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Monthly variations of Cladocerons in fresh water body upper Wardha Dam, District- Amravati(M.S.)- India.

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ABSTRACT

Availability of resources and competition would primarily determine the balance of individual species within the food web, which in turn influences the variety and proportions of the different organisms, with important implications for the overall functioning of the system. Zooplanktons are the smallest, acellular or metazoans in water bodies, ranging in size from 0.05 to 10 nm. The zooplanktons were represented by rotifers, cladocerons, copepods, ostracods, worms and larvae. Zooplanktons play a significant role in transferring energy in aquatic ecosystem as primary consumers and can be used as indicators of trophic phase of a water body. They also play an important role in the presence or absence of certain fish species and determines the population densities of zooplanktons. Most cladoceran species live in fresh water and other inland water bodies.Cladocerons are sufficiently large in size and can be identified easily so far the assessment of water pollution is concern. Cladocera (16.76%) dominated the zooplanktons population and were followed by copepod (15.49%); protozoan (15.06%); ostracods (13.28%); worms and larvae (11.52%). Seasonal distribution of cladocerans was in the order summer > winter > monsoon. Cladoceron were represented by fourteen species. Holopedium showed their dominance over all the cladocerons and their maximum number were reported at station I, III and IV. Similarly polyphemus were recorded highest at station II and III.

Keywords : Zooplankton, Cladocera, Mesotrophic, Upper Wardha Dam,fresh water body.

INTRODUCTION

The use of space in habitats may affect co-existence among organisms in a community. Zooplanktons are attracted the attention of several workers throughout the world, as they occupy a central position in the food web of aquatic ecosystem. Zooplanktons are also been used as biological indicators of eutrophication, Chakraorty *et al.* [1]. Berlgis and Guido[2], made good contribution on zooplankton studies with special reference to eutrophication process of fresh water pond. Influence of physico-chemical parameter with fluctuation of zooplanktons are of great importance and basically essential for fish culture. Zooplanktons play an integral role and serve as bioindicators and it is wel suited tool for understanding water pollution status Contreas *et al.* [3]. Islam [4] in a pond of Rajshahi University, has investigated the effect of abiotic parameters and variations of zooplankton population. The zooplankton provide a direct link between primary producers and higher trophic level. Nearly all fishes depend on zooplankton at same phase of life or entire lives, Madin *et al.*[5]. Cladoceron is natural group of organism which act as a key element in the fresh water food webs, Hessen *et al*. [6] Thus, understanding the size distribution and variation between cladoceran taxonomic groups, geographical regions and habitats will give us a unique insight into cladoceran ecology and evolution.Water fleas are important components of the fauna of fresh water and are particularly significant in the food web of stagnant water ecosystem, Forro, *et al.* [7]. Therefore the present study is under taken to evaluate population dynamics of cladocerons and the hydro biological status of Upper Wardha Dam

METHODOLOGY

Upper Wardha Dam is an earthen reservoir with the height 36 M and 7Km long spread area occupying the border of Amravati and Wardha district. It is a perennial dam situated 56 Km away from the district place Amravati (MS). The dam is constructed for the purpose of irrigation and drinking water supply. The Upper Wardha Dam is also known as 'Nal Damyanti Sagar'. It is at 780-03'-27"E longitude and 210-16'-18" N latitude. The catchment area is 4302 Sq.Km. and located at 306 MSL.

To study physico-chemical and biological properties of water representative water samples were collected from five stations. Water samples were collected monthly in two liter polythene bottles between 7:00 to 9:00 AM. Abiotic components were analysed in laboratory condition and zooplanktons for identification were fix in 4% formaline,added with 5 drops of glycerine and 5% sucrose(retain eggs in their brood chamber). The method used for the estimation of physico-chemical parameters and identification of zooplankton as given by APHA [8], Edmondson [9] and Great lake water life photo gallery.

