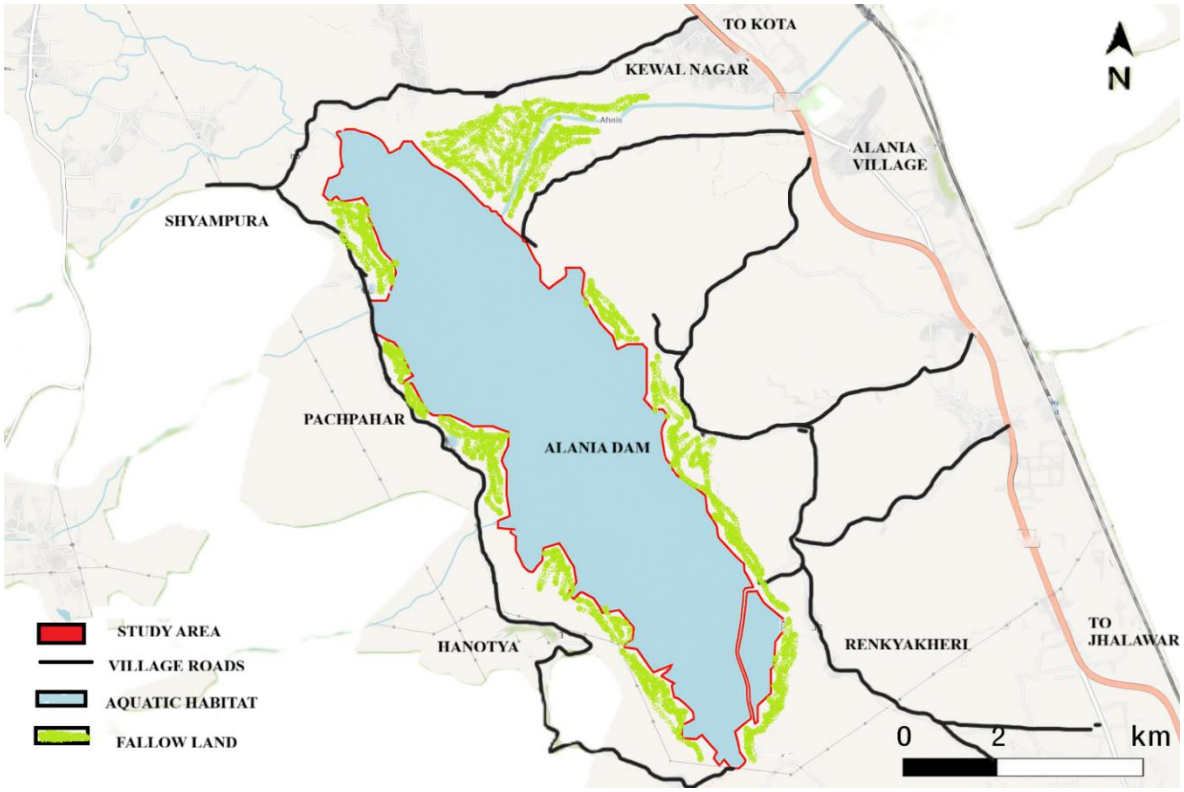


Fig. 1. Location and map of Alania wetland, Kota (Rajasthan)

Methodology

An avian survey was conducted at the study site from October, 2023 to September, 2024 in different phases (morning and evening)with the help of different methods such as Scan sampling method (Altmann, 1974), Point transect method and Line transect method (Gaston, 1975; Sutherland, 2005).The data was prepared in the form of a checklist of avian species observed in the area on the basis of common name, scientific name and alternative names classified into order, family and genus (Praveen *et al.*, 2021 and IUCN, 2026). Birds' observation was made with the help of Nikon P1000 Zoom camera. Identification was done with the help of some field Guides (Grimmett *et al.* 2019) and merlin bird ID application. Feeding Guilds were categorised into eight guilds Carnivores, Insectivores, Omnivores, Herbivores, Frugivores, Granivores, Insectivores or Nectarivores and piscivores based on direct observation and literature by Grimmett *et al.* 1999; Singh *et al.* 2020.

Assessment of bird species (whether resident or migratory) was done on the basis of their presence and absence in the study area (Grimmett and Inskipp 2003, Kumar *et al.* 2016, Sohil and Sharma *et.al*). Birds were classified in to summer migrants if they were found at the study area between April to September months, Winter migrants if observed during October to march and Residents if found thought the year (Kumar and Gupta 2009). CITES (2012) and IUCN (2026) were used to characterise the conservation status and population trends of the observed species.

