Full Length Research Article

© 2024, Centre for Advanced Research in Agricultural Sciences
Research Journal of Agricultural Sciences
Volume 15; Issue 01 (Jan–Feb 2024); pp 127–131

ISSN: 0976-1675 (P)
ISSN: 2249-4538 (E)

# Evaluation of Birds Community in the Thonikkadavu Water Reservoir, Kerala

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Received: 24 Oct 2023; Revised accepted: 29 Dec 2023; Published online: 17 Jan 2024

## Abstract

The floral and faunal communities in forest landscapes are impacted by anthropogenic activities, which in turn affects the biodiversity of the ecosystem. Using the point count sampling (PCS) approach, a survey was carried out at Thonikkadavu water reservoir - 20 distinct sample locations in March and April of 2017–2019, during the spring migration bird season. Throughout the study period, 74 distinct bird species which belongs to the order Accipitriformes, Anseriformes, Apodiformes, Bucerotiformes, Charadriiformes, Ciconiiformes, Columbiformes, Coraciiformes and Cuculiformes, Pelecaniformes, Gruiformes, Passeriformes, Piciformes, Suliformes and Psittaciformes. Among the 74 bird species, 70 species belong to least concern (LC) status whereas one species Sterna aurantia (River Tern) belongs to vulnerable (VU) conservation status whereas three species such as Threskiornis melanocephalus (Black-headed Ibis), Anhinga melanogaster (Oriental Darter) and *Ciconia episcopus* (Woolly-necked Stork) belongs to the nearly threatened (NT) conservation status.

***Key words*:** Thonikkadavu water reservoir, Avian diversity, Point sample method, IUCN

Wetlands and other bodies of water, such as dams and reservoirs, are vital to ecosystems and biodiversity, and they are frequently referred to as hotspots. Both domestic and migratory birds rely on wetlands as a food supply and refuge. Given the variety of birds, wetlands are essential for giving both native and migratory birds a place to reproduce [1]. They are often called the "Kidneys of Earth" because they absorb carbon dioxide to prevent abrupt global warming and to eradicate pollution. When it comes to abundant biodiversity, wetlands are the most significant ecosystem [2].

The ecosystem of different kinds of natural wetlands has been extensively studied over the past few decades, leading to a better knowledge of the diverse ecological services they provide, such as habitat preservation and water purification [3]. In terms of overall geographic area, wetlands comprise 152600 square kilometres (4.63%) of the country, according to the National Wetland Inventory and Assessment [4]. Wetlands comprise around 160.6 thousand hectares (ha), or 4.13 percent, of Kerala's total area. Birds play a major role in maintaining the wetland systems' ecological equilibrium. The majority of wetlands are home to a variety of bird species, including resident species, migratory species, local migrants, wetland birds, terrestrial birds linked with wetlands, etc. According to Khatri *et al*. [5], wetland birds are crucial to the health of the ecosystem since they are pollinators, predators, and bio-indicators of the aquatic ecosystem. The amount of food available, the scale of the environment, abiotic elements like rain, etc., all have an impact on the avifaunal biodiversity in a wetland ecosystem. Wetlands are currently protected at the federal, state, and local levels as sensitive environments with a variety of uses. An insufficient understanding of how to preserve the ecological function of wetlands contributes to the annual loss or degradation of many hectares of marshes and other bird habitats [6].

## MATERIALS AND METHODS

The site of Thonikkadavu is located in Kerala's Kozhikode district, close to Kariyathumpara. Kozhikode is 45 km away from Thonikkadavu. The blocks that encircle Thonikadavu are Balusseri Block to the south, Panthalayani Block to the south, Thodannur Block to the west, and Kunnummal Block to the north. With an average humidity of 80% and a temperature of 23.4±2°C. The flow of the Murat and Vykkilaseri Padavathumthazhe rivers contributes to its flourishing.

