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COMPOSITION, ABUNDANCE AND DIVERSITY OF ZOOPLANKTON POPULATION FROM THREE DIFFERENT WETLANDS FROM BARAK VALLEY, ASSAM

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ABSTRACT

The zooplanktonic composition and its community structure in three selected wetlands of Barak valley were investigated for a period of one year sampling every month. The zooplankton fauna comprised of 36 species belonging to three group *viz.*, rotifera, cladocera and copepoda. The relative abundance of rotifera was high in two studied areas (site 2 and site 3) 48.05% and 43.80% respectively. The zooplankton species richness indices were high in site 2 than the other observed study areas. The detailed aspect of composition, abundance and diversity trend of zooplankton fauna is discussed herein.

KEYWORDS: Abundance, Community Structure, Diversity, Zooplankton

INTRODUCTION

Zooplankton community is cosmopolitan in nature. It is economically and ecologically vital group of aquatic organisms as they inhabit all freshwater habitats of the world (Kar, 2013). These spices are not only useful as bio indicators, but are also helpful for ameliorating polluted waters. Several studies indicated that these enhanced the performance of fish larvae because it contains essential source of protein, amino acids, lipids, fatty acids and enzymes desirable for aquatic organisms for effective growth and survival (Kibria et al., 1997; Ovie et al., 1993; Adeyemo et al., 1994).Zooplankton is so as to occupy a wide range of habitats. A direct method for the evaluation of the potentiality of an aquatic biotope is the assessment of the rate of its primary production, where it begins the primary fixation of energy and its subsequent transfer to higher trophic levels. Hence qualitative and quantitative studies of zooplankton diversity are of great importance.

Therefore, the study aimed at evaluating the taxonomic composition, abundance and diversity of zooplankton over a period of one year in three different wetlands of Barak valley to determine the diversity of zooplankton among the water bodies.

MATERIALS AND METHODS

The distribution of zooplankton was investigated from three different wetlands of Barak valley for one year from June 2012 to May 2013. The three different wetlands were (Site-1) Ramnagar anua (Latitude, 24° 49′57.3” N and Longitude 92° 45′23.7” E), (Site-2) Srikona beel (Latitude, 24° 50′18.9” N and Longitude 92° 43′11.5” E) and (Site-3) Tapang haor (Latitude, 24° 49′24.6” N and Longitude 92° 42′6.8” E). Qualitative and quantitative zooplankton samples were collected by filtering 100 L water from the different study sites at monthly intervals from the surface waters with the help of plankton net. Collected specimens were preserved in 5% formalin for quantitative and qualitative examination. Zooplankton enumeration were done by introducing 1ml of the preserved sample into Sedgwick-Rafter counting chamber

for detailed taxonomic identification with the help of a stereoscopic microscope having different magnifications (X 10 initially, followed X 40).Zooplankton identification was done to generic level according to Edmondson (1959), Sharma and Michael (1987), Battish (1992), Michael and Sharma (1998), Sharma (1998).Various statistical analysis were done in accordance with the procedures of Ludwig and Reynolds (1988).

RESULTS AND DISCUSSIONS

The zooplankton fauna of the investigated areas comprised of 36 different genera belonging to three groups *viz*., rotifera, cladocera and copepoda. There were 18 species of rotifers belonging to fifteen families and three orders. The arthropods comprised of 14 cladocerans and 4 copepods, of which the former belongs to seven families and the later is belonging to two families Table 1. A total of 16 species were widely spread to all the study areas while some were limited in distribution. The limited species included *Testudinella* sp., *Lepadella* sp. and *Macrothrix* sp. found only in site 1; while *Mytilina* sp., *Hexarthra* sp., *Rotaria* sp. and *Daphnia* sp. were found only in site 2, on the otherhand *Scaridium* sp., *Moinodaphnia* sp., *Simocephalus* sp., *Disperalona* sp. and *Scapholeberis* sp. were found only in site 3.

Table 1: Abundance of Zooplankton Population in Three Study Areas

Taxon	Ecosystems		
	Site 1	Site 2	Site 3
Rotifera			
Brachionus sp.	+	+	+
Cephalodella sp.	+	+	-
Mytilina sp.	-	+	-
Filinia sp.	+	+	+
Asplanchna sp.	+	+	+
Keratella sp.	+	+	+
Lecane sp.	+	+	+
Hexarthra sp.	-	+	-
Trichocerca sp.	+	+	+
Anuraeopsis sp.	+	+	-
Testudinella sp.	+	-	-
Horaella sp.	-	+	+
Lepadella sp.	+	-	-
Scaridium sp.	-	-	+
Rotaria sp.	-	+	-
Ascomorpha sp.	+	+	+
Sinantherina sp.	+	+	-
Colurella sp.	+	+	-
Cladocera			
Bosminopsis sp.	+	+	+
Chydorus sp.	+	+	-
Macrothrix sp.	+	-	-
Diaphanosoma sp.	+	+	+
Bosmina sp.	+	+	+
Moinodaphnia sp.	-	-	+
Moina sp.	-	+	+
Ceriodaphnia sp.	+	+	+
Simocephalus sp.	-	-	+
Sida sp.	+	-	+
Daphnia sp.	-	+	-
Disperalona sp.	-	-	+
Alona sp.	+	+	+
Scapholeberis sp.	-	-	+

