Indian Forester, **141** (10) : 1050-1055, 2015
http://www.indianforester.co.in

ISSN No. 0019-4816 (Print)
ISSN No. 2321-094X (Online)

STATUS OF THE WATERBIRDS OF SUNABEDA WILDLIFE SANCTUARY, ODISHA, INDIA

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ABSTRACT

A study was carried out on the population of water birds in two wetlands *Raital Bandh* and *Jalkil Bandh* of the Sunabeda Wildlife Sanctuary, Odisha, India, in two successive years 2009 and 2010. 4,701 individuals of 29 species of birds belonging to 12 families in both years were earmarked. Highest number of waterbirds observed in *Raital Bandh* in both years. All total eight winter and twenty one resident species identified during the study period. The family *Anatidae* (46.67% & 51.30%) in *Raital Bandh* and 60.79% & 58.14% respectively in *Jalkil Bandh* forms the main bulk of the waterbirds population. Species diversity was found highest in *Raital Bandh* in 2009 (1.398) and in 2010 *Jalkil Bandh* (1.342). The depth of the water and siltation was the major problem in winter of these two wetlands. Illegal activities like netting, killing of wild birds are continuously major threats for the conservation.

Key words : Water birds, Population, Conservation threats.

Introduction

Wetlands are the most threatened habitats because of their vulnerability and attractiveness for development (Hollis *et al.,* 1988). Birds are the good bio-indicatiors and useful models for studying a variety of environmental problems (Urfi *et al.,* 2005). Wetlands in India occupy 58.2 million hectares, including areas under wet paddy cultivation (Prasad *et al.,* 2002). The fresh water wetlands alone support 20% of the known range of biodiversity in India (Deepa and Ramachandra, 1999). Measures of species diversity play a central role in ecology and conservation biology (Noss and Cooperrider, 1994; Krebs, 1999).

Accordingly, the relationship between distribution and abundance has important implications for measures of species diversity and community structure. The most commonly employed measures of species diversity are species richness and those based on species frequencies involving Shannon information and Simpson concentration, with community abundance structure then measured by evenness (Krebs, 1999).

A few studies have been conducted on the population status and distribution of avifauna in context to Odisha (Murthy and Rao, 1989; Dani, 1992; Pandav, 1997; Sahu and Rout, 2005; Ambastha, 2005; Nair, 2007; Gopi and Pandav, 2006a; Gopi and Pandav, 2007a&b). Few studies were also done on the breeding and nesting biology (Sing *et al.,* 2001; Gopi and Pandav, 2006b; Gopi and Pandav, 2007; Sathiyaselvam and Balachandan, 2007).

In the present study investigation of the population status and diversity of waterbirds of Sunabeda Wildlife Sanctuary was done. Mid-winter waterbird census data were also incorporated with the result. However this is the first scientific documentation of the diversity and abundance of waterbirds in Sunabeda Wildlife Sanctuary. This study was restricted in two wetlands viz. *Raital Bandh* and *Jalkil Bandh*, which constitute the major waterbird population in the Sanctuary.

Material and Methods

Study area

Sunabeda Wildlife Sanctuary is situated between longitude 82°20'00E and 82°34'42''E and Latitude20°24'N and 24°44'N is located in the Nuwapada District of Odisha. It was declared as Wildlife Sanctuary in the year 1983 with total Geographical area of 600 Km^2. Sunabeda Wildlife Sanctuary is fall in the Deccan Peninsular Zone of the Indian Biogeographical zone and Eastern Plateau province and Chhatishgarh-Dandakaranya sub-division. The Wildlife Sanctuary is sharing common border with the state of Chattisgarh. Winter starts from middle of November and last of up to the end of February. The maximum rainfall is 1100 to 1500 mm. The temperature is ranges from 12° to 40° C.

Methodology

Study on the water birds diversity and population status at *Jalkil Bandh* and *Raital Bandh* of Sunabeda Wildlife Sanctuary were carried out mainly during the Mid-winter waterbird count which occurred mainly in

Water bird population and diversity is highly depended upon the water parameters viz. depth, salinity, aquatic vegetation, etc.

