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Seasonal Occurrence of Zooplankons at the Pond of Botataung Pagoda, Botataung Township, Yangon Region, Myanmar

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Abstract:- The present study conducted on the seasonal occurrence of zooplankton at the pond of Botataung pagoda, Botataung Township, Yangon Region was conducted during June, 2017 to May, 2018. Samples of zooplanktons were taken at five sampling sites around the pond. A total of 20 zooplankton species belonging to 14 genera and eight families. Phylum Rotifera (15species) and Order Cyclopoida (5 species) for all study sites were recorded. The highest number of species was recorded in Site 3 followed by Site 4 and 5. Population densities were highest in wet season at different study sites.

Keywords:- *Zooplanktons; Distribution; Abundance of Species.*

I. INTRODUCTION

Zooplanktons are microscopic animals that are weak swimmers and are largely transported by water currents within the estuary. Zooplanktons play an important role in water purification and serve as bio-indication of water quality [7].

Abundance of zooplankton (Rotifers, Cladocerans, Copepods and Ostracods) community is depends on the availability of bacteria-plankton and phytoplankton as food. The many of the larger forms of secondary consumers feed on smaller zooplankton, some of them are detritivorous, browsing and feeding on the substrate attached organic matter, phytoplankton. Some of them are concentrating on the freely suspended organic matter those lying on the bottom sediment in an ecosystem, the zooplankton respond to a wide variety of disturbance including nutrient loading acidification and sediment of input [16].

Three major zooplankton groups dominate freshwater ecosystems - the Copepoda, Cladocera and Rotifera. They vary in contribution to total abundance and biomass depending on trophic status and predation by zooplanktivorous fish [6].

Identification of zooplankton examined in the body color, are opaque or translucent appendage of antennae and legs, hair-like setae and relative size of spines [17].

Zooplanktons play a pivotal role in aquatic food webs because they are important food for fish and invertebrate predators and they graze heavily on algae, bacteria, protozoa and other invertebrates. Zooplankton communities are typically diverse (> 20 species) and occur in almost all lakes and ponds [14].

Water quality of the pond of Botataung Pagoda is under suitable level in which the turtles and fishes released by the visitors to the pagoda are hard to survive and reproduction.

The area of the pagoda pond is 300 m^2 and square in shape. It is artificial pond constructed by concrete with cement. There is in the partial shaded pond. There are two small concrete places around the pond that nesting site for the turtles in the pond.

Thus, the present study was conducted to know the zooplankton population in different study areas by the following objectives;

- to record the zooplankton species occurring in the different study sites
- to investigate the population and distribution of zooplankton in the study area
- to observe the seasonal occurrence of zooplankton population

II. MATERIALS AND METHODS

The five study sites were chosen at the pond of Botataung Pagoda is located between 16° 46' 05.3" N and 96° 10' 20.4" E which is situated in Botataung Township, Yangon Region, Myanmar. The study period lasted for three months from June, 2017 to May, 2018.

Plankton net, concave slides, pipettes, formalin, digital camera, plastic baskets, plastic containers, cotton wool and binocular compound microscope. Water samples were collected monthly from five study sites at the pond of Botataung Pagoda. Zooplankton sample were collected by using a 26 cm diameter, 100 µm mesh size plankton net. Filtered samples were made up to a standard volume of 40 ml and it was preserved in 5 % formalin, water sample were collected in one liter plastic bucket and brought to the laboratory of Zoology Department, Dagon University. Collected specimens were shaken for 10 seconds and one ml plankton samples were taken by using a pipette and placed on the concave slide. The specimens were observed,

identified and counted under a binocular microscope at the magnification of 40 x and the measured under a microimage microscope. As seasonal abundance of zooplankton species, they were recorded during wet season (June - October), cool dry season (November - February) and hot season (March - May). Identification of all specimens was followed after [5] and [13].

III. RESULTS

A. Species Composition of the Recorded Species

A total of 20 species of zooplanktons representing two phyla, four classes, four orders and eight families were recorded from the pond of Botataung Pagoda. Among them Phylum Rotifera belonging to 11 genera of seven families and three genera of one family of Phylum Crustacea were recorded. Among them, 15 species (75.0%) of Phylum Rotifera under ten species (50.0%) of Order Ploima, four species (20.0%) of Order Floscullariaceae and only one species (5.0%) of Order Bdelloida, and five species (25.0%) of Phylum Crustacea under Order Cyclopoida were identified (Table 1and Fig. 1).

