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Study on Avifaunal Diversity of the Selected Lakes from Paoni Tehsil in Bhandara District, Maharashtra

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Abstract: The current investigation was conceded in the year of March 2022 -February 2023. It deals with the eastern Vidarbha region of Maharashtra State, especially Paoni Tehsil of Bhandara district is important to the water birds and land birds as there are many lakes in the district.It deals with the study of avifaunal diversity in lakes of Paoni Tehsil. Bird's observations were carried out at regular intervals of the three lakes of three main seasons at regular interval of the study period. The present study based on the identification of residential Bird. Observations done with the help of Olympus, 10-50 DPS. Photographs were taken by with appropriate zoom lens of digital camera Nikon. Photos were clicked by visiting twice a day .four visits per month during morning 7:30 -10:30am and at evening 4:00 – 6:00pm. During the study a total number of 43 birds species lake 10 different orders 24 different families among which order Passeriformes were dominant by contributing 13 followed by order Ciconiformes with 08 species orders Anasiformes and Corcariformes represented by 05 species each order Charadriformes represented by 03 species, order Galliformes represented by 03 species and order Pelacaniformes and Psittaciformes represented by 02 species each and order Columbiformes and Falconiformes represented by 01 species each. The number of birds species may however vary accordingly based on parameters such as availability of food, water, and expansion of human populations; seasonal impacts etc.

Keywords: Avifaunal diversity, Olympus binocular 10 X 50 DPS, Ecosystem

Introduction

Biodiversity is the variety of life on the Earth within and between all species of plants, animals and microorganisms and the ecosystems within which they live and interact. The eastern Vidarbha region of Maharashtra State, especially Paoni Tehsil of Bhandara district is important to the water birds and land birds as there are many lakes in the district. A bird has been described as a feathered biped. Birds are vertebrate warm-blooded animals that are whose temperature remains more or less constant and independent of the surrounding temperature (Ali, 2002). Birds are excellent model organisms for understanding key issues in ecology, animal behaviour, evolutionary biology and conservation.

Birds are often common denizen of the ecosystems and they have been considered as an indicator species of inhabited areas. In India, small water-storage reservoirs are a distinctive feature which provides important feeding and nesting areas for a wide range of water birds. Wetlands are the most productive and biologically diverse in the World but very fragile ecosystems. Wetlands and water birds are inseparable elements and thus form a rich array of water bird communities (Grimmett and Inskipp, 2007) .Water birds are an important component of most of the wetland ecosystems as they occupy several trophic levels in the food web of wetland nutrient cycles (Rajashekar and Venkatesha, 2010). The bird habitats of the Indian subcontinent can be roughly divided into forest, shrub, wetlands, marine, grassland, desert and agricultural land habitat. Many bird species require mixed habitat types (Grimmett *et al*., 2011). The species density, diversity, richness and relative

abundance of water birds depend upon wetland characteristics such as size, water level quality of water, availability and distribution of food resources (Manikannan, 2011). The value of each wetland is intimately tied up with the culture and the needs of the people who exploit it and is dependent to a great degree upon its location. In a developing country like India, large numbers of people living around wetlands depend heavily on their resources for subsistence and traditional activities like fishing, grazing, forming, red-gathering, etc. (Vachanth, 2013)

Bhandara is known as the district of lakes and numbers of water bodies are present in the district. Even though it represents only a small fraction of the geographical area of the

Vidarbha region of Maharashtra State, India. Avifaunal research and the usailability of detail report on the avifaunal wealth is the inspiring force behind the selection of the present study.

The paper deals with the birds diversity in Kanhalgaon,Shivnala and Wahi lake in Paoni Tehsil of Bhandara district(M.S.)

MATERIALS AND METHODS

STUDY AREA

The study area comprises three lakes in Paoni Tehsil of Bhandara district, Maharashtra. Observation of the birds was done in and around the lakes with special reference to the objectives of the present study in and around Paoni Tehsil place town of Bhandara district of Maharashtra State, India. The study area comprises the open water habitat, rocky and grassy habitat, and forest and land habitats around the following selected lakes:-

