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Ornis Hungarica 2024. 32(2): 60–73.
DOI: 10.2478/orhu-2024-0022

Species composition, diversity and foraging guilds of avifauna in two freshwater lakes of Mysore district, Karnataka, India

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Received: July 29, 2024 – Revised: October 13, 2024 – Accepted: October 15, 2024

Abhilash, H. R., Sathish, S. V. & Siddaramaiah, B. 2024. Species composition, diversity and foraging guilds of avifauna in two freshwater lakes of Mysore district, Karnataka, India. – Ornis Hungarica 32(2): 60–73. DOI: 10.2478/orhu-2024-0022

Abstract We conducted the present study in two freshwater lakes in the Mysore district of Karnataka, India, from December 2023 to May 2024, with the aim of evaluating the diversity, relative abundance, and feeding guilds of avifauna in Giribetta and Hadinaru lakes. The "point count" method was used to evaluate the species composition of birds. A total of 5,790 individuals, representing 106 species from 18 orders and 48 families, were recorded. Four species were in the near-threatened category: Painted Stork *(Mycteria leucocephala)*, Black-headed Ibis *(Threskiornis melanocephalus)*, Oriental Darter *(Anhinga melanogaster)*, and Spot-billed Pelican *(Pelecanus philippensis)*, while the others were of least concern. In terms of species richness, Giribetta Lake had 87 species belonging to 18 orders and 42 families, as compared to Hadinaru Lake, which had 86 species from 16 orders and 40 families. The two areas had similar species composition, with a Sorenson index of 76.3% and a Jaccard index of 61.7%, which indicates that the species diversity is fairly similar across the habitats. Based on the diet and foraging habitat, the recorded bird species were classified into eight major feeding guilds, which revealed a higher abundance of carnivorous and insectivorous birds, followed by omnivorous, granivorous, frugivorous, nectarivorous, herbivorous, and mixed guild types. It is expected that this study will provide a preliminary database for the waterbirds of this area, useful for further research and assessment.

Keywords: species diversity, relative abundance, diversity indices, feeding guild, point count method

Összefoglalás A vizsgálatot az indiai Karnataka Mysore körzetében található Giribetta- és Hadinaru-tó madárvilágának diverzitása, a fajok relatív abundanciája és a táplálkozási guildek felmérésére végeztük 2023 decembere és 2024 májusa között. A madarak fajösszetételét pontszámlálási eljárással határoztuk meg. A két tónál összesen 5790 egyedet jegyeztünk fel, amelyek 18 rendből és 48 családból 106 fajt képviseltek. Négy faj esett a „mérsékelten veszélyeztetett" kategóriába: a hindu gólya *(Mycteria leucocephala)*, a feketefejű gödény *(Threskiornis melanocephalus)*, a feketehasú kígyónyakúmadár *(Anhinga melanogaster)* és a foltoscsőrű gödény *(Pelecanus philippensis)*, míg a többiek a „nem veszélyeztetett" csoportba tartoztak. A Giribetta-tónál 18 rendbe, 42 családba tartozó 87 faj, a Hadinaru-tónál 16 rendbe, 40 családba sorolható 86 faj volt jelen. A két terület összehasonlításában a Sorenson-index 76,3%, míg a Jaccard-index 61,7% értéke azt jelzi, hogy a fajok diverzitása meglehetősen hasonló az élőhelyeken. A táplálék és a táplálkozásra használt élőhely alapján a feljegyzett madárfajokat nyolc fő táplálkozó guildbe soroltuk, amelyek a húsevő és rovarevő madarak nagyobb egyedszámát mutatták, ezt követték a mindenevő, magevő, gyümölcsevő, nektárevő, növényevő és vegyes guildek. A tanulmány egy előzetes adatbázist nyújt a terület vízimadarairól, amely hasznos lehet a további kutatásokhoz és értékelésekhez.

Kulcsszavak: fajdiverzitás, relatív abundancia, diverzitási indexek, táplálkozási guild, pontszámlálási módszer

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Introduction

More than 10,000 species of birds have been identified worldwide out of which 13% of the species are known to reside in the Indian subcontinent (Grimmett *et al*. 2016). Birds perform various ecological roles as scavengers, pollinators, seed dispersal agents, insect pest predators and bioindicators (Padmavathy *et al*. 1970). Due to their high mobility and habitat selectivity, they are often used as indicators of ecosystem health (Gregory *et al*. 2003). Furthermore, the study of bird diversity is an integral part of the biodiversity assessment of a particular geographical region, and biodiversity surveys cannot be complete by ignoring avifaunal diversity.

India has over 58.2 million hectares of wetland cover and is known to support more than 310 bird species (Prasad *et al*. 2002, Kumar *et al*. 2005). More than half of the wetland birds that are found in India are migratory, migrating from the colder regions of central Asia, Russia, China, and the lower Himalayas (Harisha & Hosetti 2018). Wetlands provide key habitats for both resident and migratory birds for breeding, drinking, feeding, resting, and for social interactions (Kaur & Brraich 2021). These freshwater bodies often succumb to changes in land use in their catchment areas, resulting in reduced inflows and a declining quality of the "runoff" that passes through agricultural fields and urban areas (Verma *et al*. 2001). The depletion of wetlands as a result of numerous human activities and/or climate change poses a serious threat to the diversity and number of waterbird species worldwide, with some species becoming extinct across several wetlands (Wetlands International 2012).