Table 1: Contd.,			
Copepoda			
Neodiaptomus sp.	+	+	+
Mesocyclops sp.	+	+	+
Heliodiaptomus sp.	+	+	+
Thermocyclops sp.	+	+	+

(**Note:** + denotes present and – denotes absent)

Concomitant to above, the total number of zooplankton per site varied from 183 to 590 no./ml. On the average, the total numbers of organism were recorded during the

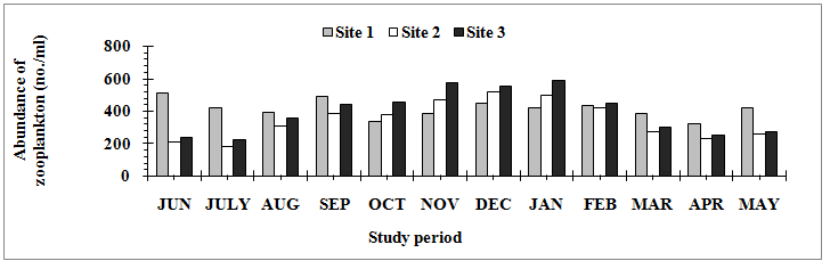

Figure 1: Monthly Variation of Zooplankton Population in Three Study Areas

Post monsoon period which is applicable to all the sites. Among them the site 3 contains the highest number of organism throughout the investigatin-g period on an average Figure 1. The rotifers were the most dominant in site 2 (48.05%), the similar trend was observed in site 3 where the rotifers form the 43.80% of total abundance of the organism except in site 1, where the cladocerans were the most abundant one (51.75%) Figure 2.

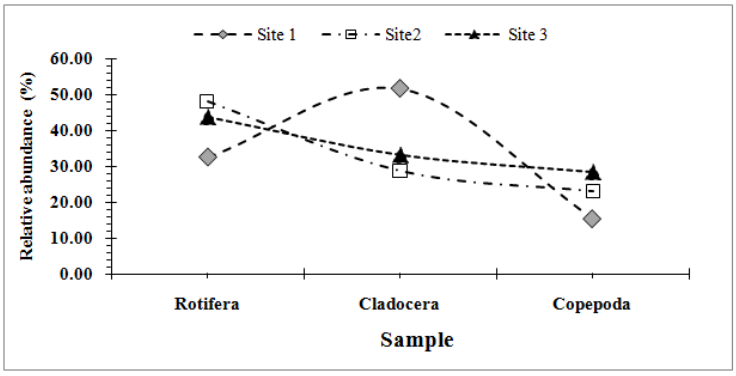

Figure 2: Relative Abundance of Available Zooplankton in Three Study Areas

The zooplankton species richness indices were generally higher in site 2 than site 1 and site 3, with Margalef index (R_1) value is 3.04 Table 2. This indicates that the site 2 were much richer in species than the other two water bodies. The zooplankton population of site 2 and 3 were more diverse than the site 1with Simpson's diversity index (λ) of 0.09 respectively. The number of abundant species (Hill's first diversity number) was also quite high in site 2.

Table 2: Zooplankton Richness and Diversity of the Studied Water Bodies

Index	Ecosystems		
	Site 1	Site 2	Site 3
Margalef index (R_1)	2.97	3.04	2.99
Simpson index (λ)	0.08	0.09	0.09
Hill's first Diversity Number (N_1)	48.18	51.4	48.08

CONCLUSIONS

The observed differences in zooplankton composition, distribution patter and abundance in the investigated water bodies subjected to different biological factors (Davies et al., 2009). It has been observed that the species richness and diversity of zooplankton is affected by various environmental disruptions. The dominance of rotifers in two studied water reveals that the water became eutrophic; this is because the eutrophic water promote the growth of small sized zooplankton especially the rotifers (Okojin and Obi, 1999). During the post monsoon season, the water bodies were found to be richer qualitatively and quantitatively than the other seasons due to various reasons like the availability of abundant food, favorable temperature for the developmental stage. The objective of this investigation was therefore to develop our knowledge about the fact that the diversity, abundance of any water body is dependent upon various biological factors and the zooplankton are playing a vital role in the stability and integrity of aquatic ecosystem, but still indicated scarcity of information. So, for any scientific utilization, an indepth study should be undertaken to analyze its community structure and dynamics.

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