1. **Kanhalgaon Lake** – It is located near Kanhalgaon village, on way to Kanpa town. It is situated in the midst of mixed dry and moist tropical rainforest, interspersed with paddy cultivation. It is shallow waterbody, perfect for mud probing waders. ($20^0$41ˈ31″N $79^0$41’27"E)
2. **Shivnala Lake –** It is very large lake utilized for the irrigation facility to paddy cultivation. On one side, Shivnala village is located while on another side dense tropical forest vegetation dominated by *Tectona grandis* and bamboo. ($20^0$41ˈ29″N $79^0$41’29"E)
3. **Wahi Lake –** It is located near catchment area of Gosikhurd dam. It is perfect roosting site for winter migratory breeding waterbird community. It is having island like topography in the midst of water reservoir, which may act as perfect roosting and nesting ground for migratory as well as resident waterbird species. ($20^0$46ˈ09″N $79^0$36’37"E)

METHODOLOGY

The present study will be carried on the avian diversity from the selected lakes of Paoni tehsil of Bhandara district, Maharashtra State. The study aims to examine the monthly and seasonal diversity, and population dynamics of the avifauna from the present study area. There is no single technique that can be used for counting all types of birds this is mainly because birds differ in terms of their size, behavior traits, habitat preferences etc. (Urfi et al., 2005).

The visual encounter surveys will be conducted to the entire lake for 'direct counts of the birds by randomized walking along the bank of the lakes (Crump and will be Scott, 1994; Whitakar, 2002; Manley *et al*., 2005, Manikannan, 2011: Vachanth, will didme 2013; Joshi, 2014). The counting of the birds will be made at morning and evening timings of the day between 07.00 AM and 06.00 PM when the birds are most active (Rajashekara and Venkatesha, 2010) and depending on the light conditions (Namgail *et al.*, 2009). Weekly visits to the site were planned for two years and an average of 4 weeks was accounted for a month (Wanjari, 2012). Based on the experience in the field considering the habitat status and area of each study site, the bird survey was made by walking at a slow pace along the bank of the site as followed by Bibby *et al* (2000), Joshi (2012). The stationary

counting and 'double counting methods for the survey of birds were also employed wherever necessary (Gregory *et al*., 2004). A field binocular (Olympus, 10-50 DPS I) will be used to observe the birds in the field. The photography of the birds will be carried out by using Nikon camera with different zoom lenses. After detection, specimens were photographed by camera and identified with the help of visible structural features (Ali, 2002). For identification and comparative studies of observed specimens the books and field guides by Ali (2002), Grimmett et al. (2011) and Manakadan et al. (2011) will be used.

Some physico-chemical parameters of water will be carried out by following the methods as described and employed by Thacker et al. (2007) and Manikannan (2011). Multiple regression equation models were used to investigate the influence of physico-chemical characteristics on the bird species (Manikannan, 2011). The morphology, behavior, natural history, diversity and population dynamics were the vast subjects which will be studied in present work in different ways such as abundance, richness and breeding. Major drivers impacting the ecosystems in general and avifauna in particular were identified from study area and assessed with respect to the conservation goals.

Observation:

Table -1. Checklist of Avifauna in Kanhalgaon, Shivnala and Wahi Lakes in Paoni Tehsil

Sr. No.	Orders/Family	Scientific name	Common name	Habit	Kanhal gaon lake	Shivnala lake	Wahi lake
1.	Anasiformes/ Anatidae	*Anas poecilorhynca*	Spot Bill Duck	**WV**	+	+	+
2.	Anasiformes/ Anatidae	*Todorna ferruginea*	Bramhiny Shelduck	**WV**	+	+	+
3.	Anasiformes/ Anatidae	*Anas clypeata*	Northern pintail	**WV**	+	+	+
4.	Anasiformes/ Anatidae	*Sarkidornis melanotos*	Comb Duck	**WV**	+	+	-
5.	Anasiformes/ Anatidae	*Nettapus coromandelianus*	Cotton teal	**R**	+	+	+
6.	Charadriformes /charadridae	*Vanellus indicus*	Red wattled lapwig	**R**	+	+	-
7	Charadriformes /Recurvirostridae	*Himantopus himantopus*	Black winged stilt	**R**	+	+	+
8.	Charadriformes /Scolopacidae	*Actitishypo leucos*	Common sandpiper	**RM**	+	+	+
9.	Ciconiformes /Ardeidae	*Bubulcus ibis*	Cattle egret	**RM**	+	+	+
10.	Ciconiformes /Ardeidae	*Ardea cineria*	Grey heron	**RM**	+	+	+
11.	Ciconiformes /Ciconidae	*Ephippiorhyrichos asiaticus*	Black necked stork	**WV**	+	+	+
12.	Ciconiformes /Ardeidae	*Casmerodilus albus*	Large Egret	**RM**	+	+	+
13.	Ciconiformes /Ciconidae	*Anastomus osciatans*	Asian open bill stork	**R**	+	+	+
14.	Ciconiformes /Ciconidae	*Mycteria leucocephala*	Painted stork	**WV**	+	+	+
15.	Ciconiformes/Threskiornithidae	*Pseudibis papillosa*	Black ibis	**RM**	+	+	+
16.	Ciconiformes /Ardeidae	*Aredeola grayii*	Indian pond heron	**R**	+	+	+
17.	Columbiformes /Columbidiae	*Strepto peliachinensis*	Spotted dove	**R**	+	+	+
18.	Coraciformes /Alcedinidae	*Alcedo attkis*	Small bluekingfisher	**RM**	+	+	+
19.	Coraciformes/Coraciidae	*Coracias beghalensis*	Indian roller	**RM**	+	+	+
20.	Coraciformes /Alcedinidae	*Halyconus myrnesis*	White breasted kingfisher	**R**	+	+	-