Mysore city, the administrative headquarters of Mysore district, is the second fastest growing city in the state of Karnataka and is known for its palaces, pilgrimage centres, gardens, lakes and rivers. Due to the steady growth of population, there is a continuous expansion of urban areas across all landscapes to create residential layouts, which has led to widespread destruction of natural habitats and pollution of several waterbodies in and around the district headquarters. The wetlands of the study area and their surroundings support a variety of resident as well as migratory bird species, such as the Bar-headed Goose *(Anser indicus)*, Northern Shoveler *(Spatula clypeata)*, Garganey *(Spatula querquedula),* Whiskered Tern *(Chlidonias hybrida)*, Black-winged Stilt *(Himantopus himantopus)*, Glossy Ibis *(Plegadis falcinellus)* and Barn Swallow *(Hirundo rustica)*.

Understanding biodiversity and the composition of bird species in relation to habitat variation is critical to assess the condition of the local ecosystem and to implement successful conservation strategies. In this regard, an attempt has been made to understand the species composition, diversity, relative abundance and feeding guilds of birds in Giribetta Lake and Hadinaru Lake of Mysore district both experiencing varying levels of human interference.

Material and Methods

Study area

The study was conducted in two freshwater perennial lakes in the Mysore district of Karnataka state. The two lakes are located at a distance of 9 kilometres apart *(Figure 1)*. Giribetta Lake (Site G) is 17 km away from district headquarters, located adjacent to the Mysore-Trichy national highway. It lies at 12˚25'93''N and 76˚77'30''E, at an altitude of 688 metres above mean sea level. The lake has an approximate water-spread area of 55.54 acres. The lake has a fair portion of submerged, floating, and emergent vegetation that attracts a lot of waterbirds. The major sources of lake water are precipitation, surface runoff, and Varuna canal water. The lake is surrounded by a diverse amount of vegetation, both cultivated (coconut *Cocus nucifera*, arecanut *Areca catechu,* mango *Mangifera indica*, banana *Musa* sp., jack fruit *Artocarpus heterophyllus*) and wild plants: *Lantana, Tecoma, Agave, Calotropis, Pterolobium indicum, Ficus* sp.*, Albizia* sp.*, Acacia* sp.*, Eucalyptus* sp., etc.

Hadinaru Lake (Site H) is situated in the Nanjangud Taluk of Mysore district, which is 33 km away from district headquarters. It lies at 12˚17'32''N and 76˚75'42''E, at an altitude of 653 metres above mean sea level. The water-spread area of the lake is around 88.68 acres, with an independent catchment area of 8.57 km^2. The lake's water is replenished by canal water from

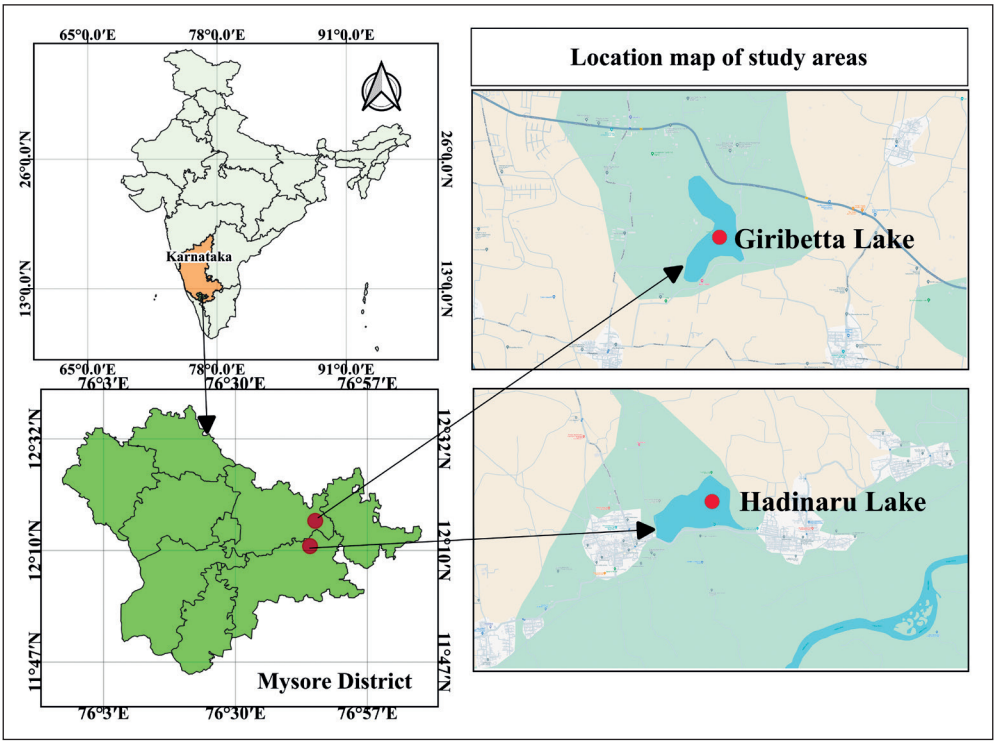

Figure 1. Geographic location of the study area
1. ábra A vizsgált terület földrajzi elhelyezkedése

the River Cauvery, rainfall, and runoff from the catchment area. The lake is teeming with aquatic hydrophytes such as water lily *(Nymphaea pubescens)*, horn wort *(Ceratophyllum demersum)*, cattail *(Typha latifolia)*, lotus *(Nelumbo)*, tape grass *(Vallisneria)*, and duck lettuce *(Ottelia alismoides)*. The lake's water catchment area is covered with *Acacia* trees, and the trees are annually flooded, providing an important roosting spot for water birds. There is an island in the centre of the lake that is physically cut off from the shore and provides an ideal nesting spot for several birds. The lake's shoreline was covered with a variety of grass species; therefore, livestock grazing was frequently observed.

