RESEARCH ARTICLE

Diversity and status of Avifauna from Bodalkasa lake in Gondia district, Maharashtra, India

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ABSTRACT

The avifaunal diversity of Bodalkasa lake was studied from February 2014 to January 2016 based on visual encounter surveys. The lake is located near Bodalkasa village having food availability and rich tree vegetation in surrounding area that harbors a variety of birds. Now a days the anthropogenic disturbances and the environmental changes happening regularly affects the seasonal biodiversity. Total sixty nine species including water birds and land birds were recorded belonging to different 33 families during the study period. Out of sixty nine species, 52 species were residents (75%), 12 species were winter visitors (18%), 03 species were summer visitors (4%) and 02 species were passage visitors (3%). The maximum species were sighted during the winter season followed by summer and monsoon season respectively. Out of sixty nine species, 37 species were very common, 13 species were common, 12 species were uncommon, 05 species were occasional and 02 species were rare for this site. The family wise relative diversity of the bird species from the lake was also calculated.

Keywords: Avifauna, Bodalkasa lake, diversity, status.

INTRODUCTION

It has been said that birds could exist without man but that man would perish without birds (Ali, 2002). Birds are very visible and integral part of the ecosystem occupies many trophic levels in a food chain ranging from consumers to predators. Their occurrences have been helpful as environmental health indicator, plant pollinators, and seed dispersals as well as pest controller (Ramchandra, 2013). The species richness and bird abundance was fundamentally affected by attributes of the size of the water covered area, particularly in case of local migrants and resident birds. Diversity and abundance of winter migratory birds appears to be affected more by habitat heterogeneity and preponderance of submerged aquatic vegetation played a negative role in this regard (Datta, 2011). Diversity of the avifauna is one of the most important ecological indicators to evaluate the quality of habitats. Now a days,

avifaunal diversity has been decreasing due to the destruction of natural habitats and human disturbances (Bhadja and Vaghela, 2013). Freshwater lakes one of the important types of wetlands, play a vital role in the economics of their respective regions, especially with reference to agriculture, fishing, livestock maintenance and drinking water facilities of the adjacent areas. The geographic location of a wetland may determine how and when birds will use it or use adjacent habitat (Manikannan, 2011).

Birds are essential animal group of an ecosystem which play a functional role in the ecosystem and are rightly called as bioindicators. There are more than 10000 bird species in the world, out of these 1313 species recorded from Indian subcontinent (Grimmett *et al.* 2011). Global warming and changing climate is affecting the activities of the avifauna. Global warming will make survival more difficult for many bird species and other wildlife. Very considerable studies on the avifaunal diversity from freshwater bodies of India have been carried out by some researchers. It has been recorded that the region of Vidarbha is lagging behind the bird studies with respect to various water bodies. Therefore, the detail study on the avifauna of Bodalkasa lake from Gondia district is important which should be to conserve the biodiversity and environment. Thus, the present investigation reveals to compile a document of avifaunal diversity from Bodalkasa lake to create the awareness for their conservation.

MATERIALS AND METHODS

Study Area

The Bodalkasa reservoir is located near Bodalkasa village at coordinates of $21^{0}21'151"$ N latitude and $80^{0}01'00"$E longitudes and constructed as a part of irrigation projects in 1917 on Bhagdeogoti - a local *nala* near Tirora having 539 hectares area. This reservoir locally called as Bodalkasa lake and famous as picnic spot, for the irrigation purposes, fishing activities, various wild animals and avifaunal diversity. Gondia is known as the district of lakes as there are many water bodies including lakes and reservoirs present in the district. Apart from this there are many large dams such as Itiyadoh, Shirpur, Pujaritola, Kalisarad as well as smaller dams, reservoirs or lakes at Chorkhamara, Bodalkasa, Navegaon, Shrungar-

Fig. 3: A Satellite View of Bodalkasa Lake

bandh, Khairbandha and other small lakes in the district. Bodalkasa lake is situated close to the Adani thermal power station in Gondia district of Maharashtra. The approximate distance between Bodalkasa reservoir and Adani thermal power station is 09 km (Distance measurement, Google map). There are different villages in surrounding area of the reservoir that is Bodalkasa, Pindkepar and Rustampur. The water of this lake is primarily used for washing, bathing, drinking, fishing activities, irrigation purposes and for other activities by the surrounding villagers. This lake harbors the aquatic vegetation as well as the periphery is covered with trees which provide suitable habitats for the birds.

