



ISSN: 2582-8169

“AQUATIC LIFE OF INDIAN BIRDS”

¹ Piyali Datta ²Dr. Sneha Pandey

¹Research Scholar ²Associate Professor

Department of Zoology

Ram Krishna Dharmarth Foundation (RKDF) University, Ranchi

Received: 21st January, 2023;

Revised: 19th February, 2023

Accepted: 25th May 2023

Abstract: The most desirable species on earth and a sensitive bio-indicator, aves of the Chordate family regulate the quality of living environments in a manner similar to that of South 24 Parganas in West Bengal, India. West Bengal is a maritime region in the northeastern part of the Indian subcontinent with an area of 10,158,22 sq.km. The coastal area includes the famous Indian Sunderbans mangrove swamps found on the Ganges (Hooghly), Brahmaputra and Meghna rivers-delta meeting with Bay of Bengal. India's Sunderbans is declared World Heritage Site in 1987. The area is known for its heterogeneous diversity of wildlife, including 260 species of birds; such as *Scaly-breasted munia*, *River kingfisher*, *White-breasted water-heron*, *Asian blue-cheeked bee-eater*, *Oriolus chinensis*, *Eastern great egret* etc. Land reform through development projects, pollution, disruption, dangerous human activities and the risk of future losses habitat due to rising sea levels are some of the biggest threats to marine birds. Conservation action can be better directed and more effective if 'habitat use' and 'environmental sustainability' of endangered species are understood. The main purpose of my research is to prepare basic human data, the emergence and density of aquatic bird species and their seasonal diversity. It highlights various aspects of nature such as breeding, roosting and foraging of different species of seabirds in order to develop ways to improve the conservation of wetlands, plants and animals. This work is based on migration, winter migration, migratory migration and bird species. The Shannon-Wiener index and fundamental statistics, including mathematical descriptions and standard deviations, are used to calculate the species diversity in the Microsoft Excel package. In the study of topological features, physic-chemical boundaries, aquaculture, ethological structure and relationship between nature and local residents of wetlands, it is hoped that this activity will be very helpful to bird watchers, conservationists, tourists, students, researchers, forestry investigators, and biologists.

Keywords: *Aquatic Avian ('ecological litmus paper') Diversity, South Bengal of India*

I. INTRODUCTION

Wetlands and deltas are diversified heterogeneous ecosystem in reference to avian species. There are different types of threats, like human disturbance through land use. These are reflected on birds' psychology.