Bird survey

Survey of birds was conducted in the late afternoon from 4.00 pm to 6.00 pm during the last week of every month from December 2023 to May 2024. Point count method was employed to study and record the birds by choosing an appropriate vantage point for a fixed amount of time (10–15 minutes) (Bibby *et al*. 2002, Lambert *et al*. 2009, Girma *et al*. 2017, Kumbhar & Mhaske 2021, Awash & Tekalign 2023, Jangral & Vashishat 2023). Observation of birds was done by using Olympus binocular (OLYMPUS 8X40 DPS I, Field 8.2°) and Nikon D3200 camera was used for photography. The birds were identified using field guides (Ali & Ripley 1995, Grewal *et al*. 2016, Grimmett *et al*. 2016). The common and scientific names of birds were retrieved from (Grimmett *et al*. 2016). The conservation status of birds was adopted from IUCN Red List of Threatened Species (IUCN 2023). The recorded birds were classified into different feeding guilds depending upon their food ecological similarities, such as carnivore, insectivore, omnivore, granivore, frugivore, mixed guild, nectarivore, and herbivore (Basnet *et al*. 2016, Grimmett *et al*. 2016, Jangral & Vashishat 2022).

Data analysis

The Paleontological Statistics (PAST) 4.03 educational software (Hammer *et al*. 2001) was used to measure various α-diversity indices such as Fisher's alpha, Shannon-Weiner index, Simpson diversity and Evenness index for the summarised data for each habitat type. Sorensen's similarity index was performed to measure the similarity between the two water bodies (Magurran 2004) using the formula below:

$$C_s = 2c/a + b$$

where 'a' is the number of species of birds found in Giribetta Lake, 'b' is the number of species found in Hadinaru Lake, and 'c' is the number of species found in both sites.

The Jaccard similarity index was calculated according to the equation below (Chao *et al.* 2006):

$$C_j = j/(a + b - j)$$

where 'j' is the number of species common to both sites, 'a' is the number of species of birds found in Giribetta Lake and 'b' is the number of species found in Hadinaru Lake.

Results

We recorded a total of 5,790 individuals (Site G = 1,702, Site H = 4,088) belonging to 106 species from 18 orders and 48 families during the six-month study period from the selected lakes of Mysore district *(Appendix 1)*. The most abundant species were from order Passeriformes (35%) followed by Pelecaniformes (12%), Charadriiformes (9%), Coraciiformes (7%), Anseriformes (6%), Cuculifromes (5%), Accipetriformes (4%), Columbiformes (4%), Gruiformes (4%), Suliformes (4%), Piciformes (3%), Galliformes (2%), Ciconiformes (2%). Four species of global conservation concern were also recorded: Black-headed Ibis *(Threskiornis melanocephalus)*, Spot-billed Pelican *(Pelecanus philippensis)*, Oriental Darter *(Anhinga melanogaster),* and Painted Stork *(Mycteria leucocephala),* all of which are under Near-Threatened category according to the IUCN Red List of Threatened Species. In terms of species richness, Site G had 87 species belonging to 18 orders and 42 families *(Figure 2)*, compared to Site H, which had 86 species from 16 orders and 40 families *(Figure 3)*. The two areas had similar species composition, with 76.3% (C_s = 0.763) reflecting a very high similarity, which indicates that the species diversity is fairly similar across the habitats (Ratliff 1993). This is also evident with the Jaccard similarity index (C_j = 0.617), which enables the comparison of two communities by taking into account the number of species common to both habitats and the number of species that are present exclusively in each of them (Jaccard 1901). It was observed that the abundance of bird species was larger in Site H than Site G. Different diversity indices of the bird species were evaluated to gain insight into the stability of the ecosystem. Site G had the highest values of the Shannon diversity

