International Journal of Scientific Research in Science and Technology
Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)
doi : https://doi.org/10.32628/IJSRST229456

Study of Zooplankton Diversity in Amarja Reservoir at Kalaburagi District

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Article Info
Volume 9, Issue 4
Page Number : 528-532

Publication Issue
July-August 2022

Article History
Accepted : 05 August 2022
Published : 22 August 2022

ABSTRACT

Amarja Reservoir is the historical reservoir situated in Kalaburagi district. Zooplankton plays an important role in aquatic ecosystem serve as a major component of food chain. It maintain proper equilibrium between biotic and abiotic components of the aquatic ecosystem. The present investigation deals with study of diversity zooplankton of Amarja reservoir. The work was carried out for the period of one year i.e., December 2014 to November 2015. The zooplankton of Amarja reservoir water is represented by five different groups like Protozoa, Rotifera, Cladocera, Copepoda, Ostracods with 19 different species were identified and recorded in Amarja Reservoir, Rotifer were dominant among zooplanktons.

Keywords : Zooplankton, Amarja reservoir and Diversity.

I. INTRODUCTION

Biodiversity refers to variety and variability among living organism and the ecological complexes in which they occur. Human induced activities pose series threats to the biodiversity which ultimate leads to environmental degradation. Zooplankton is microscopic organism which more at the mercy of water currents. Rotifera, Cladocera, Copepoda and Ostracods constitutes the major groups of zooplanktons. These groups occupy an intermediate position in the food web. The earliest studied on zooplankton diversity have been made by researchers like Arora (1962), Chandra Mohan and Rao (1976), Verma and Dutta Munshi (1987) Sharma (1980), Kodarkar (1994), Mishra and Saksena (1998), Dhanpathi and Rama Sarma (2000), Trivedy (2000), Baghela (2006), Pandit et al., (2007).

High-throughput DNA sequencing is becoming an increasingly important tool to monitor and better understand biodiversity responses to biodiversity changes in a standardized and imitable way. Environmental DNA (eDNA) from organisms can be captured in ecosystem samples and sequenced using metabarcoding, but processing large volumes of eDNA data and annotating sequences to recognized taxa remains computationally expensive. Speed and accuracy are two major bottlenecks in this critical step. Here, we evaluated the ability of convolutional neural networks (CNNs) to process short eDNA sequences and associate them with taxonomic labels. Using a unique eDNA data set collected in highly

diverse Tropical South America, we compared the speed and accuracy of CNNs with that of a well-known bio-informatic pipeline (OBI Tools) in processing a small region (60 bp) of the 12S ribosomal DNA targeting freshwater fishes. We found that the taxonomic labels from the CNNs were comparable to those from OBI Tools, with high correlation levels for the composition of the regional fish fauna (Benjamin Fluck et al., 2022).

Zooplankton play an integral role in transferring energy to the consumers hence they form the next higher trophic level in the energy flow after phytoplankton. Ecological environment and mode of reproduction zooplanktons have attracted the attention of several workers throughout the world. Yousuf and Qadri (1981) studied Manasbal lake at Srinagar for zooplankton population and recorded a cyclic patter with lowest in winter and then rising through early part of summer and early autumn and noted that Copepods contributed generally more than half of the total zooplankton in reservoir Rotifers was second to contribute to total density and Cladocera comprised generally lower as other to the total zooplanktons reasons.

The reservoir provide the moisture near agriculture side by percolation of the water being the eutrophic reservoir large numbers of migrating birds visit throughout the year, with this view the present investigation has been carried out regarding the diversity of zooplankton in Amarja Reservoir of Kalaburagi district.

II. METHODS AND MATERIAL

Amarja reservoir is located near Aland Taluka in Kalaburagi district starting of point is Duttargoan village, Aland Taluka and flow up to 50-60 kms and will merge into Bheema River at Sangam kshetra, Ghangapur Gulbarga district, Sangam kshetra is a meeting point of Bheema and Amarja Rivers. The water of these rivers especially at their confluence, called Sangam will be freed from their sins. The Amarja reservoir is built across the Amarja River, the reservoir was constructed in the year 1998. This is a multipurpose dam the reservoir is used for irrigation of the surrounding areas for providing water supply and for solving the problems of drinking water in the area. The reservoir 960 meter long and 31.85 meter high form the foundation. It covers a catchment area of 53.095 ha. The design flood of the dam is 2837 cubel. The reservoir has ogee type of spillway and 5 spillway gates. The maximum water level of the reservoir is 461.5 meters.

