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LIMNOLOGICAL DIVERSITY OF LOWER DNYANGANGA PHASE-II AT NIMKAWALA DIST. BULDANA

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Abstract

Study of zooplankton helps to know the water quality of the wetlands, waterbodies, dams and reservoirs, and also status of food chain of the ecosystem. The waterbody, on the other hand help in aquaculture development and management of food resources for animals including man. To have a healthy status of a particular water resource, zooplanktons population play a significant key role. This paper dealt with limnological diversity of Lower Dnyanganga PHASE-II at Nimkawala, near Khamgaon in Buldana district. The results shows total 15 zooplankton species with 3 Rotifers(20%), 4 Copepods (26.66%), 5 Cladocera(33.33%) and 3 Ostracods (20%).This feature of these wetlands and waterbodies is basis of the floodplain, showing a maximum ecological diversity and the productivity .

INTRODUCTION :

Limnology is considered as a part of ecology and covers the biological, chemical, physical, geological, and other attributes of all inland waters, both running as in rivers (lotic ecosystems) and standing as in lakes (lentic ecosystems). The study of rivers, springs, streams and wetlands, lakes and ponds, fresh and saline, natural or manmade are also included in limnology. François- Alphonse Forel (1841–1912) firstly proposed the term limnology. Because of increasing its practical value, the interest in the discipline rapidly expanded. The type of life, which is supported by lentic communities, is greatly dependent on biotic components of the fresh water ecosystem and zooplanktons comprise a great part of every water body. So it is important to study fresh water resources with scientific aspects. Buldana

district is one of the largest districts so far; its area of spread is concerned and is located in the central portion of the state of Maharashtra. The districts like Akola, Jalgaon, Jalna, Parbhani are the adjoining districts to the east, west and south respectively. The river basins which lies in the district is almost dry in the hot weather.

Present research work is related with new water body known as, *'Lower Dnyanganga Project Phase-II'* supported by Government of India under '*Baliraja Jal Sanjivani Yojna'* and comes under Vidarbha Irrigation Development Corporation, Nagpur. The project is situated on Dnyanganga River in Buldana district on Khamgaon-Buldana State Highway.

The Dnyanganga river rises in the table lands North of the valley of the Penganga and run towards Nandura before join the Purna. The Banganga rises in the Melghat to the north of Jalgaon Jamod tahasil and flows south ward to meet the Purna. All these rivers have a sub parallel to sub-dendritic drainage pattern which is structurally controlled by bed rock formed by Deccan trap. Generally, 42% of southern and eastern part of the district is occupied by *Painganga* and *Khadakpurna* river area. These are tributaries of river Godavari with the remaining part comes under Purna and its tributaries. (www.amravatidivision.gov.in),

The zooplankton species distribution in abundant indicates the quality of the water of aquatic ecosystem. Their biodiversity have influence on the major aspects like environmental impact assessment (EIA), bio indication of pollution and biological monitoring (Salve and Hiware, 2010) . The zooplankton comprising Rotifers, Cladocerans, Copepods and Ostracods are considered to be most important in terms of population density, biomass production, grazing and nutrient regeneration in any aquatic ecosystem (Omudu and Odeh, 2006; Mukhopadhyay et al., 2007).Their diversity and density is mainly controlled by availability of food as favorable water quality (Chandrasekhar and Kodarkar, 1997). Zooplankton is good indicators of the changes in water quality because they are strongly affected by environmental conditions and respond quickly to changes in water quality. The zooplankton constitute an important component of secondary production in aquatic ecosystems that play a key role in energy transfer from primary to higher level in the ecosystem (Wang et al., 2010; Sharma and Tiwari, 2011).

MATERIAL AND METHODS :

Study Area :

The Dnyanganga River rises in the Northern scarps of Buldana plateau near Geru-Matargaon village in Ajanta Ranges of Botha forest in Maharashtra. It is a minor river in Buldana district and passes through Nimkawala village and meets to river Purna on South bank near Yerli, Ta. Nandura. Total length of the river is 50.5 miles. The Nimkawala village is located in Khamgaon Taluka of Buldana District. Government of Maharashtra have completed the construction of this dam near Nimkawala village during 2018-19 and started storing of water and due to which this dam is a new water body, it coordinates between $20^{o}37'59^{o}$N ,76 $^{o}27'37^{o}$N and is located 15 km towards West of Khamgaon on

Buldana state highway and 35 km from district head quarter, Buldana. It is located at the altitude 306 meters above sea level.