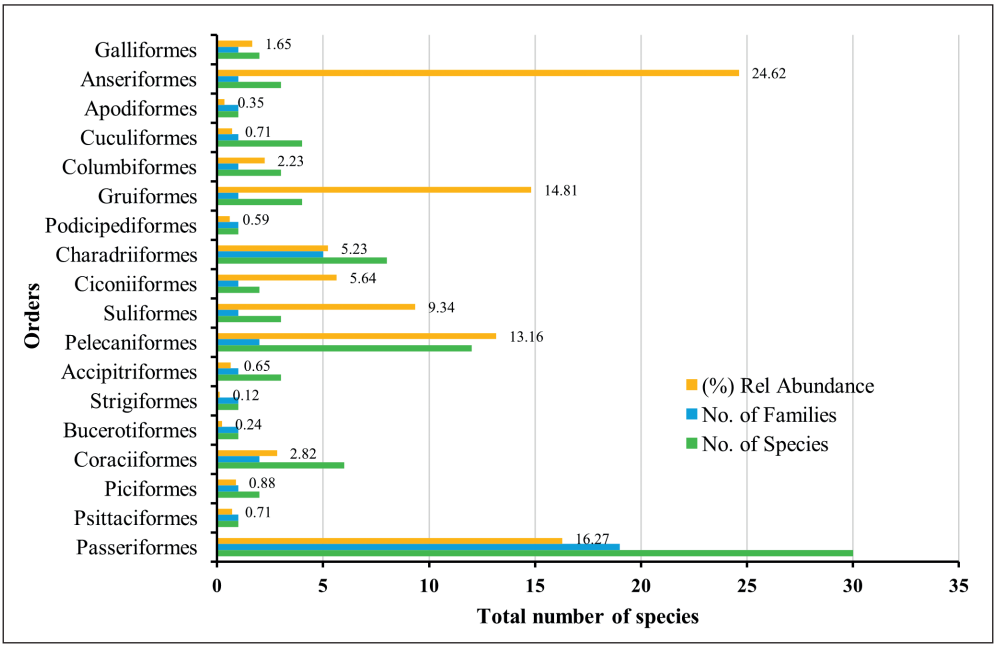

Figure 2. Bird species richness by taxonomic order in Giribetta Lake area of Mysore, India
2. ábra Madárfajgazdagság rendszertani sorrend szerint az indiai Mysore Giribetta-tónál

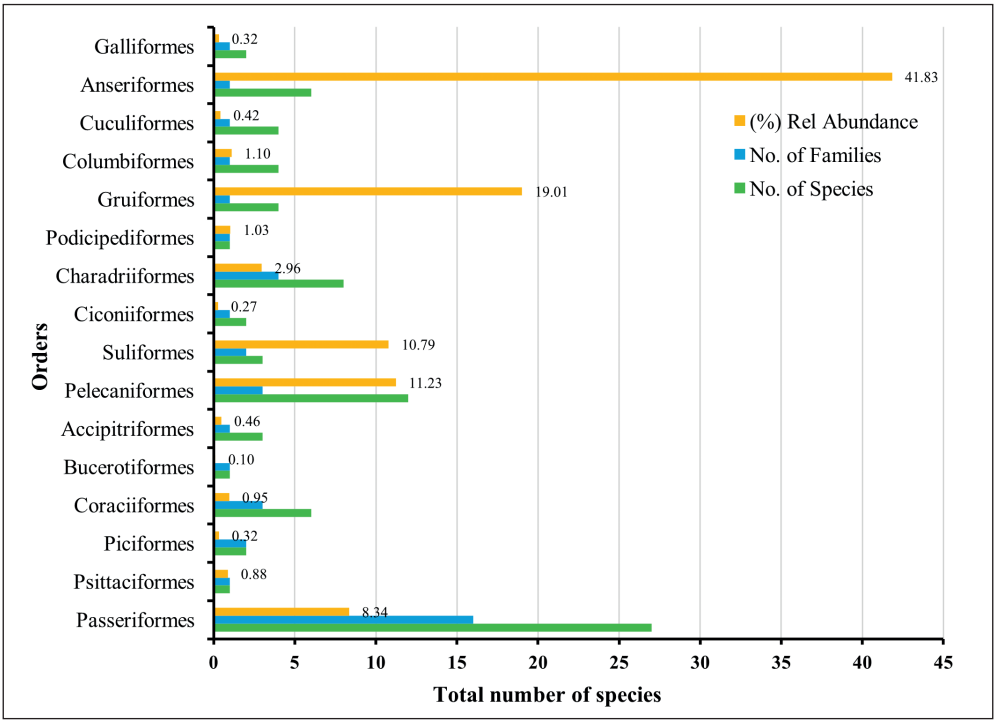

Figure 3. Bird species richness by taxonomic order in Hadinaru Lake area of Mysore, India
3. ábra Madárfajgazdagság rendszertani sorrend szerint az indiai Mysore Hadinaru-tó területén

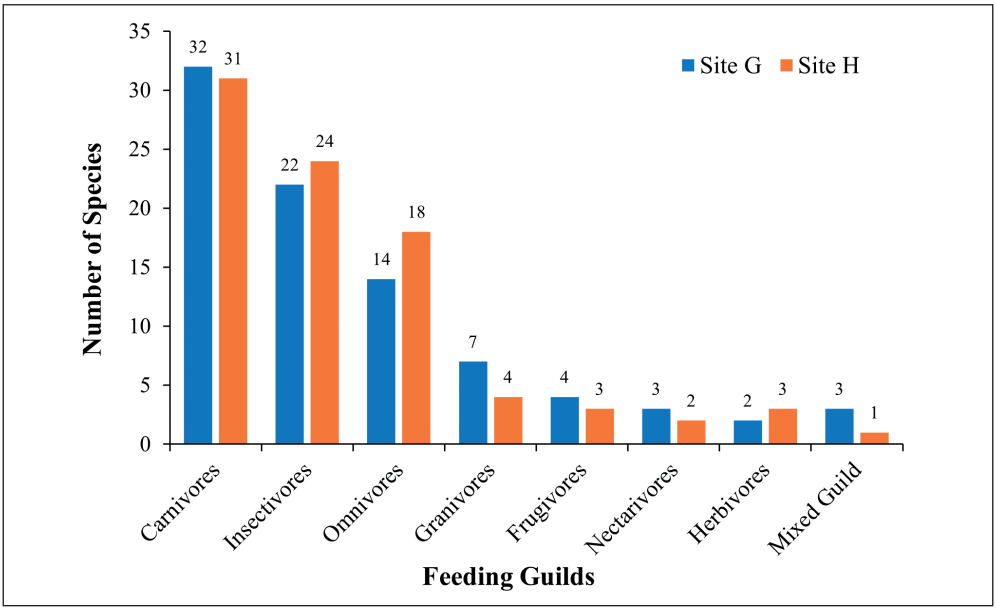

Figure 4. Feeding guilds of bird species in Giribetta Lake (Site G) and Hadinaru Lake (Site H)
4. ábra Madárfajok táplálkozási guildjei a Giribetta- és a Hadinaru-tónál

