

RESEARCH ARTICLE

Seasonal and quantitative distribution of Rotifers in Isapur Dam, District, Yavatmal Maharashtra, India

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ABSTRACT

Rotifers are microscopic soft-bodied fresh water invertebrates, which have been used to indicate the trophic status of a water body. They are one of the connecting link organisms between primary producers and consumers in aquatic food web. In present investigation, Monthly variation of rotifers recorded in Isapur Dam Pusad Dist. Yavatmal. Quantitative assessment of rotifers was undertaken during July 2019 to June 2020. Six species of rotifers were found during the course of investigation viz. *Branchionuscaudatus*, *Branchionusfalcatus*, *Branchionusdiversicornis*, *Keretellacochelearis*, *Lepidella patella*, and *Monostylaclostenocera* from Isapur dam. They were abundant during the summer season and minimum was found in the winter season.

Keyword: Isapurdam, Seasonal, Zooplankton, Rotifers.

INTRODUCTION

Zooplanktons are essential factor of aquatic ecosystems and constitute as an important elements of the food chain. They play vital role in transferring the energy from producers to large invertebrates and fish. Zooplanktons are heterotrophic and sometimes detritivorous. They feed on detritus and dead phytoplanktons's and thus help in monitoring water pollution [1]. Zooplanktons have been used as bio-indicator of eutrophication [2]. Zooplankton community comprises of five groups such as Protozoa, Rotifera, Copepoda, Cladocera and Ostracoda.

Rotifers are soft bodied invertebrates which found in both, marine and fresh water environment. They are small sized organisms, but their abundance make them important component of the aquatic ecosystem [3-5]. Rotifers play a crucial role in many ecosystems as the fish, aquatic crustaceans and their larvae feed on them. Presence of some rotifer species indicates the pollution level of water body.

Rotifers are used as good indicator for pollution level and eutrophication state of aquatic ecosystem because of their sensitivity to the changes in water environment [6]. Rotifer diversity and distribution is influenced by deteriorating quality of water in fresh water ecosystem. Hence rotifers considerable as central position of total zooplanktons. The present study is undertaken to investigate the seasonal and quantitative distribution of rotifers from the Isapur dam, district Yavatmal.

METHODOLOGY

Study area:

The work is carried out in Isapur Dam. It is located in Pusad Taluka near Isapur Village in Yavatmal District, Maharashtra State Which is about 300 kms away from Nagpur. Isapur dam is an earth-fill dam on river Penganga constructed in 1982 with geographic coordinates Lat. 19°43'40"N and Long. 77°26'12"E. Main purpose behind construction of this dam was to provide water for irrigation to surrounding areas.

Sample Collection:

For the study of rotifers, samples were collected seasonally from July 2019 to June 2020. Samples were collected from three different sampling sites, viz site 1 (West side), site 2 North side) and site 3 (South side) of the Dam in the morning time. Analysis was carried out during the three seasons of the year-summer, monsoon and winter. Collected samples were mixed well and brought to the laboratory for analysis. Water sample of 25 liters was filtered through the plankton net of bolting silk no. 25 of mesh size 63 micron. The filtered zooplankton sample was preserved in 4% formalin [7]. Few drops of glycerin were added to it to prevent hardening of rotifers. All zooplanktons were allowed to settle down at the bottom. Supernatant plankton free water was removed by siphoning with pipette and the sample was reduced to the desired volume of 25 ml.

Identification and Enumeration of Rotifers:

Rotifers were identified and enumerated by Lackey drop count method. This method employed for high density sample it is a simple technique for enumeration of rotifers. In this method the sample is shaken gently to mix the content uniformly and 1 ml sample is taken on cavity slide with the help of pipette and after putting a cover slip planktons are counted under microscope.

$$\text{Rotifers (Unit/L)} = \frac{N \times C}{V} \times 100$$

Where,

N= number of planktons in 1 ml sample

C=volume of concentrate in ml

V=Volume of total sample filtered in ml

Identification key was used for phytoplankton and zooplankton given by Adoni [8] and APHA [9].

