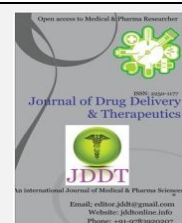


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Research Article

Study on the Diversity and seasonal variation of zooplankton in Bhusara maun under Muzaffarpur, Bihar

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ABSTRACT

Diversity of zooplankton in the Bhusara maun was studied during March 2010- Feb 2011. The population of zooplankton consisted of rotifers copepods and cladocerans. Total number of zooplankton recorded were 2335 per litre of which rotifers were 1461 (62.56%), cladocerans 226 (9.67%) and copepods 608 (27.75%). All the dominant groups of zooplankton present throughout the year. Diversity analysis showed that rotifers had 11 species cladocerans four and copepode four species. High number of zooplankton were recorded in winter season. While low number was recorded in monsoon season.

Keyword: Zooplankton, Bimodal distribution, Diversity richness

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INTRODUCTION

Correct identification of freshwater organisms is essential to understanding their ecology. Aquatic organisms interact with environment to alter water quality and perform ecology “services” such as decomposition and nutrient cycling. Identification of zooplankton species in food webs is essential part of managing aquatic bodies. Diversity of zooplankton can be used to indicate chronic water pollution problem.

Zooplankton plays an important food item of omnivorous and carnivorous fishes (*Alam et al*).

Zooplankton supports the economically important fish populations. The study of zooplanktonic composition abundance and seasonal variation is helpful in planning and successful fishery management (Jhingran V.G) the physico – chemical factors and nutrient status of water play the most important role in governing the production of planktonic biomass.

A very few researcher worked on percentage composition seasonal variation and abundance in zooplankton in **Bhsara maun**, Bihar.

A number of workers such as Das (1956), Dhanapathi (2000), Gopal (1984), Nair (2009), Sugunan (2000) and zafar (1964) have reported on different aspect of zooplankton inhabiting Indian fresh waters. Bihar in spite of being recognized as a state of flood conditions is characterized by large number of water bodies both natural and man made. **Bhusara maun** is an important water body of Bihar. It is an important source of pisciculture in addition to irrigation But this water body is under constant threat due to tourist disposal, domestic sewage and increased human activities. It is therefore, urgent need to manage scientifically this water body to tap it maximum potentiality.

The aim of the present study is to know the diversity of zooplankton groups and their seasonal variation in **Bhsara maun**

MATERIALS AND METHODS

Bhusara maun is very large wetland in Muzaffarpur in Bihar. It has a catchments area of 35 acre. The studies were continued for a period of one year from March 2010 to February 2011. zooplankton were collected on monthly basis from five different sites of the pond. Sampling was made between 8.00am to

10.00am. The samples were preserved in 5% formalin. The quantitative analysis were done with the help of Sedgwick rafter plankton counting cells and the results were expressed as organism per litre. The identification of zooplankton was done with the help of standard texts and monographs (Battish 1998), Edmondson 1965, Needham & Needham 1978, Tonapi 1980 and APHA 1995.

RESULTS AND DISCUSSION

Table 1: Diversity of zooplankton species identified from the Bhusara maun

Order:- Rotifera	<i>Species</i>
Family	
Asplanchnidae	1. <i>Asplanchna</i>
Family	
Testudinellidae	2 <i>Testudinella sp</i> 3 <i>Filnia sp</i>
Family	
Brachionidae	4 <i>Brachionous angularis</i> 5. <i>Brachionous caudatus</i> 6 <i>Brachionous diversicornis</i> 7 <i>Brachionous falcatus</i> 8 <i>Keratella lenzi</i> 9 <i>Keratella tropicana</i> 10 <i>Notholaka sp</i>
Family Lecanidae	11 <i>Lecane sp</i>

Order cladocera	
Family sididae	12 <i>Diaphanosoma sp</i>
Family Daphnidae	13 <i>Dophnia carinata</i>
Family Moinidae	14 <i>Moina dubia</i>
Family Bosminidae	15 <i>Bosmia sp</i>
Order copepoda	
Family Diplomidae	16 <i>Diaptomus sp</i>
Family cyclopida	17 <i>cyclops sp</i> 18 <i>Cyclopid nauplius</i> 19 <i>Nauplli</i>