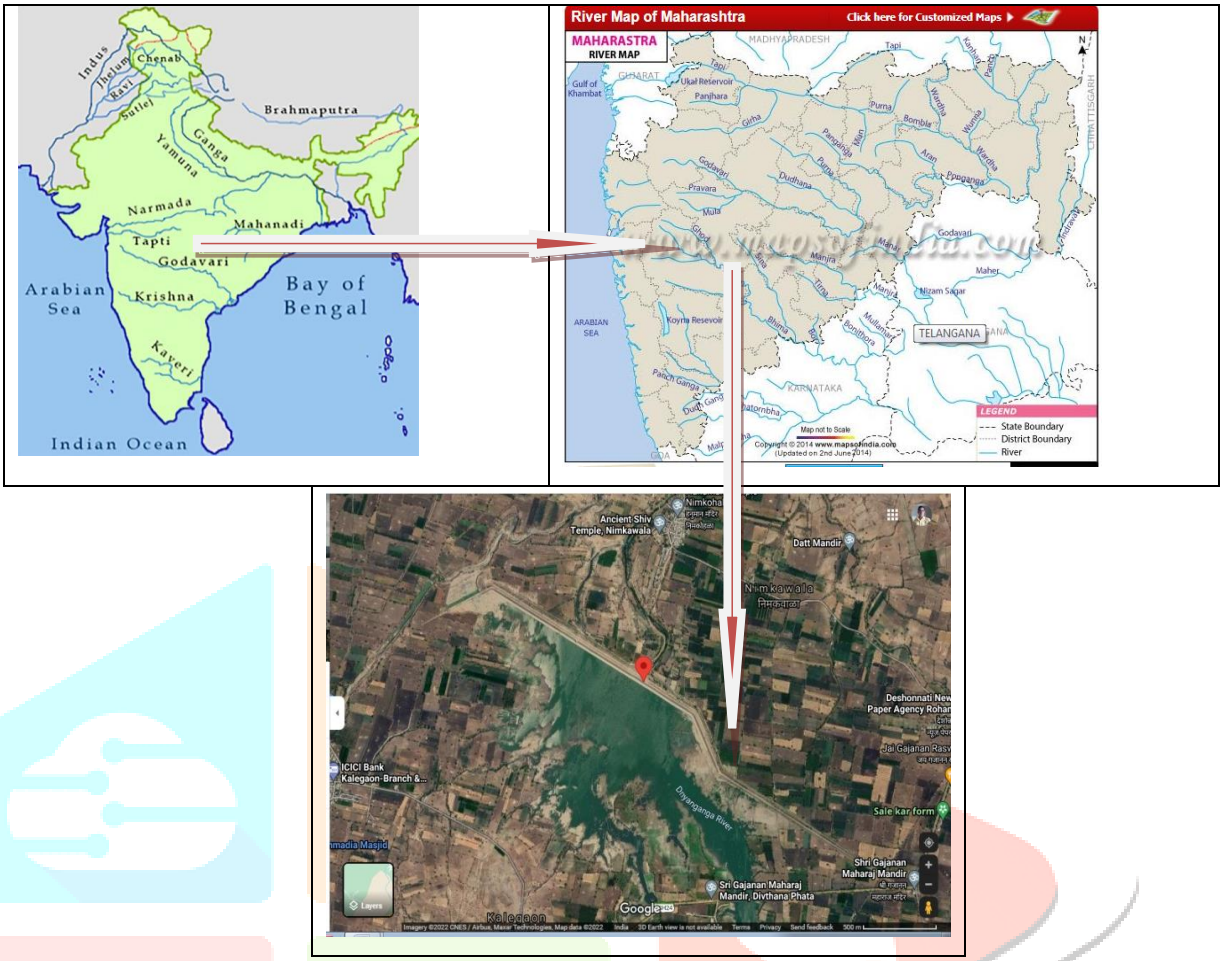


Fig.1.Geographical location of the study area, Lower Dnyanganga Dam (Ref.Google maps and https://www.mapsofindia.com/maps/maharashtra/rivers/)

Sampling and Analysis :

During the study, water samples were collected monthly from June- 2020 to November 2020, in the early morning about 9 to 11 am at the five locations marked as East, West, North, South and Centre core. Sampling sterile bottles 1 to 2 litre capacity were used. The collected samples were allowed to settle. After centrifuging and filtration further study was carried out (APHA, AWWA,2005).Colour ,temperature,pH,TDS etc. were recorded on the spot with the help of Hanna digital pH and TDS meter . Dissolved oxygen was estimated by Winkler's method. Acidity, Alkalinity and hardness were estimated by the method given by Maithei and Sachhi.

For collecting zooplankton a net with mesh size 40µm was used. Two hundred litres of water was filtered through the net and filtrate was taken in another tube. This filtrate contains phytoplanktons, algae, and zooplanktons along with some debris. Further the filtrate was fixed in 5% formaldehyde solution and was taken to the lab for further analysis. At a time a drop of this solution was observed under binocular microscope on Sedgwick-Rafter cell. The identification of zooplanktons was done by using standard keys of Dhanapathi (2000)and Altaff (2004).

RESULTS AND DISCUSSION:

In the present study a total 15 zooplankton species were recorded from the different sampling site, comprising of 3 species of Rotifers, 4 Copepods, 5 Cladocera and 3 Ostracods. The zooplankton, small that swim about in open water (Fig. I to IV) are primary consumers, graze on algae, bacteria, and detritus (partially decayed organic material), were seen with the naked eye, although they are more easily observed with a hand lens or low-power microscopes. One can stare into the water of a pond or lake on a calm night with a flashlight beam shining from above. Secondary consumers, such as planktivorous fish or predaceous invertebrates, eat zooplankton.

