



Research Paper

**PRELIMINARY SURVEY OF AVIFAUNA FROM AGROFOREST ECOSYSTEM
OF DEV TALAV, NAGBHID (MAHARASHTRA), INDIA**

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Abstract

The present study was undertaken to explore species diversity of birds, seasonal abundance of birds and their migratory pattern in and around the study area. The study area, Dev Talav (Pond) near Nagbhid (20°33'02.27"N and longitude 79°39'02.27"E) is a water reservoir, located within the newly approved Ghodazari Sanctuary by Government of Maharashtra. It presents unique geographical site having mountaneous dry deciduous tropical forest, dominated by teak *Tectona grandis* and bamboo *Dendrocalamus strictus*, interspersed with meadows and paddy cultivations. It presents unique geographical site having mountaneous tropical forest range bounding Ghodazari Lake from three sides and Paddy fields on another side. A total of around 105 avian species belonging to 48 families 16 orders were recorded during Jan, 2015 to Dec. 2017. The species recorded included 6 Migrant (M), 32 Passage Migrant (PM) and 69 Residents (R). Among these Orders, Passeriformes is richest orders in terms of avian species diversity, represented by 52 species while families Ardeidae, Accipitridae, Sturnidae and Muscicapidae are found predominant. Present study will help in designing conservation strategy as this agro-forest ecosystem posing threatened by forest grazing, forest fires during summer, poaching of birds and man-animal conflict and hence require immediate attention.

Key words: Avian, Bio-indicator, Diversity, Passeriformes, Muscicapidae.

INTRODUCTION

Birds are widespread in their occurrence, almost found everywhere in the world. Bird families and genera have broad geographical ranges, yet many individual species are specialized in their requirements and have narrow distributions. The variety of avian species in ecosystems reflects the well being of its habitat. Birds are likely to work better as biodiversity indicator taxa in terrestrial habitats than in either

freshwater or marine habitats. As the birds are the indicators of environment hence used for conservation and environmental impact assessment (Gregory, *et al.*, 2003). The India checklist acknowledges a total of 1263 species of birds for India, constituting about 12% of the world avifauna (Pravin *et al.*, 2016). Bird communities have been studied fairly well both in temperate and tropical forests (Abdulali, 1981; Islam & Rahmani, 2004; Acharya, *et al.*, 2010; Kasambe *et al.*, 2016; Pravin, *et al.*, 2016)

According to the Forest Research Institute, Maharashtra State comprises, 20 IBA sites (Important Bird Areas) have been identified, in which seven are wildlife sanctuaries; four are national parks, and nine non-protected areas. The forest area of the State is 6.38 million ha, constituting 20.75% of its geographical area. Reserved forest constitutes 76%, protected forest 14% and unclassified forest 10%. There are six national parks and 36 wildlife sanctuaries in the State, covering 4.68% of the State (ENVIS, 2018). There are six tiger reserves, namely Melghat, Pench, Sahyandri, Navegaon-Nagzira, Bor and Tadoba-Andhari Tiger Reserve (ENVIS, 2018). Abdulali (1981) listed 540 species of birds from Maharashtra. Two biomes are found in Maharashtra, the Indian Peninsula Tropical Moist Forest (Biome-10) in the Western Ghat region, and Indo-Malayan Tropical Dry Zone (Biome-11) in the remainder of the State. (ENVIS, 2018). Past studies documented bird community of Maharashtra, mostly in Western Ghat, (Gole, 2000; Kumbhar and Ghatge, 2014; Kasambe, *et al.*, 2015), Marathwada, (Balkhande, *et al.*, 2012) and in Vidarbha by Chitampally, 1993; Wagh, *et al.*, 2015; Bayani & Dandekar, 2017).

Most of the study pertaining to diversity of avifauna in this eastern part of the Vidarbha (Maharashtra) carried out in protected forests like Tadoba-Andhari Tiger Reserve, Nagzira Wildlife Sanctuary and Umred Karhandla . The study area, Dev Talav (Lake), located within the newly declared Ghodazari Sanctuary in Maharashtra. The study area had been in media during last decade due to man-wild conflict which resulted in the casualties inflicted by wild animals like tiger, leopard and wild boar on human life, keeping in view, it is approved by Government of Maharashtra as Ghodazari Sactuary. Hence this study has been undertaken to explore rich avifauna of this unexplored habitat.

