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Winter Season Avifauna of Fish Pond – A Special Habitat of Kumbhalgarh Wildlife Sanctuary, Rajasthan, India

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Abstract: Winter avifauna of Fish Pond of Kumbhalgarh wildlife sanctuary was studied for 4 winter seasons starting from winter 2019-20 to winter 2023-24. During study total 103 bird species were observed. Highest 102 bird species were observed in winter 2023-24 followed by 94 in winter 2022-23, 86 in winter 2021-22, and 75 in winter 2020-21. Highest Shannon Diversity Index was in winter 2023-24 (4.162) followed by winter 2022-23 (4.014), winter 2021-22 (3.893) and winter 2020-21 (3.687). Fish pond is well conserved and maintained by villagers which is helping in habitat conservation and ultimately more bird species are inhabiting the Fish Pond.

Keywords: Bird Diversity, Winter Avifauna, Kumbhalgarh Wildlife Sanctuary, Hamer Pal

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Introduction

Wetlands are transitional areas between terrestrial and aquatic ecosystems where the water table is at or near the surface of the earth or where land is covered by shallow water (Mitsch and Gosselink, 1986). Wetlands are among the world's most productive ecosystems, playing important roles in flood regulation, groundwater recharge, nutrient uptake, and erosion control. Additionally, wetlands are home of a wide variety of wildlife, including birds, mammals, fish, frogs, insects, and plants (Buckton, 2007). Wetlands

contribute in the conservation of biodiversity of plants and animals. In India wetlands cover an area of 582000 Km² (Prasad *et al.*, 2002). Ali and Ripley (1987) and Manakandan and Pittie (2001) reported 1340 bird species and out of them 310 species are wetland-dependent (Kumar *et al.*, 2005). Wetlands in India, like other wetlands, are subject to enormous anthropogenic pressures (Prasad *et al.*, 2002), which can significantly impact the structure of bird communities (Kler, 2002; Verma *et al.*, 2004; Reginald *et al.*, 2007).

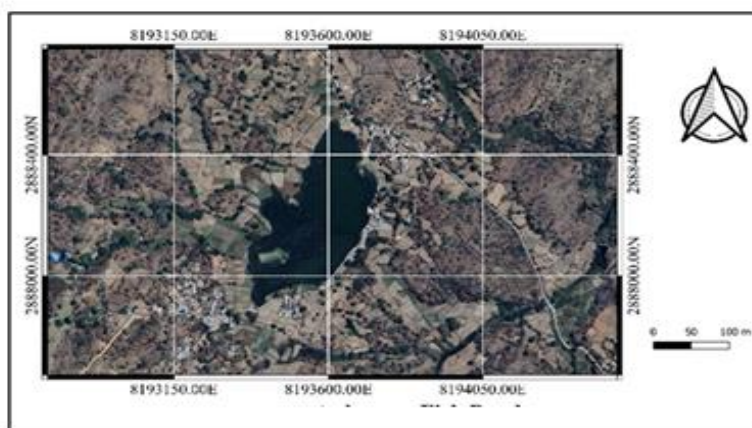


Fig. 1: Fish pond –study area.

Birds are among the best monitors of environmental fluctuations, they have been used to evaluate the environment throughout the history as bioindicators and the changes in their population, behavior pattern and reproductive ability have most often been used to inspect the long-term effects of habitat fragmentation (Harisha and Hosetti, 2009). Fish pond located under Kumbhalgarh Wildlife Sanctuary (KWLS) have a numerous microhabitats like road habitat, rural, ecotourism site, agricultural and wetland habitat which makes it a special habitat for birds and their ecological requirements. In current study winter season bird diversity of fish pond (located in Kumbhalgarh Wildlife Sanctuary) is studied.

Materials and Methods

Fish Pond (Fig. 1) is located in the famous Kumbhalgarh Wildlife Sanctuary, which is located in Rajsamand, Pali and Udaipur districts of Rajasthan, India. Fish Pond named due to the presence of big African cat fishes (*Clarias gariepinus*); it is also known as Hamer Pal Lake locally as it was made by ruler Rana Hammir Singh. It is spread over 25°6'14.22"N to 25°5'55.92"N Latitude and 73°36'7.98"E to 73°36'20.32"E Longitude. It is a seasonal water body with good area of wetland. It has different type of habitats around it namely road habitat, rural, agricultural, wetland habitat and it is also an

ecotourism site. Bird species data was collected for the whole winter season for each year from 2020 to 2024. Observations were taken in early morning and in evening. Bird still photographs were taken by Canon 700D camera and 150-500mm lens. Later photos were used to identify the species using standard field guides. Also, Covid-19 protocols were strictly followed during the field visits.

