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CRUSTACEAN ZOOPLANKTON OF LAKE MASUNDA, THANE, MAHARASHTRA

Vaishali Somani and Madhuri Pejaver*,
Deptt. of Zoology,
Maharshi Dayanand College of Arts, Science and Commerce,
Parel, Mumbai – 400 012 (Maharashtra)

*Deptt. of Zoology, B.N. Bandodkar College of Science, Thane.

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Abstract :

Density of total Zooplankton in lake Masunda varied between 726 to 6030 ind/100 l, while copepod density varied between 66 ind / 100 l (May 2000) to 2948 ind/100 l (July 1999) Though cyclopoids were dominant, calanoids also contributed in copepod, peak. Calanoid copepods constituted 10.15% of total zooplankton; while cladocerans contributed only 7.54% of total Zooplankton.

Introduction :

Zooplankton are important component of aquatic ecosystems, as they participate in natural purification of water and mainly act as primary consumers. It has been observed that zooplankton constitute the main food of fishfry, and the adult fish not only consume them, but also select them as a detectable item. Thus zooplankton have a direct bearing on the fist industry. Apart from this, a chemical analysis of copepoda one of the major zooplankton component, reveals that they are as proteinous as meat and hence could eventually become a useful supplementary diet (Battish, 1992). During the present study, it was observed that zooplankton mainly comprised of Rotifera, Copepoda and Cladocera, while other components included were nauplii, eggs and ostracods.

Materials and methods :

The zooplankton samples were collected monthly from April 1999 to June 2000 by towing 41 um mesh net through a boat at an early morning hours. Samples were preserved in 4% formalin for identification and counting. Zooplankton were classified according to Ward and Whipple, 1958 and Battish, 1992.

Results and discussion :

Density of total zooplankton in Masunda varied between 726 to 6030 ind/.100 l. The peak value of total zooplankton density was recorded in June 1999, while lowest density was observed in May 2000. The peak of zooplankton was contributed by Rotifera, Copepoda as well as Cladocera population (Table 1).

Copepods were the largest contributor in terms of density, followed by Rotifers and Cladocerans occupied the third position in order of abundance.

Copepods :

Copepods are important contributors of zooplankton population dynamics and are almost universally distributed. They form a primary food source of planktivorous fish and hence constitute an essential link in aquatic food chain.

During the present study, copepods from Masunda lake contributed 42.42% of total zooplankton and thus were the dominating contributors of total zooplankton population. Such quantitative dominance of copepods was also reported by Sharma and Hussain (2001).

Table 1. Total Zooplankton in (no/100l) Masunda Lake, Thane, Maharashtra (1999 – 2000).

	Feb	Mar	Apr	.May	Jun	Jul	.Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	.May	Jun
calanoid	0	0	20	0	990	938	532	837	558	100	84	70	0	30	36	0	0
cyclopoid	0	0	1200	2496	1350	2010	1216	1860	992	100	252	700	252	210	288	66	252
Harpacticoid	0	0	0	0	0	0	0	93	0	0	0	0	0	0	0	0	0
cladocera	0	0	82	117	1350	0	456	744	62	100	0	84	0	50	36	0	36
Nauplius	0	0	0	0	180	34	152	0	0	0	0	42	0	0	0	0	0
eggs	0	0	228	507	540	971	152	837	1240	300	378	224	84	70	0	165	108
Ostracoda	0	0	0	0	0	0	0	0	0	0	0	56	84	0	0	0	0
Total	0	0	1863	3553	6030	4289	4332	5301	4588	2600	1176	2590	1344	1033	1080	726	828
Avg	0	0	74.52	142.1	241.2	171.6	173.3	212	183.5	104	47.04	103.6	53.76	41.32	43.2	29.04	33.12
SD	0	0	240.4	504.5	471.8	464.4	345.9	445.6	348.7	183.7	97.24	179.9	77.18	66.79	84.43	51.58	68.08
Copepod total	0	0	1220	2496	2340	2948	1748	2790	1550	200	336	770	252	240	324	66	252
Cladocera total	0	0	82	117	1350	0	456	744	62	100	0	84	0	50	36	0	36
Others total	0	0	228	507	720	1005	304	837	1240	300	378	322	168	70	0	165	108

	Total	Avg	SD	%
calanoid	4195	279.7	378.6	10.15
cyclopoid	13244	882.9	783	32.04
Harpacticoid	93	6.2	24.01	0.225
cladocera	3117	207.8	376.3	7.541
Nauplius	408	27.2	58.14	0.987
eggs	5804	386.9	367.7	14.04
Ostracoda	140	9.333	25.19	0.339
Total	41333	2756	3402	-
Avg	1653	110.2	136.1	-
SD	2907	193.8	195	-
Copepod total	17532	1169	1186	42.42
Cladocera total	3117	207.8	376.3	7.541
Others total	6352	423.5	367.1	15.37

However, Salaskar (1996) in Powai lake (Mumbai) and Nene (1985) in the earlier studies on the lake Masunda, recorded copepods to occupy IInd position in total zooplankton.