MATERIAL AND METHOD

Study area

The study site ($20^{\circ}33'N$ to $20^{\circ}35'N$ and longitude $79^{\circ}39'2E$ to $79^{\circ}39'4E$) spreads over an area of 10 Km² located near Nagbhid, taluka level town in Eastern part of Vidarbha of Maharashtra State. It is situated in the vicinity of the buffer zone of Tadoba National Park.

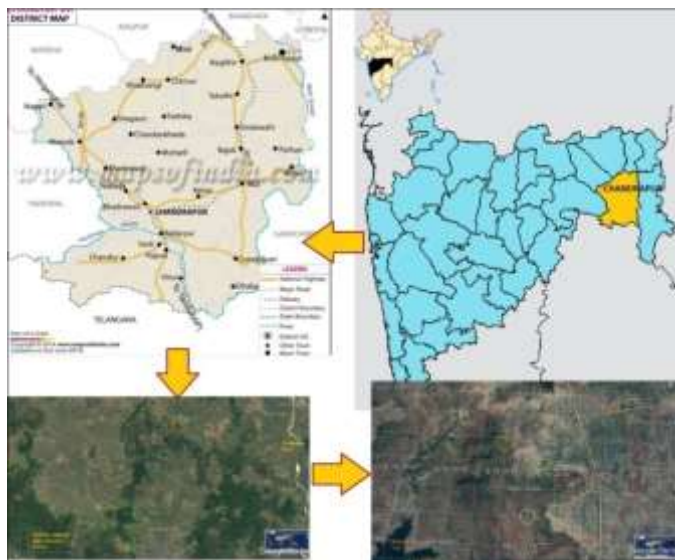


Fig. 1. Study area in Maharashtra. Four sampling sites in study are shown by circles in the map.

Bird Sampling

Preliminary bird survey of bird community was carried out during Jan, 2015 to Dec. 2017. The avian survey was conducted in 10 sq. km perimeter by monthly visit to the study area. Four sampling sites with radius of 500m had been randomly selected in the study area. (Table.1) according to point transect method for sampling of birds. (Bibby *et al.* 2000) According four point clusters, observation of birds was done by Olympus 118760 10x50 DPSI Wide-Angle Binocular and wherever possible photographed by digital camera Canon EOS 200D. The identification of birds was done as per the photographic guides to the birds of India (Ali and Ripley, 2001; Grimmett *et al.*, 2011). Qualitative data on threats to vegetation and birds were also gathered throughout the study period.

Data Analysis

The bird list (Appendix Tables 1 & 2) was compiled based on present observations as well as check list of birds, Praveen *et al.*, (2016). All individual sightings of birds from each transect were counted and bird species were ranked according to following abundance categories: 1 = rare (1 - 5 sightings), 2 = common (6 - 25 sightings), 3 = abundant (26 - 100 sightings) and 4 = very abundant (> 100 sightings). Similarly, birds were also categorized according to their feeding guilds and migratory status based on bird observation guides, Ali & Ripley (2001); Grewal. *et al.*, (2002); Grimmett *et al.*, (2011) and field observations.

RESULTS

In the present survey, total 105 species of avifauna, representing 16 orders and 48 families are recorded during the study period. Migratory status shows that 69 are residents (R), 32 Passage Migrants (PM) and 6 are Breeding Migrants (M) (Fig. 2). Foraging guild of birds in the study area indicates dominance of insectivorous birds, followed by omnivorous, grainivorous, frugivorous, piscivorous and carnivorous birds while herbivorous and nectarivorous birds are very few. (Fig.3)

