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Study of avian diversity of Maroda Tank-2 Bhilai (C.G.) India

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Abstract
The present study focuses on the avian diversity and ecological importance of Maroda Tank-2, located in Bhilai, Chhattisgarh, India. Wetlands like Maroda Tank serve as critical habitats for a variety of bird species, offering nesting, feeding, and roosting grounds throughout the year. The research was conducted over a period of one year (May, 2023 to Apr 2024), encompassing both migratory and resident bird species. Systematic field surveys were carried out using point count and transect methods during early morning and late afternoon sessions to maximize visibility and minimize disturbances. A total of 19bird species, spanning 12 families and 07 orders, were recorded during the study period. Among these, several species were identified as migratory, indicating the tank's role as a seasonal stopover and wintering ground. The presence of species from diverse ecological niches, including waterfowl, waders, raptors, and songbirds, reflects the habitat heterogeneity and ecological richness of the area. Notably, the study also observed certain near-threatened and locally rare species, emphasizing the conservation significance of Maroda Tank-2. Environmental parameters such as water quality, vegetation cover, and human disturbance levels were also assessed to understand their influence on avian distribution. The findings underscore the importance of sustained ecological monitoring and conservation management to protect and enhance the biodiversity of this urban wetland ecosystem.

Keywords: Avian diversity, Bhilai, Bird conservation, Diversity, Maroda Tank, Wetland birds, Urban ecosystem

Introduction

Birds are among the most visible and ecologically significant components of biodiversity. They occupy a broad range of ecological niches and serve as key indicators of environmental health [1]. From dense forests to arid deserts, from open grasslands to urban habitats, birds have adapted to nearly every ecosystem on Earth [2]. The study of avian diversity, therefore, plays a critical role in understanding ecological dynamics, conservation priorities, and human impacts on natural habitats [3].

Avian biodiversity is especially crucial because birds respond sensitively to changes in the environment, including alterations in habitat structure, climate, and food availability [4]. Consequently, ornithological research is widely used in environmental impact assessments, conservation planning, and ecosystem monitoring [5]. The long-term observation of bird populations provides valuable insights into the health and resilience of ecosystems and can highlight areas requiring urgent conservation attention [6]. The country is home to over 1,300 recorded species of birds, including endemic, migratory, and globally threatened species [7]. The Indian subcontinent lies within several migratory flyways, making it a crucial region for avian research [8]. In particular, wetland ecosystems both natural and man-made play an essential role in sustaining bird life, especially for waterfowl and migratory birds [9]. Wetlands, which include lakes, ponds, marshes, estuaries, and tanks, are among the most productive ecosystems in the world [10]. In India, tanks or man-made reservoirs, especially in semi-urban and rural landscapes, often become refuges for avifauna, particularly in regions where natural wetlands has degraded or disappeared [11]. These aquatic systems support a rich diversity of flora and fauna due to their unique ecological characteristics [12]. For birds, wetlands offer abundant food resources including fish, amphibians, aquatic plants, insects, and crustaceans [13]. Additionally, the vegetation and topographical features around wetlands provide safe nesting grounds and shelter from predators [14].

Maroda Tank-2, located in Bhilai, Chhattisgarh, is one such wetland ecosystem. Though artificial in origin, it has evolved into an ecologically valuable habitat over time [15]. It supports a mosaic of microhabitats, such as open water, reed beds, mudflats, and surrounding trees and grasslands, creating suitable conditions for a variety of bird species [Table 1] [16]. Despite increasing anthropogenic pressures, this tank continues to sustain significant avian diversity and offers potential as a conservation site and urban nature reserve [17]. The region of Bhilai, situated in the Durg district of Chhattisgarh, is better known for its industrial and urban character, being the site of one of India's largest steel plants [18]. However, interspersed within its rapidly urbanizing landscape are remnants of natural and semi-natural ecosystems, including several tanks and water bodies [19]. Maroda Tank-2 is among the most prominent of these and has increasingly drawn attention from birdwatchers, researchers, and environmentalists due to its rich and varied bird life [19]. Despite anecdotal observations and occasional documentation by amateur naturalists, there remains a significant gap in comprehensive scientific studies on the avifauna of this site [20]. A systematic assessment of the avian diversity at Maroda Tank-2 is essential not only for ecological documentation but also for identifying conservation priorities in an urban-industrial context [21]. The research encompasses both resident and migratory species, and examines how environmental factors such as water availability, vegetation, seasonal variations, and human disturbance influence species richness and abundance [22].

Study Area: The present study is conducted on Maroda Tank-2. It is located at Bhilai Steel Plant (BSP) township area inRisali sector, Bhilai, District Durg (C.G.) at 21.1567°N latitude and 81.3757°E longitude. The area supports a good number of avian faunal diversity including aquatic as well as terrestrial birds. The reservoirs serve as a heaven for birds with a large quantity of water including vegetation in its surroundings.