index (H = 3.495) and Simpson's index (D = 0.947) than Site H (H = 3.106) and (D = 0.923). The same trend was observed with evenness and the Fisher's α-diversity index. Site G had the highest evenness index (J = 0.378) and Fisher's α-diversity index (19.39) as compared to Site H (J = 0.259) and Fisher's α-diversity index (15.40). According to the foraging guild, carnivorous bird species were highest in both lakes, followed by insectivorous, omnivorous, granivorous, frugivorous, nectarivorous, herbivorous, and mixed guild *(Figure 4)*.

Discussion

The study revealed that the lakes were significantly homogeneous in terms of species diversity. However, we did detect a significant difference in the abundance of birds in the two sites. This could be attributed to the differences in size of the studied lakes. Site H was comparatively larger in area than Site G. There are several reports indicating an increase in the abundance of waterbirds with the size of the wetlands (Hoyer & Canfield Jr. 1990, Celada & Bogliani 1993, Riffell *et al*. 2001). Larger wetlands have the potential to provide more microhabitats, which in turn can attract more species (Paszkowski & Tonn 2000). Further, it was observed that Site H was visited by a large number of winter migratory birds, such as Bar-headed Goose, Garganey, Northern Shoveler, Little Ringed Plover *(Charadrius dubius)*, Black-winged Stilt, and Western Yellow Wagtail *(Motacilla flava)*. This is possibly due to the large catchment area of the lake and the fact that the lake is also surrounded by irrigated agricultural fields, providing suitable foraging grounds for both resident and migratory birds, which ultimately adds to the high abundance of birds in Site H. According to Smith *et al.* (1998), one of the most important variables in influencing the species diversity in a given location is the availability of food (Smith *et al.* 1998). Both the abundance and distribution of many bird species are influenced by the vegetation that makes up a significant portion of their habitats. As vegetation shifts along intricate geographical and environmental gradients, specific bird species might show up, increase or decrease in population, and eventually disappear as the habitat changes (Lee & Rotenberry 2005). The dominance of Passeriformes in Site G could be explained by that the lake is surrounded by a variety of vegetation, especially farmed trees such as mango, coconut, arecanut, and *Eucalyptus* sp. Further, the boundary of these farmlands is surrounded by variety of shrubs like *Lantana, Tecoma, Agave, Calotropis, Pterolobium indicum,* which provide suitable nesting sites for these birds. In a similar study by Awash and Tekalign (2023) on bird assemblages in two Ethiopian wetlands, it was reported that more than half of the species and families were from Passeriformes, which could be attributed to the fact that this order is the biggest and most diversified group of avian organisms (Awash & Tekalign 2023).

The diversity indices provide an overview of the relative abundance of bird species and their communities by examining the relationship between the number of bird species in the study area (Latumahina *et al*. 2020). The result of the diversity analysis shows that higher bird diversity and evenness were recorded at Site G as compared to Site H. This could be attributed to differences in the richness and diversity of vegetation, such as trees, shrubs, grasses, emergent and submerged plants. In comparison to Site H, there was more

vegetation cover at Site G. According to Kiros *et al*. (2018), a shift in bird species diversity, richness, and abundance is linked to vegetation composition, which affects the availability of food, nesting, and protection depending on the preferences and feeding habits of the birds (Kiros *et al*. 2018).

The trophic composition of birds in the current study revealed that carnivorous birds dominated the feeding guild, followed by insectivorous, omnivorous, granivorous, frugivorous, nectarivorous, herbivorous, and mixed guilds from both lakes. The prevalence of carnivorous birds in wetland ecosystems is a sign of the abundance of food supplies, including fish, amphibians, molluscs, and insects (Prajapati & Prajapati 2013). Since both study areas were adjacent to agricultural lands, insectivorous birds were also abundant. Azman *et al*. (2011) have reported that agricultural lands are rich in insect diversity, making them an ideal foraging ground for insectivorous birds (Azman *et al*. 2011). Omnivorous birds like the Eurasian Moorhen *(Gallinula chloropus)*, Grey-headed Swamphen *(Porphyrio poliocephalus)*, White-breasted Waterhen *(Amaurornis phoenicurus)*, Eurasian Coot *(Fulica atra)*, Lesser Whistling-duck *(Dendrocygna javanica)*, and Garganey were spotted in large numbers in both lakes, which could be related to the greater richness of macroinvertebrates and fish in shallow water zones (Meerhoff *et al*. 2003). In addition, a significant proportion of the bird population was documented around the lake margins, owing to the diverse terrestrial vegetation. The trees and shrubs produce a variety of flowers and fruits, attracting frugivorous and nectarivorous birds (Chettri *et al*. 2005). Studies on bird feeding guilds shed light on species ecology and are particularly helpful in identifying the specific ecological causes of community change (Jangral & Vashishat 2022). The recording of eight feeding guilds from both lakes indicates a well-defined trophic segregation within the community, comprising species that exploit diverse food sources using a variety of behavioural tactics and morphological adaptations (Davis & Smith 2001, Rajpar *et al*. 2018).

