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Distribution of Wetland Birds in Thamaraikulam Pond at Uthamapalyam Taluk, Theni District.

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ABSTRACT

Wetland supports a variety of faunal diversity by providing them suitable habitat along with food and water. The present study investigates the species composition and diversity of wetland birds in Thamaraikulam Pond, situated in Gokilapuram village, Uthamapalayam Taluk, Theni District, Tamil Nadu, over a 12 month period from March, 2023 to February, 2024. Using standardized point count and transect methods a total of 3,873 individual birds belonging to 32 species were recorded. The dominant species included the Little Grebe (*Tachybaptusruficollis*) and Little Cormorant (*Microcarboniger*), while less frequent visitors included Black-necked Stork (*Ephippior hynchusasiaticus*) and Eurasian Spoonbill (*Platalea leucorodia*). Shannon-Weiner diversity index was calculated as 2.88 and the Margalef species richness index was 3.75 indicating moderate to high diversity. These findings highlight the ecological importance of the pond as a biodiversity hotspot and underline the need for continued monitoring and habitat protection amidst increasing anthropogenic pressures.

INTRODUCTION

Wetlands are among the most productive ecosystems on Earth, providing critical habitats for a vast range of plant and animal species. Among these, birds are perhaps the most visible and ecologically significant taxa (Gibbs, 2000). Wetland birds not only reflect the health of aquatic ecosystems but also contribute to ecological processes such as nutrient cycling, seed dispersal, and pest control (Kumar & Gupta, 2013). Their abundance and diversity often serve as biological indicators of environmental quality (Ali & Ripley, 1987).

India is home to over 1,300 bird species, of which a significant proportion is dependent on wetland ecosystems (Rahmani & Islam, 2008). Tamil Nadu, with its extensive network of inland and coastal wetlands, supports a rich assemblage of both resident and migratory water birds. However, increasing urbanization, pollution, and land-use changes have resulted in the degradation of many traditional bird habitats (Praveen *et al.*, 2020). It is within this context that the present study was undertaken to assess the avifaunal diversity of Thamaraikulam Pond a freshwater wetland in Theni District, Tamil Nadu.

Wetlands are one among the most important ecosystems on earth. Wetlands also have been called "biological supermarket" because of the extensive food chain and rich biodiversity that they support (Mitsch and Gosselink, 2000). Wetlands are one of the most complex ecosystems of the world, unique in many aspects and are as old as or older than the rivers (Unni, 2002).

Birds are a very important component in any ecosystem such as prey, predators, pollinators, scavengers, seed dispersals and ecosystem engineers. Decreasing numbers of birds are the sign of threatening the environment and the conservation of the avian community is a too important aspect for maintaining the balance of the ecosystem.

METHODOLOGY:

Thamaraikulam pond is located in the Gokilapuram village in UthamapalayamTaluk of Theni District in Tamilnadu. It covers the 663ha of land surrounded by paddy fields. In the plains, the temperatures range from a minimum of 13^0C to a maximum of 39.5 ^{0}C. The district is known for its salubrious climate, hills and lake. The 2,889 km^2 (1,115 sq mi) District lies at the foot of the Western Ghats between 9' 39' and 10' 30' North latitude and between 77' 00' and 78' 30' of East Longitude. The primary water source for the area is the Mullai Periyar River. The district receives the rainfall under the influence of both southwest and northeast monsoon.

Bird surveys were meticulously carried out every month from March 2023 to February 2024. Monthly bird surveys were conducted to record species presence, abundance, and habitat use. Observations were conducted between 6:00 am and 10:00 am using Olympus binoculars, and photographic documentation was achieved with a Canon EOS 1300D camera. Species were identified using standard field guides. The direct count method was adopted, wherein observers stationed at vantage points

documented all visible birds. The pond was divided into blocks, and a total count of individuals within each block was recorded. The birds in the blocks were counted using a pent ax binocular and identified using physical features with the help of field guide.

Data Analysis

The total number of birds is expressed as abundance of birds. Species diversity and eveness determine heterogenous community. Species evenness or equitability is a measure of the even allotment of individuals among the species. A number of indices have been used to calculate diversity. Among them most widely used, one is the Shannon-Weaver index (1963) given as follows:

H' = - Σ s Pi log e Pi i= 1

Log e = ln; Pi = n1 /N

Where H' = Diversity

S= Number of Species

Pi = Proportion of individuals of the total sample belonging to the i^{th} number

The number of species recorded is expressed as species richness (Margalf species richness).Margalef Species Richness Index (D) was calculated using:

D = (S - 1) / ln (N),

Where S is the total number of species and

N is the total number of individuals recorded.