Survey and Methodology

The study was carried from February 2014 to January 2016 to examine the avifauna from the Bodalkasa reservoir. A visual encounter survey was conducted (Crump and Scott, 1994; Manley *et al.*, 2005; Joshi, 2014) for direct count of the birds by walking along the bank of the site (Rajashekara and Venkatesha, 2010). Some birds were observed by stationary and double counting methods wherever necessary. Weekly visits to the site were made for two years and an average of 4 weeks was accounted for a month (Wanjari, 2012). The observation of the birds was carried out at early morning and evening hours by using field binocular (Olympus 10×50) during the day time depending on the light conditions (Namgail *et al.* 2009). After detection, specimens were photographed by Nikon camera and identified with the help of books and field guides by Ali (2002), Grimmett *et al.* (2011)and Manakadan *et al.* (2011).

The scientific names, common names and IUCN status were ascertained as per Bird Life international (2013 version 6) and Grimmett *et al.* (2011). The residential

local status of the bird species was categorized on the basis of the observations and have been assigned strictly with reference to the study area on the basis of presence or absence method as followed by Thakur *et al.* (2010); Koli (2014); Shekhawat and Bhatnagar (2014) as (R – Resident, WV – Winter Visitor, SV – Summer Visitor, PV – Passage Visitor). The data recorded in each survey was analyzed for assessing the abundance status of the bird species on the basis of the percent frequency (encounter rates) of sightings as followed as followed the techniques developed by Kasambe and Wadatkar (2007), Tak*et al.* (2010), and Priyanka (2012). (**Vc –** Very common: 75-100%, **C –** Common: 50-74%, **Uc –** Uncommon: 25-49%, **O –** Occasional: 5-24% and **Rr –** Rare: < 5%). The relative diversity (RDi) of families was calculated by using following formula (Koli, 2014):

$$RDi = \frac{\text{No. of birds species in the family}}{\text{Total no. of Species}} X100$$

RESULTS AND DISCUSSION

During the present investigation, 69 bird species including water birds and land birds were recorded from Bodalkasa lake belonging to 33 families (Table 1). The analysis of data on residential status revealed that out of sixty nine species, 52 species were residents (75%), 12 species were winter visitors (18%), 03 species were summer visitors (4%) and 02 species were passage visitors (3%). As per IUCN status (2013), 65 species are least concern and 04 species are near threatened. The maximum species were sighted during the winter season followed by summer and monsoon season respectively. Further analysis of relative abundance indicated that 37 species were very common, 13 species were common, 12 species were uncommon, 05 species were occasional and 02 species were rare for this site.

Ardeidae was the dominant family with 07 species and followed by the family Anatidae with 06 species. The highest RDi value (10.14) was recorded for Ardeidae family (Table 2). Further investigation reveals that the Columbidae family with (4 species), Ciconiidae, Charadriidae, Scolopacidae, Alcedinidae, Corvidae, Sturnidae and Motacillidae with (3 species each), Threskiornithidae, Phalacrocoracidae, Psittacidae, Cuculidae, Picidae, Oriolidae, Timaliidae and Muscicapidae with (2 species each), Anhingidae, Recurvirostridae, Coraciidae, Meropidae, Upupidae,

Fig. 4: A View of Bodalkasa Lake

Fig. 5: Lesser Whistling Duck

Fig. 6: Northern Pintail

Fig. 7: *Rufous Treepie*

Fig. 8: Cattle Egret

Table 1: Systematic List of Bird Species at Bodalkasa lake in Gondia district, Maharashtra, India (Feb. 2014 to Jan. 2016)