RESULTS

In present investigation, monthly variation of rotifer recorded. Total rotifers were counted in unit per liter from three different stations on monthly basis for 12 months. The monthly average recorded minimum during rainy season in the month of June (733 units/liter) and maximum rotifer observed during the month of March (1806) units/liter) Six species of rotifer found during the course of investigation viz. *Brachionuscaudatus*, *Brachionusfalcatius*, *Brachiomnus diversicornis*, *Keretellacochlearis*. *Lepadellapatella* and *Monostylaclostenocera* Station wise mean value recorded and total number of rotifer fauna observed minimum (733 unit/liter) at sampling station where as larger rotifer community was observed at sampling station III (1806 units/liter). Percentage distribution of six species of rotifer at station to III and monthly distribution of total rotifer at station I-III.

Rotifers occur in all kinds of water are considered as pollution indicator species. Due to these characteristics they attract global attention. pH sensitivity of rotifers was established by Pejler [10]. Rotifers play an important role as grazer predators and suspension feeder with in zooplankton community. The seasonal variation and their abundance succession was in the order summer > winter > monsoon. Among the six species of rotifers *Lepadella patella* vigorously found at station II and III. From the observed rotifers, *Brachionusfalcatius* and *Monostylaclostenocera* were pollution indicator species and their distribution was typical at station I and III. This type of specific distribution indicated not only the different food habits of rotifers but also the type of pollutants in water. At station I and III where the depth of water was comparatively less than that of station III, in which activities of herbivorous vertebrates and human activity are predominant. These specific factors might have developed unstable condition and therefore,

much resistant rotifers like *Brachionuscaudatus* and *Brachionus diversicornis* were observed from these station.

The present study is in support with the finding of Michael [11].

