



## **Limnological study with emphasis on fish diversity of Loktak Lake, Manipur, India**

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### **ABSTRACT**

*Diversity of several fish species have been observed at Loktak lake, Manipur, India. In this regard quantitative and qualitative analysis of fishes has been. Beside this physico-chemical characteristics of water has been analysed. The study was about 1 year from April 2016 to March 2017. During this study different types of fish species from different family were found and physico-chemical parameters such as DO (Dissolved Oxygen), pH, Free CO<sub>2</sub>, Alkalinity, Water temperature and air temperature were recorded according to standard literature survey.*

**Keywords:** Limnology, wetland, fish diversity, physico-chemical properties.

Received 22.05.2017

Revised 09.06.2017

Accepted 29.06.2017

### **INTRODUCTION**

Limnology is the study of the structural and functional interrelationship of organisms of inland water as they are affected by their dynamic physical chemical and biotic environment. A wetland is a land area that is saturated with water permanently or seasonally.

The diversity is one of the important ecological parameter as they are intermediate link between the phytoplankton and fish and play important role in cycling of organic materials in aquatic ecosystem. These are one of the most important biotic component influencing all the functional aspect of an aquatic ecosystem such as food web food chain and cycling of matter. We have analysis on the physicochemical characteristic of the water of these lake because of there are certain pollution occur in these environment. In these lake there are so many kinds of fish were found. Among them some different type of fish were reported.

The loktak lake of Manipur is the largest wetland in Northeast state of India. It has an area of 26000 ha at FSL with a catchments area of more than 98000 ha. It is situated between 93046'E - 93055' E and 24025'N - 24042' N. The Lake stretches from downstream of Iiril confluence near Lilong to Khuga confluence of Ithai. The maximum depth of the lake is 4.58m and the average depth is 2.07m. The major share of water input in the lake is from a number of rivers and streams. The main rivers are Nambol, Nambul, Thongjaorok, Merakhong, Khujairok etc. Different varieties of fishes both indigenous as well as exotic have been reported from this lake.

North-Eastern region of India has been identified as a 'Hotspot' of Biodiversity by the World Conservation Monitoring Centre. This rich diversity of this region could be assigned to certain reasons, notably, the geomorphology and the tectonics of this zone. The hills and the undulating valleys of this area gives rise to large number of torrential hill streams, which lead to big rivers; and, finally, become part of the Ganga-Brahmaputra-Barak-Chindwin-Kolodyne-Gomati-Meghna system.

### **MATERIAL AND METHODS**

The study was conducted in loktak lake of manipur during the year 2016. Fish diversity and physico chemical characteristic of water has been done during this period. Fish were collected with the help of fishing gears like gill net (vertical height 2.0m), cast net (diameter 3.7 m, 3.1 m), triangular scope net (vertical height 1.0m -1.5m) and variety of traps. At once after collection fish have been preserved in the concentrated formaldehyde and later on they preserved in 4% formalin. They were brought in the laboratory in plastic container. In the laboratory the fishes were identified with the help of the standard taxonomic literature [1],[2],[3],[4],[5],[6],[8].

Water samples were collected for physico chemical analysis from the lake within morning 8 A.M. All the analysis have been done according to standard literature[7].

**RESULTS**

Physico-chemical parameters	PRM	MON	POM	WINTER
Air temperature (°C)	24	29	25	18
Water temperature(°C)	22	27.5	22.5	16.5
pH (mg/l)	6.04	5.9	6	6.06
Dissolved oxygen (mg/l)	4.38	5.2	5.5	4.4
FCO <sub>2</sub> (mg/l)	3.6	4.1	3.9	4.2
TA (mg/l)	40	44	46	42

**Table 1: Physico-chemical parameters of water according to seasonal variation.**

**Table 2: Available fish species according to their family, IUCN category and season of occurrence.**

Scientific name	Family	IUCN LIST	Season of occurrence	Local name
<i>Amblypharynogodon mola (Hamilton)</i>	Cyprinidae	LC	TY	Mukanga
<i>Anabas testudineus (Bloch)</i>	Anabantidae	DD	TY	Ngasamjet Or Ukabi
<i>Botia dario (Hamilton)</i>	Cobitidae	LC	RS	Sareng Khoibi
<i>Catla catla (Hamilton)</i>	Cyprinidae	LC	TY	Bao Or Catla
<i>Chanda nama (Hamilton)</i>	Ambassidae	LC	RS	Ngamhai
<i>Channa punctatus (Bloch)</i>	Channidae	LC	TY	Ngamu Bogra
<i>Cirrhinus mrigala (Hamilton)</i>	Cyprinidae	LC	TY	Mrigal
<i>Clarias batrachus (Linnaeus)</i>	Clariidae	LC	RS	Ngakra
<i>Ctenopharyngodon idella (Valenciennes)</i>	Cyprinidae	NE	TY	Napichabi
<i>Cyprinus carpio (Linnaeus)</i>	Cyprinidae	VU	TY	Puklaobi
<i>Esomus danricus (Hamilton)</i>	Cyprinidae	LC	TY	Belunpaibi
<i>Glossogobius giuris (Hamilton)</i>	Gobiidae	LC	TY	Nailon Nga Or Ngamu
<i>Heteropneutes fossilis (Bloch)</i>	Heteropneussidae	LC	TY	Ngachik
<i>Hypophthalmichthys molitrix (Valenciennes)</i>	Cyprinidae	LC	TY	Silver
<i>Labeo calbasu (Hamilton)</i>	Cyprinidae	LC	RS	Ngathi
<i>Labeo dero (Hamilton)</i>	Cyprinidae	LC	RS	Ngaton Or Khabak
<i>Labeo rohita (Hamilton)</i>	Cyprinidae	LC	TY	Rou
<i>Labeo gonius (Hamilton)</i>	Cyprinidae	LC	TY	Kuri
<i>Lepidocephalichthys guntea (Hamilton)</i>	Cobitidae	LC	TY	Ngakijou
<i>Mastacembelus armatus (Lacepède)</i>	Mastacembelidae	LC	TY	Ngaril
<i>Mystus bleekeri (Day)</i>	Bagridae	LC	TY	Ngasep
<i>Mystus cavasius (Hamilton)</i>	Bagridae	LC	TY	Ngasep
<i>Notopterus notopterus (Palls)</i>	Notopteridae	LC	TY	Ngapai
<i>Ompok pabda (Hamilton)</i>	Siluridae	NT	RS	Ngaten
<i>Osteobrama belangeri (Valenciennes)</i>	Cyprinidae	NT	RS	Tharak Or Pengba
<i>Parambassis ranga (Hamilton)</i>	Ambassidae	LC	TY	Ngamhai
<i>Puntius chola (Hamilton)</i>	Cyprinidae	LC	TY	Phabounga
<i>Puntius sophore (Hamilton)</i>	Cyprinidae	LC	TY	Phabounga
<i>Trichogaster fasciata (Bloch &amp; Schneider)</i>	Osphronemidae	LC	TY	Ngapemma
<i>Wallago attu (Schneider)</i>	Siluridae	NT	RS	Sareng

