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Zooplanktonic Community of Badopal, Wetland, Hanumangarh Rajasthan

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Abstract

Wetlands are most productive system main base of environment is water and without water no living being can survive. In desert area of Rajasthan Badopal is a famous. Largest wetland in Hanumanghar District. It is situated on Suratgarh to Rawatsar road. 18 km far from Suratgarh tis geographical coordinates are $29^0$19'0'' N latitude and $73^0$54'0'' E longitude.

Badopal wetland (Hanumangarh, Rajasthan) was studied for a period of one year from April 2009 to march 2010 for Zooplanktonic community structure. Samples were collecting during morning hours by using wide month polythene bottles and plankton net (No. 25). Samples were taken on monthly, basis and distribution of zooplankton. Zooplankton has been calculated using Shannon-weaner index. The zoopkankton community was composed of 5 species of rotifer, 5 species of protozoan crustaceans and larva were dominated for 4 month - Jan to April.

Keywords: Wetlands, Zooplankton.

Introduction

Zooplankton is heterogeneous assemblage of minute floating animal forms found in water. They may bear some locomotory structures but are not capable of moving against the water currents. Zooplankton usually act as primary consumers and constitute an importance link between primary producers (phytoplankton) and higher consumers (like carnivore fish) in aquatic food chains. Zooplankton are represented by a wide array of animal group of members of Protozoa, Rotifer, Copepoda cladocera and ostracoda are often dominating reproductive bodies (like gemmules egg etc.) and larval stages of large variety of animals including fish are also found in zooplanktonic collections.

Thus in the present study zooplankton has been studies qualitatively and quantitatively results get a better understand of the structure and function of this important aquatic ecosystem.

Review of Literature

Limnology, as a distinct field of science, has exhisted less than 60 year. Beginnings of the knowledge concerning freshwater life, like those of marine life, arose in the remote post, possible before the days of Aristole (384-322 B.C.).

These early beginnings, often strange mixtures of fact and fancy, have very little or no scientific value. As the time went on and man's knowledge of his surroundings slowly increased, certain conspicuous freshwater phenomenon were observed often with increasing accuracy. Although, the knowledge about microscopic organisms like plankton present in the water extends back from the days of Antony Van Leeuwenhoek (1632-1723), a professor in the University of Lausanne. Switzerland, by his work became the founder of modern Limnology.

Adak *et al*. (2001) studied the status of surface and ground water quality of Mandiakudar whereas Bhave and Borse (2001) observed the seasonal variation in temperature, dissolved oxygen, pH and salinity and their influence on planktons in Inanar river water, Jalgaon in Maharashtra. Primary productivity of the Subhas Sarovar lake in east Calcutta in relation to some selected physicochemical parameters was studied by Saha *et al*. (2001) whereas Patil and Tijare (2001) studied the water quality of Gadchiroli lake. Naga nd Kanth (2002) studied the pollution level in Hussain sagar lake of Hyderabad and physicochemical, biological and bacteriological study of Kadathur canal water of Amaravati river in Tamilandu was observed by Karthikeyani *et al*. (2002). Ganesh *et al*. (2002) noted the biophysical and chemical conditions of Ganana and Rama rivers in Tiruneveli. However, seasonal dyanamics of zooplankton in a fresh water pond developed from the waste land If Brickkiln was studied by

Prakash *et al*. (2002) and Das (2002) studied the limnochemistry and productivity of upper Ganga complex.

Jayaram, K.C. and Sanyal, A. (2003): Studied a Taxonomic Revision of the fishes of the Genus mystus scopoi (family: Bagridae). Ariyadej, C, *et al*. (2004) studies phytoplankton diversity and its relationship to the physico-chemical environment in the banglang reservoir, Baghela, B.S. (2006): studies on Biodiversity, Survival and density of freshwater zooplankton in relation to salinity changes. Kolekar, v. (2006) Studies ecology and fisheries status of keetham lake of Agra (U.P.) in early nineteens him.

Mohan D. *et al* (2007) study on Limnology and microbiology of Naya talab Jodhpur (Rajasthan). Shrivastava, S. *et al* (2007) studies on physico-chemical parameters of distillery effluent and the correlation. Ramesh M. *et al*. (2007) studies on tub physico-chemical characteristics of singallunai Lake, Coimbatore, South India.

