Nature & Environment
Vol. 19 (2), 2014: 188-194
Website: www.natureandenvironment.com

ISSN (Print) : 2321-810X
ISSN (Online) : 2321-8738

RESEARCH ARTICLE

Study on Waders and Wetland Bird Diversity, and their Habitat Selection of Some the Fresh Water Resources around Yavatmal City, Maharashtra, India

Praveen Joshi
Department of Zoology, Amolakchand Mahavidyalaya, Yavatmal, 445001, M.H. India
Email: praveenpjoshi@rediffmail.com

Received: 12th May 2014, Revised: 10th June 2014, Accepted: 15th June 2014

ABSTRACT

The study of Waders and wetland species diversity and richness of some fresh water resources was carried out in the period of Oct. 2013 to Mar 2014. Total number of 57 bird species in 3 orders and 13 families was recorded during the survey. It was observed that there was a significant relationship between habitat and bird species diversity. The results of this study showed that bird diversity was normally distributed in all the sites like 43 -Borgaon dam, 40 - Nilona dam, 48 - Jamwadi dam, 26 - Arjuna dam, 22 -Echori Lake and 36 - Singhandov dam. Out of 57 waders 16 species were noticed on all the water bodies but 10 waders were observed on single dam because of their highly-specific habitat requirements. Waders are become increasingly intolerant of even slight ecosystem disturbance which includes water quality index, soil quality index, aquatic weeds diversity, food availability, surrounding area and special features .It is really gives satisfaction that all the ecological parameters are within their permissible limits and all the fresh water resources are the best nesting, feeding, and breeding ground as per species required. The majority of wetland birds observed during this study were wide spread resident, comprising 29 % of the total species, followed by widespread winter visitor 12%, very local resident 1%, local resident-winter visitors 6%, widespread Resident –winter visitors 7 % and seasonal winter visitors vegetation 2% . Wetland birds have been found to be good indicators of the wetland environment and it must be managed sustainably. They could serve as indicators revealing the state of the wetland, as dispersal agents in transferring nutrients and spores from one wetland to another during migration and local movements, Immediate action should be taken by authority for improving the availability of fresh water bodies and control on anthropogenic activities which automatically helps to increase the waders and wetlands species in this area.