The relative diversity value of the families was calculated formula given by La Torre-Cuadros *et al.* (2007):

$$\mathbf{RDi} = \frac{\mathbf{Number\ of\ bird\ species\ in\ a\ family}}{\mathbf{Total\ number\ of\ bird\ species}} \times \mathbf{100}$$

Results and Discussion

A year-long ornithological survey (October, 2023 to September 2024) documented 89 bird species across 89 genera, 41 families, and 16 orders (Fig. 2) from Alania wetland in Kota district (Figure 2). Habitat complexity and microhabitat diversity were found to be key drivers of avian richness, as heterogeneous environments provide abundant food and shelter resources (Bellanthudawa *et al*., 2019). Alania Wetland is a large aquatic system with extensive littoral zones, roadside plantations, agricultural fields, and moderate human disturbance, supporting 89 species. Earlier studies (Sharma *et al*., 2024) reported 6 species of storks at Alania wetland, confirming its importance as a stopover site for migratory birds.

Passeriformes dominated (29 species, 16 families), followed by Charadriiformes (13 species, 5 families), Pelecaniformes (10 species, 3 families), Anseriformes (8 species, 1 family), Coraciiformes (6 species, 3 families), Ciconiiformes (5 species, 1 families), Gruiformes (4 species, 2 families), Suliformes (3 species, 2 families), Accipitriformes (2 species, 1 families), Columbiformes (2 species, 1 families), Psittaciformes (2 species, 1 families). Bucerotiformes, Cuculiformes, Galliformes, Phoenicopteriformes and Strigiformes represented by a single species each. Families Anatidae (8 species) and Muscicapidae (7 species) were most species rich, with high relative diversity indices (RDi = 8.98) and (RDi = 7.86) respectively. Insectivores (32 species) were most abundant, followed by omnivores (20), carnivores (19), herbivores and piscivores (8), granivores (5), frugivores (3) and herbivores (2). Insectivore dominance reflects high insect availability due to plantations, moist conditions, and nutrient-rich wetlands (c).

According to seasonal abundance data, winter peak in species richness due to the migratory influx especially from Anatidae and Scolopacidae Whereas in summers, there occur presence of selected breeding migrants. There is quite stable year around presence of resident insectivores and omnivores birds. Out of total 89 species, 56 species were considered Residents, 28 species were Winter migrants, 4 species were summer migrants and a single species was considered passage visitor.

According to IUCN Red List (2026), 79 species were considered Least Concern, 6 species as Near Threatened (Fig. 4) e.g., Asian woolly neck stork (*Ciconia episcopus*), Dalmantian Pelican (*Pelecanus crispus*), Eurasian Curlew (*Numenius Arquata),* Indian Roller (*Coracias benghalensis),* Loggerhead shrike (*Lanius ludovicianus),* Spotted owl (Strix occidentalis), 2 species as Vulnerable i.e., River tern (*Sterna aurantia*) and Sarus crane (*Antigone antigone*).

The avifaunal diversity at Alania Dam reflects a rich mosaic of habitats supporting both resident and migratory bird communities The dominance of Passeriformes and insectivorous guilds suggest a healthy terrestrial ecosystem, With large number of forging opportunities. The presence of many piscivores and aquatic carnivores indicate productive wetland. The high proportion of winter migratory species around 30.3% Indicates Alania dam as a seasonal refuge for water birds. Some families such Anatidae and Laridae Should strong seasonal peak Aligning with global migratory flyways. Comparatively lesser number of summer migrants and passage visitors suggest the habitat specific breeding or stopover behaviour. Feeding guild analysis reveals functional diversity (Fig. 3) with insectivorous contributing to the pest control and piscivores indicating the aquatic health and scavengers like Egyptian vulture *(Neophron percnupterus*, EN) playing key role in nutrient cycling. The presence of threatened species (*Cinchonia episcopus*, EN, *Antigone antigone*, VU) highlights the conservation value of the site. The seasonal abundance chart confirms that wetland habitats are critical during winter months while scrubs and farmland edges, support year around residents (Fig. 5). Management strategies should help in wetland preservation and minimise disturbance during migratory peaks and habitat heterogeneity to sustain diverse guilds.