Fig 1: Study Area-Maroda Tank-2Bhilai (C.G.) India

Materials and Methods

Point Count Method (PCM): The basic method that has been chosen is based on setting up a single line at each site called a transect. Birds can be identified either visually, or by their calls. This method involves identifying all the birds you see or hear while standing at a series ofpoints along a transect (a straight line through the site) [24].

Opportunistic Bird Sightings (OBS): Many species will be detected while travelling to and from survey sites, or outside standard survey times or survey sites. Birds may be identified opportunistically either by their call or by their appearance. Record all of these sightings and theirlocations, dates and times for the whole survey on the opportunistic bird sightings data sheet provided [25].

Table 1: List of Avian Fauna in Study Area

SN	Order	Family	Common Name	Scientific Name
1	Charadriiformes	Jacanidae	Bronze-winged jacana	*Metopidius indicus*
2	Suliformes	Phalacrocoracidae	Indian cormorant	*Phalacrocorax fuscicollis*
3	Passeriforms	Motacillidae	White-browned wagtail	*Vannathikuruvi*
4	Columbiformes	Columbidae	Laughing Dove	*Spilopelia senegalensis*
5	Coraciiformes	Alcedinidae	Pied kingfisher	*Ceryle rudis*
6	Columbiformes	Columbidae	Eurasian collared dove	*Streptopelia decaocto*
7	Coraciiformes	Alcedinidae	White throated kingfisher	*Halcyon smyrnensis*
8	Passeriformes	Sturnidae	Indian pied starling	*Gracupica contra*
9	Passeriformes	Alaudidae	Ashy-crowned Sparrow lark	*Eremopterix griseus*
10	Passeriformes	Motacillidae	Paddy field pipit	*Anthusrufulus*
11	Pelecaniformes	Ardeidae	Indian pond heron	*Ardeolagrayii*
12	Passeriformes	Dicruridae	Black Drongo	*Dicrurusmacrocercus*
13	Pelecaniformes	Ardeidae	Cattle Egrat	*Bubulcus ibis*
14	Gruiformes	Rallidae	Grey-headed swamphen	*Porphyrio policephalus*
15	Pelecaniformes	Ardeidae	Medium Egret	*Ardea intermedia*
16	Pelecaniformes	Ardeidae	Purple heron	*Ardea purpurea*
17	Passeriformes	Estrildidae	Red avadavat	*Amandavaamandava*
18	Coraciiformes	Coraciidae	Indian roller	*Coracias benghalensis*
19	Passeriformes	Estrildidae	Tricolored munia	*Lonchuramalacca*

Result and Discussion

The systematic study conducted at Maroda Tank-2 in Bhilai over a one-year period yielded significant insights into the avian diversity of the area. Observations were made across different seasons to ensure that both resident and migratory bird species were adequately recorded. A total of 19 bird species, spanning 12 families and 07 orders, were documented during the study period [Table 1]. The richness and diversity recorded affirm the ecological value of this urban wetland and highlight its function as a vital bird habitat. Field surveys were conducted early in the morning and late in the afternoon, using standardized methods including point counts, line transects, and opportunistic observations.

Birds were identified using binoculars and field guides, with digital photography employed for verification. Supplementary data on environmental parameters, such as water level, aquatic vegetation cover, and human activity intensity, were also recorded.

The avian population exhibited a notable degree of fluctuation across seasons, with peaks observed during the post-monsoon and winter months, corresponding with the arrival of migratory species. Notable among these were species such as the Northern Pintail (Anas acuta) and Common Teal (Anas crecca). These migratory birds utilized the wetland as a feeding and resting ground, emphasizing its role along migratory pathways. Resident species such as the Indian Pond Heron (*Ardeolagrayii*), White-throated Kingfisher (*Halcyon smyrnensis*), and Red-wattled Lapwing (*Vanellus indicus*) were recorded throughout the year, with their presence underscoring the site's permanent ecological suitability. The diversity index calculated for Maroda Tank-

2, across different months, indicating moderately high diversity. The most species-rich families observed were *Metopidius indicus; Phalacrocorax fuscicollis; Vannathikuruvi*; *Ceryle rudis; Ardeolagrayii*; *Anthusrufulus*; *Dicrurusmacrocercus; Bubulcus ibis; Porphyrio policephalus* [Table 1]. Among the orders, Passeriformes was the most dominant in terms of number of species, followed by Charadriiformes and Anseriformes. Species abundance was highest in December and January, aligning with migratory influx. The Indian Spot-billed Duck (*Anas poecilorhyncha*) was the most frequently observed species overall, indicating that the tank provides a suitable breeding and foraging habitat for this species. A few species were sighted only once or twice during the study period, suggesting either their transient presence or sensitivity to local disturbances. These included the *Dicrurusmacrocercus (*Black Drongo*; Bubulcus ibis (*Cattle Egrat*)* and *Amandavaamandav (*Red avadavat**)**.