Family	Sp Sr No	Scientific Names	Common Names	Residential Status #	Abundance Status ¤
1) Anatidae	1	*Dendrocygna javanica**	Lesser Whistling-duck	SV	Uc
	2	*Tadorna ferruginea**	Ruddy Shelduck	WV	Uc
	3	*Nettapus coromandelianus**	Cotton Pygmy-goose	R	Vc
	4	*Anas poecilorhyncha**	Western Spot-billed Duck	R	C
	5	*Anas acuta**	Northern Pintail	WV	Uc
	6	*Aythya ferina**	Common Pochard	WV	O
2) Ciconiidae	7	*Mycteria leucocephala***	Painted Stork	WV	Uc
	8	*Anastomus oscitans**	Asian Openbill	R	Vc
	9	*Ciconia nigra**	Black Stork	WV	O
3) Threskiornithidae	10	*Threskiornis melanocephalus***	Black-headed Ibis	SV	Uc
	11	*Pseudibis papillosa**	Red-naped Ibis	R	Vc
4) Ardeidae	12	*Ardeola grayii**	Indian Pond Heron	R	Vc
	13	*Ardea cinerea**	Grey Heron	WV	O
	14	*Ardea purpurea**	Purple Heron	R	Vc
	15	*Bubulcus ibis**	Cattle Egret	R	Vc
	16	*Casmerodius albus**	Great Egret	R	Vc
	17	*Mesophoyx intermedia**	Intermediate Egret	WV	Uc
	18	*Egretta garzetta**	Little Egret	R	Vc
5)Phalacrocoracidae	19	*Phalacrocorax niger**	Little Cormorant	R	Vc
	20	*Phalacrocorax fuscicollis**	Indian Cormorant	WV	O
6) Anhingidae	21	*Anhinga melanogaster***	Oriental Darter	PV	Rr
7)Recurvirostridae	22	*Himantopus himantopus**	Black-winged Stilt	R	C
8) Charadriidae	23	*Vanellus duvaucelii***	River Lapwing	PV	Rr
	24	*Vanellus indicus**	Red-wattled Lapwing	R	Vc
	25	*Charadrius dubius**	Little Ringed Plover	R	Vc
9) Scolopacidae	26	*Tringa stagnatilis**	Marsh Sandpiper	WV	Uc
	27	*Tringa nebularia**	Common Greenshank	WV	Uc
	28	*Actitis hypoleucos**	Common Sandpiper	WV	Uc
10) Columbidae	29	*Streptopelia decaocta**	Eurasian Collared Dove	R	Vc
	30	*Stigmatopelia chinensis**	Spotted Dove	R	Vc
	31	*Stigmatopelia senegalensis**	Laughing Dove	R	Vc
	32	*Treron phoenicopterus**	Yellow-footed Green Pigeon	R	C
11) Psittacidae	33	*Psittacula krameri**	Rose-ringed Parakeet	R	Vc
	34	*Psittacula cyanocephala**	Plum-headed Parakeet	R	C
12) Cuculidae	35	*Eudynamys scolopaceus**	Asian Koel	R	C
	36	*Centropus sinensis**	Greater Coucal	R	Vc
13) Coraciidae	37	*Coracias benghalensis**	Indian Roller	R	Vc

Table 1: continued...

