



ISSN: 0975-833X

## RESEARCH ARTICLE

### DIVERSITY AND ABUNDANCE OF ROTIFER IN YENAPAT LAKE OF BISHNUPUR DISTRICT, MANIPUR, N.E. INDIA

<sup>1,\*</sup>Maibam Bimola, <sup>2</sup>Shashikumar Singh, O. <sup>3</sup>Devashish Kar

<sup>1</sup>Department of Zoology, C. I. College, Bishnupur, Manipur, India

<sup>2</sup>Department of Zoology, D. M. College of Science, Imphal, Manipur, India

<sup>3</sup>Division of Wetland, Fishery Science and Aquaculture, Department of Life Science and Bioinformatics, Assam University, Silchar, India

#### ARTICLE INFO

##### Article History:

Received 20<sup>th</sup> October, 2014  
Received in revised form  
05<sup>th</sup> November, 2014  
Accepted 18<sup>th</sup> December, 2014  
Published online 31<sup>st</sup> January, 2015

##### Key words:

Rotifer, Zooplankton, Yenapat, Manipur, North-East India.

#### ABSTRACT

Rotifers are one of the fascinating groups of zooplankton in the aquatic ecosystem. They are one of the connecting link organisms between primary producers and consumers of higher order in aquatic food web. Rotifers are important group of zooplankton and acts as good indicators of the changes in water quality as they are strongly affected by environmental conditions and respond quickly to changes in water quality. The present study reports on a collection of 18 species of rotifer from Yenapat a freshwater lake in Bishnupur district of Manipur. Quantitative assessment of rotifers was undertaken during October 2012 to September 2013. The collected rotifers belongs to five family viz. Brachionidae (9 genera), Euclanidae (one genera), Lecanidae (4 genera), Mytilinidae (2 genera) and Filinidae (2 genera).

Copyright © 2015 Maibam Bimola et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### INTRODUCTION

Rotifers are commonly known as the wheel animalcules. This minor phylum Rotifera consist of approximately 2030 described species (Segers, 2007). They occur almost everywhere where water is present and important group of zooplankton community. Zooplankton assist in recycle of natural resources, to degrade the waste materials for fish culture, to decompose toxic substances such as ammonia, nitrate, pesticides and herbicides, to established biogeochemical cycle, to establish food chain and food web (Park and Shin 2007; Parnell 2003). They are important indicator in assessment of quality of the aquatic environment (Raghunathan and Kumar 2006). Their abundance is more or less governed by the interaction of a number of physical, chemical and biological processes (De Pauw and Vanhooren, 1983). Zooplankton forms principal source of food for fish (Prasad and Singh 2003; Jennings 1900; Sudzuki 1967; Chengalnath and Fernando 1973; Dumont and De Ridder 1987). Rotifers are important communities of zooplankton in fish culture as they involved in energy transfer of the aquatic ecosystem. Rotifers are important in biological research due to their diversity, smaller sizes, and ease to culture, shorter life spans, transparent bodies and ecological importance (Avinash and Vanjare, 2010) (Vanjare and Pai 2010).

Knowledge of abundance, diversity and distribution of rotifer is one of the important aspects of understanding the trophic progression of water bodies. With the present trend of habitat disturbance such as contamination of the water body in freshwater ecosystem, assessment of species diversity of such bio indicator of aquatic ecosystem is needed. Works on rotifers in India is very scattered (Vanjare, 2008) and largely concentrated in North Eastern states of India (Sharma, 2005). Very limited work on zooplankton is done in the context of Manipur except that of Ersilia Jajo and Singh (2005). Hence it is propose to make an assessment of bioindicator organism in the water bodies of Bishnupur of Manipur.

#### MATERIALS AND METHODS

The present study was carried out in Yenapat lake of Bishnupur district Manipur (24°38'N to 93°48'E) and located at an elevation of 881m above the MSL. Materials for the present study were collected randomly during September 2012 to August 2013 at regular interval between 7-9am using 55 micron mesh size conical plankton net. The collected samples are preserved in 4% formalin with a little amount of glycerine for further studies. Zooplankton sample were collected following the methods described by Edmondson (1959), Michael (1988) and APHA (2006).