Table 1. Avifaunal species recorded in Alania Dam, Kota (Rajasthan) from Oct, 2023 to Sept, 2024.

S. No.	Order	Family	Common Name	Scientific Name	IUCN (2026)	Residential Status	Feeding Guild
1.	Accipitriformes	Accipitridae	Black kite	*Milvus migrans*	LC	R	C
			Egyptian vulture	*Neophron percnopterus*	EN	R	C
2.	Anseriformes	Anatidae	Australasian Shoveler	*Spatula rhynchotis*	LC	WM	O
			Bar headed goose	*Anser indicus*	LC	WM	H
			Common shelduck	*Tadorna tadorna*	LC	WM	O
			Indian-spotted bill duck	*Anas poecilorhyncha*	LC	R	O
			Knobbed billed duck	*Sarkidiornis melanotos*	LC	R	O
			Lesser whistling duck	*Dendrocygna javanica*	LC	R	H
			Northen shoveler	*Spatula clypeata*	LC	WM	O
			Rudy Shelduck	*Tadorna ferruginea*	LC	WM	O
3.	Bucerotiformes	Upupidae	Eurasian Hoopoe	*Upupa epops*	LC	WM	I
4.	Charadriiformes	Charadriidae	Little ringed plover	*Thinornis dubius*	LC	SM	I
			Red-wattled Lapwing	*Vanellus indicus*	LC	R	I
		Jacanidae	Bronze winged Jacana	*Metopidius indicus*	LC	R	O
		Laridae	Brown headed Gull	*Chroicocephalus brunnicephalus*	LC	WM	O
			Caspian Gull	*Larus cachinnans*	LC	WM	O
			River tern	*Sterna aurantia*	VU	SM	P
		Recurvirostridae	Black winged stilt	*Himantopus Himantopus*	LC	R	I
			Pied Avocet	*Recurvirostra avosetta*	LC	WM	I
			Pied stilt	*Himantopus leucocephalus*	LC	R	I

		Scolopacidae	Common Redshank	*Tringa tetanus*	LC	WM	I
			Common Sndpiper	*Actitis hypoleucos*	LC	WM	I
			Eurasian Curlew	*Numenius Arquata*	NT	WM	I
			Wood Sandpiper	*Tringa glareola*	LC	WM	I
5.	Ciconiiformes	Ciconiidae	Asian Open bill	*Anastomus oscitans*	LC	R	C
			Asian wooly neck stork	*Ciconia episcopus*	NT	R	C
			Black Stork	*Ciconia nigra*	LC	WM	C
			Painted Stork	*Mycteria leucocephala*	LC	R	C
			White Stork	*Ciconia Ciconia*	LC	WM	C
6.	Columbiformes	Columbidae	Eurasian Collared Dove	*Streptopelia decaocto*	LC	R	G
			Laughing Dove	*Spilopelia senegalensis*	LC	R	G
7.	Coraciiformes	Alcedinidae	Common Kingfisher	*Alcedo atthis*	LC	R	P
			Pied Kingfisher	*Ceryle rudis*	LC	R	P
			White breasted Kingfisher	*Halcyon smyrnensis*	LC	R	C
			White throated Kingfisher	*Halcyon smyrnensis*	LC	R	C
		Coraciidae	Indian Roller	*Coracias benghalensis*	NT	R	I
		Meropidae	Asian Green bee eater	*Merops orientalis*	LC	R	I
8.	Cuculiformes	Cuculidae	Pied Cuckoo	*Clamator jacobinus*	LC	SM	I
9.	Galliformes	Phasianidae	Indian Peafowl	*Pavo cristatus*	LC	R	O
10.	Gruiformes	Gruidae	Sarus crane	*Antigone Antigone*	VU	R	O
		Rallidae	Eurasian moorhen	*Gallinula chloropus*	LC	R	O
			Gray headed swamphen	*Porphyrio poliocephalus*	LC	R	O
			White breasted Waterhen	*Amaurornis phoenicurus*	LC	R	O