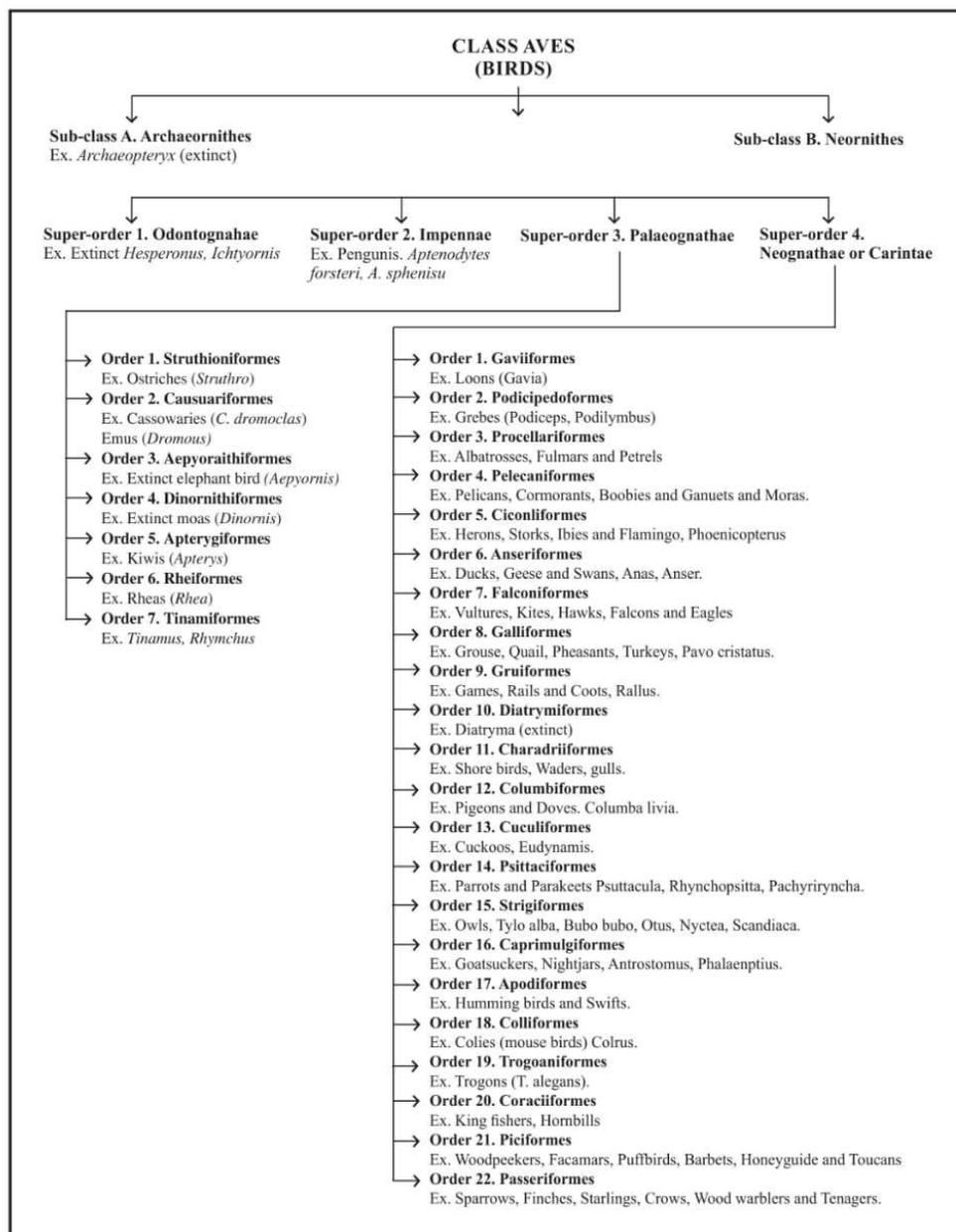
*Corresponding Author: **Piyali Datta**

Email: dattapiyal@gmail.com

Aquatic birds born, reproduce, feed and die in wetlands. The study of their psychology helps to study the diversity. There are two basic methods of studying bird psychology and behavior:

- (a) Observing birds in their natural condition and surroundings;
- (b) In accordance with Herold E. Burt, it is based on the auditory and visual organs of the birds, the urges and motives, such as hunger and sex, migration, which is both an instinctual and taught

Table 1 :: Classification of CLASS AVES (BIRDS)



WHY WATCH BIRDS:

1. Colourful and lively creatures – chirp, whistle and sing
2. All around us, even in cities
3. No specialized equipment required, only binocular and a notebook
4. Bird is the mirror of the nature.

- Summer or pre monsoon from March to May
- Southwest monsoon from June to September
- Post monsoon from October to November

DESCRIPTION OF THE STUDY SITES:

South Twenty-Four Parganas Region:

Wetlands are transitional areas between aquatic and terrestrial ecosystems. The district 24-Parganas of West Bengal of India is divided into six sub-divisions; among them my study area is Diamond Harbour zone. There are freshwater and brackish water wetlands. The stations surveyed are as follows :

Mamudpur pond, Samsundarpur pond, Apsara jheel, Balsura jheel, Roychak beel, Kellar jheel, Harwood pond, Kakdwip fishery, Moynapara pond I and II, Bishalakshmpur pond, Narayanpur pond, Gansagar beel etc.

For most aquatic birds, research will be conducted in the study area prior to the selection of the study site. Considering the ecological compatibility and diversity of habitats, six major areas will be selected as the area for in-depth activity research.