\*Corresponding author: Maibam Bimola,  
Department of Zoology, C. I. College, Bishnupur, Manipur, India.

Table 1. Distribution of Rotifer in Yenapat lake

Family	Name of Species	Premonsoon	Monsoon	Postmonsoon
Brachionidae	<i>Brachionus angularis</i>	+	-	+
	<i>B. urceolarius</i>	-	+	+
	<i>B. calyciflorus</i>	+	+	+
	<i>B. falcatus</i>	+	+	+
	<i>B. quadridantatus</i>	+	+	-
	<i>B. ruben</i>	+	+	+
	<i>Keratella tropica</i>	+	-	+
	<i>Anuraeopsis fissa</i>	-	-	+
	<i>Plationus patalus</i>	+	-	-
Euchlanidae	<i>Euclanis dilatata</i>	-	+	+
Lecanidae	<i>Lecan helicysta</i>	+	+	+
	<i>L. (Monostyla) bulla</i>	+	+	-
	<i>L. papuana</i>	-	+	+
	<i>L. leontina</i>	+	+	+
Mytilinidae	<i>Mytilina ventralis</i>	+	-	-
	<i>M. mucronata</i>	+	+	-
Filinidae	<i>Filinia camaseela</i>	+	-	+
	<i>F. terminalis</i>	-	+	+

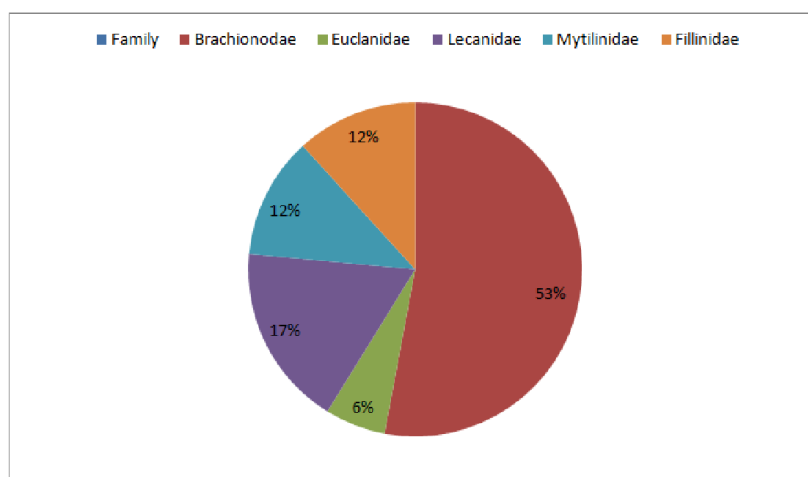


Fig.1. Family wise percentage representation of rotifer of Yenapat (Sept 2012-Aug 2013)

Identification of zooplankton specimens were done following Edmondson (1959), APHA, (2006), Battish, (1992), Needham and Needham, (1962), Segers, (2007) and Sharma (2008). Microscope observations of preserved samples were done using Fisher-Scientific Micromaster Stereo zoom microscope with computerized inbuilt CCD camera and image capture software.

## RESULTS AND DISCUSSION

A total of 18 genera of rotifers are collected from the study sites. These 18 genera belong to five families viz. Brachionidae, Euchlanidae, Lecanidae, Mytilinidae and Filinidae. All the families come under the class- Eurotatoria, Subclass- Monogononta and Order Plomia. The family Brachionidae is represent by 9 genera, Euchlanidae by one genera, Lecanidae by 4 genera, Mytilinidae by 2 genera and Filinidae by 2 genera. Abundance of Brachionus in tropical region is a common feature (Fernando, 1980). Occurrence of Brachionus and Keratella together indicates that the status of the water body is nutrient rich. The percentage contribution of different family of Rotifera is shown in Fig. 1. And the seasonal occurrences of the rotifers are shown in Table 1.