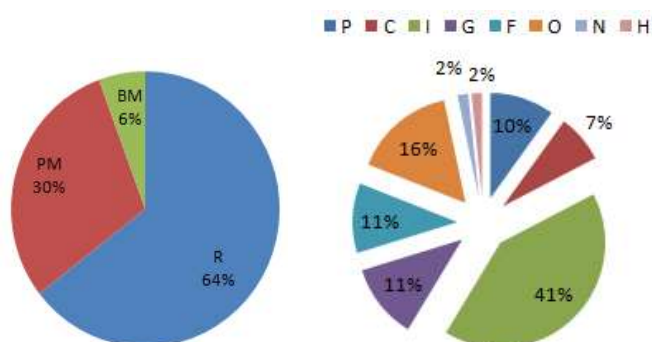


Fig.2. Graph showing migratory status of bird community

Fig.3. Graph showing dietary pattern of bird community

Maximum abundance recorded from Order - Passeriformes with 49.50% of total avian species represented by 52 species belonging 23 families. Maximum abundance noted from Fam-Muscicapidae represented by 8 species followed by Fam-Ardeidae and Sturniidae. Conservation status of bird community of study area indicates that only one bird, Black Headed Ibis (*Threskiornis melanocephalus*) is placed in Near Threatened (NT) category, while all other birds are Least Concern (LC) category as per IUCN list. Checklist of bird community in the study area is prepared on the basis bird field guides of Ali & Ripley, 2001; Grewal, *et al.*, (2002); Grimmett, *et al.*, (2011) and India check list

by Pravin, *et al.*, (2016), eBird (2017) and Bird Life International (2018). (Appendix Table.1)

Table 1. Bird species recorded in and around DevTalav (Pond), Maharashtra, India Jan, 2014 to Dec. 2016.

Sr. No.	Common Name	Zoological Name	Season	A	IUCN Status	FG	M
Ord – Ciconiiformes							
Fam - Ciconiidae							
1	Asian Openbill	<i>Anastomus oscitans</i>	MN	+++	LC	P,C	PM
Ord – Peliconiiformes							
Fam - Ardeidae							
2	Grey Heron	<i>Ardea cinerea</i>	WN	+	LC	P	M
3	Indian Pond Heron	<i>Ardea grayii</i>	AL	+++	LC	P	R
4	Cattle Egret	<i>Bubulcus ibis</i>	AL	++++	LC	I	R
5	Little Egret	<i>Egretta garzetta</i>	MN	+++	LC	P	R
6	Intermediate Egret	<i>Ardea intermedia</i>	MN	++	LC	P,I	PM
Fam - Threskiornitidae							
7	Red Naped Ibis	<i>Pseudibis papillosa</i>	AL	+++	LC	P,C,I	PM
8	Black Headed Ibis	<i>Treskiornis melanocephalus</i>	WN	++	NT	P	M
9	Little Cormorant	<i>Phalacrocorax niger</i>	AL	+++	LC	P	R
Ord – Accipitriformes							
Fam - Accipitridae							
10	Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>	WN	++	LC	I	M
11	Shikra	<i>Accipiter badius</i>	AL	++++	LC	C	R
12	Black winged Kite	<i>Elanus caeruleus</i>	WN	+++	LC	C	R
13	Black Kite	<i>Milvus migrans</i>	AL	++	LC	C	R
14	Bramhiny Kite	<i>Haliastur indus</i>	AL	++	LC	C	R
Ord – Gruiformes							
Fam - Rallidae							
15	Waterhen	<i>Amaurornis phoenicurus</i>	AL	++	LC	O	R
16	Eurasian Coot	<i>Fulica atra</i>	WN	+++	LC	O	M
17	Common Moorhen	<i>Gallinula chloropus</i>	AL	++	LC	O	R
Ord – Gulliformes							
Fam - Phasianidae							
18	Peafowl	<i>Pavo cristatus</i>	AL	+++	LC	G	R
19	Grey Francolin	<i>Francois pondicerianus</i>	AL	++	LC	G	R
20	Lesser Whistling duck	<i>Dendrocygna javanica</i>	WN	+++	LC	O	R
21	Indian spot billed duck	<i>Anas poecylorhynchos</i>	AL	+++	LC	O	PM
Ord – Apodiformes							
Fam - Apodidae							
22	House Swift	<i>Apus nipalensis</i>	AL	++++	LC	I	R
23	Asian Palm Swift	<i>Cypsiurus balasorensis</i>	AL	++	LC	I	R
Ord – Charadriiformes							
Fam - Charadriidae							
24	Red Wattled Lapwing	<i>Vanelius indicus</i>	AL	++++	LC	I	R
25	Little Ringed Plover	<i>Charadrius dubios</i>	WN	++	LC	I	PM
Fam - Turnicidae							
26	Jungle Bush Quail	<i>Purdicula asiatica</i>	AL	++	LC	I,G	R
27	Rain Quail	<i>Coturnix coromandelica</i>	AL	+++	LC	I,G	R
Fam - Scolopacidae							
28	Wood Sandpiper	<i>Tringa glareola</i>	WN	++	LC	I	PM
Fam - Recurvirostridae							
29	Black Winged Stilt	<i>Himantopus himantopus</i>	WN	++	LC	P,C,I	M
Ord – Columbiformes							