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Table 1 : Population of water birds in *Raital Bandh* and *Jalkil Bandh* of Sunabeda Wildlife Sanctuary recorded from 2009-2010

Sl. No.	Family	Species	*Raital Bandh*		*Jalkil Bandh*	
			2009	2010	2009	2010
1.	Podicipedidae	Little Grebe *Tachybaptus ruficoll is*	0	0	0	13
2.	Phalacrocoracidae	Little Cormorant *Phalacrocorax niger*	23	8	10	16
3.		Great Cormorant *Phalacrocorax carbo*	0	1	0	0
4.	Anhingidae	Darter *Anhinga melanogaster*	4	0	0	0
5.	Ardeidae	Little Egret *Egretta garzetta*	55	35	12	86
6.		Purple Heron *Ardea purpurea*	4	3	6	3
7.		Cattle Egret *Bubulcus ibis*	45	46	0	26
8.		Large Egret *Casmerodius albus*	1	0	0	0
9.		Median Egret *Mesophoyx intermedia*	7	21	58	120
10.		Indian Pond Heron *Ardeola grayii*	13	5	0	8
11.	Ciconiidae	Asian Openbill-stork *Anastomus oscitans*	43	12	0	12
12.	Anatidae	Lesser Whistling Duck *Dendrocygna javanica*	460	430	252	231
13.		Brahminy Shelduck *Tadorna ferruginea*	22	40	0	36
14.		Gadwall *Anas strepera*	32	150	0	101
15.		Northern Pintail *Anas acuta*	142	105	31	108
16.		Common Teal *Anas crecca*	80	41	0	25
17.		Commmon Pochard *Aythya ferina*	0	0	0	58
18.		Cotton Teal *Nettapus coromandelianus*	0	0	52	69
19.	Pandionidae	Osprey *Pandion haliaetus*	1	1	0	0
20.	Ralidae	White-breasted Waterhen *Amaurornis phoenicurus*	13	3	0	4
21.		Purple Moorhen *Porphyrio porphyrio*	230	305	50	54
22.		Common Moorhen *Gallinula chloropus*	120	101	42	34
23.		Common Coot *Fulica atra*	120	102	20	43
24.	Jacanidae	Pheasent-tailed Jacana *Hydrophasianus chirurgus*	20	3	10	6
25.		Bronze-winged Jacana *Metopidius indicus*	18	8	6	4
26.	Charadridae	Little-ringed Plover *Charadrius dubius*	22	11	0	0
27.		Red-wattled Lapwing *Vanellus indicus*	20	10	2	23
28.	Scolopacidae	Common Sandpiper *Actitis hypoleucos*	41	21	0	0
29.	Glareolidae	Small Pratincole *Glareola lactea*	41	31	0	0

Table 2 : Birds of Sunabeda Wildlife Sanctuary, Odisha 2009-2010 and their status

