



Zooplankton Composition in Navegaonbandh Reservoir of Navegaon National Park Dist Gondia MS India

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Abstract: To study Zooplankton composition in Navegaonbandh Reservoir a total number of 24 samples are analyzed during a period of 24 months (during 2010-2012), their relative abundance in both the sampling stations of the lake was emphasized. Zooplanktons were represented by 25 species, and consisted of members from Rotifera (11), belonging to 5 families and 6 genera; Cladocera (11), belonging to 6 families and 9 genera; Ostracoda (01), and Copepoda (02). During both the years of study Cladocerans dominated the plankton population, and represented by 11 species (44%) of the total plankton population, followed by Rotifers with 11 species (44%), which found relatively in lesser numbers than that of the Cladocerans; while Copepods (8%) and Ostracods (4%), represented by 2 & 1 species respectively. In the present investigation, among the 11 species of Rotifers reported from both the sampling stations of the Lake during 2010 – 2012, Genus *Brachionus* is very common and is represented by 6 species, followed by one species each of *Keratella*, *Lepadella*, *Asplanchna*, *Filinia* and *Rotaria*.

Key word: Zooplankton, Navegaonbandh, Qualitative analysis, Diversity

Introduction:

Rotifers, Cladocerans, Copepods and Ostracods constitute the major groups of zooplankton. They occupy an intermediate position in the food web and mediate the transfer of energy from lower to higher trophic levels (Waters, 1987). Being heterotrophic in nature, they play a key role in cycling of organic materials in an aquatic ecosystem (Gupta and Sharma, 2007). Zooplankton communities are typically diverse and occur almost in all lakes and ponds and are highly sensitive to environmental variation. Due to short life cycle, these communities often respond quickly to environmental change (Sharma et al., 2007). The phenomenon of cultural eutrophication, siltation, predation, habitat destruction etc. exerts drastic impact on their community structure (Wanganeo, 2007). Zooplanktons have great significance as pollution indicators. As a major element in the aquatic biota, the zooplankton community often exhibits dramatic changes in response to the changes in the physico-chemical properties of the aquatic environment. Hence zooplankton fauna or zooplankton association can be used as useful means for the assessment of water pollution. The present paper is the attempt to analyze the two years (2010-2012) qualitative zooplankton community structure.

Material and Methods:

Study Area: **Navegaonbandh Reservoir:** Although this Park is known as Navegaon National Park in Govt. records, because of the Navegaon (Bandh) tank, in the area it is known as Navegaon Bandh National Park. It will not be out of context to have a glimpse of Navegaon Bandh or Navegaonbandh Reservoir as

the National Park cannot be thought or perceived without Navegaon Bandh. The Navegaon Bandh is an impounded Fresh water lake having water spread area of 11 Sq. km and max depth of 75 feet.

Zooplanktons: Zooplankton collection was done by using the conical net made from bolting silk cloth having mesh size approximately 64 μ . R.G. Michael (1966), after studying diurnal rhythm of different constituents of Zooplankton has shown that ideal time for collection of Zooplankton is the time of sunset. Thus, a total number of 24 samples are analyzed during a period of (2010-2012).

Qualitative analysis: For this, the samples were collected with the help of plankton net. Sweeps were made in all directions in the littoral zones, for the collection from open water; net was thrown to some distance from peripheral zone to the centre avoiding the macrophytes and solid floating material. A six meter rope is tied to the hook of the net and it was thrown from the periphery from defined depth of the pond. Collected planktons was transferred to enamel tray, inside of the net was carefully washed so as to collect any sticking planktons. Plankton was preserved in 4 % formalin and observed, photographed and identified under the Digi-2 Pro Labomed camera. Detailed taxonomical identification was carried out by using keys from Edmondson, (1959); Pennack, (1978); Michael and Sharma (1988); Sehegal, (1983); Battish, (1992); Roy, (1998); Sharma, (1998); Tonapi, (1980); Plaskit (1997); and Dhanapathi, (2000).