Key Words: *Waders, Wetland, Diversity, Habitat selection, Fresh water resource*

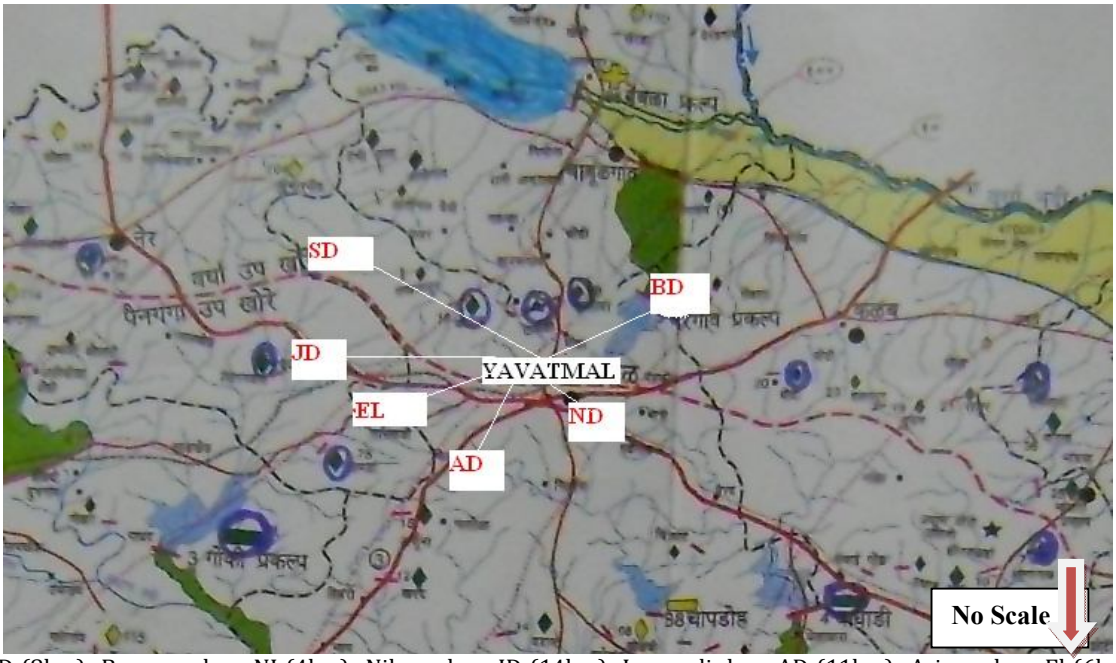
INTRODUCTION

Waders, called shorebirds is used to refer to long-legged wading birds such as storks ,herons and many small birds, which bear greater resemblance to waders like Sandpipers stints,plovers,wagtails, terns, etc. This leaves about 210 species, most of which are associated with wetland or coastal environments. Many species of Cold and temperate regions are strongly migratory, but tropical birds are often resident, or move only in response to rainfall patterns. Some of the species, such as Stints, are amongst the longest distance migrants, spending the non-breeding season in the hemisphere. The majority of species eat small invertebrates picked out of mud or exposed soil. Different lengths of bills enable different species to feed in the same habitat, particularly on the coast, without direct competition for food. Many waders have sensitive nerve endings at the end of their bills which enable them to detect prey items hidden in mud or soft soil. Some larger species, particularly those adapted to drier habitats will take larger prey including insects and small reptiles. Waders and many other groups are subsumed into a greatly enlarged Ciconiiformes order. Many of the smaller species found in wetland habitats, particularly but not exclusively the calidrids, are often named as "sandpipers", but this term does not have a strict meaning, since the Upland Sandpiper is a grassland species. The study was carried out at six different fresh water bodies during Oct. 2013 to Mar. 2014. All the details are given in the Observation Table 1 and Graph1.

Table 1: Details of fresh water resources

Fresh Water Resource	Type of Project	Location	Area	Utility Value
Borgaon dam	Medium	78⁰-17'-43"-20⁰-27'-16"	50.82 sq.k.m	Pisiculture, irrigation
Nilona dam	Medium	78⁰-8'-32"-20⁰-23'-10"	46.15 sq.k.m	Drinking
Jamwadi dam	Medium	77⁰-1'-1/2"-20⁰-1'-1/4"	27.12 sq.k.m	Pisiculture, irrigation
Arjuna dam	Small	77⁰-8'-23"-20⁰-27'-12"	24.16 sq.k.m	Pisiculture, irrigation
Echori lake	Small	77⁰-4'-18"-20⁰-27'-14"	16.48 sq.k.m	Pisiculture
Singhandov dam	Medium	77⁰-58'-8", 20⁰-24'-6"	41.19 sq.k.m	Pisiculture, irrigation

Graph 1: Location and Distance from Yavatmal



(BD (8km)- Borgaon dam, NJ (4km)- Nilona dam, JD (14km)- Jamwadi dam, AD (11km)- Arjuna dam, El (6km)- Echori lake, SD (20km)- Singhandov dam)

MATERIALS AND METHODS

Birds were recorded as bird seen and heard and birds in flight were also noticed. A Binocular with magnification 10× 50X, Digital camera (Nikon 520) were used for observation and identification of birds visually, Photography as well as location record respectively. Grimmett et al (2000) & Grewal B. et al (2011) books were used for field identification and residential status. Macrophytes in shallow water can be collected by hand while those from deeper waters with the help of long handed hook net. Collected specimens are thoroughly washed and excess water soaked with a filter paper, kept in polythene bag and brought to the laboratory. The Macrophytes were identify and classified with the help of literature. The water samples were collected in two

Liters sterilized polythene bottles in the early hours of the day. Every day only one water sample had been collected and analyzed. Temperatures, pH, TDS, hardness, DO, conductivity were measured at the dams' sites by using Standard digital kit. Transparency was measured by using Secchidisc; remaining parameters like alkalinity, CO2, and turbidity were measured as per the procedure described by kodarkar (1992) and also guidelines given by APHA (1995).food availability were studied by observations during regular visits.