*Avifauna survey*

Using the point count sampling (PCS) approach, the survey was conducted in March and April of 2017 and 2019 during the spring migrating bird season. To be included in the final analysis, twenty different sampling stations from the Thonikkadavu water reservoir were selected at random. Systematic sampling locations were 200 metres apart from each station [7]. Each point had two ten-minute bird counts, one for each month of the sampling period. Birds were seen and

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**Citation:** Subair MP, Jobiraj T, Shamsudin M, Jerald IJA. 2023. Evaluation of birds community in the Thonikkadavu water reservoir, Kerala. *Res. Jr. Agril. Sci.* 15(1): 127-131.

counted in the morning from 7:00 to 10:30 a.m. [8]. Using the local field guide and previous research conducted in the area, the birds were identified, classified, and placed. The identified species of birds are registered and classified. The IUCN status of the bird species was also examined.

## RESULTS AND DISCUSSION

Birds were categorized as Domain: Eukaryota, Kingdom: Animalia, Phylum: Chordata, Class: Aves. During the study period, seventy-four different bird species were observed which belongs to the sixteen different orders such as Accipitriformes, Anseriformes, Apodiformes, Bucerotiformes, Charadriiformes, Charadriiformes, Ciconiiformes, Columbiformes, Coraciiformes, Cuculiformes. Gruiformes, Passeriformes, Pelecaniformes. Piciformes. Psittaciformes and Suliformes orders. Among the 74 bird species, Passeriformes, Coraciiformes, Pelecaniformes order showed high incidence of birds diversity in the Thonikkadavu water reservoir. Most of the species belongs to the least concern (LC) conservation status which means common avian diversity. One species Sterna aurantia (River Tern) belongs to vulnerable (VU) conservation status whereas three species such as *Threskiornis melanocephalus* (Black-headed Ibis), *Anhinga melanogaster* (Oriental Darter) and *Ciconia episcopus* (Woolly-necked Stork) belongs to the nearly threatened (NT) conservation status.

Table 1 Cumulative data about the avian species observed in Thonikkadavu water reservoir during 2017 to 2019