Observations & Result: Zooplanktons relative abundance in both the sampling stations of the lake was emphasized. Zooplanktons were

represented by 25 species, and consisted of members from Rotifera (11), belonging to 5 families and 6 genera; Cladocera (11), belonging to 6 families and 9 genera; Ostracoda (01), and Copepoda (02). The species composition is illustrated in the table: 1 and Plate: (I& II).

Table:1 :Diversity of Zooplanktons in Navegaonbandh Reservoir

S.No.	Plankton Species	Stations	
		S1	S2
A	ROTIFERA		
	Family: Brachionidae		
1.	<i>Brachionus caliciflorus</i> (Pallas)	-	+
2.	<i>B. caliciflorus var hymani</i> (Dhanpati)	-	+
3.	<i>B. caliciflorus var amphicerus</i> (Ehrenberg)	-	+
4.	<i>B. quadridentum var melhini</i> (Barrios & Daday)	-	
5.	<i>B. falcatus</i> (Summer form) (Lammerman)	+	+
6.	<i>B. caudatus</i> (Barrios & Daday)	+	+
7.	<i>Keratella tropica</i>	-	+
	Family: Colurellidae		
8.	<i>Lepadella acuminata</i> (Ehrenberg)	-	+
	Family: Asplanchnidae		
9.	<i>Asplanchna brightwelli</i> (Gosse)	-	+
	Family: Filinidae		
10.	<i>Filinia longiseta</i> (Ehrenberg)	+	-
	Family: Philodinidae		
11.	<i>Rotaria rotatoria</i> (Pallas)	-	+
B	CLADOCERA		
	Family: Sididae		
12.	<i>Diaphnosoma sarci</i> (Richard)	-	+
13.	<i>Diaphnosoma excisum</i> (Sars)	-	+
	Family: Daphnidae		
14.	<i>Ceriodaphnia cornuta</i> (Sars)	+	+
15.	<i>Simocephalus exspinosus</i> (Koch)	+	+
	Family: Moinidae		
16.	<i>Moina micrura</i> (Kurz)	-	+
17.	<i>Moinodaphnia macleayi</i> (King)	-	+
	Family: Bosminidae		
18.	<i>Bosmina longirostris</i> (Miiller)	+	
19.	<i>Bosmina longirostris</i> (Summer form) (Miiller)	-	+
	Family: Macrothricidae		
20.	<i>Macrothrix spinosa</i> (King)	+	+
	Family: Chydoridae		
21.	<i>Chydorus sphaericus</i> (Miiller)	+	+
22.	<i>Pleuroxus triganelus</i> (Miiller)	+	-
C	OSTRACODA		
23.	<i>Cypris Spp</i>	+	+
D	COPEPODA		
24.	<i>Cyclops Spp</i>	+	+
25.	<i>Diaptomus Spp</i>	+	-

Discussion:

Many minute, microscopic plants and animals are able to spend their whole life, floating in the water having no resistance to current or free floating and suspended in open or pelagic water. These suspended organisms form plankton (Tonapi, 1980). Plankton is defined as free floating organisms whose intrinsic power of locomotion if present is so feeble that they remain almost at the

mercy of the current and waves (Jhingran, 1997). The plankters according to their quality may be classified as, phytoplankton and zooplankton.

Zooplankton:

Zooplankton is an integral component of aquatic ecosystem and comprises of microscopic animal life that passively float or swim. The heterogeneous assemblage of minute floating micro & macro invertebrates, and their qualitative study provided good indices of water quality & the capacity of water to sustain heterotrophic communities. They constitute an important link between primary producers (Phytoplankton) & the consumers of higher order like fishes in the food chain of aquatic ecosystems. Zooplankton helps in bio monitoring of environmental pollution as they are tolerant to adverse environmental conditions. In the present investigation the diversity of zooplankters collected from both the sampling stations of the lake are presented in table: I. In the present study Zooplankton constituents such as Rotifers, Cladocerans, Copepods and Ostracods are studied at both the sampling stations of the lake during 2010 to 2012. Rotifera or 'Rotatoria' comprise an important group of freshwater invertebrates as well as an integral component of aquatic food-webs. The studies on Rotifera from India began more than a century ago (review by Sharma 1998 a). The Indian literature shows a paucity of works on the faunal diversity of phylum Rotifera from the aquatic biotopes of conservation areas of India in particular. Except the relevant works from Pobitra wildlife Sanctuary of Assam (Sharma, 2006) and Loktak Lake (Sharma, 2009). Aquatic biodiversity in the NPs & WLs in this area are not authentically reported. From the tables, it is clear that during both the years of study Cladocerans dominated the plankton population, and represented by 11 species (44%) of the total plankton population, followed by Rotifers with 11 species (44%), which found relatively in lesser numbers than that of the Cladocerans; while Copepods (8%) and Ostracods (4%), represented by 2 & 1 species respectively. In the present investigation, among the 11 species of Rotifers reported from both the sampling stations of the Lake during 2010 – 2012, Genus *Brachionus* is very common and is represented by 6 species, followed by one species each of *Keratella*, *Lepadella*, *Asplanchna*, *Filinia* and *Rotaria*. Hutchinson (1967) observed that *Brachionus* species are very common in temperate and tropical waters. Various workers reported Rotifers from fresh water bodies of India, such as Sharma et al., (2011) reported 70 species from Nokrek Biosphere Reserve. Patil (2001) reported 14 species from Nilgiri Biosphere Reserve. Sharma & Sharma (2008) reported 74 species from Lakes of Kaziranga National Park, Assam. Cladocerans,

commonly known as water fleas, are minute crustaceans generally ranging in size from 0.2 to 5.0 mm. Important earlier work on Cladocera from various other Indian National parks are those of Venkatraman (1988, 1990, 1992) on Keoladeo National Park, Bharatpur, Rajasthan; Raghunathan & Rane (2001) on Bandipur National Park & Nagarhole National Park of Karnataka state; Rane (1984), on Cladocera of Kanha National Park, Madhya Pradesh; Rane (2005) work out Cladoceran fauna of Melghat Tiger Reserve & Pench National Park, Maharashtra; Mahajan et al., (1982) dealt with the Cladoceran fauna of Tadoba Andheri National Park, in the Chandrapur district of Maharashtra state. In the present investigation the Cladocera is represented by 11 species, belonging to 6 families of which family Sididae is represented by *Diaphnosoma sarci* & *Diaphnosoma excisum*, family Daphnidae with *Ceriodaphnia cornuta* & *Simocephalus exspinosus*, family Moinidae with *Moina micrura* & *Moinodaphnia macleyi*, family Bosminidae with *Bosmina longirostris* & *Bosmina longirostris* (Summer form), family Macrothricidae with *Macrothrix spinosa* and family Chydoridae with *Chydorus sphaericus* & *Pleuroxus triganelus*. In the present investigation, sampling station II (S2) of the lake showed more Cladoceran diversity presumably due to important bio-ecological relationship between Macrophytes and Zooplankton, and is in conformity with Venkatraman et al., (2000); Procter et al., (1967) and Ghosh and Chattopadhyay (1994). The least diversity in sampling station I (S1) might be due to predation pressure by fishes (Fernando, 1980 and Venkatraman, 1983). Among the Crustaceans, Ostracoda was represented by only *Cypris* spp in the Lake. Pailwan (2005) recorded 3 species of Ostracoda from perennial tanks of Kolhapur district. Ostracod abundance also depends upon the availability of food as opined by Swain (1955); Engel & Swain (1967) & Joy and Clark (1977). Annapurna et al., (1999) recorded seven species of Ostracoda from D. G. M. S. colony pond, Dhanbad, Bihar.