Malara, H (2008) : Research on Biodiversity of planktonic and littoral potifersin water Bodies of South Rajasthan. Jayaram K.C. (2010) : Published a book on "the freshwater fishes of the Indian region". Joshep B. and Yamakanardi, M.S. (2011) studies about monthly changes in the advance and biomass of zooplankton and water quality parameter in Kukkarahalli Lake of Mysole. Young and Abnizova (2011) studied a Hydrologic thresholdr of ponds in a polar desert wetland Environment, Biddle *et al* (2012) study on anaerobic exidation at methane at different temperature. Smith *et al* (2012) studies on recent changes in climate and permafrost temperatures at forest and polar desert in North Cananda. Stibal *et al* (2012) studied about net sediment production of methane, distribution of methanogens and methane – oxidizing Bacteria Parks *et al* (2013) studies the genetic basis for bacterial mercury Hru-kim *et al* (2013) mechanisms regulating mercury Bioavailability for methylating microorganisms in the Aquatic Environment.Shib (2014) recorded seasonal variation i physico-chemical characteristics of ruderasager wetland (tripura). Lunu and kaur (2015) studied the density and diversity of zooplankton in harsolav pond of Bikaner.

Sharma and srivastava (2016) studied seasonal variations in protozoan diversity in sadul branch of sirhind feeder canal, hanumangarh, rajasthan. Ingle AD. (2017) boddey studied seasonal variation of zooplanktonin river chanderabhaga, Daryapur tahasil district Amravati. Ramesh sharma and Rama kumari (2018) studied seasonal variation in zooplankton community and environmental variables of sacred lake prasur Himanchal pradesh, India

Aim of the Study

Badopal mainly is a village in Pilibanga tehsil of Hanumangarh District in Rajasthan. Badopal is famous for fresh water wetland, a variety of birds species are found in the Badopal area near wetlands. Around 103 species of birds migrate here from different area of country and out of country in winter season. Zooplanktonic community effect Direct and indirect birds community as thus present study is important for knowing migratory birds and their habitat.

Materials and Methods

Study Area

Bodopal fresh water wetlands are situated 15 km from Pilibanga and 25 km from Suratgarh city eastern side. It lies between $29^0$19'0'' N latitude and $73^0$54'0'' E longitude.

The studies were continued for a period of one year from April 2009 to march 2010. Plankton sample were collected on monthly basis from four different location including areas of maximum and minimum human activities for Quantitative and qualitative estimation water samples were collected in 500 ml plastic bottles. Plankton samples were collected by means of horizontal haul, using plankton net (no. 25) with a mesh size of 55 micro meter. The plankton net was hauled for a distance of 6 meters. Zooplankton were preserved in 5% formalin and brought to laboratory. Plankton samples were identified and counted under a microscope a using plankton counting chamber.

Diversity index H' (Shannon and weaver, 1949) was calculated for zooplankton using the following formula.

$H' = -ENi/N\log^2 Ni/N$

Where

H' = Shannon – Weaver index

Ni = The number of individuals of ith species

N = The total number of individuals

Result and Discussion

Results of present study are summarized in Table 1,2. Life in water is often more vivid than on land. Minute planktonic algae to larger angiosperms as well as minute protozoans to mammoth mammals harbor bodies of freshwater. Fish comes as a first throught as one talks on animal life in water, however, a larger variety of invertebrates forms, though not well known and appreciated, play a highly significant role in the ecology of aquatic ecosystems. They act as heterotrophs, themselves constitute food for many, help cycling of matter and flow of energy, and of course some play vectors or intermediate hosts of parasites. They inhabit almost conceivable regions in water living as plankton, neuston, nekton, periphyton and benthos (Saxena, 2008b)

During present study zooplankton were represented by members of phylum Protozoa, phylum Rotifera and class Crustecea (orders-Copepoda, Cladocera and Ostracoda).