Sl. No.	Species	Status	Remarks
1	Little Grebe *Tachybaptus ruficollis*	R/LC	Less abundant and only recorded in *Jalkil Bandh*
2	Little Cormorant *Phalacrocorax niger*	R/C	Less abundant.
3	Great Cormorant *Phalacrocorax carbo*	R/LC	Less abundant.
4	Darter *Anhinga melanogaster*	R/R	Less abundant, once recorded in *Raital Bandh*
5	Little Egret *Egretta garzetta*	R/C	Less abundant.
6	Purple Heron *Ardea purpurea*	R/C	Less abundant
7	Cattle Egret *Bubulcus ibis*	R/C	Less abundant.
8	Large Egret *Casmerodius albus*	R/LC	Less abundant and only recorded in *Raital Bandh* in2009
9	Median Egret *Mesophoyx intermedia*	R/C	Abundant.
10	Indian Pond Heron *Ardeola grayii*	R/C	Less abundant
11	Asian Openbill-stork *Anastomus oscitans*	R/C	Less abundant
12	Lesser Whistling Duck *Dendrocygna javanica*	R/C	Very abundant
13	Brahminy Shelduck *Tadorna ferruginea*	WV/C	Less abundant and Regular Winter visitor.
14	Gadwall *Anas strepera*	WV/C	Abundant and Regular winter visitor
15	Northern Pintail *Anas acuta*	WV/C	Abundant and Regular winter visitor
16	Common Teal *Anas crecca*	WV/LC	Less abundant and Regular winter visitor
17	Common Pochard *Aythya ferina*	WV/?	Less abundant, First time recorded in 2010 at *Jalkil Bandh*
18	Cotton Teal *Nettapus coromandelianus*	R/C	Less abundant
19	Osprey *Pandion haliaetus*	WV/R	Less abundant, only sighted near dame
20	White-breasted Waterhen *Amaurornis phoenicurus*	R/C	Less abundant
21	Purple Moorhen *Porphyrio porphyrio*	R/C	Very abundant
22	Common Moorhen *Gallinula chloropus*	R/C	Abundant
23	Common Coot *Fulica atra*	WV/C	Abundant and regular winter visitor
24	Pheasent-tailed Jacana *Hydrophasianus chirurgus*	R/C	Less abundant
25	Bronze-winged Jacana *Metopidius indicus*	R/C	Less abundant
26	Little-ringed Plover *Charadrius dubius*	R/LC	Less abundant and Regular winter visitor, sighted near dam
27	Red-wattled Lapwing *Vanellus indicus*	R/C	Less abundant
28	Common Sandpiper *Actitis hypoleucos*	WV/LC	Less abundant and regular winter visitor, Recorded near dam
29	Small Pratincole *Glareola lactea*	R/LC	Less abundant, recorded near dam

Abbreviation: *C=Common, *LC= Less Common, *R= Rare, *WV=Winter Visitor, ?= observed only once.

* For classifying status additional Forest Dept. data were used from 2006-2008 along with the authors data.

Abundant= <200 individuals in both the year. Very abundant= <500 individuals in both the year. Less abundant= >200 individuals in both the year.

the month of February. The data were collected in 2009 and 2010. Regular surveys at monthly intervals from December to March (in 2009 and 2010) were also undertaken. Binocular with 8x40 and 12x50 were used and for identification field guide Grimmitt *et al.* (1999) was used. The nomenclature and systematic sequence of birds as given by Manakadan and Pittie (2001) was used. Percent occurrence was estimated according to Basavarajappa (2006). Data were analyzed with Biodiversity Program version-2.

Results and Discussion

In total, 4,701 individuals of 29 species of wetland birds belonging to 12 families were counted from *Raital Bandh* and *Jalkil Bandh* (Table 1). Our list comprises of 8 winter visitors and 21 residents (Table 1).

A variety of waterbirds and aquatic flora were found in *Raital Bandh* and *Jalkil Bandh* wetland of Sunabeda Wildlife Sanctuary. The wetlands are surrounded by dry deciduous forest with varieties of bushes and herbs. But the flora of this region is yet to be study. The observed waterbirds during our study period (2009-2010) were summarized in Table 2 and average estimated populations of waterbirds in *Raital Bandh* and *Jalkil Bandh* in two successive years (2009-2010) were listed in Table 1. The number of all wintering species varied in *Raital Bandh*, 25 species in 2009 and 24 species in 2010 and in *Jalkil Bandh*, 13 species in 2009 and 22 species in 2010. The comprehensive study of waterbirds has revealed that there were altogether 28 species in *Raital Bandh* and 25 species in *Jalkil Bandh* along with the adjoining areas. The family *Anatidae* (46.67% & 51.30%) respectively in two successive the years in *Raital Bandh* and 60.79% & 58.14% respectively in two successive the years in *Jalkil Bandh*) forms the main bulk of the waterbirds population in both the wetlands. The highest congregated species observed in *Raital Bandh* was Lesser Whistling Duck (29.16% in 2009 & 27.26% in 2010) followed by Purple Moorhen (14.58% in 2009 & 20.42% in 2010) and Northern Pintail (9.0% in 2009 & 7.03% in 2010) and in *Jalkil Bandh* was Lesser Whistling Duck (45.73% in 2009 & 21.39% in 2010) followed by Median Egret (10.52% in 2009 & 11.11% in 2010) and Northern Pintail (5.62% in 2009 & 10% in 2010) of the total population (Fig. 1).