The Copepod diversity was represented by two species. Some genera of Copepods and Cladocerans are cosmopolitan in distribution, while others are restricted to some continents (Brooks, 1959; Williamson, 1991). Depth of the pond water transparency, pH & predators determine the distribution & abundance of Copepods (Confer et al., 1983; Patalas, 1971). Verma et al., (1984); Kulshrestha et al., (1992) and Kumar & Singh (1994) observed that the Cyclopes are sensitive to pollution and increased with an increase in nutrients. In the present

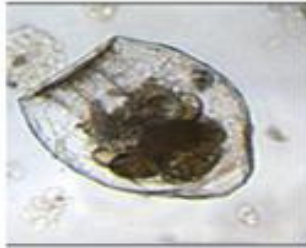
investigation, only qualitative study of Zooplankton was emphasized. The zooplankton was recorded maximum during summer months & minimum during monsoon season. A summer maxima of zooplankton is attributed to higher photosynthetic activity, lower water level and high population of bacteria. A similar observation was noted by Bohra (2004) in Nathu&Munshi pond, Jharkhand. Kiran et al., (2007) noted increased density in summer due to absence of inflow of water that brings stability to water body and availability of food is more while density reduced during winter in fish pond of Bhadra fish farm, Kamataka.

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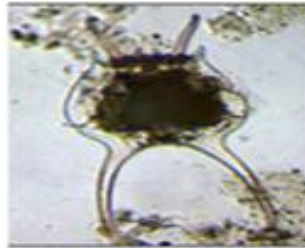
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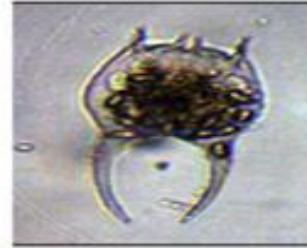
ROTIFERA



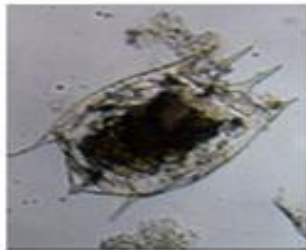
Asplanchna brightwelli



Brachionus falcatus
(Summer form)



Brachionus caudatus



Brachionus caliciflorus
var *hymani*



Rotaria rotatoria



Brachionus caliciflorus
var *amphiceros*



Filinia longiseta



Keratella tropica



Lapadella acuminata

COPEPODA

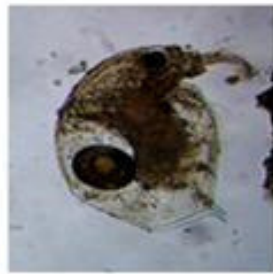


Cyclops spp

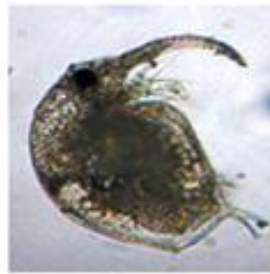


Diaptomus spp

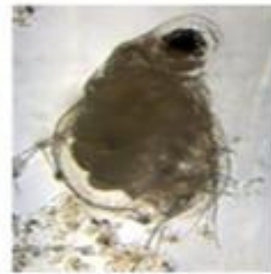
CLADOCERA



Bosmina longirostris



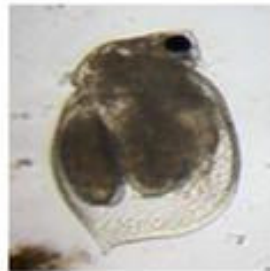
Bosmina longirostris
(Summer form)



Diaphanosoma sarsi



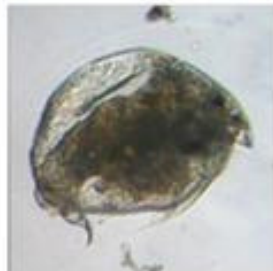
Diaphanosoma excisum



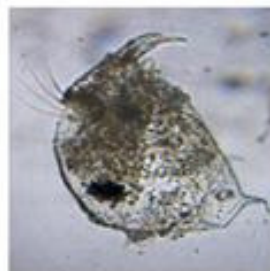
Ceriodaphnia cornuta



Moinodaphnia macleayi



Chydorus sphaericus



Pleuroxus triganelus



Simocephalus exspinosus



Moina micrura

OSTRACODA



Cypris spp