Fam - Columbidae								
30	Laughing Dove	<i>Spilopelia senegalensis</i>	WN	+++	LC	G,F	R	
31	Blue Rock Pigeon	<i>Columba livia</i>	AL	++++	LC	G,	R	
32	Spotted Dove	<i>Spilopelia chinensis</i>	WN	+++	LC	G,F	PM	
33	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	WN	++	LC	G,F	PM	
34	Green Pigeon	<i>Treron phoenicopterus</i>	WN	++	LC	G,F	PM	
Ord – Cuculiformes								
Fam - Cuculidae								
35	Asian Koel	<i>Eudynamis scolopaceous</i>	AL	++	LC	F	R	
36	Greater Coucal	<i>Centropus sinensis</i>	AL	++	LC	C	R	
Ord – Strigiformes								
Fam - Tytonidae								
37	Barn owl	<i>Tyto alba</i>	AL	+++	LC	C	R	
Fam - Strigidae								
38	Mottled Wood Owl	<i>Stryx ocellata</i>	SM	+	LC	C	R	
39	Spotted Owlet	<i>Athene brama</i>	AL	++	LC	C,I	R	
40	Indian Scops Owl	<i>Otus bakkamoena</i>	SM	+	LC	C,I	R	
Ord – Caprimulgiformes								
Fam - Caprimulgidae								
41	Indian Nightjar	<i>Caprimulgus asiaticus</i>	AL	+++	LC	I	R	
42	Jungle Nightjar	<i>Caprimulgus indicus</i>	AL	++	LC	I	R	
Ord – Bucerotiformes								
Fam - Upupidae								
43	Common Hoopoe	<i>Upupa epops</i>	AL	++	LC	I	R	
Fam - Bucerotidae								
44	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	SM	+	LC	C,F	PM	
Ord – Coraciiformes								
Fam - Coraciidae								
45	Indian Roller	<i>Coracius bengalensis</i>	AL	+++	LC	I	R	
Fam - Halcyonidae								
46	White Throated Kingfisher	<i>Halcyon smyrnensis</i>	AL	++	LC	C,I	R	
Fam - Alcedonidae								
47	Common Kingfisher	<i>Alcedo atthis</i>	AL	+++	LC	P	R	
48	Pied Kingfisher	<i>Cerule rudis</i>	AL	++	LC	P,I	R	
Fam - Meropidae								
49	Green bee-eater	<i>Merops orientalis</i>	AL	++++	LC	I	PM	
Ord – Psittaciformes								
Fam - Psittacidae								
50	Rose Ringed Parakeet	<i>Psitacula krameri</i>	AL	++	LC	F	R	
51	Plum Headed Parakeet	<i>Psitacula cyanocephala</i>	WN	++++	LC	F	R	
Ord – Piciformes								
Fam - Megalimidae								
52	Coppersmith Barbet	<i>Psilopogon hematocephala</i>	AL	++	LC	F,I	R	
Fam - Picidae								
53	Lesser Goldenback	<i>Dinopium benghalense</i>	WN	++	LC	F,I	R	
Ord – Passeriiformes								
Fam - Ploceidae								
54	Baya Weaver Bird	<i>Ploceus philipinus</i>	AL	+++	LC	G	R	
Fam - Dicruridae								
55	Black Drongo	<i>Dicrurus macrocerces</i>	AL	++++	LC	I	R	
Fam - Oriolidae								
56	Indian Golden Oriole	<i>Oriolus kundoo</i>	MN	++	LC	F	PM	
Fam - Monarchidae								
57	Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i>	SM	+	LC	I	PM	
58	Black Naped Monarch	<i>Hypothymis azurea</i>	SM	+	LC	I	M	
Fam - Corvidae								
59	Indian Jungle crow	<i>Corvus culminatus</i>	AL	++	LC	O	R	
60	House Crow	<i>Corvus splendens</i>	AL	+++	LC	O	R	

