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A Study on Copepod diversity of Wadgaon dam, District Nagpur (Maharashtra)

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ABSTRACT:

The diversity and abundance of planktonic Copepods were studied from the plankton samples collected from Wadgaon dam water, District Nagpur (Maharashtra State). Sampling station-wise study was carried out for the two consecutive years. A total of nine species of Copepods belonging to two genera were found. In present study, the following copepods were identified from the dam water during the study period. Cyclops species were: *Cyclops albidus, Cyclops strennus, Cyclops biscuspidatus,* and *Eucyclops* ; Diaptomus species were: *Heliodiaptomus vidus, Sinodiaptomus indicus, Rhinodiaptomus indicus, Leptodiaptomus sicilis,*and *Limnocalanus macrurus.* Seasonal fluctuations of copepods were studied. Diversity indices such as population density (N), species richness (d), species evenness (J), species dominance and diversity index (H) were also assessed during the entire study period.

Keywords: - Wadgaon dam, Sampling stations, Copepod, Diversity indices

Introduction:

Water is an important natural resource for the survival of all living things. An aquatic ecosystem is a dynamic system of water habitat which includes both biotic and abiotic environment. Influencing the

properties of each other both are necessary for the maintenance of life. Water supports many lives, organisms which survive in water are called aquatic organisms. Zooplankton constitute an important link in food chain as grazers (Primary and Secondary Consumers) and serves as food for many fishes directly[13]. Zooplankton occupy central position between the autotrophs and heterotrophs of a fresh water ecosystem[11]. Copepods are one of the most important components of the zooplankton community. In addition they are principle conduit for the flow of energy between primary producers and the higher trophic levels[2]. Copepods comprise a major portion of consumer biomass in aquatic habitats and play a significant role in food webs both as primary and secondary consumers and as a major source of food for many larger invertebrates and vertebrates including zooplanktivorous fishes and prawns. Copepods are used as biological indicators for certain ecosystem[15]. The present work was carried out to assess the species diversity and population density of copepods among the zooplankton collected from Wadgaon dam water located in Nagpur district, Maharashtra, in order to evaluate its suitability for fish culture.

Material and Methods:

Plankton net is field equipment used to trap zooplankton. Qualitative and quantitative analysis of copepods were done during two years study period from March-2013 to February-2015. Samples from the selected stations were collected seasonally early in the morning hours between 06:00 AM to 08:00 AM. Zooplankton Samples were collected by filtering 100 liters of water through standard plankton net of bolting silk no. 25 (mesh size 64 µ). All the filtered contents were then transferred to plastic bottles filled with 4% formalin, the aqueous solution of formaldehyde. The qualitative and quantitative analysis of different copepod species were done by Sedgwick-Rafter cell method.

Identification of zooplankton Copepods was done under microscope using keys and monographs of Edmondson (1959), Battish (1992), Reddy (1994), Dhanapathi (2000) and Kodarkar (2006).

Statistical analysis was done by using IBM-SPSS (v20) Software. Different diversity indices, such as species dominance (D), species evenness (J), species richness (S) and Shannon-Weaver diversity index (H) were calculated. Season wise data were subjected to statistical analysis through one way ANOVA. Shannon diversity index was calculated by using formula:

$H=s\sum_{i} \log_e (pi)$

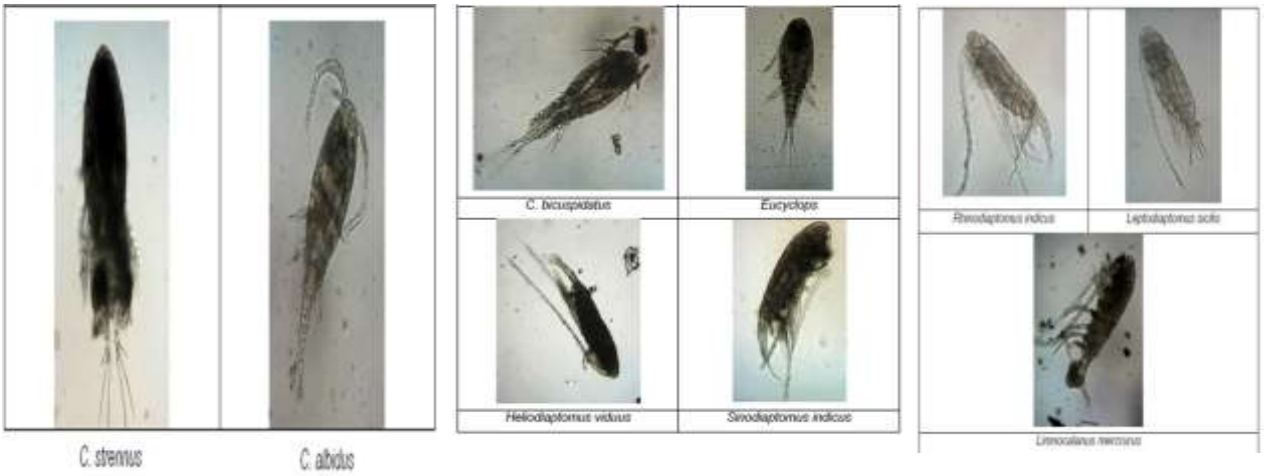
Where, s is the number of species.

$p_i =$ the proportion of the total number of individuals consisting of the i^{th} species.

Results and Discussion:

To observe the copepod diversity among the zooplankton community in the dam water, two years study was carried out for obtaining the reliable data. A total of nine species of copepoda belonging to two genera were identified. Station wise zooplankton composition were observed and recorded separately during the study period. In present study, the following copepod species were noticed and the obtained data were subjected for analysis. The copepod species obtained were depicted in Fig. 1.

Fig.1: Copepod species



It was observed that the copepod comprised an average of 34.56% in the first year and 34.53% in the second year of the total zooplankton population throughout the study period. The highest population density was observed in the month of January 2014 and it was noted 585.5± 19.69, whereas the minimum population density was noted in the month of October 2013 (132.75± 41.56). On an average the copepod species were found to be 326 with standard deviation 121.65. Coefficient of variation of observed copepod species was found to be 0.37. F-value was 43.76 significant at $p < 0.0001$.

Conclusion:

Occurrence of the Copepod species during the two years study period revealed that the dam was productive for fish culture.

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