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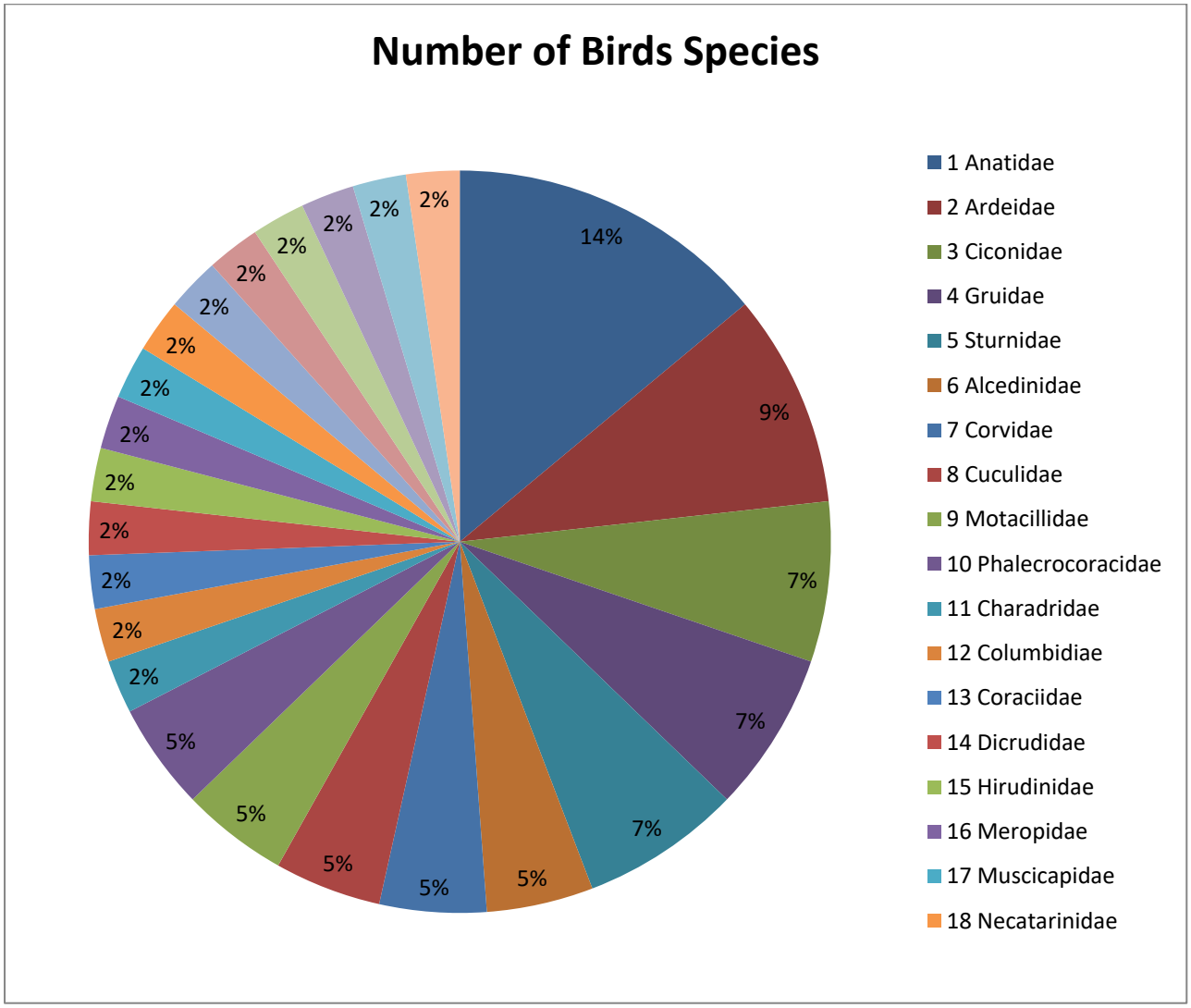
21.	Coraciformes /Meropidae	*Merops orientalis*	Small green bee eater	**R**	+	+	+
22.	Coraciformes /Upupidae	*Upupa epops*	Common Hoopoe	**R**	+	+	+
23.	Falcaniformes /Anatidae	*Milvus migrans*	Black kite	**R**	+	-	-
24.	Galliformes /Gruidae	*Amauromis phoenicurus*	White breasted water hen	**R**	+	+	+
25.	Galliformes /Gruidae	*Porphyrio porphyrio*	Purple swampheae	**R**	+	+	-
26.	Galliformes /Gruidae	*Fulica atra*	Common coot	**RM**	+	+	-
27.	Passeriformes /Necatarinidae	*Cinnyris asiaticus*	Purple sunbird	**R**	+	+	+
28.	Passeriformes /Passeridae	*Hydrophaslanus chirurgus*	Pheasant tailed jacana	**R**	+	+	-
29.	Passeriformes /Muscicapidae	*Soxicolodies fulicatus*	Indian robin	**R**	+	+	+
30.	Passeriformes /Sturnidae	*Acridothere stristis*	Common myna	**R**	+	+	+
31.	Passeriformes /Pycnonotidiae	*Pycnomotus cafer*	Red vented bulbul	**R**	+	+	+
32.	Passeriformes /Dicrudidae	*Dicrurus macrocercus*	Black drongo	**R**	+	+	+
33.	Passeriformes /Sturnidae	*Starnia pagodarum*	Bramhiny starling	**R**	+	+	+
34.	Passeriformes /Hirudinidae	*Hirundo rustica*	Common swallow	**R**	+	+	+
35.	Passeriformes /Corvidae	*Corvus macrorhyncous*	Jungal crow	**R**	+	+	-
36.	Passeriformes /Motacillidae	*Motacilla alba*	White wagtail	**WV**	+	+	-
37.	Passeriformes /Motacillidae	*Motacillacinerea*	Grey wagtail	**WV**	+	+	+
38.	Passeriformes /Sturnidae	*Sturmus contra*	Pied myna	**R**	+	+	+
39.	Passeriformes	*Corvus splendens*	House crow	**R**	+	+	+

