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Seasonal Variation in Zooplankton Diversity of Banghara Holi Pokher, Ghataho, Samastipur (Bihar)

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Abstract: *Zooplankton community is cosmopolitan in nature and they inhabit all freshwater habitats of the world. The zooplankton diversity is one of the most important ecological parameters in water quality and biodiversity assessment because they are strongly affected by environmental conditions and respond quickly to change in water quality. Zooplankton is the intermediate link between phytoplankton and fish. The present study deals with zooplankton analysis and its seasonal variation of Banghara Holi Pokher Ghataho, Dist. Samastipur, Bihar in order to estimate its potency for fish culture during period of Jan. 2017 to Dec. 2017. The zooplankton groups in order of dominance were rotifers, copepods, cladocerans, ostracods and protozoans were found to be dominant over other groups in all seasons and the population of Zooplanktonic groups were found to be generally high during summer and low during rainy season. Each group of zooplankton showed their own maximal and minimal peak.*

Keywords: *Holi Pokher, Zooplankton diversity, Dominant group*

I. INTRODUCTION

The zooplankton occupies a vital role in the trophic structure of an aquatic ecosystem and plays a key role in energy transfer. Unlike algae or phytoplankton, zooplankton are microscopic animals that do not produce their own food. Freshwater zooplankton play an important role in ponds, lakes, and reservoirs ecosystem and food chain. They not only serve a link between autotrophs and heterotrophs but link entire food chain and are main energy sources of fishes. Thus role of zooplanktons in the functioning of ecosystem is of paramount importance to human. The phenomena are influenced by temperature, pressure, gravity and predators. Zooplanktons are always in variable proportion in an aquatic environment because the zooplankton feed on phytoplankton.

The present investigation was designed to study zooplankton analysis of Banghara Holi Pokher of village Ghataho, Dist. Samastipur, Bihar, because, no such work was done previously in this water body. Holi Pokher is large, deep, perennial rain cum river fed, roughly rectangular in shape. Perusal of work related to zooplankton analysis of different water bodies were done previously by Michael et. al. (1968); Edmonson, W.T. (1974); Nasar, S.A.K. (1977); Quasium, S.Z. (1977); Battish, S.K. (1992); Kaushik, K.S. et. al. (1994); Bhuiyan, A.S. et. al. (1998); APHA. (1998); Biswas, B.K. et. al. (2000); Dhanpati, M.V. (2000); Islam, M.N. et. al. (2000); Cottenie, K.N. et. al. (2000); Vaishali et. al. (2004); Pradhan, P. et. al. (2006); Islam, S.N. et. al. (2007); Kumar, Manoj (2009); and Pawar, S.K. et. al. (2009). Kumar, Ashok (2011), Uchchariya, D. K. et. al. (2012); and Singh, Karunesh et. al. (2012). It is apparent that much emphasis has been paid to study of zooplanktons at different water bodies at different places in India. A thorough knowledge of zooplanktons their abundance and distribution in this water body is essential for proper exploitation of fish culture.

II. MATERIAL AND METHODS

Holi Pokher is situated in village Ghataho near village Kishunpur of Samastipur district. The intake of water occurs during rainy season. The water of this pokher is used for bathing of local villagers and drinking for cattle.

Zooplanktonic samples were collected on monthly basis from January 2017 to December 2017. The samples were preserved in 8% formalin and subsequently quantitative analysis was done by "Sedgwick-Rafter cell" expressed in number of organisms. Zooplankton species identified following Battish (1992).

III. RESULT AND DISCUSSION

Zooplankton population of Holi Pokher Ghataho comprised generally rotifers, copepods, cladocerans, ostracods and protozoans. Quantitatively zooplanktons recorded were 2561 per liter of which rotifers were 832 (32.49%), copepods 632 (23.62%), cladocerans 376 (14.49%), ostracods 335 (13.08%), protozoans 349 (13.63%) and miscellaneous only 69 (2.69%).