RESULTS AND DISCUSSION

The major aquatic groups consists of filter feeding cladocerans, of which the 'common flea' Daphnia is the best known representative. The other major groups, the copepod is divided in mostly filter feeding calanoid and cycloids which feeds occasionally by the filtration. The cladocerans and copepods together with rotifers and protozoans dominate the zooplanktons of fresh water [10. Abundance of zooplankton was in order of Rotifera > Cladoceron > Copepoda > Protozoa > Ostracoda > Worms & Larvae. Upper Wardha Dam exhibited heavy bulk of cladocerons all through the period of investigation. Amongs the cladoceron Holopedium showed their dominance over all the cladocerons and their maximum number were reported at stations I,III and IV. Similarly, polyphemus were recorded to be the second highest at station II and III. Station wise abundance and their monthly variation in average cladocerons of Upper Wardha Dam are in Table -1. Fourteen species of cladocerons were identified and their variation in the abundance of cladoceron at different sampling stations are shown in Table -2. The seasonal variation and their abundance succession was in the order summer > winter > monsoon. Among the cladoceron observe ceriodaphnia,

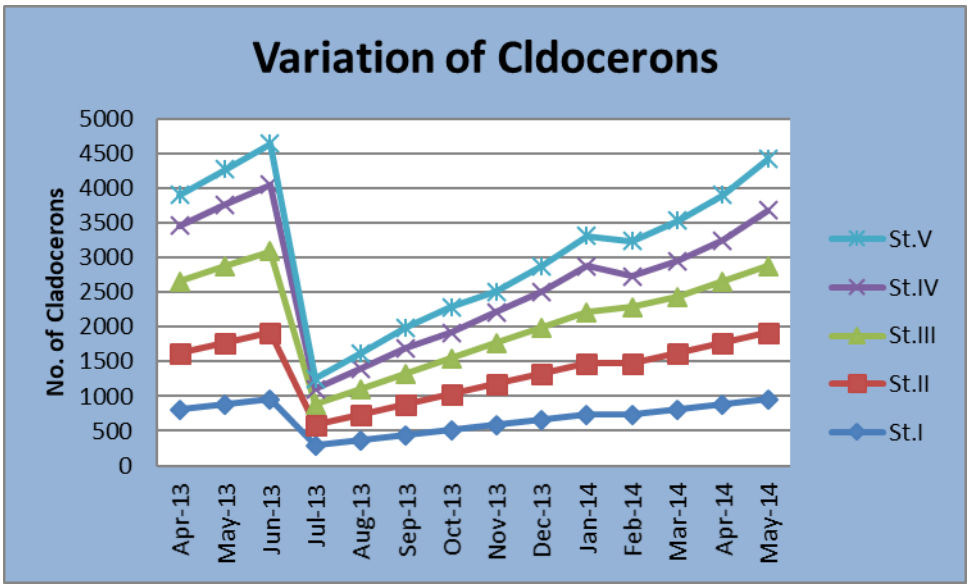
diaphanosoma, leydigia, moinodaphnia were the pollution indicator species but quantity was very meager. During study period positive correlation is observed between cladocerons and water temperature and with turbidity. Nasar and Dattamunshi [11] observed negative correlation with these parameters. on the other hand Saunders *et al.* [12] suggested that temperature modulates the duration of egg development and this together with availability of food, can control the abundance of cladocera in rainy season & winter (July 2013 to Feb. 2014).