Results and Discussion

During this study a total of 7654 birds individuals of 19 orders were recorded from the Fish Pond in 4 wintering seasons (Table 1). Highest individuals were recorded in winter 2023-24 (2479), followed by winter 2022-23 (2023), winter 2021-22 (1729), and winter 2020-2021 (1423) (Fig. 2). Order Passeriformes has highest 2691 bird individuals whereas order Piciformes has just 8 bird individuals. Highest bird species were observed in winter 2023-24 (102 bird species) and lowest in winter 2020-21 (75 bird species). Shannon Diversity Index was in the following decreasing order – winter 2023-21 (4.162), winter 2022-23 (4.162), winter 2021-22 (3.893), and winter 2020-21 (3.687) (Table 2; Fig. 3); this indicates that habitat condition is improving with time and getting more favorable to other species also. Fish pond is well conserved by the villagers as they maintain water levels by filling Fish Pond through canal from a nearby pond named

Table 1: Bird species observed during different winter seasons in the study area

S. No.	BIRD SPECIES NAME	WINTER 2020-21	WINTER 2021-22	WINTER 2022-23	WINTER 2023-24
Order: Accipitriformes					
1	<i>Neophron percnopterus</i> (Egyptian vulture)	0	2	4	4
2	<i>Spilornis cheela</i> (Crested Serpent Eagle)	0	0	0	2
3	<i>Pernis ptilorhynchus</i> (Oriental Honey-buzzard)	0	0	1	2
Order: Anseriformes					
4	<i>Dendrocygna javanica</i> (Lesser Whistling-Duck)	12	17	25	29
5	<i>Tadorna ferruginea</i> (Ruddy Shelduck)	0	5	9	14
6	<i>Sarkidiornis melanotos</i> (Comb Duck)	11	15	31	45
7	<i>Nettion coromandelianus</i> (Cotton Pygmy-Goose)	14	21	28	35
8	<i>Anser indicus</i> (Bar-headed Goose)	0	11	9	16
9	<i>Anas strepera</i> (Gadwall)	10	12	11	16
10	<i>Anas poecilorhynchos</i> (Spot-billed Duck)	14	18	9	21
11	<i>Anas clypeata</i> (Northern Shoveller)	9	11	15	19
12	<i>Anas acuta</i> (Northern Pintail)	15	23	24	32
13	<i>Anas querquedula</i> (Garganey)	10	14	12	16
14	<i>Anas crecca</i> (Common Teal)	0	8	0	9
15	<i>Aythya ferina</i> (Common Pochard)	149	150	152	157
16	<i>Aythya fuligula</i> (Tufted pochard)	12	21	28	34
Order: Bucerotiformes					
17	<i>Ocyrops birostris</i> (Indian Grey Hornbill)	12	14	16	18
18	<i>Upupa epops</i> (Common Hoopoe)	0	4	12	15
Order: Caprimulgiformes					
19	<i>Apus affinis</i> (House Swift)	12	15	16	19
Order: Charadriiformes					
20	<i>Limosa limosa</i> (Black-tailed Godwit)	0	0	2	2
21	<i>Tringid totanus</i> (Common Redshank)	14	18	35	42
22	<i>Tringid stagnatilis</i> (Marsh Sandpiper)	0	0	2	3
23	<i>Tringid nebularia</i> (Common Greenshank)	17	22	29	36
24	<i>Actitis hypoleucos</i> (Common Sandpiper)	19	28	31	38
25	<i>Himantopus himantopus</i> (Black-winged Stilt)	55	45	68	65
26	<i>Vanellus indicus</i> (Red-wattled Lapwing)	41	40	43	49
27	<i>Sterna aurantia</i> (River Tern)	12	15	19	23
Order: Ciconiiformes					
28	<i>Ciconia episcopus</i> (Woolly-necked Stork)	0	0	2	5
29	<i>Mycteria leucocephala</i> (Painted Stork)	0	0	0	3
30	<i>Anastomus oscitans</i> (Asian Open-billed Stork)	1	1	3	5
Order: Columbiformes					
31	<i>Columba livia</i> (Rock Pigeon)	166	169	172	181
32	<i>Streptopelia senegalensis</i> (Laughing Dove)	25	35	34	45
33	<i>Streptopelia chinensis</i> (Spotted dove)	18	19	22	27
34	<i>Treron phoenicoptera</i> (Yellow-legged Green Pigeon)	24	28	31	35
Order: Coraciiformes					
35	<i>Coracias garrulus</i> (European Roller)	0	2	2	5
36	<i>Coracias benghalensis</i> (Indian Roller)	1	3	4	7
37	<i>Alcedo hercules</i> (Common Kingfisher)	0	0	0	2
38	<i>Halcyon smyrnensis</i> (White-throated Kingfisher)	2	2	3	5
39	<i>Ceryle rudis</i> (Pied Kingfisher)	0	2	2	4
40	<i>Merops orientalis</i> (Green Bee-eater)	52	59	67	69
Order: Cuculiformes					
41	<i>Eudynamis scolopacea</i> (Asian Koel)	0	11	11	13
42	<i>Centropus sinensis</i> (Greater Coucal)	12	11	0	13
Order: Galliformes					
43	<i>Pavo cristatus</i> (Indian Peafowl)	5	11	15	18
44	<i>Perdica argoondah</i> (Rock Bush Quail)	0	0	0	3
Order: Gruiformes					