Water samples were collected on monthly basis. Collections were made on specific dates of every month. Surface samples were collected using a clean plastic container for the study of various physico-chemical and biological parameters. Water samples were collected from seven different stations in the Amarja reservoir. All the sample collection and observation were made between 10.00 am hours to 01.00 pm hours throughout the study period.

III. RESULTS AND DISCUSSION

Zooplankton of the most important food items of the aquatic organisms. Almost all the fishes in their larval stages were dependent on it and some of them exclusively feed on planktons. Monthly variation of zooplankton species were presented in Table-1. The zooplankton pollution observed has been composed of Protozoa, Rotifera, Copepods, Cladocera and Ostracods .

In the present study the concentration of Zooplankton was recorded in the month May and August exhibited maximum and minimum in January zooplankton per liter respectively. On the whole zooplankton exhibited higher density in summer season. Similar summer maximum of zooplankton population was also reported by George (1970) and

Adoni (1985) Joshep B. et al. (2011). Zooplanktons density and composition exhibit a monthly variation.

Monthly variation in the species diversity index of the major zooplankton population was also recorded. Composition and abundance of each zooplankton group varied from time to time and season and depended on limnological characteristics of the water body. Zooplankton consisted of species of Protozoa, Rotifer, Copepoda and Cladocera in Amarja Reservoir Rotifera dominate among zooplankton and this indicates the polluted nature of the reservoir water were presented in Table 2.

Table. 1 : Monthly distribution of Zooplankton at Amarja Reservoir from December 2014 to November 2015.

MONTHS	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.
Protozoa												
Difflugia	+	+					+	+	+ +	+ +	+	++
Nebela	+ +	+					+				+	+
Paramecium	+	+	+								+	++
Verticella	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Rotifers												
Pofyartha	+	+	+						+	+	+	+
KeraluIIo	+	+	+								+	++
Rotaria	+ +	+				+ +	+				+	+
Gastropus	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Brachionus	+	-	+	+	+				+	+	+	++
Copepods												
Eyclops	+	-	+ +	+	+ +	+					+	+
Diaptomus	+ +	-	+ +	+	+ +	+					+	+
Heliodiap torn us	+	+	+					+	+	+	+	++
Paracyclops	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Cladocerans												
Bosmania	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Daphnia sp.	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Alona	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Ostracods												
Cyperis	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Steno cypris	+	+	+	+	+	+ +	+	+	+	+	+ +	+
Cyclo cypris	+	+	+	+	+	+ +	+	+	+	+	+ +	+

Table 2. Total Zooplankton of Amarja Reservoir during Dec. 2014 to Nov. 2015.

Zooplanktons	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
Protozoa (11.21%)	63.29	22.01	18.81	77.39	117.9 8	102.7 5	32,03	32.51	52.68	45.36	70.30	65.20
Rotifera (41.17%]	123.3 4	167.4 4	146.1 5	220.2 8	324.5 6	386.3 9	295.5 8	127.9 8	186.7 1	84.70	135.2 0	130.1 2
Copepods (20.06 %)	66.88	51.31	106.9 1	142.5 4	242.9 9	216.1 6	117.1 8	9.78	1.63	1.07	70.80	74.01
Cladocera (24.06 %)	14.79	*27.67*	63.16	250.4 5	190.3 4	190.9 8	145.2 9	128.2 4	56.93	109.5 4	30.79	20.15
Ostracods (03.03%)	8.93	*8.43*	15.51	24.39	33.31	29.63	23.68	0.83	0.00	0.00	280.8 0	260.0 3
Total Zooplankton s	277.2 3	*276.86*	350.5 4	715.0 5	909.1 8	925.7 8	604.7 6	299.3 3	297.9 5	240.67	587.8 9	550.5 1

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Cite this article as :

Dr. Neelakanth S. Wali, K. Vijay Kumar, Pruthviraj C.B., "Study of Zooplankton Diversity in Amarja Reservoir at Kalaburagi District ", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 9 Issue 4, pp. 528-532, July-August 2022. Available at doi : https://doi.org/10.32628/IJSRST229456
Journal URL : https://ijsrst.com/IJSRST229456