Based on main four seasons of India my study is on :

- Winter from December to February

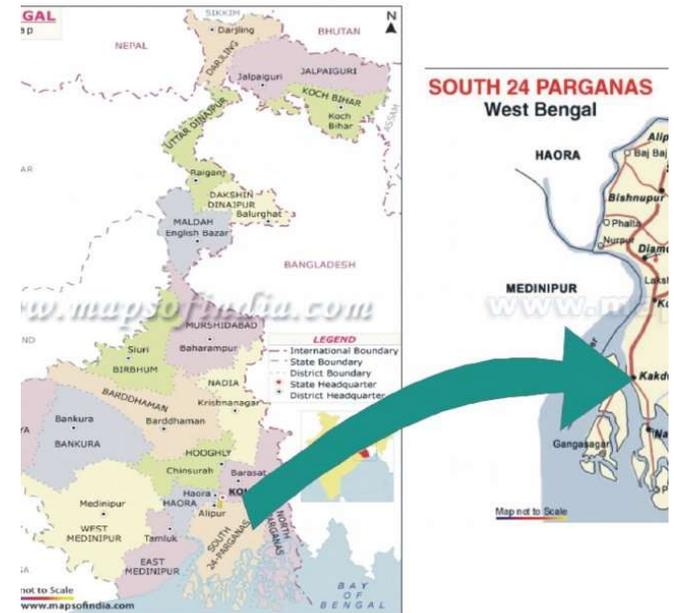


Figure: 1 Study site

BIRDS SURVEY

METHODOLOGY:

Data Collection:

The abundance of species will be calculated by their appearance during the study classified as rare, common and uncommon in a particular study area. Depending on the seasonal variation in the composition of the species, animal species are classified as migratory, migratory winter, migratory habitats and habitats.

Wealth of species:

The richness of the species will be measured by the number of species of seabirds recorded during the weekly census at various locations during the study period (Verner, 1985). The richness of the species will also be calculated in all natural groups.

Variety of species

To assess the diversity of aquatic species and ecosystems during the months of the study period, year and region of the study the species diversity will be calculated using the Shannon-Wiener indicator (Shannon & Wiener, 1949) .The diversity index will be calculated as

$$H = - [\sum (P_i \log_{10} P_i)]$$

where P_i is an individual component of a given type,

\log is a natural log of 10 and

H represents the total value of the variant.

Mathematical analysis

Basic statistics i.e., arithmetic mean and standard deviation were calculated for all the data by $\bar{X} \pm 1 \text{ SD}$. Statistical analyses were performed by using Windows-based worldwide most popular statistical package viz. Microsoft Excel.

Fields observation and collection:

1. Freshwater of Hugli river and Bay of Bengal
2. Brackish-water

Local natural ponds, jheels and water lands



Figure: 2 Estuary



Figure : 3 :: Brackish water



Figure : 4 [Asian green bee-eater]
Merops orientalis



Figure : 5 [Red-whiskered Bulbul]
Pycnonotus jocosus



Figure : 6 [Black-hooded Oriole]
Oriolus xanthornus



Figure : 7 & 8 [White-breasted Kingfisher – *Halcyon smyrnensis*]



Figure : 9 [Little Cormorant]
Halcyon smyrnensis



Figure : 10 [Chinese pond Heron]
Ardeola bacchus



Figure : 11 [White-breasted Waterhen]
Amaurornis phoenicurus



Figure : 12 [Asian Koel] –Pied Cuckoo or
Eudynamis scolopaceus campaign helps
tracking their migration in association of the
monsoon

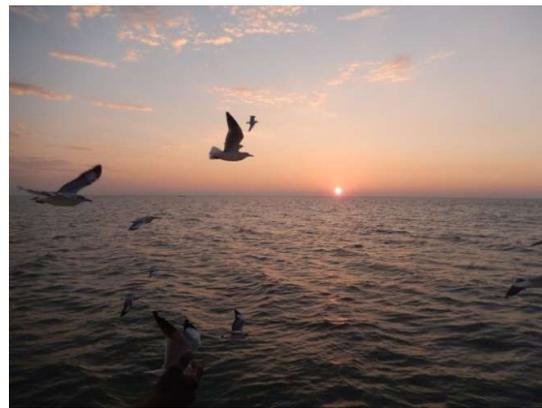


Figure : 13 & 14 [Gull - *Chroicocephalus sp.* flying over Bay of Bengal]