B. Population Abundance of Zooplanktons

Among the species recorded, over 100 individuals of population recorded species were *Mesocyclops edax* (204 individuals), *Eucyclops prionophorus* (174 individuals), *Filinia longiseta* (167 individuals), *Trichocerca rattulus pusillus* (124 individuals), *Mesocyclops leuckarti* (115 individuals), *Cyclopoid nauplius* (112 individuals), *Brachionus falcatus* (111 individuals) and *Proalides verrucosus* (104 individuals) (Table 1).

A few numbers of species populations (< 100 individuals) were *Brachionus caudatus* (87 individuals), *Polyarthra vulgaris* (84 individuals), *Brachionus calyciflorus* (63 individuals), *Anuraeopsis fissa* (55 individuals), *Brachinous angularis* (52 indivdiuals), *Mesocyclops tenuis* (32 individuals), *Pompholyx sulcata* (22 individuals), *Synchaeta* sp. (19 individuals) and *Conochiloides dossuarius* (11 individuals) (Table 1).

The lowest species (< 10 individuals) were *Rotaria citrinus*, *Keratella cochlearis* and *Filinia terminalis* (Table 1).

No.	Species	Site I	Site II	Site III	Site IV	Site V	Total
1	*Brachionus angularis*	8	5	8	26	5	52
2	*Brachionus caudatus*	15	8	11	35	18	87
3	*Brachionus calyciflorus*	-	1	19	30	13	63
4	*Brachionus falcatus*	39	3	19	15	35	111
5	*Anuraeopsis fissa*	18	13	11	-	13	55
6	*Keratella cochlearis*	-	3	1	2	-	6
7	*Polyarthra vulgaris*	27	8	8	1	40	84
8	*Synchaeta* sp.	10	-	-	3	6	19
9	*Trichocerca rattulus pusillus*	27	17	23	21	36	124
10	*Proalides verrucosus*	32	23	12	26	11	104
11	*Filinia longiseta*	14	8	56	38	51	167
12	*Filinia terminalis*	3	-	-	2	1	6
13	*Pompholyx sulcata*	2	10	3	1	6	22
14	*Conochiloides dossuarius*	4	-	1	3	3	11
15	*Rotaria citrinus*	4	2	1	-	-	7
16	*Cyclopoid nauplius*	27	13	12	19	41	112
17	*Eucyclops prionophorusonellus*	8	33	102	16	15	174
18	*Mesocyclops edax*	-	-	133	45	26	204
19	*Mesocyclops leuckarti*	-	-	95	-	20	115
20	*Mesocyclops tenuis*	-	-	8	20	4	32
	Total	238	147	523	303	344	1555

Table 1:- Zooplankton Population Recorded from Different Study Sites

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From the study site 1, a total of 238 individuals (15.3%) of zooplankton were recorded. The maximum number of *Brachionus falcatus* (39 individuals) and the minimum number of *Filinia terminalis* and *Pompholyx sulcata* in the present study site (Table 1, Fig. 4 and 5).

From the study site 2, a total of 147 individuals (9.5%) of zooplankton were recorded. The maximum number of *Eucyclops prionophorus* (33 individuals) and the minimum number of *Rotaria citrinus* and *Brachionus calyciflorus* in the present study site (Table 1, Fig. 2 and 3).

From the study site 3, a total of 523 individuals (33.6%) of zooplankton were recorded. The maximum number of *Mesocyclops edax* (133 individuals) and the minimum number of *Conochiloides dossuarius*, *Rotaria citrinus* and *Keratella cochlearis* in the present study site (Table 1, Fig. 2 and 3).

From the study site 4, a total of 303 individuals (19.5%) of zooplankton were recorded. The maximum number of *Mesocyclops edax* (45 individuals) and the minimum number of *Polyarthra vulgaris* and *Pompholyx sulcata* in the present study site (Table 1, Fig. 2 and 3).