45	<i>Amaurornis phoenicurus</i> (White-breasted Waterhen)	5	6	14	19
46	<i>Gallinula chloropus</i> (Common Moorhen)	4	5	8	13
47	<i>Fulica atra</i> (Common Coot)	18	21	26	31
48	<i>Porphyrioporphyrus</i> (Purple Swamphen)	5	8	14	19
Order: Passeriformes					
49	<i>Dendrocitta vagabunda</i> (Rufous Treepie)	15	16	18	21
50	<i>Corvus splendens</i> (House Crow)	32	36	39	42
51	<i>Oriolus oriolus</i> (Eurasian Golden Oriole)	0	0	3	4
52	<i>Pericrocotus cinnamomeus</i> (Small Minivet)	0	2	5	6
53	<i>Rhipidura aureola</i> (White-browed Fantail Flycatcher)	2	3	4	7
54	<i>Dicrurus macrocercus</i> (Black Drongo)	42	48	49	52
55	<i>Dicrurus caeruleus</i> (White-bellied Drongo)	10	16	18	22
56	<i>Copsychus saularis</i> (Oriental Magpie Robin)	12	13	15	18
57	<i>Saxicoloides fulicata</i> (Indian Robin)	13	14	18	21
58	<i>Phoenicurus ochruros</i> (Black Redstart)	0	0	0	4
59	<i>Saxicola torquata</i> (Common Stonechat)	9	11	12	18
60	<i>Saxicola caprata</i> (Pied Bushchat)	4	6	9	16
61	<i>Sturnus pagodarum</i> (Brahminy Starling)	8	12	16	18
62	<i>Acridotheres tristis</i> (Common Myna)	16	22	28	31
63	<i>Acridotheres ginginianus</i> (Bank Myna)	11	19	25	31
64	<i>Hirundo smithii</i> (Wire-tailed Swallow)	25	26	29	33
65	<i>Pycnonotus cafer</i> (Red-vented Bulbul)	40	46	52	68
66	<i>Priniasocialis</i> (Ashy Prinia)	0	0	5	6
67	<i>Prinia inornata</i> (Plain Prinia)	10	13	16	18
68	<i>Zosterops palpebrosus</i> (Oriental White-eye)	0	0	0	20
69	<i>Orthotomus sutorius</i> (Common Tailorbird)	6	8	15	22
70	<i>Phylloscopus griseolus</i> (Sulphur-bellied Warbler)	9	12	16	23
71	<i>Chrysomastix inornata</i> (Yellow-eyed Babbler)	12	15	18	28
72	<i>Nectarinia asiatica</i> (Purple Sunbird)	120	133	136	152
73	<i>Passer domesticus</i> (House Sparrow)	22	26	28	31
74	<i>Motacilla flava</i> (Yellow Wagtail)	6	8	12	16
75	<i>Anthus rufus</i> (Paddyfield Pipit)	12	14	18	18
76	<i>Ploceus philippinus</i> (Baya Weaver)	7	11	19	25
77	<i>Melophus lathami</i> (Crested Bunting)	4	8	9	15
78	<i>Corvus macrorhynchos</i> (Jungle Crow)	15	16	17	17
79	<i>Machlolophus aplonotus</i> (Indian Yellow Tit)	0	11	12	12
80	<i>Machlolophus nuchalis</i> (White-naped Tit / Pied Tit)	2	3	3	5
81	<i>Argya striata</i> (Jungle Babbler)	7	11	13	14
82	<i>Argya caudata</i> (Common Babbler)	14	21	21	35
83	<i>Argya malcolmi</i> (Large Grey Babbler)	0	0	12	12
84	<i>Corvus corax</i> (Common Raven)	2	2	4	7
Order: Pelecaniformes					
85	<i>Egretta garzetta</i> (Little Egret)	9	7	10	12
86	<i>Casmerodius albus</i> (Great Egret)	6	5	8	10
87	<i>Mesophoyx intermedia</i> (Intermediate Egret)	4	3	6	8
88	<i>Bubulcus ibis</i> (Cattle Egret)	4	6	8	11
89	<i>Ardeola grayii</i> (Indian Pond Heron)	2	5	8	13
90	<i>Ardea purpurea</i> (Purple heron)	0	2	3	5
91	<i>Threskiornis melanocephalus</i> (Black-headed Ibis)	3	5	8	9
92	<i>Plegadis falcinellus</i> (Glossy Ibis)	0	0	2	3
93	<i>Platalea leucorodia</i> (Eurasian Sponbill)	5	18	22	25
Order: Piciformes					
94	<i>Dinopium benghalense</i> (Black-rumped Flameback Woodpecker)	0	0	1	4
95	<i>Megalaima haemacephala</i> (Coppersmith Barbet)	0	0	0	1
96	<i>Megalaima zeylanica</i> (Brown-headed Barbet)	1	0	1	0
Order: Podicipediformes					
97	<i>Tachybaptus ruficollis</i> (Little Grebe)	36	43	55	68
Order: Psittaciformes					
98	<i>Psittacula krameri</i> (Rose-ringed Parakeet)	24	21	23	28
99	<i>Psittacula cyanocephala</i> (Plum-headed Parakeet)	45	62	59	65
Order: Pteroclidiformes					