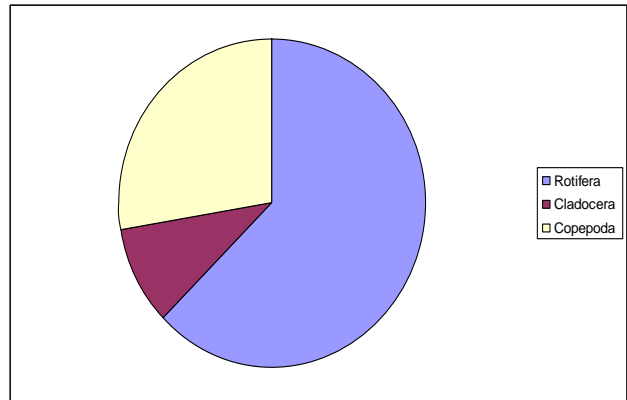


Figure 1: Percentage of different group of zooplankton

Table 2: Zooplankton: species distribution and abundance at. **Bhusara maun**

Zooplankton	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.
Rotifera												
<i>Asplanchna</i>	17	8	3	3	-	-	-	7	11	45	38	22
<i>Testudinella</i>	-	3	16	10	8	3	-	-	-	-	-	2
<i>Filnia</i>	30	16	14	3	-	-	-	-	-	-	4	24
<i>Brachious angularis</i>	-	-	-	-	-	-	10	35	45	70	55	14
<i>B. caudatus</i>	35	50	55	25	-	-	-	-	-	-	-	10
<i>B. diversicornis</i>	5	40	10	-	-	-	-	-	-	-	5	15
<i>B. Falcatus</i>	-	-	-	55	75	50	19	-	-	-	8	6
<i>Keratella lenzi</i>	2	6	15	10	-	-	-	-	-	-	-	5
<i>K. Tropicana</i>	-	-	-	70	100	15	55	14	12	4	2	18
<i>Notholca</i>	-	-	3	15	3	-	-	-	-	-	-	-
<i>Lecane</i>	-	-	-	3	5	15	6	4	-	-	-	-
Cladocera												
<i>Diaphanosoma</i>	-	-	-	-	-	8	6	8	11	6	3	3
<i>Daphnia carinata</i>	12	6	2	3	-	-	-	-	-	-	8	25
<i>Moina dupia</i>	14	4	-	-	3	30	14	6	2	-	3	6
<i>Bosmia</i>												
Copepoda												
<i>Diaptomus</i>	-	-	-	30	34	90	25	-	-	10	19	35
<i>Cyclops</i>	25	15	-	-	-	15	30	9	10	15	27	22
<i>Cyclopidi nauplius</i>	-	-	-	-	-	6	10	-	-	-	6	4
<i>Nauplli</i>	45	75	90	18	-	-	-	-	2	16	20	25
Total	185	143	206	248	241	332	175	89	96	176	201	243

Seasonal population densities of zooplankton showed a high degree of seasonality within and between the groups. Some species were present throughout the year while others make sporadic appearance. During present study only three groups of zooplankton were taken into consideration. The seasonal distribution of major groups of zooplankton (unit/l) and of the different species are presented in table 1 and table 2.

Rotifers were quite common in this habitat. The rotifers mainly consists of four families. Distinct seasonal difference in the abundance of the various rotifers were observed during the study period.

A total of 11 species of rotifers were restricted to this habitat and their total number showed different seasonal trends in the year. The lowest populations density (60 u/l) was recorded in October and the maximum (1194 u/l) in June.

Generally cladocera was represented by family sididae, Daphnidae, Moinidae and Bosminidae. The peak of total cladoceran population (41u/l) found in February and the lowest (2u/l) was recorded in May month of the study period. Copepod was commonly present in this habitat and was represented by two families Diplomidae, Cyclopidae and their nauplie. Copepod seasonal variations in abundance showed their lowest population (9u/L) in August and the highest peak (80 u/L) in February of the year.

The interpretation of zooplankton population dynamics assumes that the species co-occur and interact in space and time. During the present investigation the zooplankton showed a bimodal pattern of fluctuations with the primary peak in monsoon and secondary peak in winter month during the study period.

According to the literature several researchers observed bimodal as well as unimodal peak from different water bodies of India. A bimodal peak was observed from the freshwater body of Uttar Pradesh, the first peak in September while the second in April (Das and Shrivastava 1956). The bimodal type of annual cycle of Rotifera has been reported by Gophen (1942) while a single peak in late April was recorded in a pond in West Bengal (Jana 1973). Abimodal distribution has been observed in the population of some rotifers in a freshwater pond at Ranchi (Sinha & Sinha 1986). The zooplankton species of Indian freshwater bodies were reported by several workers which was quite compatible. Sewell (1934) recorded 10 rotifera, 15 cladocera and 10 copepoda from a fresh water tank of Bengal. Nasar (1973, 77) recorded 16 Rotifera, 8 cladocera and 3 copepoda from other pond of Bhagalpur. Laal (1984) found 10 Rotifera from freshwater pond of Patna. Sharma and Pant (1985) recorded 66 Rotifera, 15 cladocera and 7 copepods from two Kumaun Himalayan lakes. During present investigation the number 11 species recorded of Rotifera, 4 cladocera and 4 copepoda from Mahendra Nath Pond.

During the study period Rotifera was the dominant group composing 67.56% of total zooplankton, Cladocera 9.07% and copepoda constitute only 27.75%. Species diversity was evaluated using Shannon and Weaver index (H), Evenness (J), Margalef (R_1), Menhinick (R_2) and Odum (R_3).

As a result of this study the value below 1.0 (Shannon and Weaver index) indicates the low quality of aquatic body and less supportive to the life of zooplankton.

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