11.	Passeriformes	Acrocephalidae	Booted Warbler	*Iduna caligata*	LC	WM	I
		Alaudidae	Ashy-crowned Sparrow Lark	*Eremopterix griseus*	LC	R	G
		Cisticolidae	Plain Prinia	*Prinia inornate*	LC	R	I
		Corvidae	House crow	*Corvus splendens*	LC	R	O
		Dicruridae	Black Drongo	*Dicrurus macrocercus*	LC	R	I
			Fork tailed drongo	*Dicrurus adsimilis*	LC	R	I
		Estrildidae	Shikra	*Tachyspiza badia*	LC	R	G
		Hirundinidae	Wire-tailed Swallow	*Hirundo smithii*	LC	R	I
		Laniidae	Loggerhead shrike	*Lanius ludovicianus*	NT	WM	C
			Long Tailed shrike	*Lanius Schach*	LC	R	C
		Leiothrichidae	Comman Babbler	*Argya caudata*	LC	R	I
			Jungle babbler	*Argya striata*	LC	R	I
			Large grey babbler	*Argya malcolmi*	LC	R	I
		Motacillidae	Eastern yellow wagtail	*Motacilla tschutschensis*	LC	Passage Visitor	I
			White wagtail	*Motacilla alba*	LC	WM	I
		Muscicapidae	Amur Stonechat	*Saxicola stejnegeri*	NA	WM	I
			Black Redstart	*Phoenicurus ochruros*	LC	WM	I
			Brown Rock Chat	*Oenanthe fusca*	LC	R	I
			Indian robin	*Copsychus fulicatus*	LC	R	I
			Isabelline Wheateater	*Oenanthe isabelline*	LC	WM	I
			Oriental magpie robin	*Copsychus saularis*	LC	R	I
			Siberian Stonechat	*Saxicola maurus*	LC	WM	I

		Nectariniidae	Purple sunbird	*Cinnyris asiaticus*	LC	R	I
		Passeridae	House sparrow	*Passer domesticus*	LC	R	G
		Pycnonotidae	Red vented Bulbul	*Pycnonotus cafer*	LC	R	F
		Sturnidae	Brahminy Starling	*Sturnia pagodarum*	LC	R	O
			Indian Pied staling	*Gracupica contra*	LC	R	O
			Rosy Starling	*Pastor roseus*	LC	SM	O
		Sylviidae	Lesser Whitethroat	*Curruca curruca*	LC	WM	I
12.	Pelecaniformes	Ardeidae	Eastern Cattle Egret	*Ardea coromanda*	LC	R	C
			Grey Heron	*Ardea cinerea*	LC	R	C
			Indian Pond Heron	*Ardeola grayii*	LC	R	C
			Little Egret	*Egretta garzetta*	LC	R	C
			Purple heron	*Ardea purpurea*	LC	R	C
		Pelecanidae	Dalmantian Pelican	*Pelecanus crispus*	NT	WM	P
			Great White Pelican	*Pelecanus onocrotalus*	LC	WM	P
		Threskiornithidae	Black headed Ibis	*Threskiornis melanocephalus*	LC	R	O
			Eurasian Spoonbill	*Platalea leucorodia*	LC	WM	C
			Red naped Ibis	*Pseudibis papillosa*	LC	R	C
13.	Phoenicopteriformes	Phoenicopteridae	Greater Flamingo	*Phoenicopterus roseus*	LC	WM	O
14.	Psittaciformes	Psittaculidae	Plum headed Parakete	*Psittacula cyanocephala*	LC	R	F
			Rose ringed Parakete	*Psittacula krameria*	LC	R	F
15.	Strigiformes	Strigidae	Spotted owl	*Strix occidentalis*	NT	R	C
16.	Suliformes	Anhingidae	Oriental Darter	*Anhinga melanogaster*	LC	R	P
		Phalacrocoracidae	Great Cormorant	*Phalacrocorax carbo*	LC	WM	P

			Little cormorant	*Microcarbo niger*	LC	R	P

Abbreviations:

Feeding guilds: H- Herbivore/ O-Omnivore/ I-Insectivor/ C-Carnivore/ G-Grainivore/ F-Frugivore/ P-Piscivore/ In/N- Insectivore/Nectarivore

Conservation status: LC- Least Concern/ NT- Near threatened/ VU-Vulnerable

R/M status: R -Resident, WM - Winter Migrant/ SM-Summer Migrant

Table 2. RDI value of observed species families from the study area.