Location Map of Isapur Dam

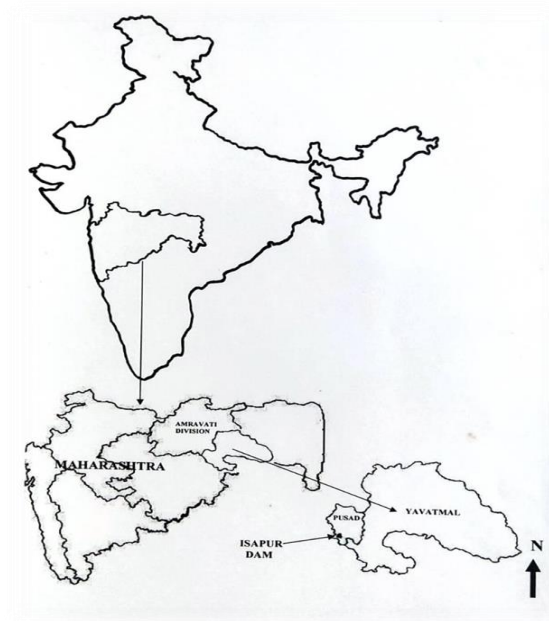


Plate Showing Different Sampling Station of Isapur Dam



Station-1



Station-2



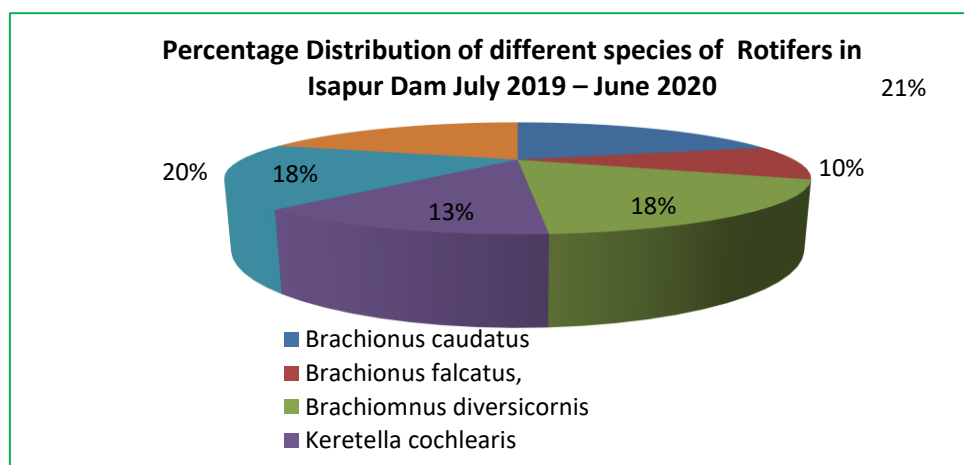
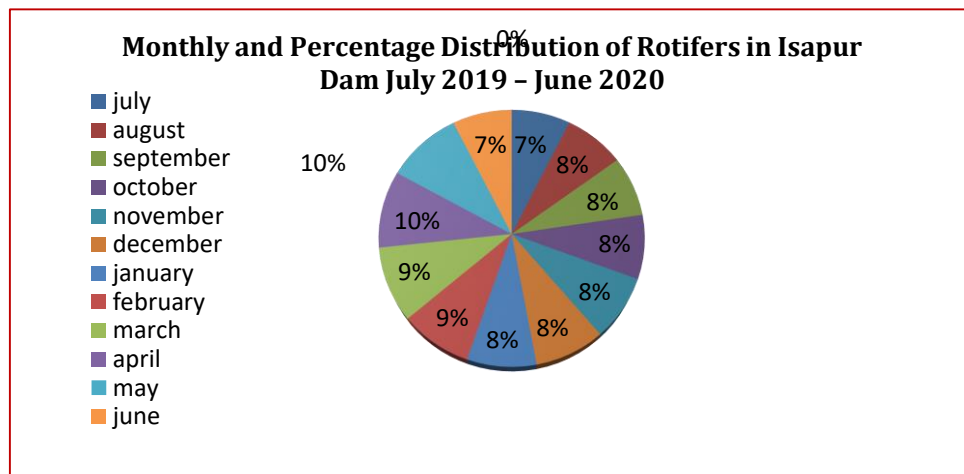
Station-3



Isapur Dam

Table 1: Monthly and Quantitative Distribution of Rotifers in Isapur Dam July 2019 - June 2020

Month	<i>Brachionus caudatus</i>	<i>Brachionus falcatus</i>	<i>Brachiomnus diversicornis</i>	<i>Keretella cochlearis</i>	<i>Lepadella patella</i>	<i>Monostyla clostenocera</i>	Total	Mean
July	855	368	717	395	716	793	3844	1098.3
August	863	394	749	428	724	807	3965	1132.9
Sept.	782	364	771	474	714	850	3955	1130
Oct	859	423	785	522	765	852	4206	1201.7
Nov	866	433	759	547	760	871	4236	1210.3
Dec	918	395	766	571	811	879	4340	1240
Jan	888	414	749	555	800	864	4270	1220
Feb	961	455	803	551	827	878	4475	1278.6
March	985	606	824	657	909	955	4936	1410.3
April	1055	494	924	681	972	941	5067	1447.7
May	999	502	916	663	927	965	4972	1420.6
June	809	329	668	530	748	803	3887	1110.6
Total	10840	5177	9431	6574	9673	10458	52153	14901



The rotifers were observed abundant in summer but a sharp decrease in their number was noticed on the onset of rainy season reaching to its minimum in August. During winter, again a slight increase in abundance of

rotifers was seen. This type of seasonal fluctuation is in confirmation with the findings of Seenayya [12]. Zooplankton established peak in May, June and December. This anomaly could be due to the feeding

habits of the rotifers along with the high nutrient level. This is well in agreement with the observations of Sharma and Sahai [13], Adholia and Vyas [14], Bais and Agrawal [15]. Minimum density of rotifer in monsoon months may be due to the influx of rainwater and dilution effect as reported by Chapman [16].

CONCLUSION

The present study infers that there is an abundance of rotifers in the Isapur dam reservoir. Also, the distribution of rotifers showed a seasonal variation which might be due to the physicochemical factors of the water body. Few pollution indicator species were also recorded it appear that at present oligotrophic nature of Isapur dam is on the verge of becoming eutrophic.

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