Throughout the study period, a variety of anthropogenic activities were observed in both the lakes, including urban encroachment, agricultural expansion, agricultural runoff, boating, washing clothes, washing livestock, and tourism. All of these activities are either directly or indirectly responsible for the process of eutrophication of lakes. Similar conditions were reported by Suryakanth (2017) in his study on avifauna diversity in wetlands of Kolhapur, Maharashtra, India. Despite being used for farming, fishing, and grazing, both wetlands provide shelter and foraging grounds for a variety of bird species. However, the high level of human encroachment has caused the wetlands to shrink, depriving a variety of resident and migratory birds of their homes. Therefore, a suitable management plan should be put into effect by law in order to preserve the lakes and the bird population in the study area.

Conclusions

The study on the diversity and composition of birds in Giribetta Lake and Hadinaru Lake shows that the sites are productive avian habitats as they harbour a variety of bird species, including resident, migratory, and species with conservation value (Painted Stork, Black-headed Ibis, Oriental Darter, and Spot-billed Pelican). The current study emphasizes

the significance of semi-urban and rural water bodies as key feeding grounds for both migratory and resident bird species. Even though the lakes support diverse bird populations, anthropogenic activities near the waterbodies are reducing habitat accessibility for birds, which may eventually have a negative impact on bird diversity and the overall health of the lakes. The present study suggests that proper and regular maintenance of the lakes is needed to increase and conserve the avifaunal diversity.

Acknowledgements

The authors would like to thank The Principal of Yuvaraja's College (Autonomous), University of Mysore, Mysuru, for providing facilities. No funding was used to conduct this research.

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Appendix 1. Checklist of bird species recorded during the study period, with their common name, scientific name, order, family, IUCN status, and feeding guild

1. melléklet A vizsgálati időszak során feljegyzett madárfajok listája IUCN-státuszukkal és táplálkozási besorolásukkal

Sl. No.	Order/ Family	Common Name	Scientific Name	IUCN Status	Food Habit
1. Order – Galliformes					
1	Phasianidae	Gray Francolin	*Francolinus pondicerianus* (Gmelin, 1789)	LC	I
2	Phasianidae	Indian Peafowl	*Pavo cristatus* (Linnaeus, 1758)	LC	O
2. Order – Anseriformes					
3	Anatidae	Indian Spot-billed Duck	*Anas poecilorhyncha* (Forster, 1781)	LC	H
4	Anatidae	Lesser Whistling-duck	*Dendrocygna javanica* (Horsfield, 1821)	LC	O
5	Anatidae	Cotton Pygmy-goose	*Nettapus coromandelianus* (Gmelin, 1789)	LC	H
6	Anatidae	Garganey	*Spatula querquedula* (Linnaeus, 1758)	LC	O
7	Anatidae	Northern Shoveler	*Spatula clypeata* (Linnaeus, 1758)	LC	O
8	Anatidae	Bar-headed Goose	*Anser indicus* (Latham, 1790)	LC	H
3. Order – Apodiformes					
9	Apodidae	Little Swift	*Apus affinis* (Gray, 1830)	LC	I
4. Order – Cuculiformes					
10	Cuculidae	Common Hawk Cuckoo	*Hierococcyx varius* (Vahl, 1797)	LC	I
11	Cuculidae	Blue-faced Malkoha	*Phaenicophaeus viridirostris* (Jerdon, 1840)	LC	I
12	Cuculidae	Grey-bellied Cuckoo	*Cacomantis passerines* (Vahl, 1797)	LC	I
13	Cuculidae	Asian Koel	*Eudynamys scolopaceus* (Linnaeus, 1758)	LC	I
14	Cuculidae	Greater Coucal	*Centropus sinensis* (Stephens, 1815)	LC	C
5. Order – Columbiformes					
15	Columbidae	Eurasian Collared Dove	*Streptopelia decaocto* (Frivaldszky, 1838)	LC	G
16	Columbidae	Spotted Dove	*Spilopelia chinensis* (Scopoli, 1786)	LC	G
17	Columbidae	Laughing Dove	*Spilopelia senegalensis* (Linnaeus, 1766)	LC	G
18	Columbidae	Rock Pigeon	*Columba livia* (Gmelin, 1789)	LC	O
6. Order – Gruiformes					
19	Rallidae	Eurasian Moorhen	*Gallinula chloropus* (Linnaeus, 1758)	LC	O
20	Rallidae	Grey-headed Swamphen	*Porphyrio poliocephalus* (Latham, 1801)	LC	O
21	Rallidae	White-breasted Waterhen	*Amaurornis phoenicurus* (Pennant, 1769)	LC	O
22	Rallidae	Eurasian Coot	*Fulica atra* (Linnaeus, 1758)	LC	O
7. Order – Podicipediformes					
23	Podicipedidae	Little Grebe	*Tachybaptus ruficollis* (Pallas, 1764)	LC	O