\*\* (LC = Least Concern, DD = Data Deficient, NT = Near Threaten, NE = Not Evaluated, VU = Vulnerable)

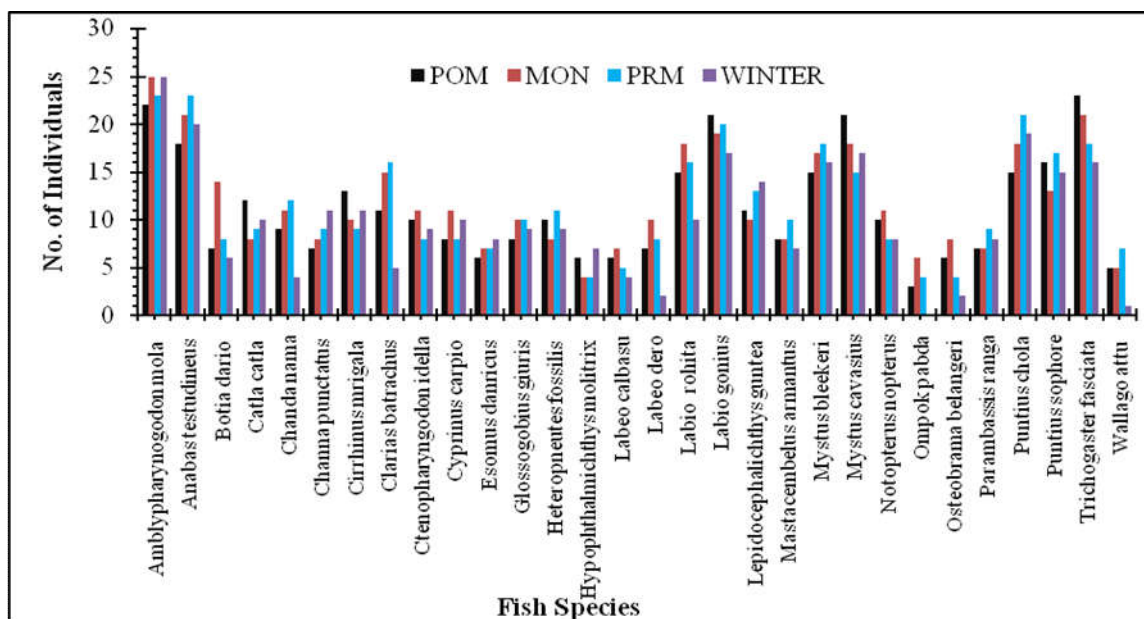


Fig: Seasonal distribution of available fish species during the study period.

## DISCUSSION

Table .1 shows the physico – chemical characteristics of water during the study period. Maximum air and water temperature recorded during monsoon, while minimum temperature recorded during winter. pH found to be good condition. Maximum pH recorded during winter while minimum range of pH recorded during monsoon. Dissolved oxygen and free carbon-di-oxide found to be good in all four seasons. Alkalinity ranges from 40 to 46 mg/l during the whole study period.

Table.2 shows the available fish species found during the whole study according to their family, IUCN category, season of occurrence and their local name. Total 30 fish species belonging from 13 family reported during the study period. Total 8 species found mostly during the rainy season, rest others have been found throughout the year. Total 3 fish species found to be near threaten. These are *Ompok pabda*, *Wallago attu*, *Osteobrama belangeri*. *Cyprinus carpio* found to be in vulnerable condition and *Anabas testudineus* about to data deficient. Rest other fish species have been found to be least concern.

Seasonal variation in the number of several fish species has been expressed in fig. 1 where *Amblypharyngodon mola* found to be dominant in all seasons and *wallago attu* found to be least dominant.

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## CITATION OF THIS ARTICLE

W. Subadani Devi , Das Uma, Das Papia, Kar Sulata and Kar Devashish. Limnological study with emphasis on fish diversity of Loktak Lake, Manipur, India. Bull. Env. Pharmacol. Life Sci., Vol 6 [8] July 2017: 75-77