Family	Species	RDI Value
Accipitridae	2	2.24
Acrocephalidae	1	1.12
Alaudidae	1	1.12
Alcedinidae	4	4.49
Anatidae	8	8.98
Anhingidae	1	1.12
Ardeidae	5	5.61
Charadriidae	2	2.24
Ciconiidae	5	5.61
Cisticolidae	1	1.12
Columbidae	2	2.24
Coraciidae	1	1.12
Corvidae	1	1.12
Cuculidae	1	1.12
Dicruridae	2	2.24
Estrildidae	1	1.12
Gruidae	1	1.12
Hirundinidae	1	1.12
Jacanidae	1	1.12
Laniidae	2	2.24
Laridae	3	3.37
Leiothrichidae	3	3.37
Meropidae	1	1.12
Motacillidae	2	2.24
Muscicapidae	7	7.86
Nectariniidae	1	1.12
Passeridae	1	1.12
Pelecanidae	2	2.24
Phalacrocoracidae	2	2.24
Phasianidae	1	1.12
Phoenicopteridae	1	1.12
Psittaculidae	2	2.24

Pycnonotidae	1	1.12
Rallidae	3	3.37
Recurvirostridae	3	3.37
Scolopacidae	4	4.49
Strigidae	1	1.12
Sturnidae	3	3.37
Sylviidae	1	1.12
Threskiornithidae	3	3.37
Upupidae	1	1.12
Grand Total	**89**	100

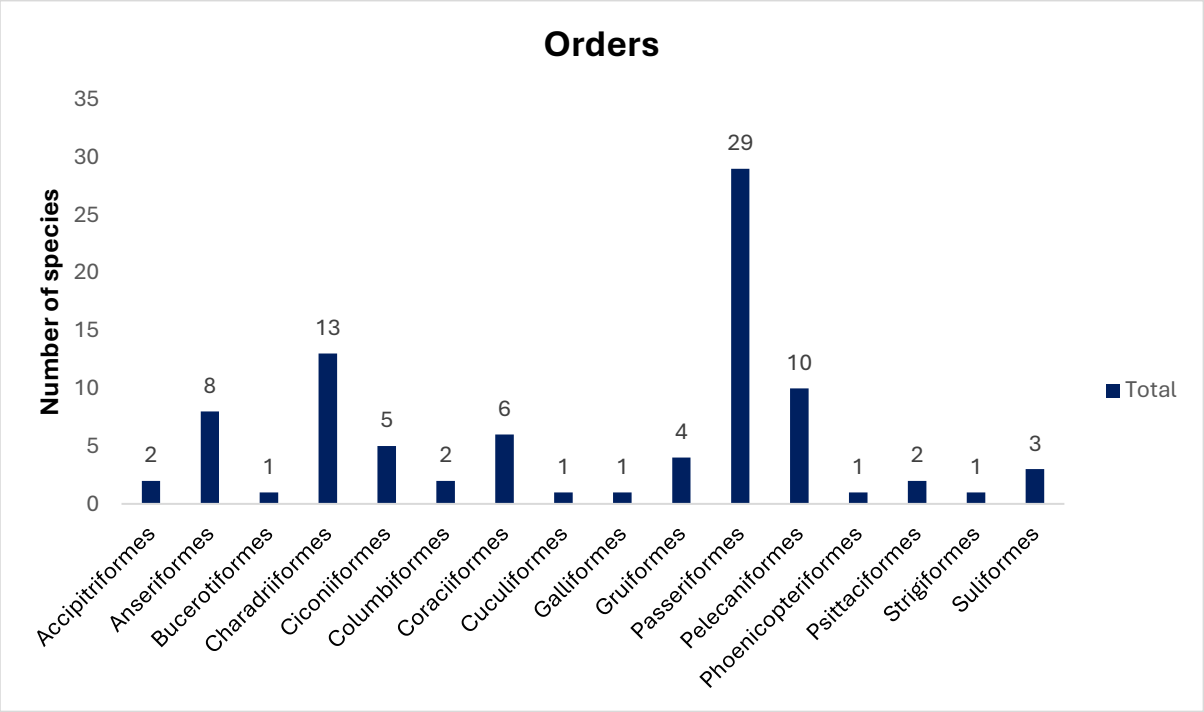


Fig. 2. Number of reported avian species in different orders at Alania Wetland, district Kota, Rajasthan