Percent occurrence found in the families was also varied in both years in both the wetlands. In *Raital Bandh* family-wise proportion of species richness was found highest in *Ardeidae* (20.68% in 2009 and 17.24% in 2010), followed by *Anatidae* (17.24% in both years) and *Ralidae* (13.79% in both years). In *Jalkil Bandh* species richness was found highest in *Anatidae* (10.34% in 2009 & 24.13% in 2010), followed by *Ardeidae* (10.34% in 2009 & 17.24% in 2010) and *Ralidae* (10.34% in 2009 and 13.79% in 2010). The Rarefunction plot shows that the species diversity is increasing, so it is recommended that the further study is necessary to find out appropriate diversity (Fig. 2).

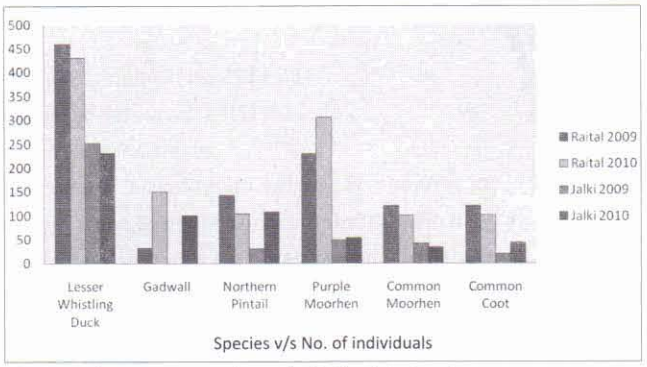

Fig. 1 : Highest congregation of individuals belonging to most common water birds species recorded in Raital bandh and Jalki bandh in 2009 & 2010

Species diversity was found highest in *Raital Bandh* during 2009 (1.398) followed by in Jalki *Bandh* 2010 (1.342) using Shannon Hmax Log Base 10. (Table 3). Species richness was found to be high in *Jalki Bandh* in 2010 (29) followed by 2009 (28.6) and in *Raital Bandh* in 2010 (26.4).

Conclusion

Sunabeda Wildlife Sanctuary harbour good habitat for the avifauna. The present study provided a very preliminary database which would be taken as a baseline for the further study.

The species diversity remains constant in *Raital bandh* but again without any long term study it would be difficult to conclude. In case of *Jalki bandh* the diversity of waterbirds become increasing. One of the major factor could be the park management has been continuously renovated and new conservation policies were being

Table 3 : Species diversity of Raital bandh and Jalki bandh in 2009 & 2010 using Program Bio-diversity.

Index	Raital 2010	Raital 2009	Jalki 2010	Jalki 2009
Shannon H' Log Base 10.	1.073	0.994	0.808	1.133
Shannon Hmax Log Base 10.	1.398	1.38	1.114	1.342
Shannon J'	0.768	0.72	0.726	0.844