	/Corvidae						
40.	Pelecaniformes /Phalecrocoracidae	*Phalacrocoraxniger*	Little cormorant	**R**	+	+	+
41.	Pelecaniformes /Phalecrocoracidae	*Phalacro coraxfusicollis*	Indian cormorant	**R**	+	+	+
42.	Psittaciformes /Cuculidae	*Eudynamys scolopaceus*	Asian koel	**R**	+	+	+
43.	Psittaciformes /Cuculidae	*Centropus sinensis*	Greater coucul	**R**	+	-	-

Sr.No.	Family	Number of Birds Species
1	Anatidae	6
2	Ardeidae	4
3	Ciconidae	3
4	Gruidae	3
5	Sturnidae	3
6	Alcedinidae	2
7	Corvidae	2
8	Cuculidae	2
9	Motacillidae	2
10	Phalecrocoracidae	2
11	Charadridae	1
12	Columbidiae	1
13	Coraciidae	1
14	Dicrudidae	1
15	Hirudinidae	1
16	Meropidae	1
17	Muscicapidae	1
18	Necatarinidae	1
19	Passeridae	1
20	Pycnonotidiae	1
21	Recurvirostridae	1

22	Scolopacidae	1
23	Threskiornithidae	1
24	Upupidae	1

Table-2.Avian fauna species with families from Kanhalgaon,Shivnala amd Wahi lakes .



Observations:

The water of lakes is primarily used for washing, fishing, agriculture irrigation and cattle bathing activities by the villagers. The lake contains large number of aquatic weed in submerged as well as in floating state which attracts and nourishes large number of living organisms the periphery of the lake has of 08 species were observed in winter season. In monsoon 35 species and in summer season. In the present study maximum richness was recorded during rainy season. It is quite significant that the distribution and occurrence of avifauna

appears to be related to the local vegetation patterns Photographs of birds mentioned in plates which are taken in various seasons.