Result

A study was conducted from March, 2023 to February, 2024 to enumerate the bird species in Thamaraikulam pond. A total of 3,873 individual birds belonging to 32 species were recorded from Thamaraikulam pond during the study period from March, 2023 to February, 2024 (Table 1, 2). Among the recorded species, the most abundant were Little Grebe (780 individuals), Little Cormorant (546), and Large Cormorant (345), indicating a dominance of piscivorous species. Less frequently observed species included Black-necked Stork (7), Eurasian Spoonbill (26), and Painted Stork (34), suggesting occasional or habitat-specific occurrence. The overall Shannon-Weiner diversity index (H') was calculated to be 2.88, while the Margalef species richness index (D) was 3.75. These values reflect a moderately high diversity and richness of wetland birds in the study area.

Diversity Index	Value
Shannon –Weiner Index(H')	2.88
Margalef Richness Index(D)	3.75
Total Bird Individuals	3,873
Total Bird Species(S)	32

Table 1

Identified bird species during the study period of March, 2023 – February,2024				
S.No	**Name of the Birds**	**Scientific Name**	**Family**	**Order**
1	Little cormorant	*Phalacrocorax niger*	Phalacrocoracidae	Pelicaniformes
2	Indian pond heron	*Ardeola grayii*	Ardeidae	Pelecaniformes
3	Cattle Egret	*Bulbulcus ibis*	Ardeidae	Ciconiiformes
4	Common Coot	*Fulica arta*	Rallidae	Gruiformes
5	Grey Heron	*Ardea cinerea*	Ardeidae	Pelecaniformes
6	Little Grebe	*Tachybaptus ruficollis*	Podicipididae	Podicipidiformes
7	Large Cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	Pelicaniformes
8	Large Egret	*Casmerodius albus*	Ardeidae	Ciconiiformes
9	Little Egret	*Egretta garzetta*	Ardeidae	Ciconiiformes
10	White Ibis	*Threskiornis melanocephalus*	Threskiornithidae	Pelicaniformes
11	Black necked stork	*Ephippiorhynchus asiaticus*	Ciconiidae	Ciconiiformes
12	Lesser Flamingo	*Phoenicopterus minor*	Phoenicopteridae	Phoenicopteriformes
13	Bar headed Goose	*Anser indicus*	Anatidae	Anseriformes
14	Singing Bush Lark	*Mirafra javanica*	Alaudidae	Passeriformes
15	Black winged stilt	*Himantopus himantopus*	Recurvirostridae	Charadriiformes
16	Painted stork	*Mycteria leucocephala*	Ciconiidae	Ciconiiformes
17	Grey Duck	*Anas superciliosa*	Anatidae	Anseriformes
18	Grey Patridge	*Francolinus spondicerianus*	Phasianidae	Galliformes
19	Common Sandpiper	*Tringa hypoleucos*	Recurvirostridae	Charadriiformes
20	Darter	*Anhinga melanogaster*	Anhingidae	Suliformes
21	Intermediate Egret	*Egretta intermedia*	Ardeidae	Pelecaniformes
22	Indian spot billed duck	*Anas poecilorhyncha*	Anatidae	Anseriformes
23	Common teal	*Anas crecca*	Anatidae	Anseriformes
24	Marsh sand piper	*Tringa stagnatilis*	Scolopacidae	Charadriiformes
25	Common moorhen	*Gallinula chloropus*	Rallidae	Gruiformes
26	Eurasian Spoonbill	*Platalea leucorodia*	Threskiornithidae	Pelecaniformes
27	Common tern	*Sterna hirundo*	Sternidae	Charadriiformes
28	Indian sang	*Phalacrocorax fuscicollis*	Phalacrocoracidae	Pelecaniformes
29	White breasted water hen	*Amaurornis phoenicurus*	Rallidae	Gruiformes
30	Northern pintailduck	*Anas acuta*	Anatidae	Anseriformes
31	Purple heron	*Ardea purpurea*	Ardeidae	Pelecaniformes

32	Pheasent tailed jacana	*Hydrophasianus chirurgus*	Jacanidae	Charadriiformes

Table 2

Distribution of bird species in Thamaraikulam pond during March, 2023 – February, 2024		
S.No	**Species Name**	**Total Number of birds**
1.	Bar headed goose	59
2.	Black winged stilt	43
3.	Black necked stork	59
4.	Cattle egret	292
5.	Common coot	120
6.	Common moorhen	69
7.	Common sandpiper	79
8.	Common teal	69
9.	Common tern	57
10.	Darter	40
11.	Eurasian spoonbill	46
12.	Grey duck	78
13.	Grey heron	181
14.	Grey patrichdge	64
15.	Indian pond heron	253
16.	Indian sang	64
17.	Intermediate Egret	90
18.	Large cormorant	345
19.	Large egret	189
20.	Lesser flamingo	43
21.	Little cormorant	546
22.	Little egret	383
23.	Little grebe	780
24.	Marsh sand piper	54
25.	Northern pintail duck	58
26.	Painted stork	36
27.	Pheasant tailed jacana	44
28.	Purple heron	33
29.	Singing buslark	51
30.	Spot bill duck	59
31.	White breasted water hen	62
32.	White ibis	76

The present study was aimed to enumerate bird species composition in Thamaraikulam pond in Uthamapalayam Taluk from March, 2023 to February, 2024.Bird counting was done by using total count method.In Thamaraikulam, pond 32 species of birds were under 15 families and 11 orders.