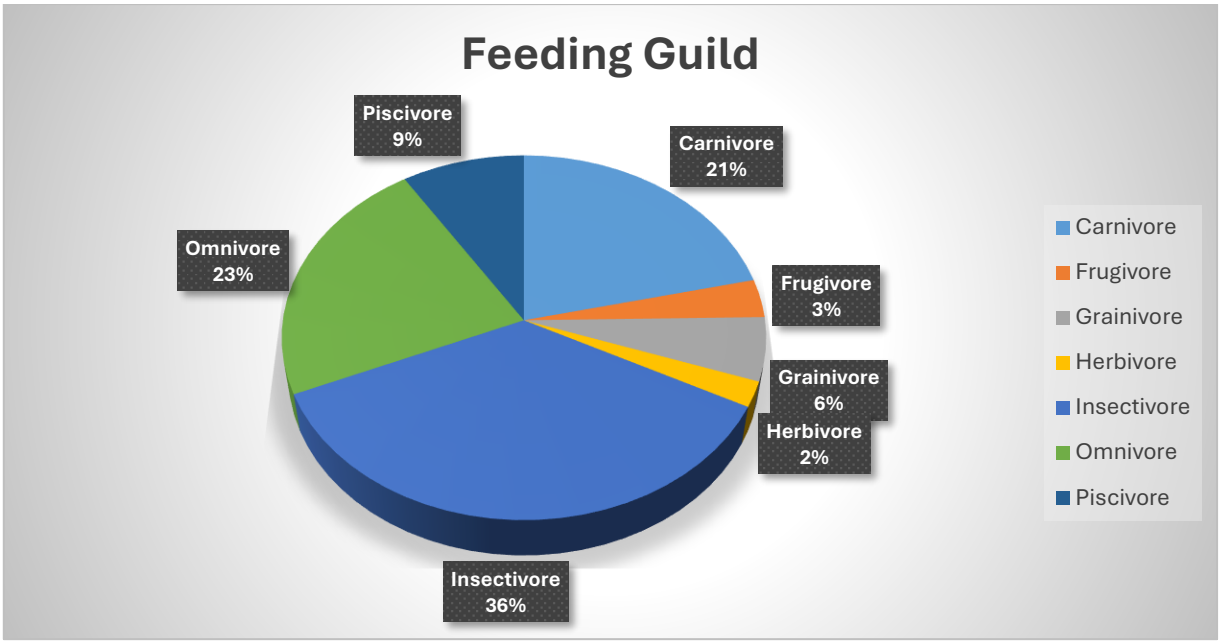


Fig. 3. Feeding guild of reported avian species at Alania Wetland, district Kota, Rajasthan