Table : 2 :: Aquatic Bird recorded from South Bengal and adjacent areas :

Sl.	Common name	Scientific Name	Family
1.	Duck	<i>Dendrocygna sp.</i>	Anatidae
2.	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae
3.	Little Grebe	<i>Tachybaptus ruficollis</i>	Podicipadidae
4.	Rock Pigeon	<i>Columba livia</i>	Columbidae
5.	Pied Cuckoo or Koel	<i>Clamator jacobinus</i>	Cuculidae
6.	India Nightjar	<i>Caprimulgus asiaticus</i>	Caprimulgidae
7.	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Apodidae
8.	Indian Water-rail	<i>Rallus indicus</i>	Rallidae
9.	Whitebreasted Waterhen	<i>Amaurornis phoenicurus</i>	Rallidae
10.	Gull	<i>Chroicocephalus sp.</i>	Laridae
11.	Common Kingfisher	<i>Alcedo atthis</i>	Alcedinidae
12.	Little Cormorant	<i>Phalacrocorax niger</i>	Phalacrocoracidae

And many more are recorded.

GAPS IN OUR KNOWLEDGE:

1. Geographical distribution of birds
2. Migratory routes and seasonality of different species

Impacts of changing, human-modified environments

RESULTS AND DISCUSSIONS:

1. The main objective of this study was to update the basic data on species of water birds in and around South Bengal and related ecosystems. This study will provide information on comparative behaviors of water-birds. This study will make data available to understand ecology, ethology and the effects of human actions in the study area.
2. Know the composition of the species of water birds in the right places in and around the South 24 Parganas region, West Bengal
3. Study of the abundance, emergence and evolution of populations of aquatic bird species
4. Assessing the seasonal variability of waterfowl
5. Identify environmental factors that affect the diversity of water birds
6. Study the different aspects of nature such as breeding, foraging and feeding of different species of water birds
7. Propose measures to improve the conservation of wetlands, their flora and fauna.

CONCLUSION

Sunderban of South 24-Parganas is acknowledged as one of the world heritage centre in 1987. In 1989, it was declared as 'Biosphere reserve'. 150 species of birds population is the pick point of my research. The diversified relationship among flora and

fauna regulate the biodiversity. Avifauna dominates the branches of the trees. The effect of climatic variability and drastic weather change due to global warming affects the avian diversity. More and more research and proper initiatives will be helpful to save the BIRDS "the Feathered Biped" from extinction. Diversity of bird species is greatest in tropical regions near the equator and decreases towards the poles. α , β and γ levels of diversity are compared that may affect the structure and composition of the avian species assemblages in South 24 Parganas wetlands.

We need research on it for progressive discovery of our own ignorance to preserve from extinction. According to International Union for Conservation of Nature (IUCN) Red Data Book:

Birds : 1) Extinct : (Paleo species, Neospecies) :- Passenger pigeon, Ivory-billed woodpecker

2) Threatened : (a) Endangered, (b) Rare, (c) Depleted :- Spanish Imperial Eagle, Bengal florican or Bengal bustard.

REFERENCES

1. Balcombe, C, Anderson, J., Fortney, R.H., Kordek, W.S. "Aquatic macro invertebrate assemblages in reduced wetlands and ecosystems." *Hydrobiology* 541. 175-188, 2005.