RESULTS AND DISCUSSION

Table 2: List of recorded bird species from the selected fresh water bodies of Yavatmal

S. N.	Order	Family	Scientific Namei	Common Name	Habit
1	Gruiformes	Rallidae	Amaurornis phenicurus	White Breasted Waterhen	R
2			Porphyrio Porphyrio	Purple Swamphen	R
3			Gallinula chloropus	Common Moorhen	R
4			Fulica atra	Common Coot	rW
5	Ciconiformes	Scolopacidae	Fantail Snipe	Common Snipe	rW
6			Limosa limosa	Black tailed Godwit	W
7			Tringa erythropus	Spotted Redshank	W
8			Tringa tetanus	Common Redshank	sW
9			Tringa stagnatilis	Marsh Sandpiper	W
10			Tringa nebularia	Common Greenshank	W
11			Tringa ochropus	Green Sandpiper	W
12			Tringa glareola	Wood Sandpiper	W
13			Actitis hypoleucos	Common Sandpiper	sW
14			Calidris minuta	Little Stint	W
15			Calidris temminckii	Temminck's Stint	W
16			Calidris ferruginea	Curlew Sandpiper	W
17			Philomachus pugnax	Ruff	W
18		Rostratulidae	Rostratula benghalensis	Greater Painted Snipe	r
19		Alcedinidae	Alcedo atthis	Common Kingfisher	R
20		Halcyonidae	Halcyon smyrnensis	White Throated kingfisher	R
21		Cerylidae	Ceryle rudis	Pied kingfisher	R
22		Jacanidae	Hydrophasianus chirurgus	Pheasant tailed Jacana	R
23			Metopidius indicus	Bronze winged Jacana	R
24		Charadriidae	Himantopus himantopus	Black winged Stilt	RW
25			Charadrius dubius	Little ringed Plover	RW
26			Charadrius alexandrinus	Kentish Plover	RW
27			Vanellus malarbaricus	Yellow wattled lapwing	R
28			Vanellus indicus	Red wattled lapwing	R
29		Charadriidae	Glareola lactea	Small Pratincole	R
30		Laridae	Sterna aurantia	River Tern	R
31		Anhingidae	Anhinga melanogaster	Darter	R
32		Phalacrocoracidae	Phalacrocorax niger	Little Cormorant	R
33			Phalacrocorax fuscicollis	Indian Cormorant	R
34			Phalacrocorax carbo	Great Cormorant	RW
35		Ardeidae	Egretta garzetta	Little Egret	R
36	Ciconiformes		Ardea cinerea	Grey Heron	RW
37			Ardea purpurea	Purple Heron	R
38			Casmerodius albus	Great Egret	RW
39			Mesophoyx intermedia	Intermediate Egret	R
40			Bubulcus ibis	Cattle Egret	R
41			Ardeola grayii	Indian Pond Heron	R
42			Butorides striatus	Little Heron	R
43			Nycticorax nycticorax	Black Crowned Night Heron	R
44			Ixobrychus cinnamomeus	Cinnamon Bittern	R
45		Threskiornithidae	Thre skiornis melanocephalus	Black Headed Ibis	R
46			Pseudibis papillosa	Black Ibis	R
47			Platalea leucorodia	Eurasian Spoonbill	RW
48		Ciconiidae	Mycteria leucocephala	Painted Stork	R
49			Anastomus oscitans	Asian Open bill	R
50			Ciconia nigra	Black Stork	W
51			Ciconia episcopus	Woolly Necked Stork	R
52	Passeriformes	Passeridae	Motacilla personata	White Wagtail(Masked)	rW
53			Motacilla dukhunensis	White Wagtail (Pied)	rW
54			Motacilla maderaspatensis	White Browed Wagtail	R
55			Motacilla citreola	Citrine Wagtail	rW
56			Motacilla thunbergi	Yellow Wagtail	W
57			Motacilla cinerea	Grey Wagtail	rW