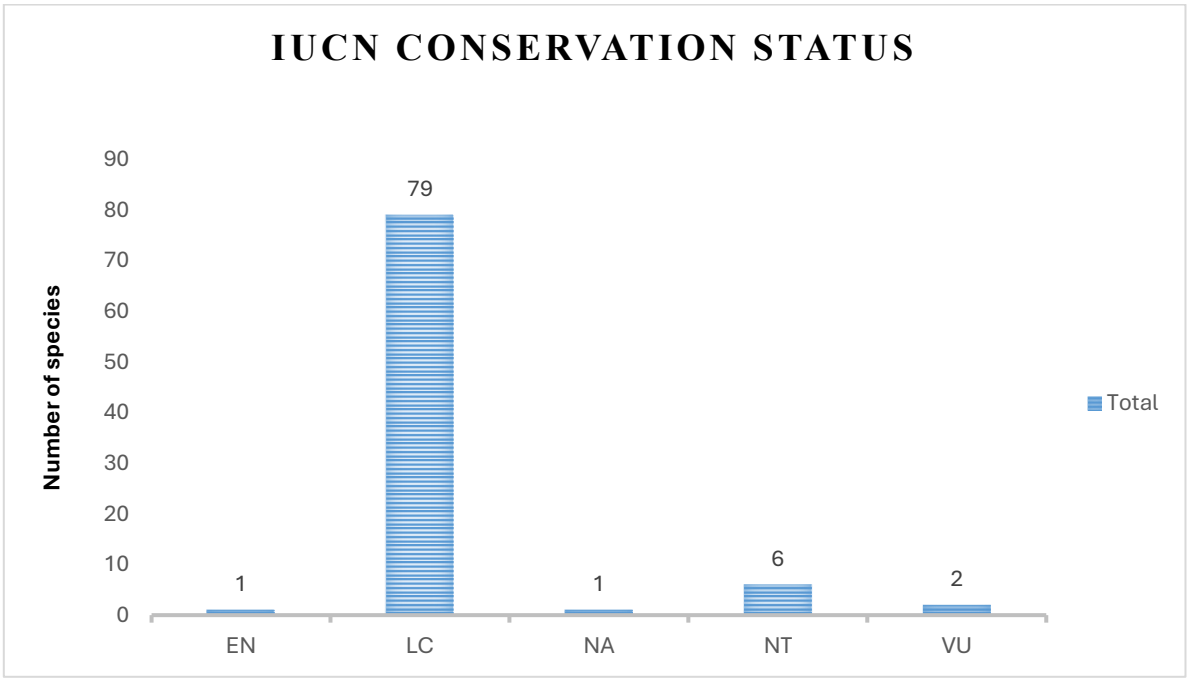


Fig. 4. IUCN conservation status of reported avian species at Alania Wetland, district Kota, Rajasthan

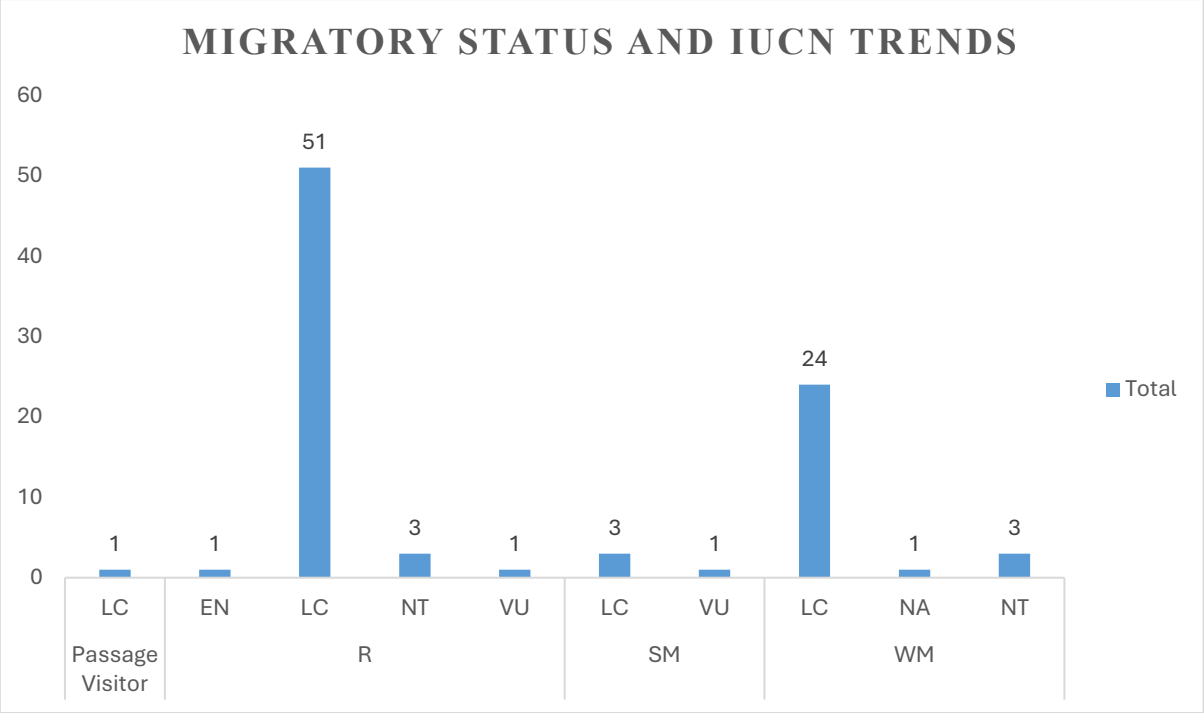


Fig. 5. Migratory status vs IUCN conservation status of reported avian species at Alania Wetland, district Kota, Rajasthan

Conclusion

The present study which was conducted at Alania Dam provides information and ecological characters of this site which serves as a great place for avian diversity due to its unique features.

Recorded data is about 89 species at this Alania Dam which can be used as a baseline data for assessment of species in future perspective. If long term monitoring is performed at this, it can help in determining the effect of anthropogenic pressure and implement conservation strategies accordingly for this particular site.

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