| S. No. | Common name of the bird | Order | Family | Binomial name | IUCN status |
|---|---|---|---|---|---|
| 1 | Ashy Woodswallow | Passeriformes | Artamidae | *Artamus fuscus* | LC |
| 2 | Asian Koel | Cuculiformes | Cuculidae | *Eudynamys scolopaceus* | LC |
| 3 | Asian Openbill stork | Ciconiiformes | Ciconiidae | *Anastomus oscitans* | LC |
| 4 | Barn swallow | Passeriformes | Hirundinidae | *Hirundo rustica* | LC |
| 5 | Black Drongo | Passeriformes | Dicruridae | *Dicrurus macrocercus* | LC |
| 6 | Black Eagle | Accipitriformes | Accipitridae | *Ictinaetus malaiensis* | LC |
| 7 | Black-headed Ibis | Pelecaniformes | Threskiornithidae | *Threskiornis melanocephalus* | NT |
| 8 | Black-hooded Oriole | Passeriformes | Oriolidae | *Oriolus xanthornus* | LC |
| 9 | Black-naped Oriole | Passeriformes | Oriolidae | *Oriolus chinensis* | LC |
| 10 | Black-rumped Flameback | Piciformes | Picidae | *Dinopium benghalense* | LC |
| 11 | Bluetailed Bee-eater | Coraciiformes | Meropidae | *Merops philippinus* | LC |
| 12 | Blyth's Reed Warbler | Passeriformes | Acrocephalidae | *Acrocephalus dumetorum* | LC |
| 13 | Brahminy Kite | Passeriformes | Dicruridae | *Dicrurus macrocercus* | LC |
| 14 | Brown shrike | Passeriformes | Laniidae | *Lanius cristatus* | LC |
| 15 | Cattle Egret | Pelecaniformes | Ardeidae | *Bubulcus ibis* | LC |
| 16 | Chestnut-headed Bee-eater | Coraciiformes | Meropidae | *Merops leschenaultia* | LC |
| 17 | Common Kingfisher | Coraciiformes | Alcedinidae | *Alcedo atthis* | LC |
| 18 | Common Myna | Passeriformes | Sturnidae | *Acridotheres tristis* | LC |
| 19 | Common sandpiper | Charadriiformes | Scolopacidae | *Actitis hypoleucos* | LC |
| 20 | Common Snipe | Charadriiformes | Scolopacidae | *Gallinago gallinago* | LC |
| 21 | Eurasian Hoopoe | Bucerotiformes | Upupidae | *Upupa epops* | LC |
| 22 | Fork-tailed Drongo-cuckoo | Cuculiformes | Cuculidae | *Surniculus dicruroides* | LC |
| 23 | Golden-fronted Leafbird | Passeriformes | Chloropseidae | *Chloropsis aurifrons* | LC |
| 24 | Gray Heron | Pelecaniformes | Ardeidae | *Ardea cinerea* | LC |
| 25 | Great Cormorant | Suliformes | Phalacrocoracidae | *Phalacrocorax carbo* | LC |
| 26 | Greater Coucal | Cuculiformes | Cuculidae | *Centropus sinensis* | LC |
| 27 | Greater Flameback | Piciformes | Picidae | *Chrysocolaptes guttacristatus* | LC |
| 28 | Greater Racket-tailed Drongo | Passeriformes | Dicruridae | *Dicrurus paradiseus* | LC |
| 29 | Green Bee-eater | Coraciiformes | Meropidae | *Merops orientalis* | LC |
| 30 | Grey Wagtail | Passeriformes | Motacillidae | *Motacilla cinerea* | LC |
| 31 | House Crow | Passeriformes | Corvidae | *Corvus splendens* | LC |
| 32 | Indian Golden Oriole | Passeriformes | Oriolidae | *Oriolus kundoo* | LC |
| 33 | Indian Pitta | Passeriformes | Pittidae | *Pitta brachyuran* | LC |
| 34 | Indian Pond heron | Pelecaniformes | Ardeidae | *Ardeola grayii* | LC |
| 35 | Indian Roller | Coraciiformes | Coraciidae | *Coracias benghalensis* | LC |
| 36 | Indian Swiftlet | Apodiformes | Apodidae | *Aerodramus unicolor* | LC |
| 37 | Intermediate egret | Pelecaniformes | Ardeidae | *Ardea intermedia* | LC |
| 38 | Jungle Babbler | Passeriformes | Leiothrichidae | *Argya striata* | LC |
| 39 | Large-billed Crow | Passeriformes | Corvidae | *Corvus macrorhynchos* | LC |
| 40 | Lesser Whistling duck | Anseriformes | Anatidae | *Dendrocygna javanica* | LC |
| 41 | Little Cormorant | Suliformes | Phalacrocoracidae | *Microcarbo niger* | LC |
| 42 | Little Egret | Pelecaniformes | Ardeidae | *Egretta garzetta* | LC |
| 43 | Little Swift | Apodiformes | Apodidae | *Apus affinis* | LC |
| 44 | Malabar Parakeet | Psittaciformes | Psittaculidae | *Psittacula columboides* | LC |
| 45 | Orange Minivet | Passeriformes | Campephagidae | *Pericrocotus flammeus* | LC |
| 46 | Oriental Darter | Suliformes | Anhingidae | *Anhinga melanogaster* | NT |
| 47 | Oriental Honey-buzzard | Accipitriformes | Accipitridae | *Pernis ptilorhynchus* | LC |
| 48 | Oriental Magpie Robin | Passeriformes | Muscicapidae | *Copsychus saularis* | LC |
| 49 | Paddyfield Pipit | Passeriformes | Motacillidae | *Anthus rufulus* | LC |

