A Case Study on Ichthyofaunal Diversity in Fresh Water Ansupa Lake, Banki, Odisha

Dr. Sashi Bhushan Mohapatra
Department of Zoology, Banki Autonomous College, Banki, Cuttack, Odisha, India

Abstract
Fishes exhibit enormous diversity and biological aspects, as well as in the habitats in which they live. The present study is focused on the status of fish diversity of Ansupa lake. The Lake is identified under National Wetland Conservation Programme. The lake as such enjoys varieties of fish species in its water. Collected sample fishes were measured and identified up to the species level, with the help of standard keys and books. During the study period 39 species of fishes, belonging to 21 families of 9 orders, were recorded. Cypriniformes was dominant (45%) followed by Siluriformes and Perciformes both constituting 24% each, likewise Osteoglossiformes constituting 5% and other contributes 4 % of total fish species. As far as biodiversity status (IUCN-2018) is concerned, out of 39 fish species, 34 fish species were categorized in to least concerned, 1 vulnerable, 2 nearly threatened,1 not evaluated and 1data deficient.
Keywords: Freshwater wetlands, Fishery, Fish diversity, Ansupa, Management, Sustainable development

I. INTRODUCTION

Freshwater represents only about three percent of all water on Earth and freshwater lakes and swamps account for a mere 0.29 percent of the Earth's freshwater. It is estimated that freshwater wetlands alone support 20 per cent of the known range of biodiversity in India. Fishes exhibit enormous diversity of size, shapes, numbers, and biological aspects, as well as in the habitats in which they live. About 21,723 species of fish under 4044 genera, 445 families and 50 orders have been recorded in the world [9]. Around 10,500 species of fishes inhabit freshwaters, of which 10,000 are considered as exclusively freshwater fishes. The freshwater fish fauna of India is highly diverse in nature and constitute 1027 species [7]. Various freshwater resources of Odisha are blessed with diverse fish fauna constituting about 13.92% of the freshwater fish fauna in India [4]. Odisha situated in the east coast of India, bestowed with 6.66 lakh hectors of freshwater resources. Odissa has Ansupa and Kanjia Lake under freshwater sector. Ansupa Lake is identified under National Wetland Conservation Programme [1]. The lake as such enjoys varieties of fish species in its water. Fish diversity comprises of species richness (number of species in a defined area), species abundance (relative number of species) and phylogenetic diversity (relationships between different groups of species), [8]. Fishes are the important indicator of aquatic ecosystem and occupy a remarkable position from a socioeconomic point of view. The lake has got immense socioeconomic value as the fishermen from the local village derive their livelihood. Fish is very rich source of protein as well as vitamins and other minerals. In the present communication an attempt was aimed to document information on fish diversity resources. The study was carried out by documenting the following aspect.
1. Collection of primary data on fish diversity based on specimen procured by fisherman.
2. Identification and enlisting the fish species prevalent in the Lake.

II. MATERIAL AND METHODS

II.1 Study Site

Ansupa lake is situated in Banki block of Cuttack district of Odisha. Geographically, it is within 20.26'28.43"to 28.28'34.44"latitude and 85.35'56.74"to 85.36'30.01"longitude. It is exactly situated on the bank of the river Mahanadi. Apart from this original existence as lake, it is declared as "Wetland of national importance. The lake Ansupa is surrounded by two hills. One is Saranda hill on its western side and Bishnupur hill on its north-eastern side. The length of the lake is approximately three kilometres and breadth vary from 250m to 500m embracing an area of about 328 acres. The total water spread area of this lake is 152.00 ha. and catchment area 5231.00 ha. Ansupa is connected with the Mahanadi on its southern side with a channel called Kabula Nala (Kabula Channel) through which flood water of the river Mahanadi passes the lake. It's relation to the Mahanadi and the geometry of this lake is as like as a horseshoe, for which it is popularly known as horseshoe Lake of Odisha. The entire horse shoe shaped area of the lake appears to be surrounded by greenery or large trees. The lake Ansupa is famous owing to rich diversity of species. Different species of insects like

butterflies, dragonflies, damselflies, honeybees, wasps and beetles multiply the magnitude of the beauty. The lake as such enjoys varieties of fish species in its water. In addition to animal diversity, the lake is unique for its floral diversity. Submerged species and floating species of plants of this lake is spectacular. This enhances the beauty of the green environment.