From the study site 5, a total of 344 individuals (22.1%) of zooplankton were recorded. The maximum number of *Filinia longiseta* (51 individuals) and the minimum number of *Filinia terminalis* in the present study site (Table 1, Fig. 2 and 3).

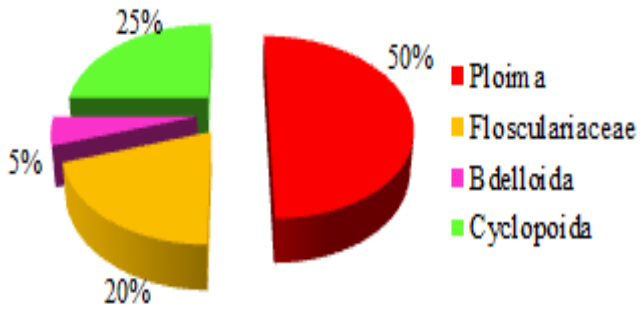

Fig 1:- Species Composition among the Orders of Recorded Zooplankton in the Study Area

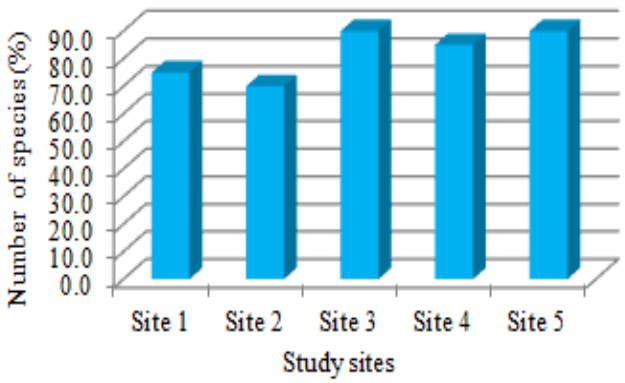

Fig 2:- Occurrence of Zooplankton Species in Different Study Sites

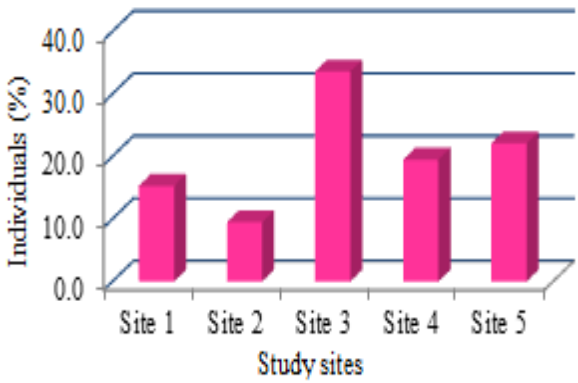

Fig 3:- Occurrence of Individuals of Zooplankton Population in Different Study Sites

C. Seasonal Occurrence of Species and Population Abundance of Zooplanktons

As the monthly occurrence, a total of 19 species (95.0%) in cool dry season, 13 species (65.0%) in wet season and 10 species (50.0%) in hot season were recorded. Out of them, a total of 10 species were recorded in all seasons (Table 1 and Fig. 4).

Total individuals densities of zooplanktons during study period of three months were 806 individuals (51.8%) in wet season, 370 individuals (23.8%) in cool dry season and 379 individuals (24.4%) in hot season (Table 1 and Fig. 5).