| | | | | | |
|---|---|---|---|---|---|
| 50 | Pied Kingfisher | Coraciiformes | Alcedinidae | *Ceryle rudis* | LC |
| 51 | Plain Prinia | Passeriformes | Cisticolidae | *Prinia inornata* | LC |
| 52 | Purple Heron | Pelecaniformes | Ardeidae | *Ardea purpurea* | LC |
| 53 | Purple Sunbird | Passeriformes | Nectariniidae | *Cinnyris asiaticus* | LC |
| 54 | Purple-rumped Sunbird | Passeriformes | Nectariniidae | *Leptocoma zeylonica* | LC |
| 55 | Red vented bulbul | Passeriformes | Pycnonotidae | *Pycnonotus cafer* | LC |
| 56 | Red wattled Lapwing | Charadriiformes | Charadriidae | *Vanellus indicus* | LC |
| 57 | Red whiskered bulbul | Passeriformes | Pycnonotidae | *Pycnonotus jocosus* | LC |
| 58 | River Tern | Charadriiformes | Laridae | *Sterna aurantia* | VU |
| 59 | Rock Pigeon | Columbiformes | Columbidae | *Columba livia* | LC |
| 60 | Rose-ringed Parakeet | Psittaciformes | Psittaculidae | *Psittacula krameri* | LC |
| 61 | Rosy Starling | Passeriformes | Sturnidae | *Pastor roseus* | LC |
| 62 | Scaly-breasted Munia | Passeriformes | Estrildidae | *Lonchura punctulata* | LC |
| 63 | Spotted Dove | Columbiformes | Columbidae | *Spilopelia chinensis* | LC |
| 64 | Stork-billed Kingfisher | Coraciiformes | Alcedinidae | *Pelargopsis capensis* | LC |
| 65 | Tricoloured Munia | Passeriformes | Estrildidae | *Lonchura malacca* | LC |
| 66 | Vernal Hanging-parrot | Psittaciformes | Psittaculidae | *Loriculus vernalis* | LC |
| 67 | Western Reef Heron | Pelecaniformes | Ardeidae | *Egretta gularis* | LC |
| 68 | White browed wagtail | Passeriformes | Motacillidae | *Motacilla maderaspatensis* | LC |
| 69 | White cheeked barbet | Piciformes | Megalaimidae | *Psilopogon viridis* | LC |
| 70 | White-breasted Waterhen | Gruiformes | Rallidae | *Amaurornis phoenicurus* | LC |
| 71 | White-rumped Munia | Passeriformes | Estrildidae | *Lonchura striata* | LC |
| 72 | White-throated Kingfisher | Coraciiformes | Alcedinidae | *Halcyon smyrnensis* | LC |
| 73 | Wiretailed swallow | Passeriformes | Hirundinidae | *Hirundo smithii* | LC |
| 74 | Woolly-necked Stork | Ciconiiformes | Ciconiidae | *Ciconia episcopus* | NT |

Table 2 Frequency of bird species based on their order species observed in Thonikkadavu water reservoir during 2017 to 2019

| S. No. | Order | No. of species |
|---|---|---|
| 1 | Accipitriformes | 2 |
| 2 | Anseriformes | 1 |
| 3 | Apodiformes | 2 |
| 4 | Bucerotiformes | 1 |
| 5 | Charadriiformes | 4 |
| 6 | Charadriiformes | 4 |
| 7 | Ciconiiformes | 2 |
| 8 | Columbiformes | 2 |
| 9 | Coraciiformes | 8 |
| 10 | Cuculiformes | 3 |
| 11 | Gruiformes | 1 |
| 12 | Passeriformes | 31 |
| 13 | Pelecaniformes | 8 |
| 14 | Piciformes | 3 |
| 15 | Psittaciformes | 3 |
| 16 | Suliformes | 3 |