All dominant groups of zooplanktons were present throughout the year. Zooplankton showed variations of their abundance during different months of the year maximum 12.72% in November and minimum 3.75% in July.

In all 17 species of zooplanktons were identified. Qualitative analysis showed that rotifers had 7 species, cladocerans, copepods and protozoans 3 species each and ostracodes 1 species.

All dominant groups of zooplankton were present throughout the year. Zooplanktons showed variations in their abundance during different months of the year i.e., zooplankton population showed distinct seasonal variations. Each group of zooplankton showed their own maximal and minimal peaks. Zooplankton fauna was abundant during winter (Oct. to Dec.) and again during summer (April, May)

Several workers have investigated on different water bodies from time to time to find out zooplankton. Ganpati, S.V. (1943), Michael, R.G. (1968), Edmonson, W.T. (1974), Quasium, S.Z. (1977), Battish, S.K. (1992), Bhuiyan, A.S. et. al.(1998), Biswas, B.K. et al. (2000), Vaishali et al. (2004), Pradhan, P. et al. (2006), Islam, S.N. et al. (2007) and Pawar, S.K. et al. (2009).

IV. SUMMARY

The zooplankton groups in order of dominance were rotifers, copepods, cladocerans, ostracods and protozoans were found to be dominant over other groups in all seasons and the population of Zooplanktonic groups were found to be generally high during summer and low during rainy season. Each group of zooplankton showed their own maximal and minimal peak.

TABLE-1

Net Zooplankton Production of Banghara Holi Pokhar, Ghataho, Samastipur (Bihar)

Major group of Zooplankton	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	%
Protozoa	40	41	35	57	24	12	11	5	17	27	39	41	349	13.63
Rotifers	31	46	75	140	172	75	33	45	59	60	63	33	832	32.49
Copepodes	72	37	44	26	51	33	30	44	33	73	91	71	605	23.62
Cladocerans	36	12	12	5	30	23	10	16	30	61	73	63	371	14.49
Ostracodes	30	9	6	6	22	27	7	13	25	57	63	70	335	13.08
Miscellaneous	7	4	3	6	8	7	8	6	4	3	7	6	69	2.69
Total Zooplankton	216	149	175	240	307	177	99	129	168	281	336	284	2561	
Percentage	8.18	5.64	6.63	9.09	11.62	6.70	3.75	4.88	6.36	10.64	12.72	10.75		

Graph of Zooplanktons

Table -2

A list of zooplankton population of Banghara Holi pokhar	
<p>A. <i>Protozoans</i></p> <ol style="list-style-type: none"> 1. <i>Paramecium sps</i> 2. <i>Euglena sps</i> 3. <i>Arcella sps</i> <p>B. <i>Rotifers</i></p> <ol style="list-style-type: none"> 4. <i>Brachionus sps</i> 5. <i>Keratella sps</i> 6. <i>Polyarthra sps</i> 7. <i>Monostyla sps</i> 8. <i>Tricoceron sps</i> 9. <i>Filinia sps</i> 10. <i>Testudinella sps</i> 	<p>C. <i>Copepods</i></p> <ol style="list-style-type: none"> 11. <i>Cyclops sps</i> 12. <i>Nauplius sps</i> 13. <i>Diatomus sps</i> <p>D. <i>Cladocerans</i></p> <ol style="list-style-type: none"> 14. <i>Daphnia sps</i> 15. <i>Moina sps</i> 16. <i>Ceriodaphnia sps</i> <p>E. <i>Ostracods</i></p> <ol style="list-style-type: none"> 17. <i>Cypris sps</i> <p>F. <i>Miscellaneous</i></p> <ol style="list-style-type: none"> 18. <i>Larvae of Insects</i> 19. <i>Larvae of Dragon fly</i>