Sl. No.	Order/ Family	Common Name	Scientific Name	IUCN Status	Food Habit
8. Order – Charadriiformes					
24	Charadriidae	Red-wattled Lapwing	*Vanellus indicus* (Boddaert, 1783)	LC	MG
25	Charadriidae	Yellow-wattled Lapwing	*Vanellus malabaricus* (Boddaert, 1783)	LC	I
26	Charadriidae	Little Ringed Plover	*Charadrius dubius* (Scopoli, 1786)	LC	I
27	Recurvirostridae	Black-winged Stilt	*Himantopus himantopus* (Linnaeus, 1758)	LC	C
28	Jacanidae	Bronze-winged Jacana	*Metopidius indicus* (Latham, 1790)	LC	C
29	Jacanidae	Pheasent-tailed Jacana	*Hydrophasianus chirurgus* (Scopoli, 1786)	LC	C
30	Scolopacidae	Wood Sandpiper	*Tringa glareola* (Linnaeus, 1758)	LC	C
31	Scolopacidae	Common Sandpiper	*Actitis hypoleucos* (Linnaeus, 1758)	LC	C
32	Scolopacidae	Green Sandpiper	*Tringa ochropus* (Linnaeus, 1758)	LC	C
33	Laridae	Whiskered Tern	*Chlidonias hybrida* (Pallas, 1811)	LC	C
9. Order – Ciconiiformes					
34	Ciconiidae	Asian Openbill	*Anastomus oscitans* (Boddaert, 1783)	LC	C
35	Ciconiidae	Painted Stork	*Mycteria leucocephala* (Pennant, 1769)	**NT**	C
10. Order – Suliformes					
36	Phalacrocoracidae	Little Cormorant	*Microcarbo niger* (Vieillot, 1817)	LC	C
37	Phalacrocoracidae	Great Cormorant	*Phalacrocorax carbo* (Linnaeus, 1758)	LC	C
38	Phalacrocoracidae	Indian Cormorant	*Phalacrocorax fuscicollis* (Stephens, 1826)	LC	C
39	Anhingidae	Oriental Darter	*Anhinga melanogaster* (Pennant, 1769)	**NT**	C
11. Order – Pelecaniformes					
40	Pelecanidae	Spot-billed Pelican	*Pelecanus philippensis* (Gmelin, 1789)	**NT**	O
41	Ardeidae	Little Egret	*Egretta garzetta* (Linnaeus, 1766)	LC	C
42	Ardeidae	Eastern Cattle Egret	*Bubulcus coromandus* (Boddaert, 1783)	LC	C
43	Ardeidae	Black-crowned Night Heron	*Nycticorax nycticorax* (Linnaeus, 1758)	LC	C
44	Ardeidae	Indian Pond Heron	*Ardeola grayii* (Sykes, 1832)	LC	C
45	Ardeidae	Great Egret	*Ardea alba* (Linnaeus, 1758)	LC	C
46	Ardeidae	Medium Egret	*Ardea intermedia* (Wagler, 1829)	LC	C
47	Ardeidae	Grey Heron	*Ardea cinerea* (Linnaeus, 1758)	LC	C
48	Ardeidae	Purple Heron	*Ardea purpurea* (Linnaeus, 1766)	LC	C
49	Threskiornithidae	Black-headed Ibis	*Threskiornis melanocephalus* (Latham, 1790)	**NT**	C
50	Threskiornithidae	Red-naped Ibis	*Pseudibis papillosa* (Temminck, 1824)	LC	C
51	Threskiornithidae	Glossy Ibis	*Plegadis falcinellus* (Linnaeus, 1766)	LC	C
52	Threskiornithidae	Eurasian Spoonbill	*Platalea leucorodia* (Linnaeus, 1758)	LC	C
12. Order – Accipitriformes					
53	Accipitridae	Black Kite	*Milvus migrans* (Boddaert, 1783)	LC	C