Species recorded in Thamaraikulam pond was high during December followed by January. The maximum diversity was recorded in January and low in April and May.The most dominant as well as common species in Thamaraikulam pond was little grebe. Water bird species seen abundantly in the study area were little cormorant, Egret species. The least number of bird species observed were Northern Pintail duck.

According to this investigation, the Thamaraikulam pond provides good habitat for the birds especially in terms of vegetation and food source. This study area provide all the resources for birds to fulfill their biological needs like food, water, cover forage and roost.

DISCUSSION

The findings of the present study highlight the ecological importance of Thamaraikulam Pond as a biologically rich wetland supporting diverse avian fauna. The recording of 3,873 individual birds representing 32 species over a period of one year signifies a robust bird community, which reflects the pond's capacity to support a wide range of feeding guilds including piscivores (e.g., cormorants, grebes), insectivores (e.g., bush larks), waders (e.g. Stilts, sandpipers) and omnivores (eg.moorhens,ducks).

The Shannon-Weiner Diversity Index (H′ = 2.88) suggests a moderately high level of biodiversity, typical of healthy wetland systems. This value indicates that the bird community is not overly dominated by a single species but is relatively balanced. Similarly, the Margalef Species Richness Index (D = 3.75) points to rich species diversity compared to the overall bird abundance. These indices align with similar studies from wetlands in southern India, such as Vedanthangal (Sundar *et al*., 2014) and Kaliveli Wetlands, which have reported comparable index values under healthy conditions. Notably, Little Grebe (*Tachybaptus ruficollis*) and Little Cormorant (*Microcarbo niger*) dominated the observations, contributing to the high abundance count. These species thrive in shallow, open water bodies with good fish populations, indicating that Thamaraikulam Pond still provides optimal habitat features for diving and foraging birds. The presence of rare or less frequently observed species like the Black-necked Stork (*Ephippiorhynchus asiaticus*) and Eurasian Spoonbill (*Platalea leucorodia*), albeit in low numbers, is ecologically significant. These birds are often associated with less disturbed or relatively pristine wetland environments, thus indicating the conservation potential of the site.

Seasonal trends observed during the survey suggested increased bird presence during post-monsoon and winter months, coinciding with migratory arrivals and availability of foraging grounds. The habitat mosaic of open water, bunds, and vegetation zones likely supports both resident nesting birds and migrants, including ducks and waders.

When compared to protected wetlands like Koonthankulam and Mukkombu, Thamaraikulam Pond, although unprotected, still supports a comparable level of diversity (Praveen *et al*., 2020). This highlights the importance of non-sanctuary wetlands in regional conservation planning. Despite lacking formal protection, these traditional ponds are often community-managed and, if sustainably maintained, can serve as critical bird habitats.

However, potential threats to the site include: siltation and seasonal shrinkage affecting water retention. Runoff from nearby agriculture, introducing pollutants or altering nutrient cycles. Encroachment for farming or infrastructure. and disturbance from human activities like fishing or livestock grazing.

To mitigate these threats, the following actions are recommended:

- Periodic desilting and water-level management to maintain year-round aquatic habitats.
- Habitat zoning to prevent human disturbance in key nesting or foraging areas.
- Community awareness programmes on bird conservation.
- Integration into district-level wetland monitoring programmes for long-term protection.

CONCLUSION

The present study confirms that Thamaraikulam Pond in Gokilapuram village is a biologically important wetland that supports a diverse community of wetland birds. Over one-year study period, a total of 3,873 individuals representing 32 species were recorded, indicating a moderately high level of biodiversity. The calculated Shannon-Weiner diversity index (2.88) and Margalef species richness index (3.75) suggesting that the pond offers favorable ecological conditions for a variety of avifaunal species, including both common and rare birds.

This research contributes valuable baseline data for the region and underscores the need for local conservation initiatives. Community participation, habitat restoration, and ongoing ecological monitoring will be key strategies to protect and enhance this vital wetland ecosystem in the face of increasing anthropogenic pressures.

In conclusion, this study underlines the ecological relevance of Thamaraikulam Pond and establishes it as a valuable yet under recognized wetland in Theni Dt.Regular monitoring and minimal interventions can help sustain its biodiversity in the conservation of birds' biodiversity.

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