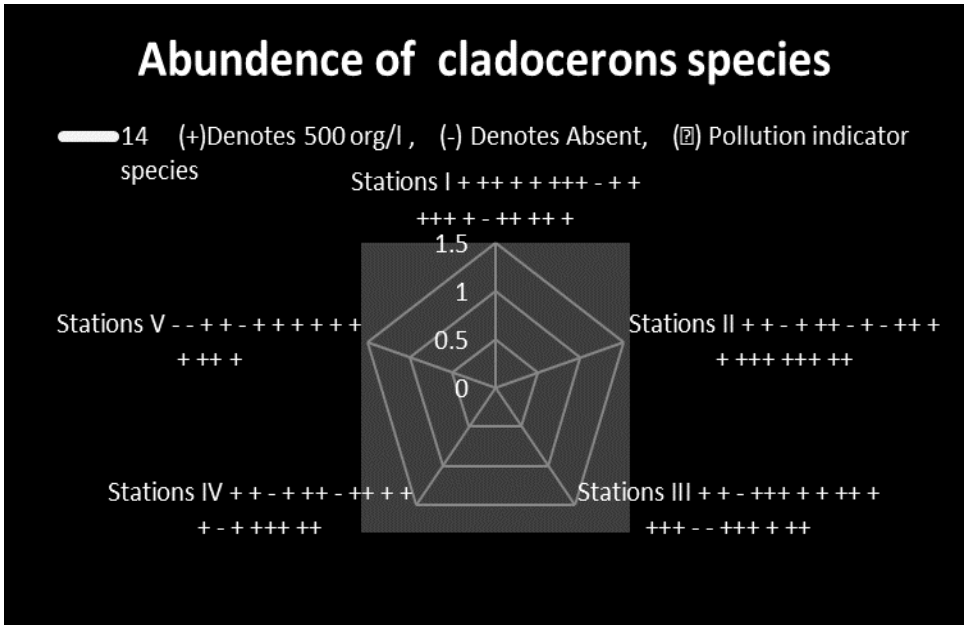
Table 1: Monthly variation of Cladocerons (org/l) at different stations of Upper Wardha Dam during 2013-2014.

Sr.No.	Months	St.I	St.II	St.III	St.IV	St.V	Total	%
1	Apr-13	810	810	1031	810	442	3903	8.9
2	May-13	884	884	1105	884	515	4272	9.8
3	Jun-13	957	957	1178	957	589	4638	10.6
4	Jul-13	295	295	295	221	147	1253	2.9
5	Aug-13	368	368	368	295	221	1620	3.7
6	Sep-13	442	442	442	368	295	1989	4.5
7	Oct-13	515	515	515	368	368	2281	5.2
8	Nov-13	589	589	589	442	295	2504	5.7
9	Dec-13	663	663	663	515	368	2872	6.6
10	Jan-14	736	736	736	663	442	3313	7.6
11	Feb-14	736	736	810	442	515	3239	7.4
12	Mar-14	810	810	810	515	589	3534	8.1
13	Apr-14	884	884	884	589	663	3904	8.9
14	May-14	957	957	957	810	736	4417	10.1

Table- 2: Variation in the abundance of cladocerons at different stations of Upper Wardha Dam during 2013-2014.

Sr. No.	Zoo planktons	Stations				
		I	II	III	IV	V
1	Acantholeberis	+	+	+	+	-
2	Bosmina	++	+	+	+	-
3	Ceriodaphnia□	+	-	-	-	+
4	Chydorrus	+	+	+++	+	+
5	Daphnia	+++	++	+	++	-
6	Diaphanosoma□	-	-	+	-	+
7	Disparalona	+	+	++	++	+
8	Graptoleberis	+	-	+	+	+
9	Holopedium	+++	++	+++	+	+
10	Leydigia□	+	+	-	+	+
11	Moinodaphnia□	-	+	-	-	+
12	Polyphemus	++	+++	+++	+	+
13	Sida crystallina	++	+++	+	+++	++
14	Simocephalus	+	++	++	++	+
(+)Denotes 500 org/l , (-) Denotes Absent, (□) Pollution indicator species						





Similarly, most of the species observed reported to occure in alkaline water and were known to tolerate a certain range of pH variation. The present study agrees with the findings of Roff [13]; Harshman and Zera [14] and Bell [15]. In the water sample of station II a positive correlation was observed between DO and turbidity ($P<0.05$); while negative correlative on was observed between DO and chlorophyceae ($P<0.05$); cladoceron ($P<0.01$); ostracod ($P<0.02$). From the result shown in present study it is concluded that status of water body is mesotrophic. Pollution indicator planktons are less in number confirms that the water is safe for drinking. The large zooplankton community present in the water body forms a very good food chain as it serve as food for the fish and hence fishery activities can be accelerated and many more migratory birds can be visited in future.

Conflicts of interest: The authors stated that no conflicts of interest.

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