(R-widespread resident, W-widespread winter visitor, r-very local resident, s-Seasonal visitor, rW-local resident-winter visitos, RW-widespread Resident –winter visitors, sW- seasonal winter visitors)

Table 3: FWR-Fresh water Resource

S. N	FWR	Specific Habitat status					
		WQI	SQI	AW	F A	S A	S F
1	BD	All the parameters are within the Permissible limits.	All the parameters are within the Permissible limits.	Ten Varieties like Hv,Cz,Pd,Pc,Ia, Vs,Pa,Nm,Ss, and Ec were noticed.	List of creature were primarily observed like Sn, Cl, Ab, Pdb, Wb, Dn, Ml, Gh, Fw----------etc.	40% area is Covered with hill and 60% by open Surface area.	Open surface areas are helps to watch every activity from longer distance.
2	N D	All the parameters are within the Permissible limits.	All the parameters are within the Permissible limits.	Fourteen varieties likeHv,Cz,Pd,Pc ,Ia,Vs,Pa,Nm,Ss, Ec,Pp,Pc,Lm and Sa were observed.	List of creature were primarily observed like Sn, Cl, Ab, Pdb, Wb, Dn, Ml, Gh, Fw----------etc.	70% area is covered with slopes, vegetation and bushes and 30% by forest.	Vegetations and slopes are the good hiding and breeding places for them.
3	J D	All the parameters are within the Permissible limits.	All the parameters are within the Permissible limits.	Twelve varieties like Hv,Cz,Pd,Pc,Ia, Vs,Pa,Nm,Ss,Ec, Pp and As were identified.	List of creature were primarily observed like Sn, Cl, Ab, Pdb, Wb, Dn, Ml, Gh, Fw----------etc.	90% area is covered with forest and 10% by open space and small bushes.	Forest area near the shower is the better resting and hiding places.
4	A D	All the parameters are within the Permissible limits.	All the parameters are within the Permissible limits.	Eleven varieties like Hv,Cz,Pd,Pc,Ia, Vs,Pa,Nm,Ss,Ec and Nn were found.	List of creature were primarily observed like Sn, Cl, Ab, Pdb, Wb, Dn, Ml, Gh, Fw----------etc.	90% area is covered with Agricultural land and 10% by forest.	Anthropogenic activities in the field are Provided security to from predatory creatures.
5	E l	All the parameters are within the Permissible limits.	All the parameters are within the Permissible limits.	Seven varieties like Hv,Cz,Pd,Pc,Ia, Nm and Ss were conformed.	List of creature were primarily observed like Sn, Cl, Ab, Pdb, Wb, Dn, Ml, Gh, Fw----------etc.	All the area is surrounded by hill and dense forest.	Isolated water body is the home of specific species.
6	S D	All the parameters are within the Permissible limits.	All the parameters are within the Permissible limits.	Fourteen varieties like Hv,Cz,Pd,Pc,Ia, Vs,Pa,Nm,Ss,Ec, Pp,Pc,Cs and As were noticed.	List of creature were primarily observed like Sn, Cl, Ab, Pdb, Wb, Dn, Ml, Gh, Fw----------etc.	All the area is surrounded by agriculture land.	Human presence in the field around shore has given protection from predatory species.