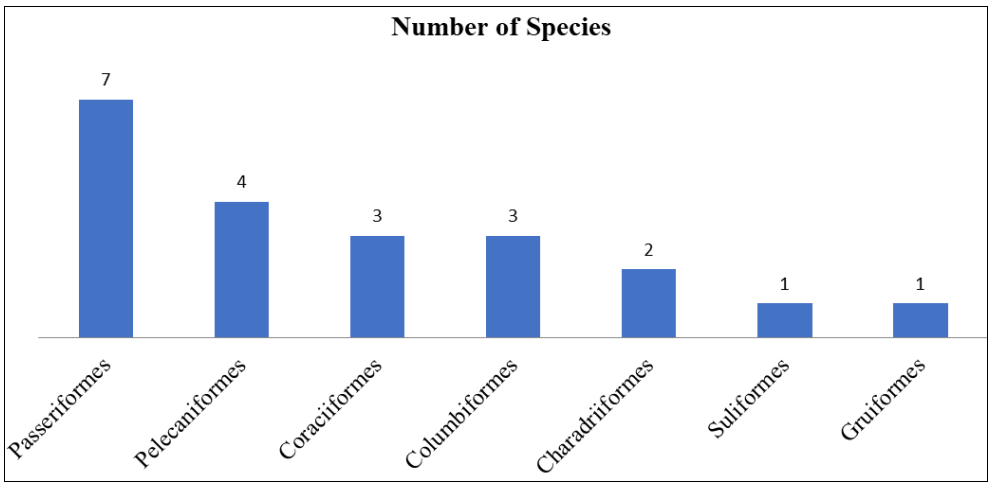

Fig 2: Number of species belongs to the order of avian fauna in maroda tank-2, Bhilai

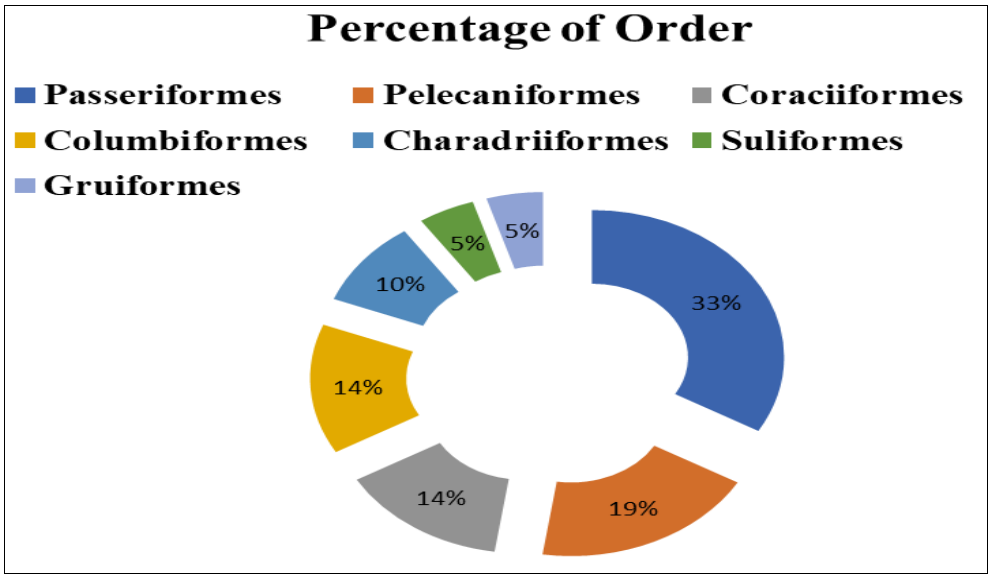

Fig 3: represents percentage of avian orders found during study period (May, 2023 to Apr 2024)

Conclusion

The year-long avian survey at Maroda Tank-2 in Bhilai underscores the ecological significance of this urban wetland as both a seasonal refuge for migratory birds and a year-round habitat for resident species. The documentation of 19 bird species across 12 families and 7 orders, along with moderately high diversity index values, reflects the habitat's richness and ecological stability. Seasonal fluctuations in species abundance, particularly the winter peaks due to migratory arrivals, highlight the tank's role in broader migratory pathways. The presence of species like the Indian Spot-billed Duck year-round further emphasizes its suitability for foraging and breeding. Overall, the study affirms Maroda Tank-2's value as a critical avifaunal habitat and calls for continued conservation efforts to preserve its ecological integrity amidst urban pressures.

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