Sl. No.	Order/ Family	Common Name	Scientific Name	IUCN Status	Food Habit
54	Accipitridae	Brahminy Kite	*Haliastur indus* (Boddaert, 1783)	LC	C
55	Accipitridae	Western Marsh Harrier	*Circus aeruginosus* (Linnaeus, 1758)	LC	C
56	Accipitridae	Shikra	*Accipiter badius* (Gmelin, 1788)	LC	C
13. Order – Strigiformes					
57	Strigidae	Spotted Owlet	*Athene brama* (Temminck, 1821)	LC	C
14. Order – Bucerotiformes					
58	Bucerotidae	Indian Grey Hornbill	*Ocyceros birostris* (Scopoli, 1786)	LC	F
15. Order – Coraciiformes					
59	Alcedinidae	Common Kingfisher	*Alcedo atthis* (Linnaeus, 1758)	LC	C
60	Alcedinidae	White-throated Kingfisher	*Halcyon smyrnensis* (Linnaeus, 1758)	LC	C
61	Alcedinidae	Pied Kingfisher	*Ceryle rudis* (Linnaeus, 1758)	LC	C
62	Alcedinidae	Stork-billed Kingfisher	*Pelargopsis capensis* (Linnaeus, 1766)	LC	MG
63	Coraciidae	Indian Roller	*Coracias benghalensis* (Linnaeus, 1758)	LC	C
64	Meropidae	Green Bee-eater	*Merops orientalis* (Latham, 1801)	LC	I
65	Meropidae	Blue-tailed Bee-eater	*Merops philippinus* (Linnaeus, 1767)	LC	I
16. Order – Piciformes					
66	Megalaimidae	Coppersmith Barbet	*Psilopogon haemacephalus* (Muller, 1776)	LC	F
67	Megalaimidae	White-cheeked Barbet	*Psilopogon viridis* (Boddaert, 1783)	LC	F
68	Picidae	Lesser Goldenback	*Dinopium benghalense* (Linnaeus, 1758)	LC	I
17. Order – Psittaciformes					
69	Psittaculidae	Rose-ringed Parakeet	*Psittacula krameria* (Scopoli, 1769)	LC	F
18. Order – Passeriformes					
70	Aegithinidae	Common Iora	*Aegithina tiphia* (Linnaeus, 1758)	LC	I
71	Alaudidae	Jerdon's Bush Lark	*Mirafra affinis* (Blyth, 1845)	LC	I
72	Acrocephalidae	Eurasian Reed Warbler	*Acrocephalus scirpaceus* (Hermann, 1804)	LC	I
73	Campephagidae	Small Minivet	*Pericrocotus cinnamomeus* (Linnaeus, 1776)	LC	I
74	Dicruridae	Black Drongo	*Dicrurus macrocercus* (Vieillot, 1817)	LC	I
75	Dicaeidae	Pale-billed Flowerpecker	*Dicaeum erythrorhynchos* (Latham, 1790)	LC	N
76	Cisticolidae	Ashy Prinia	*Prinia socialis* (Sykes, 1832)	LC	I
77	Cisticolidae	Common Tailorbird	*Orthotomus sutorius* (Pennant, 1769)	LC	I
78	Pycnonotidae	White-browed Bulbul	*Pycnonotus luteolus* (Lesson, 1841)	LC	O
79	Pycnonotidae	Red-vented Bulbul	*Pycnonotus cafer* (Linnaeus, 1766)	LC	O
80	Pycnonotidae	Red-whiskered Bulbul	*Pycnonotus jocosus* (Linnaeus, 1758)	LC	O
81	Sturnidae	Common Myna	*Acridotheres tristis* (Linnaeus, 1766)	LC	O
82	Sturnidae	Jungle Myna	*Acridotheres fuscus* (Wagler, 1827)	LC	O

Sl. No.	Order/ Family	Common Name	Scientific Name	IUCN Status	Food Habit
83	Sturnidae	Brahminy Starling	*Sturnia pagodarum* (Gmelin, 1789)	LC	O
84	Muscicapidae	Pied Bushchat	*Saxicola caprata* (Linnaeus, 1766)	LC	I
85	Muscicapidae	Indian Robin	*Copsychus fulicatus* (Linnaeus, 1766)	LC	I
86	Muscicapidae	Oriental Magpie Robin	*Copsychus saularis* (Linnaeus, 1758)	LC	I
87	Nectariniidae	Purple-rumped Sunbird	*Leptocoma zeylonica* (Linnaeus, 1766)	LC	N
88	Nectariniidae	Purple Sunbird	*Cinnyris asiaticus* (Latham, 1790)	LC	N
89	Motacillidae	White-browed Wagtail	*Motacilla maderaspatensis* (Gmelin, 1789)	LC	I
90	Motacillidae	Grey Wagtail	*Motacilla cinerea* (Tunstall, 1771)	LC	I
91	Motacillidae	Western Yellow Wagtail	*Motacilla flava* (Linnaeus, 1758)	LC	I
92	Motacillidae	Paddyfield Pipit	*Anthus rufulus* (Vieillot, 1818)	LC	I
93	Oriolidae	Indian Golden Oriole	*Oriolus kundoo* (Sykes, 1832)	LC	I
94	Laniidae	Brown Shrike	*Lanius cristatus* (Linnaeus, 1758)	LC	C
95	Laniidae	Long-tailed Shrike	*Lanius schach* (Linnaeus, 1758)	LC	C
96	Leiothrichidae	Yellow-billed Babbler	*Argya affinis* (Jerdon, 1845)	LC	O
97	Corvidae	House Crow	*Corvus splendens* (Vieillot, 1817)	LC	O
98	Corvidae	Large-billed Crow	*Corvus macrorhynchos* (Wagler, 1827)	LC	O
99	Paridae	Cinereous Tit	*Parus cinereus* (Vieillot, 1818)	LC	I
100	Ploceidae	Baya Weaver	*Ploceus philippinus* (Linnaeus, 1766)	LC	G
101	Hirundinidae	Barn Swallow	*Hirundo rustica* (Linnaeus, 1766)	LC	I
102	Hirundinidae	Red-rumped Swallow	*Cecropis daurica* (Laxmann, 1769)	LC	I
103	Estrildidae	Tricoloured Munia	*Lonchura malacca* (Linnaeus, 1766)	LC	G
104	Estrildidae	Scaly-breasted Munia	*Lonchura punctulate* (Linnaeus, 1758)	LC	G
105	Estrildidae	Red Avadavat	*Amandava amandava* (Linnaeus, 1758)	LC	G
106	Rhipiduridae	Spot-breasted Fantail	*Rhipidura albogularis* (Lesson, 1831)	LC	I

Abbreviations: IUCN – International Union for Conservation of Nature Status, LC – Least Concern, NT – Near Threatened, VU – Vulnerable. **Key:** C (Carnivore), F (Frugivore), G (Granivore), I (Insectivore), MG (Mixed Guild), N (Nectarivore), O (Omnivore), H (Herbivore)