The relative contribution of different planktonic groups in the lentic habitats had been shown to be influenced by trophic level of water. The waters with copepod abundance are regarded to be at a lower trophic stage than those with rotifer abundance (Yousuf, 1988).

During the present study, copepod density varied between 66 (May 2000) ind/100 l to 2948 and / 100 l (July 1999). It was higher than the range of 29 to 1220.60 ind. of copepods/ 100 L earlier reported by Nene (1985) in the same lake.

In lake Masunda, copepod maxima was recorded in July 1999, i.e. monsoon which is supported by Sharma & Hussain (2001). The copepod minima was exhibited in summer season.

Copepoda is comprised of orders calanoidea, cyclopoidea & harpacticoidea, of which calanoids and cyclopoids are the common zooplankton of freshwater ecosystems.

Calanoid copepods during the present study, were at lower ebb. The population ranged between 0 to 990 ind/100 L and they were absent in May 1999. Calanoid copepods constituted 10.15% of total zooplankton.

Lakes rich in organic matter support higher number of cyclopoids (Subbamma, 1992), thus suggesting their prepoderence in higher trophic state of water. Cyclopoid copepods were quantitatiely dominant in Masunda indicating eutrophic condition.

The, density of cyclopoid copepods ranged between 66 to 2496 ind/100 L, maxima & minima represented in May 1999 & May 2000 respectively. Though cyclopoids were dominant, they did not contribute solely in copepod maxima, it was also contributed by calanoids along with cyclopoids.

No definite period is observed to be suitable for growth of cyclopoids. Instead they flourish in different seasons, as January-February observed by Subbamma (1992); March reported by Malathi (1999) or December as recorded by Rao & Durve (1992) while during the present study in Masunda, the peak was observed in May, supporting the observations.

Gravid female copepods were recorded wherever possible. Gravid calanoids were never recorded but gravid cyclopoid females were observed in May 1999 & January 2000, with higher density in May. This coincided with abundance of total cyclopoid population, while January abundance is supported by Nene (1985).

Cladocera:

Being filter feeders, feed on algae and at the same time, the favourable prey of vertebrate and invertebrate predators from aquatic environment, cladocerans represent a key group in energy transfer along the food chain.

During the present study, cladocera occupied IIIrd position in order of dominance in total Zooplankton. They contributed only 7.54% of total zooplankton in Masunda. Such lower contribution of cladocerans in total zooplankton was also recorded by Ahmed & Alireza (1992), Ovie and Adenji (1994), Dutta Munshi and Dutta Munshi (1995), The general scarcity of cladocerans in lakes has been related to the factors like shortage of suitable sized food particles and production of fish (Wanganeo,1980).

Cladoceran density in Masunda varied between 0-1350 ind/ 100 l. Their abundance was noted mainly in monsoon. Nene (1985) as well as Salaskar (1996) supported such monsoon maxima of cladocerans. According to Datta Munshi and Datta Munshi (1995), abundance of cladocerans might be attributed to thick deposits of organic matter. From February 2000 onwards cladoceran population was at lower ebb.

Nauplii :

Occurrence of nauplii reflects active reproductive phase of crustaceans (Sharma and Hussain (2001). During the present study, nauplii constituted 0.98% of zooplankton & appearance of nauplii was of discontinuous nature. They appeared only in Monsoon i.e. July to September 1999 and later in the month of January 2000 & their density ranged between 0-180 ind/100 L.

Though nauplii represent developmental stages of various crustaceans, abundance of nauplii in Masunda lake coincided with maxima of only calanoid copepod & cladocora but not with cyclopoid copepods.

Ostracods :

These were recorded only in two months, contributing only 0.34% in total zooplankton.

Conclusion :

Crustaceans were dominant among zooplankton of Masunda lake, with cyclopoids showing high average density. The high abundance appeared to support the aquaculture observed in this lake.

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