Family	Sp Sr No	Scientific Names	Common Names	Residential Status #	Abundance Status ¤
14) Alcedinidae	38	*Halcyon smyrnensis**	White-throated Kingfisher	R	Vc
	39	*Alcedo atthis**	Common Kingfisher	R	Vc
	40	*Ceryle rudis**	Pied Kingfisher	R	Vc
15) Meropidae	41	*Merops orientalis**	Little Green Bee-eater	R	Vc
16) Upupidae	42	*Upupa epops**	Common Hoopoe	R	Vc
17) Bucerotidae	43	*Ocyceros birostris**	Indian grey Hornbill	R	Uc
18) Picidae	44	*Dinopium benghalense**	Black-rumpedFlameback	R	Vc
	45	*Chrysocolaptes festivus**	White-naped Woodpecker	R	Vc
19) Pittidae	46	*Pitta brachyura**	Indian Pitta	SV	Uc
20) Aegithinidae	47	*Aegithina tiphia**	Common Iora	R	C
21) Oriolidae	48	*Oriolus oriolus**	Eurasian Golden Oriole	R	C
	49	*Oriolus xanthornus**	Black-hooded Oriole	R	C
22) Dicruridae	50	*Dicrurus macrocercus**	Black Drongo	R	Vc
23) Corvidae	51	*Dendrocitta vagabunda**	RufousTreepie	R	Vc
	52	*Corvus culminatus**	Indian Jungle Crow	R	Vc
	53	*Corvus splendens**	House Crow	R	Vc
24) Alaudidae	54	*Eremopterix griseus**	Ashy-crowned Sparrow Lark	R	Vc
25) Pycnonotidae	55	*Pycnonotus cafer**	Red-vented Bulbul	R	Vc
26) Sylviidae	56	*Orthotomus sutorius**	Common Tailorbird	R	Vc
27) Timaliidae	57	*Turdoides malcolmi**	Large Grey Babbler	R	C
	58	*Turdoides striata**	Jungle Babbler	R	Vc
28) Zosteropidae	59	*Zosterops palpebrosus**	Oriental White-eye	R	C
29) Sturnidae	60	*Acridotheres tristis**	Common Myna	R	Vc
	61	*Sturnus contra**	Asian Pied Starling	R	Vc
	62	*Temenuchus pagodarum**	Brahminy Starling	R	C
30) Muscicapidae	63	*Copsychus saularis**	Oriental Magpie Robin	R	C
	64	*Saxicoloides fulicatus**	Indian Robin	R	Vc
31) Nectariniidae	65	*Nectarinia asiatica**	Purple Sunbird	R	C
32) Passeridae	66	*Passer domesticus**	House Sparrow	R	Uc
33) Motacillidae	67	*Motacilla alba**	White Wagtail	WV	O
	68	*Motacilla maderaspatensis**	White-browed Wagtail	R	Vc
	69	*Anthus rufulus**	Paddyfield Pipit	R	Vc

#Koli (2014); Shekhawat and Bhatnagar (2014):R - Resident, **WV -** Winter visitor, **SV -** Summer visitor, **PV -** Passage visitor.

¤ Kasambe and Wadatkar (2007), Tak*et al.* (2010), Priyanka (2012): Rr - Rare (<5%), **O -** Occasional (5-24%), **Uc -** Uncommon (25-49%), **C -** Common (50-74%), **Vc -** Very common (75-100%).

BirdLife International (2013):* LC -** Least concern, * NT -** Near threatened.