Composition and diversity of zooplankton provide information on the characteristics and quality of the water body (Okayi et al., 2001). Zooplankton diversity is one of the most important ecological parameters in water quality assessment. It is a good indicator of the changes in water quality. In the present work, zooplankton density occur a cyclic pattern with lowest in the late pre-monsoon month and raising through late part of post monsoon to early part of summer. These result shows similarities of Veeranam Lake, Tamil Nadu, (Krishnamoorthi and Selvakumar, 2012) and in Triveni Lake, Maharashtra (Khan Rafiullah et al., 2016).

Sr.No.	Class	Total Number
	Copepoda	
1	*Cyclops*	15
2	*Dioptomus*	24
3	*Phyllodiaptomu*	10
4	*Nauplius*	08
	Ostracoda	
5	*Cypris*	25
6	*Cyprinotus*	14
7	*Strandesia*	10
	Rotifera	
8	*Anuropsis*	22
9	*Rotatoria*	16
10	*Testudinella*	04
	Cladocera	
11	*Latona narendrai*	19
12	*Daphnia sarojae*	35
13	*Moina oryzae*	17
14	*Alona dhilloni*	11
15	*Oxyurella sangramsagari*	23

Table 1: The Occurrence of Zooplankton in Lower Dnyanganga Phase-II(Dam) at Nimkawala village , in Khamgaon tahsil.

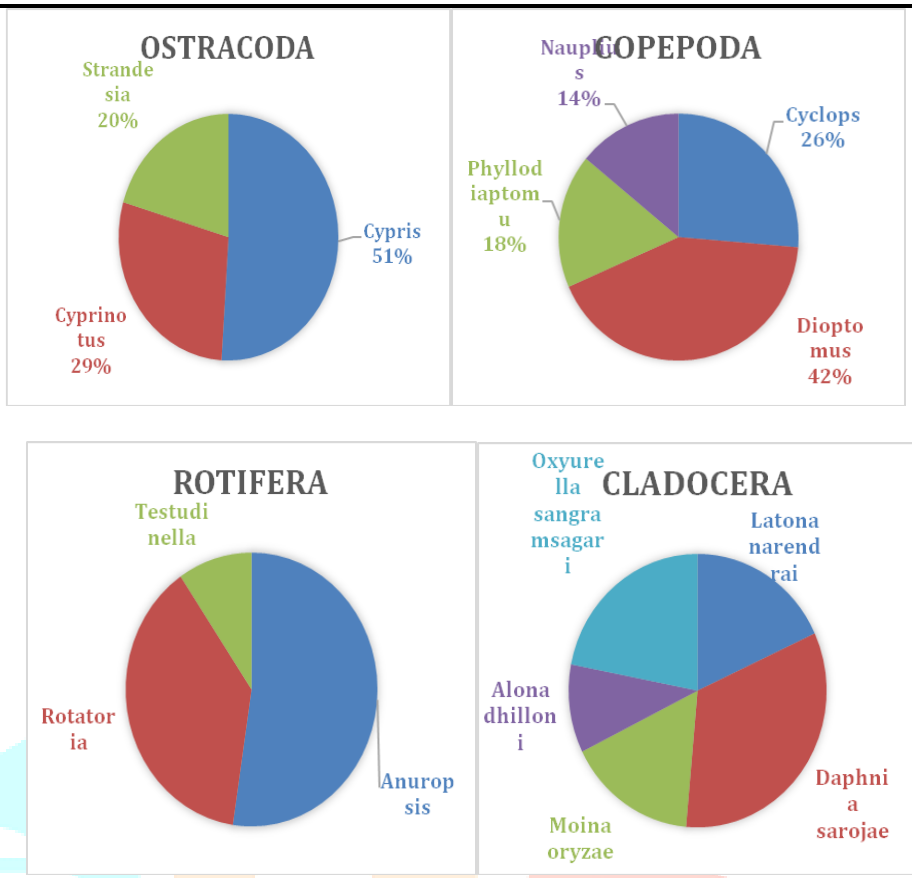
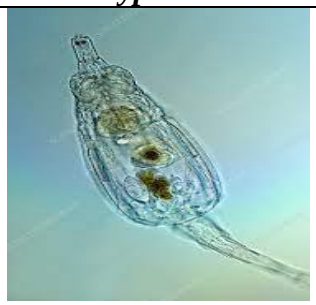


Fig:2.Graphs I to IV-Distribution of Zooplanktons (Copepoda, Ostracoda, Rotifera, Cladocera) in Lower Dnyanganga Phase-II (Dam), Nimkawala.

		
Cyclopes	***Nuaplius***	***Dioptomus***
		
Cyprinus	***Strandesia***	***Rotatoria***
		
Latona	***Monia***	***Oxyurella***

		
Dapnia	***Alona***	Copepoda (Don Loarie , image unaltered. Flickr.com, https://creativecommons.org/licenses/by/2.0)

Fig. 3: Some photographs of zooplanktons recorded in the study area.

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