Table 1
PLANKTON COUNT IN BADOPAL WETLAND

	2009-2010	April	May	June	July	August	Sept	Oct.	Nov.	Dec.	January	February	March
Sampling Station 1st	ZOOPLANKTON												
	Protozoa	60.1	40.0	15.0	12.0	11.0	8.2	5.4	7.6	12.0	19.0	30.0	50.0
	Rotirers	65.2	31.2	20.0	13.0	10.5	10.2	8.2	10.0	9.5	18.0	25.0	40.2
	Nematodes	45.6	46.2	21.0	13.5	11.2	10.2	10.1	12.1	16.0	16.0	21.0	41.2
	Crustaceans & larva	40.2	31.2	15.1	10.0	6.2	6.5	4.9	6.0	6.5	14.0	31.0	32.1
	Total	211.1	148.6	71.1	48.5	38.9	35.1	28.6	35.7	44.0	67.0	107.0	163.5
Sampling Station 2nd	ZOOPLANKTON												
	Protozoa	70.0	61.0	32.1	15.1	10.2	11.8	6.5	10.2	15.4	26.1	40.2	67.9
	Rotirers	99.9	50.0	40.2	15.0	12.4	13.9	15.9	25.0	18.2	30.1	47.2	95.9
	Nematodes	70.2	25.0	11.2	14.1	13.9	11.2	15.2	17.2	19.5	50.2	77.9	101.0
	Crustaceans & larva	93.2	65.1	40.2	20.3	17.2	8.9	5.4	9.2	10.4	21.0	52.2	82.1
	Total	333.3	201.1	123.7	64.5	53.7	45.8	43.0	61.6	63.5	127.4	217.5	346.9
Sampling Station 3rd	ZOOPLANKTON												
	Protozoa	65.2	61.2	33.9	19.5	13.0	14.9	10.2	16.1	17.2	24.5	43.5	65.7
	Rotirers	100.0	53.2	43.2	21.0	19.0	18.9	19.2	15.2	18.2	29.2	49.2	88.2
	Nematodes	105.0	83.1	27.2	16.0	17.0	17.0	16.5	16.2	20.1	25.2	53.2	81.0
	Crustaceans & larva	90.9	57.2	48.2	21.0	21.0	11.2	8.6	13.2	9.9	19.0	55.2	83.0
	Total	361.1	254.7	152.5	76.5	67.0	62.0	54.5	60.7	65.4	96.9	220.1	317.9
Sampling Station 4th	ZOOPLANKTON												
	Protozoa	105.0	67.2	45.1	20.2	20.1	15.4	8.9	13.9	23.1	34.5	63.1	145.0
	Rotirers	193.0	143.1	68.0	18.5	18.5	16.4	21.0	26.1	22.0	49.1	93.5	129.0
	Nematodes	138.1	87.2	29.0	21.2	21.2	16.1	17.0	23.2	29.1	33.0	67.0	107
	Crustaceans & larva	163.0	67.1	26.1	19.5	19.5	13.9	9.9	11.9	17.0	34.1	77.0	134.0
	Total	599.1	364.6	168.2	82.9	79.3	61.8	56.8	75.1	91.2	150.7	300.6	515.0

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Table - 2
SEASONAL DOMINANT ZOOPLANKTON FORM

SEASONS	YEAR	ZOOPLANKTON	Sampling Station - 1st	Sampling Station - 2nd	Sampling Station - 3rd	Sampling Station - 4th
AUTUMN October November	2009	Protozoa Rotifers Nematodes Crustaceans& larva	Amoeba, Neballa, Vorticella. Trichocera, Asplachna, Euchlanis. Dorylaimus, Oxystomatina. Chiromonas, Larva, Ephydra, Larvae, Cyclops, Cypris.	Vorticella, Chylomonas, Neballa. Asplanchna, Brachionus, Filinia. Enoplus, Xiphinema. Daphnia, Crustaceans, Egg.	Neballa, Chylomonas, Senia. Brachionus, Lepadella. Trichocera. Chiromonas, Daphnia, Ephydra.	Euglenna, Paramaecium, Volvox. Branchionus, Polyarthra. Enoplus, Anticoma. Cypris, Cyclops, Ceriodaphnia.
WINTER December January February	2010	Protozoa Rotifers Nematodes Crustaceans& larva	Vorticella, Babesia, Opalina, Ceratomyxa. Tricocera, Polyarthra Branechinus. Daphnia, Rotaria. Cypris, Ectocythera, Daphnia.	Diffugia, Chylomonas, Entamoeba. Trichocera, Filinia. Trilobus. Cypris, Chiromonas, Larvaem Daphnia.	Diffugia, Actinobolina. Asplanchna, Trichocera. Trilobus. Simocephalus, Daphnia, Cypris.	Vorticella, Senia, Amoeba. Brachionus, polyarthra. Diplogasteroides, Trilobus. Daphnia, Cyclops, prinocypris.
SUMMER March April May June		Protozoa Rotifers Nematodes Crustaceans& larva	Euglena, Babesia, Nosema, Opalina. Trichocera, Asplanchna, Keratella. Diplogasteroides, Rotaria. Daphnia, Cypris. Crustacean egg.	Epistylus, Amoeba, Paramaecium. Brachionus, Lepadella, Asplanchna. Oxystomatina, Dorylaimus. Daphnia, Prinocypris, Simocephalus.	Neballa, Amoeba, Actinobalina. Brachionus, Polyarthra, Keratella. Diplogasteroides. Entocythera, simocephalus.	Actinobolina, Diffugia, Vortivella Trichocera, Brachionus, Filinia. Trilobus, Oxystomatina. Entocythera, Cyclops.
MONSOON July August September		Protozoa Rotifers Nematodes Crustaceans& larva	Ceratomyxa, Opalina, Neballa. Filiania, Brachionus, Keratella. Trilobus,Diphnia, Somocephalus.	Chylomonas, Neballa, Vorticella. Asplachna,keratella. Diplogasteroides. Crustaceans, Egg., Daphnia.	Chylomonas, Vorticella. Asplachna, Trichocera, Filinia. Trilobus. Cypris, Daphnia, Crustaceans egg.	Amoeba, Voticella, Epistylus. Lepadella, Keratella, Filinia. Trilobus, Dorylaimus. Cypris, Crustaceans egg., Cyclops.

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