Fam - Leiothrichidae							
61	Jungle Babbler	<i>Argya striata</i>	AL	++++	LC	O	R
62	Common Babbler	<i>Argya caudata</i>	AL	+++	LC	O	R
Fam - Hirudinidae							
63	Barn Swallow	<i>Hirundo rustica</i>	WM	++	LC	I	PM
Fam - Paridae							
64	Great Tit	<i>Parus major</i>	AL	++	LC	O	R
Fam - Alaudidae							
65	Indian Bush Lark	<i>Mirafr erythroptera</i>	AL	++++	LC	O	R
66	Ashy Crowned Sparrow Lark	<i>Erimopteryx griseus</i>	WN	+++	LC	O	R
67	Rufous Tailed Lark	<i>Ammomanes phoenicura</i>	WN	++	LC	O	R
Fam - Timalidae							
68	Jungle Babbler	<i>Turdoides striata</i>	AL	+++	LC	I	R
69	Common Babbler	<i>Turdoides caudata</i>	AL	++	LC	I	R
Fam - Pycnonotidae							
70	Red Vented Bulbul	<i>Pycnonotus cafer</i>	AL	++++	LC	O	R
Fam - Cisticolidae							
71	Plain Prinia	<i>Prinia inornata</i>	WN	+++	LC	I	PM
72	Ashy Prinia	<i>Prinia socialis</i>	MN	++	LC	I	PM
73	Common Tailor Bird	<i>Orthotomus sutorius</i>	AL	+++	LC	I,F	R
Fam - Aegithinidae							
74	Common Iora	<i>Aegithina tiphia</i>	AL	+	LC	I	R
Fam - Zosteropidae							
75	Oriental White Eye	<i>Zosterops palpebrosus</i>	SM	+	LC	O,N	PM
Fam - Phylloscopidae							
76	Paddyfield Warbler	<i>Acrocephalus agricola</i>	SM	++++	LC	I	PM
77	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	SM	++	LC	I	PM
Fam - Laniidae							
78	Long Tailed Shrike	<i>Lanius schach</i>	SM	++	LC	I	PM
79	Bay Back Shrike Bird	<i>Lanius vittatus</i>	AL	+++	LC	I	R
Fam - Sturnidae							
80	Common Maina	<i>Acridotherus tristis</i>	AL	++++	LC	O	R
81	Pied Myna	<i>Gracupica contra</i>	AL	++	LC	O	R
82	Bramhany Myna	<i>SturnUS pagodarum</i>	SM	+++	LC	O	PM
83	Rosy sterling	<i>Paster roseus</i>	WN	+	LC	I,F	M
Fam - Motaciliidae							
84	Paddyfield Pipit	<i>Anthus rufulus</i>	WN	+++	LC	I	R
85	Citrine Wagtail	<i>Motacila citreola</i>	WN	+++	LC	I	R
86	White browed Wagtail	<i>Motacila maderaspatensis</i>	AL	++	LC	I	R
87	Grey Wagtail	<i>Motacila cinerea</i>	AL	+++	LC	I	R
Fam - Muscipapidae							
88	Indian Robin	<i>Copsychus fulicatus</i>	AL	+++	LC	I	R
89	Magpie Robin	<i>Copsychus saularis</i>	AL	++	LC	I	R
90	Red Breasted Flycatcher	<i>Ficedula parva</i>	WN	+	LC	I	PM
91	Tickel's Blue Flycatcher	<i>Cyornis tickelliae</i>	SM	+	LC	I	PM
92	Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>	WN	+	LC	I	PM
93	Common Stone chat	<i>Saxicola torquatus</i>	WN	+++	LC	I	PM
94	Pied Bush Chat	<i>Saxicola caprata</i>	WN	+++	LC	I	PM
95	Brown Rock Chat	<i>Oenanthe fusca</i>	AL	++++	LC	I	R
Fam - Rhipiduridae							
96	White Browed Fantail Flycatcher	<i>Phipidura auriola</i>	WN	++	LC	I	PM
97	Asian Brown Flycatcher	<i>Muscicappa dauurica</i>	WN	++	LC	I	PM
Fam - Estridiidae							
98	Chestnut Munia	<i>Lonchura atricapila</i>	AL	+++	LC	G	R
99	Scaly Breasted Munia	<i>Lonchura punctulata</i>	AL	+++	LC	G,I	R
100	Straberry Finch/Red Munia	<i>Amandava amandava</i>	WN	+	LC	G,I	R
101	White Rumped Munia	<i>Lonchura striata</i>	WN	+	LC	G,I	R
102	Indian Silverbill	<i>Euodice malabarica</i>	WN	++++	LC	G,I	R