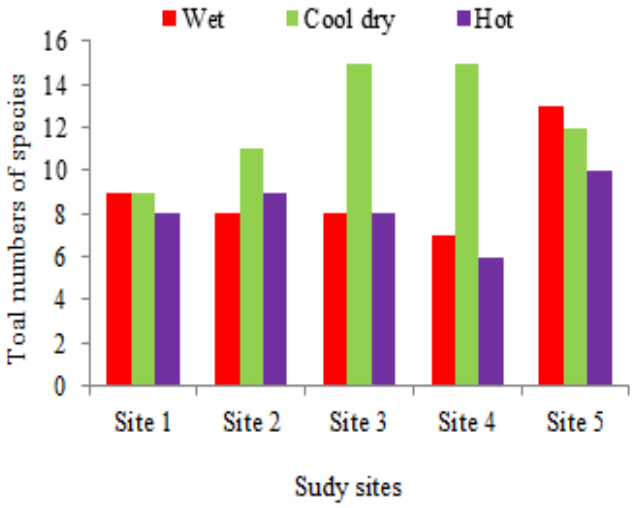

Fig 4:- Seasonal Distribution of Species in Different Study Sites

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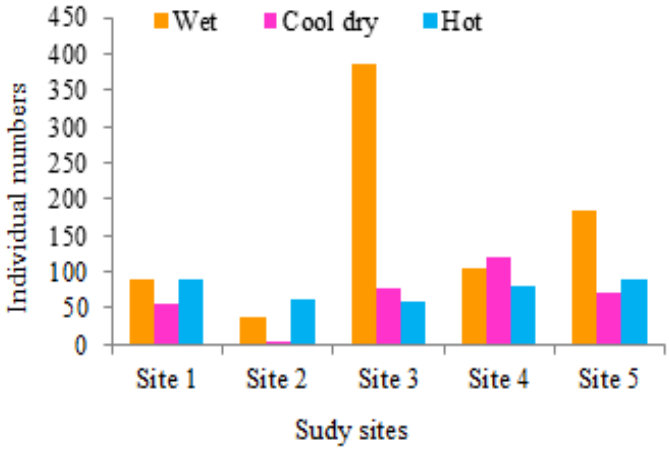

Fig 5:- Seasonal Variation of Zooplankton Population in Different Study Sites

IV. DISCUSSION

The present study was conducted to investigate the zooplankton population at the pond of Botataung Pagoda is regard to the five different study sites. The study found 20 zooplankton species belonging to 14 genera and eight families.

11 species of zooplankton from Kandawgyi Lake, Yangon Region was collected the study period [11].

In the present study, the zooplankton *Brachionus* sp. was the most diverse genus, comprising four species, *B. angularis, B. caudatus, B. calyciflorus* and *B. falcatus*. It was suggests that the occurrence of species depends on the habitat and environmental factors.

Rotifer species (n=55) from the Inya Lake in which *Brachionus* was the most diverse genus, comprising 8 species [2].

It was suggests that the occurrence of species depends on the habitat and environmental factors.

Rotifers are more species rich in the lake littoral regions that in the open water which is corroborated by results of our studies where most of the rotifer species [8].

Although, the second highest abundance of the species of Copepoda found in this study might be observed by the favourable condition [4].

The populations of Copepoda and Cladocera and the chemical composition of the water of Inya Lake with respect to seasonal changes. He recorded eight species of zooplankton from Inya Lake [15].

The population of zooplanktons in Site 3, 4 and 5 were more abundance than in Site 1 and 2. This may be due to the directly sunlight affect in quantitative changes of zooplankton. Since these sites obtained more sunlight for the growth of phytoplankton and consequently this provided organic nutrients for production zooplankton.

Zooplankton communities are highly sensitive to environmental variation, changes in their abundance, species diversity or community composition can provide important indication of environment change of disturbance [14].

Low population of zooplankton was at Site 2. It may be due to its depth where temperature was low and penetration of sunlight was very low, thriving of autotroph was difficult and serve as food for the primary consumers also in possible.

The occurrence of Copepod species of were found to be dominant population and there as other group of Bdelloida was rare in this study period.

The abundance of Copepoda also indicated the stable environmental condition [3].

The second highest abundance and diversity of the Rotifer species of *Filinia longiseta* was found in this all study sites. It was suggests that the occurrence of species depends on the water quality and *Filinia longiseta* was resistend in any water condition.

As the monthly occurrence, a total of 10 species were recorded in all months of the wet season. Some zooplankton species such as *Mesocyclops edax* and *Eucyclops prionophorus* were representing mean density above 100 individuals.

Similarly, during the wet season in Inya Lake, population of Copepod species were recorded more in number [12] investigated that greatest zooplankton diversity during the wet season.

V. CONCLUSION

The present study was conducted to investigate the zooplankton distribution at the five different study sites. Total numbers of 20 species of zooplanktons were recorded in this study. 15 rotifer species were collected in the total numbers of zooplanktons, *Brachionus* was the most diverse genus, comprising these species *Mesocyclops edex* was highest population density than the other recorded species. Among the recorded species, a total of 10 species (50.0%) were found in all five study sites. Population densities of zooplanktons were highest in wet season at different study sites.

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