(BD- Borgaon Dam, ND-Nilona Dam, JD-Jamwadi Dam, AD-Arjuna Dam, EL-Echori lake, SD- Singhandov Dam, SR-Species Recorded- 1 to 56 Details given in Table 1., WQ- Water quality Index-- All the Parameters of Water (like-Temperature, pH, Transparency, Turbidity, Alkalinity, Hardness, Total dissolve solids, Dissolve Oxygen, Carbon dioxide and Conductivity), SQ- Soil Quality Index- All the parameters of soil (like Nitrates, Phosphates, Potassium and organic carbon.). AW- Aquatic Weeds-Hydrillla verticillata (Hv), Potamogeton diversifolius (Pd), Potamogeton Crispus (Pc), Ipomoea aquatic (Ia), Vallisneria spiralis (Vs), Polygonum amphibium (Pa), Najas minor (Nm), Eleocharis plantoginea (Ep), Cladophora spp. (Cs) Typha spp. (Tp) Chara zeylennica (Cz) Lemna minor (Lm) Scirpus articulates (Sa), Anabaena spp. (As) Elodea Canadensis (Ec), Nelumbo nucifer (Nn) Panicum purpurascens (Pp), Pharagmites communis (Pc) Spirogyra spp. (Ss) Azolla imbricate (Ai). Food Availability (FA)-Sn- Snails, Cl- Clams, Ab-Aquatic bugs, Pdb- Predaceous diving bettles, Wb-Water bettles, Dn-Dragonfly nymphs, Ml- Midge larvae, Gh-Grasshoppers-, Fw-Flatworms- etc. SA- Surrounding Area, SC- Special Feature)

During study period i.e. from Oct.2013 to Mar 2014, 57 species were recorded in the selected fresh water bodies of Yavatmal which belonging to 3orders (Gruiformes, Ciconiformes, Passeriformes) and 13 families (Rallidae, Scolopacidae, Rostratulidae, Alcedinidae, Halcyonidae, Cerylidae, Jacanidae, Charadriidae, Charadriidae, Laridae, Anhingidae, Phalacrocoracidae, Ardeidae, Threskiornithidae, Ciconiidae, Passeridae). Family Scolopacidae was found to be the most dominant family represented by 13 species followed

by family Ardiedae represented by 10 species. Observation Table-1 and Graph-1 illustrates bird species diversity, Taxonomy and details about habit. The dominant habit was wide spread resident, comprising 29 % of the total species, followed by widespread winter visitor 12%, very local resident 1%, local resident-winter visitors 6%, widespread Resident –winter visitors 7 % and seasonal winter visitors vegetation 2% .

It was observed that waders constitute one of the common fauna of all habitat types, and because they are responsive to change, their diversity and abundance can reflect ecological trends in other biodiversity. Because of their highly-specific habitat requirements, birds become increasingly intolerant of even slight ecosystem disturbance and their details are giver in observation Table-3 which includes water quality index, soil quality index, aquatic weeds diversity, food availability, surrounding area and special features.

The dam wise species details are mention in observation Table-4 & Graph-3, 43 species of waders were counted on the Borgaon dam,40 on Nilona dam, 48 on Jamwadi dam, 26 on Arjuna dam, 22 on Echori lake and 36 on Singhandov dam. Some of waders like White Breasted Waterhen, Common Coot, Wood Sandpiper, Common Sandpiper, Common Kingfisher , White Throated kingfisher, Pied kingfisher, Red wattled lapwing, River Tern, Little Cormorant, Indian Cormorant, Cattle Egret, Indian Pond Heron, Woolly Necked Stork, White Wagtail (Pied), Grey Wagtail were recorded on all the fresh water resources but Purple Swamp hen , Pheasant tailed Jacana , Bronze winged Jacana , Black Crowned Night Heron , Cinnamon Bittern were found only on Niloan dam , Yellow wattled lapwing at Borgaon dam and Black tailed Godwit, Spotted Redshank, Curlew Sandpiper, Ruff on Jamwadi only and so it is clearly indicates about their specific habitat selection (Observation Table-5).