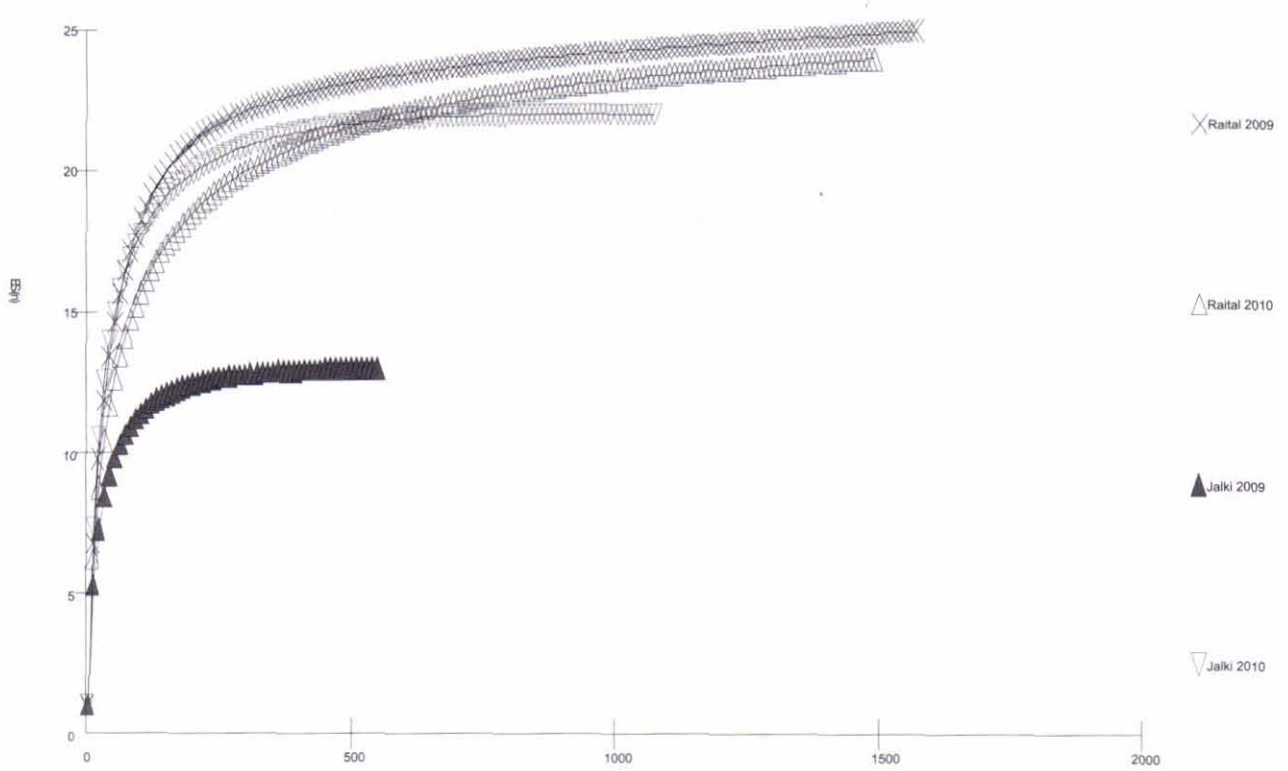

Fig. 2 : Rarefanction plot of Jalki bandh and Raital bandh 2009 & 2010 Rarefunction plot

introduced. Second factor could be the availability of water throughout the year. The waterbird population and diversity is highly depending upon the water content (depth, salinity, aquatic vegetation etc) so, water parameters play an important role in the species composition. The wetlands were previously full of water hyacinth and other aquatic flora but when the open water increases the diversity become increased remarkably. The rarefanction graph shows that the population become open, so more rigorous and continuous study is highly recommended to find out the actual population size.

The depth of the water and siltation was the major problem in winter of these two wetlands. As a part of management practices, *Raital bandh* is connected to the nearby dam (*Patora dam*) through an artificial canal to facilitated water round the year. Some artificial earthen mounts were prepared around the northern border of the wetland for the water birds especially Anatidaes for perch. Illegal activities like netting, killing of wild birds are continuously a major problem for the conservation.

Acknowledgements

The authors are grateful to Odisha Forest Department for allowing us to do the study. We are also thankful to the DFO, Sunabeda Wildlife Sanctuary for his help and co-operation. We are also thankful to Mr. Biswajit Baruah, Mr. Sunit Das, Mr. Mritunjay Giri and Mr. Jugesh for their help in data collection.

सुनाबेड़ा वन्यप्राणि अभयारण्य, ओडिशा, भारत के जलपक्षियों का स्तर

दिपांकर लहकर, एच.के.साहू और एस. रहमान

सारांश

सुनाबेड़ा वन्यप्राणि अभयारण्य, ओडिशा, भारत के दो आर्द्रभूमियों रायताल बांध और जलकिल बांध में दो क्रमिक वर्षों 2009 और 2010 में जल पक्षियों की आबादी पर एक अध्ययन किया गया। हमने दो सालों में 12 कुलों से संबंधित पक्षियों की 29 जातियों के 4,701 एकलों की गणना करके चिह्नित किया। दोनों सालों में रायताल बांध में जलपक्षियों की उच्चतम संख्या देखी गई। अध्ययन अवधि के दौरान कुल आठ शीत एवं इक्कीस आवास जातियों की पहचान की गई। जलकिल बांध में क्रमश: 60.79% और 58.14% तथा रायताल बांध में कुल एनाटिडा (46.67% एवं 51.30%) मुख्य जलपक्षी आबादी थी। प्रजाति विविधता 2009 (1.398) में रायताल बांध में और 2010 में जलकिल बांध (1.342) में उच्चतम पाई गई। इन दो