Table-1 General Features of Ansupa:
(1)	Location-	Banki, District-Cuttack, Odisha
(2)	Type-	Freshwater Lake
(3)	Length of the lake-	Approximately three kilometres
(4)	Breadth-	Varies from 250m to 500m
(5)	Area-	328 acres
(6)	Water spread area of the lake-	152.00ha
(7)	Catchment area-	5231.00 ha
(8)	Number of villages in catchment area-	28
(9)	Primary fisherman cooperative society-	01

Source: Chilika Development Authority, Forest and Environment Department, Government of Odisha.

II.2 Sampling of Fish Specimen
Fishes were collected and sampling was done in two ways:
(1) By Nets: - The fish specimen was sampled from their natural habitats.
(2) From Market and Landing sites: - The local fish market, village market and landing sites were also visited, and specimen procured.

II.3 Recording and Identification of Fish Specimen
The collected fishes were labelled with coded numbers and recorded against a number. The details included date, time and locality of collection and other related information of specimen. Sample fishes were measured and identified up to the species level, with the help of standard keys and books of [5,4,13,9,3, and; 10] . Identification of fish specimen was based on diagnostic characters such as body form, colour, size, shape and position of fins, meristic features such as the number of rays in a fin or the number of scales in a specific series, the presence of scales in a specific series, the presence of distinctive organs such as barbless, or the lateral line and various proportions such as the ratio of the length of the head to the total length of the body, etc. The relevant literatures were collected by both offline and online searching. The scientific names of the identified fishes were also checked by referring the website.
Species based on their percentage of occurrence categorized into:
1. Dominant: Species occurred more than 80 percent of sampling sites,
2. Abundant: Species occurred in 60 – 80 percent of sampling sites,
3. Less abundant: Species occurred in 40 - 60 percent of sampling sites and
4. Rare: Species occurred less than 40 percent of sampling sites.

III.RESULTS AND DISCUSSION
During the study period 39 species of fishes, belonging to 21 families, were recorded. These fishes include in nine orders.Cyprinids (family: Cyprinidae), Live fish (family: Channidae, Clariidae, Heteropneustidae), Cat fish (family: Silurdae, Schilbeidae), featherbacks (family: Notopteridae), Glass fishes (family: Ambassidae), and Eels (family: Mastacembelidae) are the major groups of fresh water fishes found in Ansupa lake.[12]and [2] revealed 28 and 24 species of fishes in Ansupa in their respective finding. In a further study [11] reported 43 species of fishes belonging to 21 family. In this study family Cyprinidae with fourteen fish species forms the largest single group in the fish fauna of Ansupa. A list of species. of fish observed during the study is presented in Table- 2. Scientific names and common English names were presented in the table. Among the total enlisted species, the dominant ones included family Cyprinidae representing *Labiorohita, Catlacatla, Cirrihinus mrigal, Labiobata, Labiocalabasu, Chela argentea, Esonusdandricu, Amblyphyringodon mola, Systomussarana, Puntius sarana, Puntius ticto, Puntius sophore, Cirrhinusreba, and Pethiaphutunio.* Likewise, *Labeobata, Notopterusnotopterus, Heteropneustes* and *Wallago attu*are the abundant or common fishes at all sampling sites. Analysis of the fish species recorded reveals that the species belonging to the order Cypriniformes was dominant constituting 45%, (out of which Family Cyprinidae contributes about 43 %) followed by order Siluriformes and Perciformes both constituting 24% each, likewise Osteoglossiformes constituting 5% and other contributes 4 % of total fish species. These fishes have high economic and cultivable values in this region.As far as biodiversity status (IUCN-2018) is concerned, out of 39 fish species, 34 fish species were categorized in to least concerned, 1 vulnerable, 2 nearly threatened,1not evaluated and 1data deficient.