2. Czech, H.A., Parsons, K.C. "Agricultural wetlands and aquatic birds: a review." *Water birds* 25 (suppl. 2), 56 - 65, 2002.
3. Erwin, R.M. "Integrated management of seabirds: extraordinary." *Water birds* 25 (suppl. 2), 5 - 1, 2002.
4. Erwin, R.M., and Beck, R.A. "Restoration of Chesapeake Bay seabirds: the most anticipated or Sisyphus re-visited? *Water Birds* 30 (Special Publication 1)". 163-176, 2007.
5. Froneman, A., Mangnall, M.J., Little, R.M., and Crowe, T.M. "The combination of waterfowl and the associated habitats of farm ponds in the Western Cape, South Africa." *Biodiversity and Conservation* 10, 251 -270, 2001.
6. Hannam, K.M., Oring, L.W., and Herzog, M.P. "The effects of salt on the growth and behavior of chicks in American Avocet." *Waterfowl* 26, 119 - 125, 2003.
7. Joel Carl Welty and Luis Baptista "The Life of birds" 0-03-068923-6, 1982 Saunders College Publishing, New York
8. Longcore, J.R., McAuley, D.G., Pendelton, G.W., Bennatti, C.R., Mingo, T.M., and Stromborg, K.L. "The large number of invertebrates, water chemistry, and wetland conditions affect the use of wetlands by birds in Maine, *Hydrobiologia*" 567, 143 - 167, 2006.
9. Losito, M.P., and Baldassarre, G.A. "Use of wetlands for breeding and breeding female mallards in the St. Lawrence River Valley." *Wilson Bulletin* 107, 55-63, 1995.
10. Maldonado-Chaparro AA, Martin JG, Armitage KB, Oli MK, Blumstein DT. "Natural phenotypic diversity in wild marmots with yellow bellies. *J Mammal* ". 96 (2): 269–78, 2015.
11. Megan Taig-Johnston, Madeline K. Strom, Kendall Calhoun, Kendra Nowak, Luis A. Ebensperger & Loren Hayes., "Natural value for long-term studies of birds and mammals in Central America, South America and Antarctica", *Revista Chilena de Historia Natural*, Vol 90, No. 7, pp. 1-13, 2017.
12. Mouslim Bara, Luciano N. Segura., "Impact of Air Temperature and Depth of Water on Birds: Case Study of Rallidae and Anatidae in the Northeastern Algerian Garaet Hadj Tahar", *Pakistan J. Zool.* 51 (1), pages 211-217, 2015.
13. Mukhopadhyay, S. K., Chattopadhyay, B., Roy, G. A. and Chatterjee, A. "The local diversity of zooplankton in water contaminated by combined pollution." 66 (2), 97-106, 2007.
14. Nielsen, SL, Sand-Jensen, K., Borum, J., and Geertz-Hansen, O. "Depth of eel grass (*Zostera marina*) and large algae as determined by the presence of water in the Danish coastal waters. " *Coastal Rivers* 25, 1025 - 1032, 2002.
15. Prasad, SN, Ramachandra, TV, Ahalya N., Sengupta, T., Kumar, A., Tiwari, AK, Reginald, VS, Mahendran, C, Kumar SS, and

- Pramod, P., "Birds of Singanallur Lake. Coimbatore, Tamilnadu. Zoos' Print J. 22 (12), 2944-2948, 2007.
16. Rehfishch, M.M. "Man-made ports and their appeal to waders may be enhanced by controlling the biomass of the benthos insect." *AppUed Ecology Journal* 31,383-401, 1994.
17. Sahu, H. K., Raut, S. D. 2005. "Checklist of seabirds in the Mayurbhanj District, Orissa." *Zoos Print J.* 20, 1992-1993.
18. Salim Ali and Futehally "Common Indian Birds", National Book Trust, India, New Delhi.
19. Sivaperuman, C, Jayson, E. A. "The status and conservation of bird life in the Vembanad-Lole Ramsar region, Kerala, India." *To: Proc. Nat. Conf on Wetland Biodiversity.* February, 2-3, 2006: 31-37, 2006.
20. Slowly, C. "Biology of soft shores and harbors." Oxford University Press, Oxford, 2000.
21. Taft, O.W. and Haig, S.M. "A number of agricultural wetlands as the main source of wintering for coastal birds." *Agriculture, Environment and Environment* 110,249-256, 2005.
22. Vanderbilt K, Gaiser E. "Long-term international environmental research network: a collaborative forum". *Ecosphere.*; 8 (2): e01697, 2017.
- Verner, J. "A study of accounting techniques, in R. F. Johnston [ed.]. *Current ornithology.*" Vol. 2. Plenum Press, New York, 247-302, 1985.