100	<i>Pterocles indicus</i> (Painted Sandgrouse)	4	6	9	14
Order: Strigiformes					
101	<i>Athene brama</i> (Spotted Owllet)	2	2	4	4
Order: Suliformes					
102	<i>Anhinga melanogaster</i> (Darter)	0	3	2	6
103	<i>Phalacrocorax fuscicollis</i> (Indian Cormorant)	15	17	19	22

Table 2: Winter diversity and number of species during 2020-2024

	WINTER 2020-21	WINTER 2021-22	WINTER 2022-23	WINTER 2023-24
No. of Species	75	86	94	102
Individuals	1423	1729	2023	2479
Simpson Diversity	0.9564	0.9657	0.9712	0.9762
Shannon Diversity Index	3.687	3.893	4.014	4.162

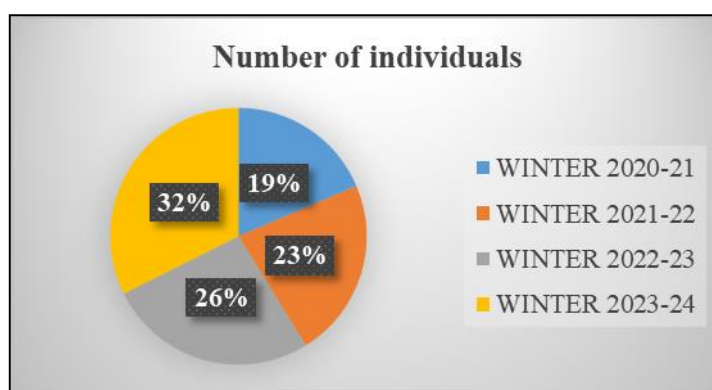


Fig. 2: Number of bird individuals during 2020-2024.

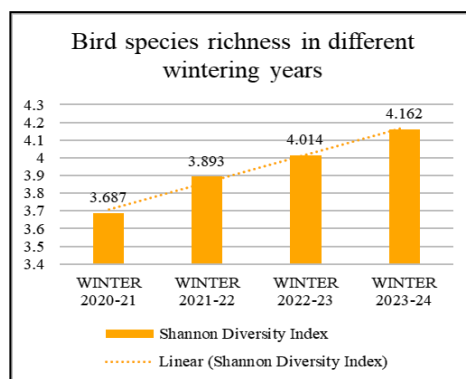


Fig. 3: Bird species richness from 2020-2024 during winter season.

Lakhela Talab and villagers also prohibit fishing and other irrelevant activities around the Fish Pond.

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Conflict of Interest

The authors declare no conflicts of interest.

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