आर्द्रभूमियों की सर्दी में पानी की गहराई और गादीकरण प्रमुख समस्या थी। जाल में फंसाने, जंगली पक्षियों को मारने जैसे अवैध कार्यकलाप संरक्षण के लिए सतत रूप से प्रमुख संकट हैं।

References

Ambastha K. (2005). Records of Red-wing crested cuckoo Clamator coromandus from Bhitarkanika National park, Orissa. *Indian Birds*, **1**(5).

Basavarajappa S. (2006). Avifauna of agro-ecosystems of maidan area of Karnataka. *ZOOS Print*, **21**(4) :2217-2219.

Dani C.S. (1992). *A checklist of birds of Orissa*. Wildlife wing, Forest depertment, Goverment of Orissa.

Deepa R.S. and Ramachandra T.V. (1999). Impact of Urbanization in the interconnectivity of Wetlands. In: *National symposium on Remote Sensing Applications for Natural Resources: Retrospective and Perspective* (XIX-XXI 1999, Indian Society of Remote Sensing, Benglore.

Grimmett R., Inskipp C. and Inskipp T. (1999). *A pocket guide to the birds of the Indian subcontinent*. Oxford University Press. Delhi.

Gopi G.V. and Pandav B. (2006). White-bellied sea-eagle Haliaeetus leucogaster preying on salt-water Crocodile Crocodylus porosus hatching. *Indian Birds*, **2**(6):173.

Gopi G.V and Pandav B. (2007 a). Observation on breeding biology of three stork species in Bhitarkanika mangroves, India. *Indian Birds*, **3**(2):45-50.

Gopi G.V and Pandav B. (2007 b). Avifauna of Bhitarkanika mangroves, India. *Zoos Print*, **22**(10):2839-2847.

Hollis G.E., Holand M.M. and Larson J.S. (1988). Wise Use of Wetlands. *Nature and Resources*, **24**(1):2-13.

Krebs C.J. (1999). *Ecological methodology*. Second edition. New York: Harper Collins Publishers.

Murthy T.S.N and Rao K.V.R. (1989). Observations on some snake eating birds of the Chilika Lagoon, *Orissa. J Bombay Nat Soc.*, **85**(3):620.

Manakadan R. and Pittie A. (2001). Standardized common and scientific names of the Birds of the Indian subcontinent. *Buceros,* **6**(1): 1-37.

Noss R.F. and Cooperrider A.Y. (1994). *Saving nature's legacy, protecting and restoring biodiversity*. Washington DC: Island Press.

Nair M.V. (2007). On the occurrence of Jerdons' Baza Aviceda jerdoni in Simlipal Tiger Reserve, with note on behaviour. *Indian Birds*, **3**(2):61-62..

Pandav B. (1997). Birds of Bhitarkanika mangroves, eastern India. Forktail, 12:9-20.

Prasad S.N., Ramachandra T.V., Ahalya N., Sengupta T., Kumar A., Tiwari A.K., Vijayan V.S., and Vijayan L. (2002). Conservation of wetlands of India- a review. *Tropical Ecology*, **43**(1):173-186.

Singh L.A.K., Srivastava S.S. and Raut S.D. (2001). Observations on nesting ecology of Black-headed Munia (*Lonchura malaca malacca*). *Zoos Print*, **16**(2):423-427.

Sahu H.K. and Rout S.D. (2005). Checklist of waterbirds in Mayurbhanj district, Orissa, India. *Zoos Print*, **20**(9)1992-1993.

Sathiyaselvam P. and Balachandan S. (2007). A large breeding colony of River Tern Sterna aurantia in Chilika lake, Orissa, India. *Indian Birds*, **3**(2):65-66.

Urfi A.J., Sen M., Kalam A. and Megnathan T. (2005). Counting Birds in India: Methodologies and Trends. *Current Science*, **89**(12):1997-203.