REFERENCES

- [1] APHA, (1988) : Standard method of the examination of water and Waste 20th edition. American Public Health Association, Washington U.S.A.
- [2] Battish, S.K. (1992) : Freshwater Zooplankton of India, Oxford and IBH publishing Co., p-233.
- [3] Bhuiyan, A.S. and Q. Nessa (1998) : A quantitative study of Zooplankton in relation to the Physicochemical conditions of freshwater pond of Rajshahi Uni. J. Zool. Rajshahi Univ. 17 : 29-37.
- [4] Biswas, B.K. and Konar, S.K. (2000) : Influence of Nunia Nullah (Canal) discharge on Plankton abundances and diversity. Indian J. Environ. & Ecoplan. 3 : 209-217.
- [5] Cottenie, K.N. Nuytten, E. Michels and L.D. Meester (2001) : Zooplankton community structure and environmental conditions in a set of inter connected ponds. Hydrobiol., 442 : 339-350.
- [6] Dhanpathi, M.V. S.S.S. (2000) : Taxonomic notes on the rotifers from India from 1989-2000, IAAB publication Hyderabad.
- [7] Edmonson, W.T. (1974) : A simplified method for counting plankton, "A manual on Method for measuring primary production in Aquatic Environment (ed., Richard, A. Vollenweider)", P-14.
- [8] Ganpati, S.V. (1943) : A ecological study of a Garden pond containing abundant Zooplankton. Proc. Ind. Acad. Sci., 17: 41-58.
- [9] Islam, M.N., T.A. Khan and A.S. Bhuiyan, (2000) : Ecology and seasonal abundance of some Zooplankton of a pond in Rajshahi, Univ. J. Zool. Rajshahi Univ. , 19:25-32.
- [10] Islam, S.N. (2007) : Physicochemical condition and occurrence of some Zooplankton in a pond of Rajshahi Univ. Research Journal of Fisheries and Hydrobiology. 2(2) : 21-25.
- [11] Kaushik, K.S. and Sharma, D.N. (1994) : Tropic status and Rotifer fauna of certain water bodies in central India. J. Environ. Biol. 16 : 283-291.
- [12] Kumar, Manoj (2009) : Diversity and seasonal fluctuation of Zooplankton in Rahika reservoir of Madhubani Dist. North Bihar Bull. Biol.Sci. Vol. VII 2nd ed. PP- 93-98.
- [13] Kumar, Ashok (2011) : Ecology of river Beas with special reference to Flora and Fauna, Himachal Pradesh. Flora and Fauna Vol. 17 No. 2 : 285-289
- [14] Michael, R.G. (1968) : Status on the Zooplankton of tropical fish pond. Hydrobiologia, 32 (1-2) : 47-68.
- [15] Nasar, S.A.K. (1977) : Investigation on the seasonal periodicity of Zooplankton in a fresh water pond in Bhagalpur, India, Acta. Hydrochim Hydrobiol. 5 : 577-584.
- [16] Pawar, S.K., K.M. Shendge and Bhupalwar, S.R. (2009) : Diversity and density of Zooplanktons of Manar river water in Nanded (M.S.) Flora and Fauna Vol 15 No.1 : 100-102.
- [17] Pradhan, P. and S.K. Chakrabarty (2006) : Diversity of Zooplanktonic Rotifers of river Shilabati West Midnapur District, W.B., India. Aqua. Biol., Vol 21 (2) : 51-55.
- [18] Quasium, S.Z. (1977) : Contribution of Zooplankton in water environment. Proc. Symp. Water Zool. P. Goa (India) : 700-708.
- [19] Singh, Karunesh, Indu Singh and R. B. Tripathi (2012) : Phytoplankton and zooplankton diversity in fresh water bodies of Kohargaddi Dam of district Balrampur (U.P.). Vol. 18 No. 1: 141-144.
- [20] Uchchariya, D. K. and D. N. Saksena (2012) : Zooplankton diversity of Tighra reservoir of Gwalior, Madhya Pradesh. Flora and Fauna Vol. 18 No. 2 : 233-244.
- [21] Vaishali, Somani and Madhuri Rajaver (2004) : Crustacean Zooplankton of Lake Masunda Thane Maharashtra, J. Aqua Biol. Vol. 9(1) : 57-60.

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