Fam -		Passeridae					
103	House Sparrow	<i>Passer domesticus</i>	AL	++++	LC	G	R
104	Chestnut Shouldered Petronia	<i>Gymnoris xanthocolis</i>	WN	++	LC	G	R
Fam -		Nectarinidae					
105	Purple Sunbird	<i>Cinnyris asiaticus</i>	AL	++++	LC	N	R

A = Abundance, FG = Foraging Guild, IUCN=International Union for Conservation of Nature, M = Migratory status, MN = Monsoon, AL = All Seasons, WN = Winter, LC = Least Concern, NT = Near Threatened, P = Piscivorous, C = Carnivorous, I = Insectivorous, O = Omnivorous, F = Frugivorous, N = Nectarivorous, G = Grainivorous, BM=Breeding Migrant, PM=Passage Migrant, R=Resident

DISCUSSION

Avifauna of study area Dev Talav Nagbhid, within the proposed Ghodazari Wildlife Sanctuary, remained unexplored till date. During present survey of study site, total 107 species of avifauna, representing 16 orders and 50 families are recorded during Jan, 2015 to Dec. 2017. Bayani and Dandekar (2017) recorded 255 species of avifauna from Tadoba-Andhari Tiger Reserve (TATR) forest in Maharashtra, which is located in the vicinity of study area.

Dietary pattern of bird community shows dominance of insectivorous birds (41%) followed by grainivorous birds (11%) indicates that agro-forest ecosystem in the study area provide food for their sustenance. Ecosystem of local area impacted composition of bird community and their foraging guild (Gregory, *et al.*, 2003; Karanth, *et al.*, 2016). Substantial number of rare bird species like Purple Heron, White-Eyed Buzzard, Mottled Wood Owl, Indian Pitta, Plum-Headed Parakeet, Great Horned Owl, Black Naped Monarch and Asian Paradise Flycatcher, adds to the richness of avifauna. As such rare species are indicative of rich diversity of birds in this habitat hence need special conservation measures. (Prendergast, *et al.*, 1993).

Birds like Rosy Sterling are winter visitors from their breeding ground in European countries found to perched on *Butea monosperma* tree during flowering in the month of March. *Anastomus oscitans*, *Threskiornis melanocephalus*, *Plegadis falcinellus*, *Pernis ptilorhynchus* and *Hypothymis azurea* are breeding migrants, migrated from their faraway nesting places. *Anastomus oscitans* and *Threskiornis melanocephalus* are monsoon breeding migrants arrive from their faraway nesting places in North-East India, Burma and Bangladesh to breeding places in the month of June-July and departs

from breeding place in the month of December. (Wells et al., 1999; Ali and Ripley, 2001; Das, et al., 2014; Pramanik, *et al.*, 2016)

CONCLUSION

In the present study of avifauna, migratory birds are observed in few numbers as compared to resident birds. The substantial number of insectivorous and granivorous birds in the study area underline the significance of agroforest ecosystem. Anthropogenic activities like livestock grazing, fishing, uses of pesticides in agriculture and deforestation are posing threat to the bird diversity in the study area hence need conservation measures.

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