Table-2 Fish diversity of Ansupa and their threat status

Order	Family	Vernacular name/Common name	Scientific name	IUCN Status
Cypriniformes	Cyprinidae	Rohu	*Labiorohita*	LC
		Catla	*Catlacatla*	LC
		Mirgal	*Cirrihinusmirgal*	LC
		Bata	*Labiobata*	LC
		Kalbasu	*Labiocalabasu*	LC
		Silver razorbelly minnow	*Chela argentea*	LC
		Molacarplet	*Amblyphyringodon mola*	LC
		Flying Barb	*Esonusdandricu*	LC
		Olive Barb	*Systomussarana*	LC
		Olive Barb	*Puntius sarana*	LC
		Ticto Barb	*Puntius ticto*	LC
		Pool Barb	*Puntius sophore*	LC
		Reba carp	*Cirrhinusreba*	LC
		Spotted sail barb	*Pethiaphutunio*	LC
	Cobitidae	Guntea loach	*Lepidocephalichthysguntea*	LC
Perciformes	Channidae	Great snakehead	*Channa marulius*	LC
		Walking snakehead	*Channa orientalis*	NE
		Spotted snakehead	*Channa punctata*	LC
		Common snakehead	*Channa striata*	LC
	Ambassidae	Elongate glass-perchlet	*Chanda nama*	LC
		Indian glassy fish	*Parambassisranga*	LC
	Osphronemidae	Giant gourami	*Colisa fasciatus*	LC
		Dwarf gourami	*Trichogasterlalius*	LC
	Gobiidae	Tank goby	*Glossogobiusgiuris*	LC
	Badidae	Dwarf chameleon fish	*Badisbadis*	LC
	Nandidae	Gangetic leaf fish	*Nandus nandus*	LC
	Anabantidae	Climbing Perch	*Anabas testudineus*	DD
Beloniformes	Belonidae	Freshwater gar fish	*Xenentodoncancila*	LC
Cyprinidontiformes	Poeciliidae	Mosquito Fish	*Gambusia affnis*	LC
Siluriforms	Claridae	Cat fishes	*Clariasbatrachus*	LC
	Siluridae	Wallago	*Wallago attu*	NT
	Heteropneustidae	Stinging Catfish	*Heteropneustesfossilis*	LC
	Schilbeidae	Silond catfish	*Siloniasilonia*	LC
	Ailiidae	Gangetic ailia	*Ailiacoila*	LC
	Bagridae	Tengra catfish	*Mystustengara*	LC
Synbranchiformes	Mastacembelidae	Barred spiny eel	*Macrognathuspancalus*	
Ostioglussiformes	Notopteridae	Chital	*Notopterus chital*	NT
		Bronze featherback	*Notopterusnotopterus*	V
Gobiiformes	Oxudercidae	Glass goby	*Gobiopteruschuno*	LC
Tetradontiformes	Tetraodontidae	Ocellated puffer fish	*Tetraodon cutcutia*	*LC*

IUCN status; LC = Least Concern; NT = Near Threatened; VU = Vulnerable; EN =Endangered; DD = Data Deficient; NE =Not Evaluated.

This study provides a baseline data of the fish diversity of Ansupa Lake, therefore emphasizing on better management of the habitat and conservation of its rich diversity. Habitat degradation is today a major threat for fish species. The major threats faced by these fishes were analysed to be both environmental and anthropogenic.

Environmental degradation like siltation, closure of inflow and outflow mechanism from Mahanadi into Ansupa reduced water spread area creating highly eutrophic condition of water and weeds infestation. Anthropogenic activities include fishing, cattle grazing, firewood collection etc. Management of Ansupa lake is being done by Chilika Development Authority (CDA) since November 2009. Though some of the renovation initiatives of Ansupa by CDA and barren hill plantation initiative by Forest Department, Government of Odisha have taken place in the study area. There is a widespread need for conservation of natural ecosystem in aqua regime. Development of culture-based capture fisheries in Ansupa have to be further promoted for narrowing gap between fish supply and demand by which to the sustain aquatic ecosystem. Recent data regarding Fish diversity in Ansupa, aiming to contribute to a better knowledge of the fish diversity in the water resources of Ansupa.

IV.CONCLUSION

The present study investigated the fish biodiversity in the water resources of Ansupa Lake. During the entire study period different fish varieties were observed in the water resources and result shows that the area is rich and diversified fish fauna. This offers immense scope for biodiversity studies and for gaining new opportunities for sustainable development. Another aspect that has come into light that biodiversity is essential for stabilization of ecosystem, protection of overall environmental quality and for understanding the intrinsic worth of all species on Ansupa. To improve with the present state of lake, the implementation of conservation measures could contribute to the increase and sustenance of fish population, which serve as a major source of livelihoods for the local farmers. The findings of present study may serve as baseline information for conservation and management of fish and fisheries resources of Ansupa.

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