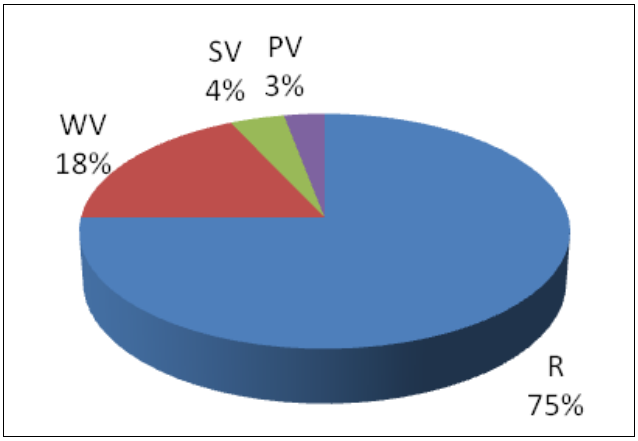

Fig. 1 Residential Status

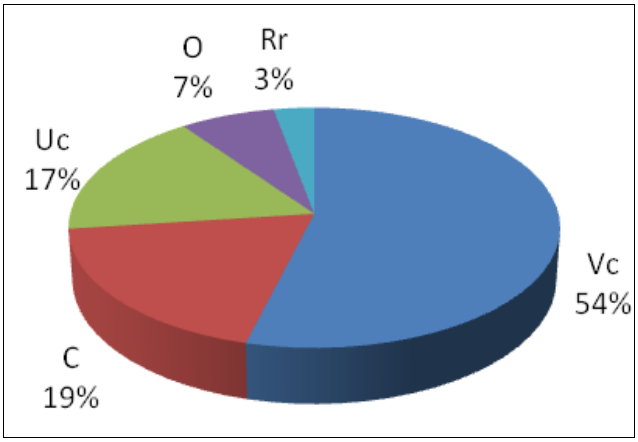

Fig. 2: Abundance Status

Table 2: Relative diversity (RDi) of various families at Bodalkasa lake, Gondia district, Maharashtra (Feb. 2014 to Jan.2016)

Family Sr. No.	Family	RDi
1	Anatidae	8.70
2	Ciconiidae	4.35
3	Threskiornithidae	2.90
4	Ardeidae	10.14
5	Phalacrocoracidae	2.90
6	Anhingidae	1.45
7	Recurvirostridae	1.45
8	Charadriidae	4.35
9	Scolopacidae	4.35
10	Columbidae	5.80
11	Psittacidae	2.90
12	Cuculidae	2.90
13	Coraciidae	1.45
14	Alcedinidae	4.35
15	Meropidae	1.45
16	Upupidae	1.45
17	Bucerotidae	1.45
18	Picidae	2.90
19	Pittidae	1.45
20	Aegithinidae	1.45
21	Oriolidae	2.90
22	Dicruridae	1.45
23	Corvidae	4.35
24	Alaudidae	1.45
25	Pycnonotidae	1.45
26	Sylviidae	1.45
27	Timaliidae	2.90
28	Zosteropidae	1.45
29	Sturnidae	4.35
30	Muscicapidae	2.90
31	Nectariniidae	1.45
32	Passeridae	1.45
33	Motacillidae	4.35

Bucerotidae, Pittidae, Aegithinidae, Dicruridae, Alaudidae, Pycnonotidae, Sylviidae, Zosteropidae, Nectariniidae and Passeridae with (1 species each) were represented in the study area.

Many researchers done related work such as Kumar (2006) recorded Ardeidae to be the most dominant family in Bharathpuzha river basin in Kerala, and Surana *et al.* (2007) recorded Anatidae to be the most dominant family in Chimdi lake Nepal. Also the avifaunal diversity was studied by different authors from Maharashtra state such as Kasambe and Wadatkar (2007) recorded 78 species from Pohara-Malkhed forest reservoir of Amravati district, Kedar *et al.* (2008) recorded 74 species from two freshwater lakes of Washim district, Kukade *et al.* (2011) recorded 68 species from Chhatri lake of Amravati district, Wanjari (2012) reported 72 species from Nagpur city, Chinchkhede and Kedar (2013) recorded 126 species from Navegaon national park from Gondia district, Bhandarkar and Paliwal (2014) recorded 52 species from Shrungarbandh lake in Gondia district, Lad and Patil (2015) recorded 131 species from Bhayander and Naigaon wetlands in Thane district, Puri (2015) reported 27 species from Zaliya lake in Gondia district.

Avifaunal diversity of the Bodalkasa lake confirm that the site as suitable habitat for the residential and migratory birds. But the birds present in and around the study site are affected by anthropogenic disturbances like washing clothes, direct bathing, washing livestocks, fishing practices and pollution due to spraying of insecticides on the crops in encroachment area. As there is Adani thermal power station started from 2012 near the study site (09 km

away) may increase in temperature which affects the bird diversity adversely in future. Keeping in view the varied avifauna recorded from the Bodalkasa lake, the steps should be taken to do proper maintenance and conservation of the site.

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