In this study, I provide evidence on the response of waders to certain habitat and it is really gives satisfaction that all the ecological parameters are within their permissible limits and they are the best nesting, feeding, and breeding ground for the species. Waders are rich in their diversity and their number goes on increasing, Black tailed godwit, Temminck's stint, Curlew sandpiper, Kentish Plover, Ruff, Cinnamon Bittern and Black Stork were never recorded regularly but this year it could be possible to observed and click many times and hope it will be goes on increasing. It is very essential to verify all the problems and find suitable solution for the excess growth aquatic weeds, condition of fresh water bodies, management of water which is mainly used for drinking, pisiculture and irrigation purposes and deforestations problems. Immediate action should be taken by authority for improving the availability of fresh water bodies which automatically helps to increase the waders and wetlands species in this area.

Table 4: Number species are recorded on fresh water resources and species numerical (Details are mention in the observation table 2)

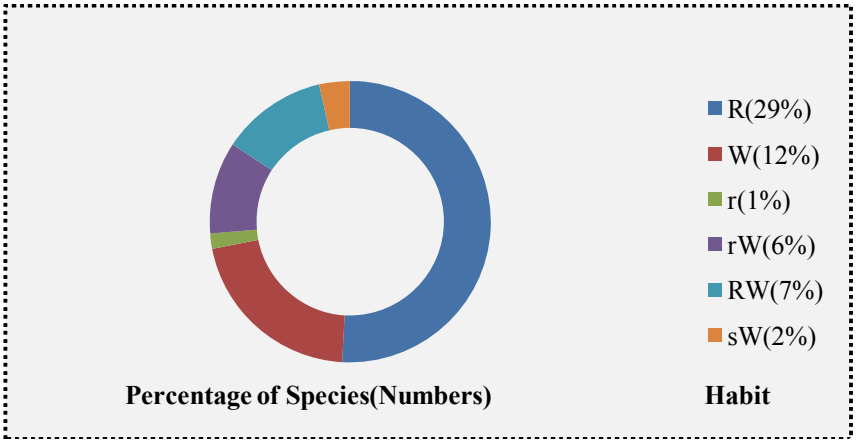
S. No.	Name Fresh Water Resource	Number Species Recorded	Species Details
1	Borgaon Dam	43	1,4,5,8,12,13,14,15,18,19,20,21,24,25,26,27,28,30,31,32,33, 34,35, 36,37,38,39,40,41,42,45,46,47,48,49,50,51,52,53,54, 55,56,57.
2	Nilona Dam	40	1,2,3,4,5,9,12,13,18,19,20,21,22,23,24,28,30,31,32,33,34,35 ,36,37,38,39,40,41,42,43,44,45,46,51,52,53,54,55,56,57.
3	Jamwadi Dam	48	1,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,24,25,26, 28,30,32,33,34,35,36,37,38,39,40,41,42,45,46,47,48,49,50, 51,52,53,54,55,56,57.
4	Arjuna Dam	26	1,3,4,12,13,19,20,21,24,25,28,29,30,32,33,35,38,40,41,42,49,51,5 2,53,55,57.
5	Echori Lake	22	1,4,12,13,19,20,21,25,28,30,32,33,36,37,40,41,42,49,51,53,56,57.
6	Singhandov Dam	36	1,3,4,10,11,12,13,14,15,19,20,21,24,25,28,29,30,32,33,34,35,36,3 7,38,40,41,46,47,49,51,52,53,54,55,56,57.

Table 5: Species Recorded in all or single fresh water resources and their numerical **(**Details are mention in the observation table-2)