## Acknowledgement

The authors express their deep sense of gratitude to respective Head of Department of Life Science and Bioinformatics, Assam (Central) University, Silchar Assam and Coordinator of the DBT sponsored Institutional Biotech Hub, D. M. College of Science, Imphal for providing the necessary laboratory facilities required for carrying out the present work.

## REFERENCES

- APHA 2005. Standard methods for the examination of water and wastewater. 21st Edn. Washington DC, USA.
- Battish, S.K. 1992. Feshwater Zooplankton of India. Oxford and IBD Publishing Co., New Delhi.
- Berzins B. and Pejler (1987). Rotifer occurrence in relation to pH. *Hydrobiologia*, 182: 171-182.
- Berzins, S.L. 1979. Specific status of *Keratella cochlearis* (Gosse) and *K. Ahlastrar* (rotifer: Brachionidae): *Ecological Considerations, Can. J. Zool.*, Vol. 7(9):1719-1722.
- Chengalnath, R. and Fernando, C.H. 1973. Rotifers from Sri Lanka (Ceylon), I Genus *Lecane* with descriptions of two new species. *Bull. Fish Res. Stn. Sri Lanka.*, 24, 13-27.

- De Pauw, N. and Vanhooren. G. 1983. Method for Biological Quality Assessment of Water Courses in Belgium, *Hydrobiologia*, 100: 153-168.
- Dumont, H. J. and De Ridder, M. 1987. Rotifers from Turkey, *Hydrobiologia*, 147, 65-73.
- Edmonson, W.T. 1959. Freshwater Biology (eds. Ward and Wipple) 2<sup>nd</sup> ed. John Wiley and Sons Inc. New York, pp. 194-1202.
- Ersilia Jajo and Singh O.S. 2005. Preliminary studies on the Rotifer Fauna of Manipur. *Abstracts of Papers NASFAB-05*: BC31.
- Fernando, C.H. 1980. The freshwater zooplankton of Sri Lanka with a discussion of topical freshwater zooplankton composition., *Hydrobiologia*, Vol. 65: 85-129.
- Jennings, H.S. 1900. Rotatoria of the United States with special reference to great lakes. *Bull. Fish. Comm. Washington*, 19, 67-104.
- Michael, R. G. and Sharma, B.K. 1988 Fauna of India and adjacent countries, Indian Cladocera, (Crustacea: Branchiopoda: Cladocera).ed. Director, Zoological Survey of India, Calcutta, p.262.
- Needham. J. G. and Needham, P.R. 1962. *A guide to the Freshwater Biology*, Holden Day Inc., San Fransisco, p. 108.
- Park, K.S. and Shin H.W. 2007. Studies on phyto-and-zooplankton composition and its relation to fish productivity in a west coast fish pond ecosystem. *J. Environ. Biol.*, 28, 415-422.
- Parnell, P.E. 2003. The effects of sewage discharge on water quality and phytoplankton of Hawaiian coastal waters. *Mar Environ. Res.*, 55, 293-311.
- Prasad, B.B. and Singh, R.B.2003. Composition, abundance and distribution of phytoplankton and zoobenthos in a tropical water body. *Nat. Environ. Pollut. Technol.* 2: 225-258.
- Raghunathan, M.B. and Suresh kumar, R. 2006. Diversity of rotifers of Tamil Nadu. *Rec. Zool. Surv. India.* 106(2). 67-78.
- Segers, H. 2007. Annotated checklist of the rotifers (Phylum Rotifera), with notes on nomenclature, taxonomy and distribution. *Zootaxa* 1564: 1-104.
- Sharma, S. and Sharma, B.K. 2008. Zooplankton diversity of Loktak Lake, Manipur, India. *Journal of Threaten Taxa*, 3(5): 1745-1755.
- Sudzuki, H. 1967. Rotifer from South Australia. *Proc. Jap. S. Zool.*, 3, 17-19.
- Vanjare and Pai 2010, Rotifers from a pond of Pune (India), with the record of *Ptyrura pedunculata* (Edmonson, 1939), (Rotifera: Monogononta) from the oriental region. *Turk J Zool.*, 34: 417-419.

\*\*\*\*\*