Nameer [9] provided evidence that of the eight red data book birds reported from evergreen forests, White-bellied Shortwing (*Brachypteryx major*), the Nilgiri Wood-pigeon (*Columba elphinstonii*), and Broad-tailed Grassbird (*Schoenicola platyura*) are listed as Vulnerable (VU) by the IUCN. The Nilgiri Laughingthrush (*Garrulax cachinnans*) is listed as Endangered (EN) by the International Union for Conservation of Nature or World Conservation Union. The IUCN lists the Black-and-Orange Flycatcher (*Ficedula nigrorufa*), Nilgiri Pipit (*Anthus nilghiriensis*), Great Hornbill (*Buceros bicornis*), and Nilgiri Flycatcher (*Eumyias albicaudata*) as Near Threatened (NT) species [10]. Because of their ecological relevance, high nutritional value, and productivity, wetlands provide as a home to a diverse range of birds. Wetlands are important bird habitats that provide perfect breeding, staging, and nesting grounds for a range of migratory and resident species. Wetlands provide a multitude of micro- and sub-habitats that attract a diverse range of water bird species. The birds consume a wide variety of items, including crustaceans (Shore Birds, Waterfowl), fish and amphibians (Wading Birds), seeds (Ducks, Cranes), leaves (Geese), and tubers and rhizomes (Geese, Swans). The quantity, make-up, and spatiotemporal dynamics of these meals have a significant impact on how water birds use their foraging sites and can serve as crucial markers of the quality of the habitat [11]. A total of 33 species were identified, the majority of which (52%) belong to the carnivorous feeding guild. Fish and other organisms like them also serve as a strong draw for carnivorous bird species to the wetlands. The study's observed bird species have a variety of eating environments. It could be the cause of Ashtamudi Lake's avifauna's diversity [12]. Jangral and Vashishat [13] surveyed the Keshopur Chhamb wetland, they found that there are roughly seven main feeder guilds: herbivorous, frugivorous, granivorous, carnivorous, and insectivorous. The survey found that the guild of carnivores had the highest number of species (28%), followed by the guild of insectivores (21%).

Subair *et al*. [14] reported forty different avian species that belongs to Passeriformes, Columbiformes, Coraciiformes, Pelecaniformes, Piciformes, Galliformes, Apodiformes, Bucerotiformes, Psittaciformes, Trogoniformes and Accipitriformes families in Peruvannamuzhi forest. Among the 40 bird species, 30 species belong to least concern (LC) status and one species Ocyceros griseus belongs to vulnerable IUCN status.

## CONCLUSION

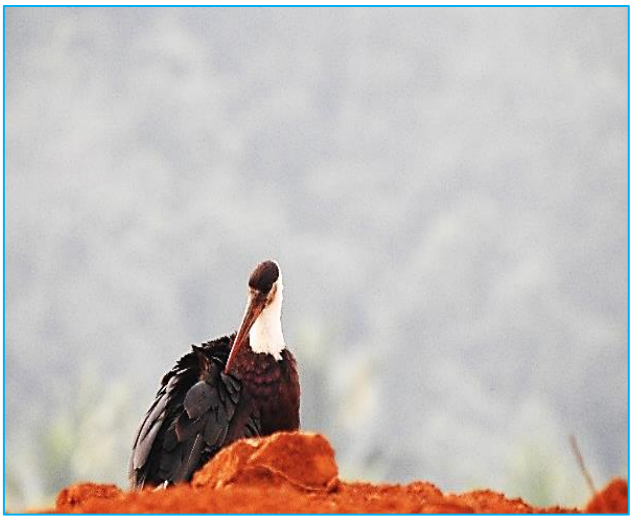
Birds are regarded as human buddies since they have the ability to eradicate numerous dangerous insects and mosquitoes from the surrounding area. Thus, the preservation of birds is more crucial. The lowlands of Kerala are currently facing

significant pressure to alter their landscape as a result of increased tourism, a growing population, and other development-related activities. The primary issues at hand are tourism-related activities, home waste disposal, and land modification and reclamation. Wetland monitoring should therefore be done on a regular basis. Strict laws should be implemented to prevent the modification and reclamation of land.

*Sterna aurantia* (River Tern)

*Threskiornis melanocephalus* (Black-headed Ibis)

*Anhinga melanogaster* (Oriental Darter)



*Ciconia episcopus* (Woolly-necked Stork)

Fig 1 Vulnerable and nearly threatened bird species observed in Thonikkadavu water reservoir during 2017 to 2019

***Acknowledgment***

*Authors were thankful to Dr. A. K. Khaja Nazeemudeen Sahib, Secretary and Correspondent, Dr. S. Ismail Mohideen, Principal for Institutional support. We are also thankful to Kerala Forest Department for permitting us to conduct this study.*

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