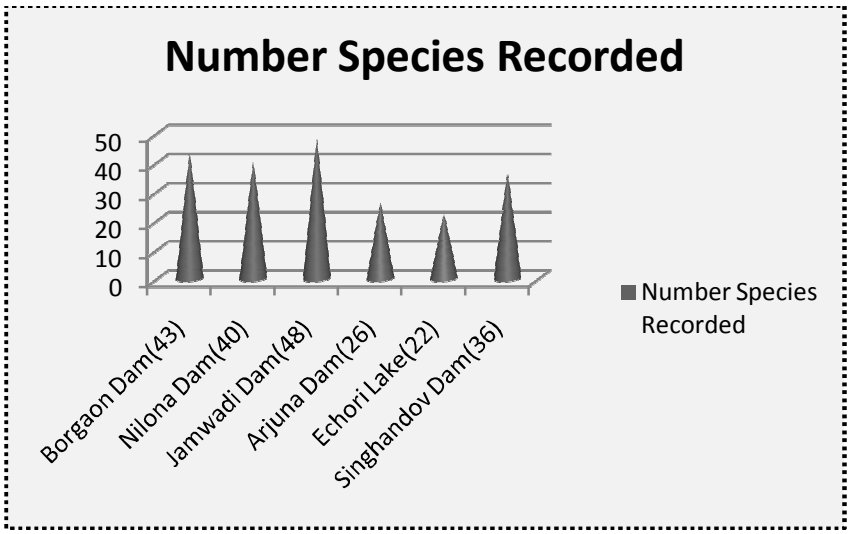
.

Name of the Dam	Species Recorded
All (BD,ND,JD,AD,EL,SD)	1,4,12,13,19,20,21,28,30,32,33,40,41,51,53,57.
Single	2-ND,6-JW,7-JW,16-JW,17-JW,22-ND,23-ND,27-BD,43-ND,44-ND.

Graph 2: Percentage of species relation to habit and abbreviations (Details are mention in observation Table No. 2)



Graph 3: Number of species recorded in the fresh water resources



ACKNOWLEDGEMENT

The author is very grateful to the people of Bird watcher group of Yavatmal; Special thanks also go to Mr. Pramod Jirapure and zoology Dept. personals for constant encouragement and lab and field facilities.

REFERENCES

1. Abdulali H. (1972): Checklist of Birds of Maharashtra. Bombay Natural History society, Mumbai.
2. Ali S. (1996): The book of Indian birds. 11th Edition, Bombay Natural History Society and Oxford University Press, Bombay.
3. Ali S. (2002): Oxford University Press, Delhi.
4. Anon (2000): Wetland values and functions. The Ramsar Bureau. Gland, Switzerland, pp. 20-25.

5. APHA, AWWA and WPCF (1995): Standard methods for the examination of water and waste water, 19thed. American public Health Association, Washington D.C.
6. Dayananda G.Y. (2009): Our Nature, 7: 100-109.
7. Grewal B. (2000): Birds of the Indian subcontinent. Local colour limited, Hongkong, 213 pp.
8. Grewal B., Harvey B. and Pfister O. (2011): Birds of India. Periplus Editions (HK) Ltd., 512 pp.
9. Grimmet R., Inskipp C. and Inskipp T. (1999): Oxford University Press, Delhi.
10. Hutchinson G.E. (1993): A Treatise on Limnology. Vol. IV, the Zoobenthos. Ed. Y.H. Edmondson. John Wiley & Sons, Inc. Xx, 944 pp.
11. Kodarkar M.S. (1992): Methodology for water analysis, IAAB, 2: 2-16.
12. Kumar P. and Gupta S.K. (2009): Our Nature, 7: 212-217.
13. Kurup D.N. (1991): Migrant shore birds in estuarine habitats with special reference to Kadalundi and Bharathapuzha estuaries. In Proceedings of the third Kerala Science Congress, Feb-March, 1991, Kozhikode. pp. 31-32.
14. Lloyd E. (2003): The Encyclopedia of Insects. Academic Press, pp. 115-120.
15. Mandal R.C. (2007): Weed, weedicide and weed control. Agrobios., 128-154.
16. Murphy K.J. (1988): Aquatic weed problems and their management, a review. The worldwide scale of the aquatic weed problem. Crop Prot., 7: 232-234.
17. Rathore and Sharma (1999): Avifauna of a lake in district Etawah, Uttar Pradesh, India. Zoos' Print, 15(6): 275-278.
18. Steward R.E. Jr. (2007): Technical aspects of wetlands: Wetlands as bird habitat. United States Geological Survey Water Supply Paper, pp. 24-25.