Additionally, (Figure 1) displays the species representation by family at all these three lakes. The most number of bird species found in the wetlands habitat belong to the families Anatidae, Ardeidae, Criconidae ,Gruidae , and Sturnidae, which includes woods, grassland, rice fields, and open habitat. Their propensity for food and foraging is what led to their large population. Near water bodies, the majority of the species are tiny, lush green grasses from Wardha reservoir Morshi, Amravati, Maharashtra There were other frequent visitors that were located in the marshes and that favoured fish as their main food source. Thus, their existence in the two lakes under study is reasonable abundant number of tress and crops which provide suitable habitat for birds.In the present study Kanhalgaon,Shivnala and Wahi lakes avian fauna total of forty three species of birds belonging twenty four families have been recorded (Table-2) .

It appears that this area could be taken into account in future research and conservation efforts. Kanhalgaon,Shivnala and Wahi lakes are known to have a diverse range of birds. It appears that birds utilize this space as a passageway. Some birds were polyphagous in their diet, whereas others were monophagous. Given that many bird species rely on the lakes as their primary source of food, this illustrates the need of protecting every area within them. Both lakes retain a high degree of biological diversity even if most species become more homogenized as a result of expansion, with some becoming noticeably more common than others. The importance of the green space in preserving the biological balance in both lakes is highlighted by this study.

Species Distribution

Kanhalgaon Lake and Shivnala Lake have the highest species richness, with only the Black Kite (*Milvus migrans*) being absent from Shivnala Lake, and the Greater Coucal (*Centropus sinensis*) being absent from Shivnala Lake (and both absent from Wahi Lake). All other 41 species are present in both Kanhalgaon and Shivnala Lakes.

Wahi Lake has the lowest species richness, with 11 species being absent:

- Comb Duck (*Sarkidornis melanotos*)
- Red Wattled Lapwing (*Vanellus indicus*)
- White Breasted Kingfisher (*Halcyonus myrnesis*)
- Black Kite (*Milvus migrans*)
- Purple Swamphen (*Porphyrio porphyrio*)
- Common Coot (*Fulica atra*)
- Pheasant Tailed Jacana (*Hydrophaslanus chirurgus*)
- Jungle Crow (*Corvus macrorhyncous*)
- White Wagtail (*Motacilla alba*)
- Greater Coucal (*Centropus sinensis*)
- Northern Pintail (*Anas clypeata*)

Habit and Presence

- All **10 Winter Visitor (WV)** species are present in Kanhalgaon and Shivnala Lakes, but **2 are absent from Wahi Lake** (*Comb Duck* and *White Wagtail*).

- All **6 Resident Migrant (RM)** species are present across all three lakes.
- Of the **27 Resident (R)** species, **9 are absent from Wahi Lake**, while only 2 are noted as absent from the other two (Black Kite and Greater Coucal are only in Kanhalgaon).

Conclusion

The data suggests that Kanhalgaon Lake and Shivnala Lake are significantly more diverse and ecologically stable in supporting the documented avian population compared to Wahi Lake. The high species commonality between Kanhalgaon and Shivnala (41 out of 43 species) indicates a very similar and rich habitat structure.

The greater number of absences in Wahi Lake, particularly of waterfowl (Comb Duck, Common Coot, Purple Swamphen) and waders (Red Wattled Lapwing, Pheasant Tailed Jacana), indicates that Wahi Lake may have poorer habitat quality, less suitable foraging areas (like shallower water or less vegetation), or greater disturbance compared to the other two lakes. This difference is consistent across resident, resident migrant, and winter visitor groups, suggesting a year-round deficiency in the Wahi Lake habitat.

Result

Kanhalgaon Lake and Shivnala Lake exhibit the highest avian diversity (43 and 41 species, respectively) and habitat suitability for the recorded species, while Wahi Lake exhibits lower diversity (32 species) and habitat support. The two most widely distributed species are the Spot Bill Duck (*Anas poecilorhyncha*), Bramhiny Shelduck (*Tadorna ferruginea*), and Northern Pintail (*Anas clypeata*). The rarest species, in terms of lake presence, are the Black Kite and the Greater Coucal, each only found in Kanhalgaon Lake among the 43 species listed.

Common coot	Comb duck	Northern pintail
(Fulica atra)	*(Sarkidornis melanotous)*	*(Anas clypeata)*

Greater coucal (*Centropus sinensis*) | Black headed ibis (*Pseudibis papillosa*) | Indian carmorant (*Phalacro coraxfusicollis*)

Cattle egret (*Bubulcus ibis*)

Plate -1.Photographs were taken from the study Area

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