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**ORIGINAL ARTICLE** **OPEN ACCESS**

# Rotifer Diversity in Shivdham Temple Pond Fulchur, Gondia District, Maharashtra

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**ABSTRACT**
*In the evaluation of the condition of Shivdham temple pond, a monthly survey and sampling were carried out for over a year. The water sampling to collect zooplanktons in which the representative samples were segregate, identified and their role as a biological indicator is discussed. In the present paper the specific group viz. rotifer is used to assess the condition of the water environment in Shivdham Temple pond Fulchur. Zooplanktons are varied in community structure as per nutrient input or surrounding environment or the anthropogenic practices in that water. Rotifera, among all planktonic groups comprises a significant constituent of freshwaters whose inhabit with aquatic weeds and varied nutrients compositions. They linked with transforming energy in subordinate trophic level to advanced trophic level and also considered as valuable ecological indicator of trophic status of the freshwater ecosystem. In the present findings the total of 30 rotifer species were recorded from the 07 families of 02 orders and their trophic significance is discussed from the Shivdham Temple pond Fulchur Gondia.*
***Key words:*** *Diversity, Rotifer, Shivdham Temple Pond, Fulchur, Gondia*

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## INTRODUCTION

Rotifer is one of the groups of planktonic microorganism; as a primary consumer in its ecosystem nurturing on pelagic phytoplankton and available organic substances. Simultaneously, Rotifers and other group member are acting as natural fodder of fish, exhibit links in food web and inhabit diversity of trophic level [1] also responding to any change in its habitat ecology [2]. The variation of rotifer assemblages varies from water to water is due to abiotic variables viz. temperature, salinity and biota as food availability, predation etc [3-5]. Generally small population of rotifer due to the low oxygen content can affect the abundance and high carbon dioxide in water, they prefer more alkaline water, Brachionus species with higher population in the period of high alkalinity [6] while Rotifer shows outstanding growth peak of population in summer with high macrophytes abundance [7]. According to Saksena, [8], certain living organism serve the purpose of monitoring the environmental pollution as they are tolerant to adverse environmental condition and therefore considered as bio-indicator in depicting the trophic status of water quality [9-14]. Bhandarkar *et al*., [15] and Bhandarkar and Paliwal, [16, 17] observed the rotifer diversity in different productive water bodies and manure enriched tropical pond. Bhandarkar, [18] observed that the dominance of Brachionus species in culturally eutrophied polluted water. Gondia district is popularly known as 'Lake district'. Owing to this fact only few workers like Meshram [19], Gadekar, [20, 21], Bhandarkar, [18, 22] and Gadwe *et al*., [23] contributed limnological study on few water bodies of Gondia district. The present study deals with the diversity of rotifer from Shivdham Temple pond which is used as recreational and fisheries activities, even though various anthropogenic activities found adjoining residential viz. cloths washing, cattle washing, dumping sewage, immersion of idols etc, which led to nutrient enrichment in water. In addition to this, the agricultural runoff also added to that water, which leads to nutrient enrichment in water. Rotifer diversity from this pond is helping to understand the trophic status of water, for further assessment of other abiotic and biotic properties of this pond.

## MATERIAL AND METHODS

Zooplankton samples were collected first week of every month during period of October 2019 to September 2020. For this specially designed plankton collecting net made up of bolting cloth of mesh size 40 microns (**Fig.2**) was used. About 100 liters of water was filtered through net and concentrated sample was preserved by using 4% of formaldehyde solution. In laboratory a sample was further concentrated to 30 ml for the qualitative and quantitative analysis. Rotifers were observed and photographed by Metzer-M-Co-axial trinocular digital camera research microscope vision plus-5000 DTM. Identification of rotifers was done as per the keys given by Edmondson [24], Battish [25] and Dhanpathi [6].

**Study Area:** Shivdham temple Pond (21° 26' 7.9"N, 80° 12' 9.26"E) also popularly known as Fulchur Lake, it was built in 2014 by Fulchur Tourism and Environmental Developmental Society. It has occupied over 16 acres of Government land. As in Map given (**Fig. 1 and 2**) the pond is surrounded by human habitation and agricultural land on the either side.

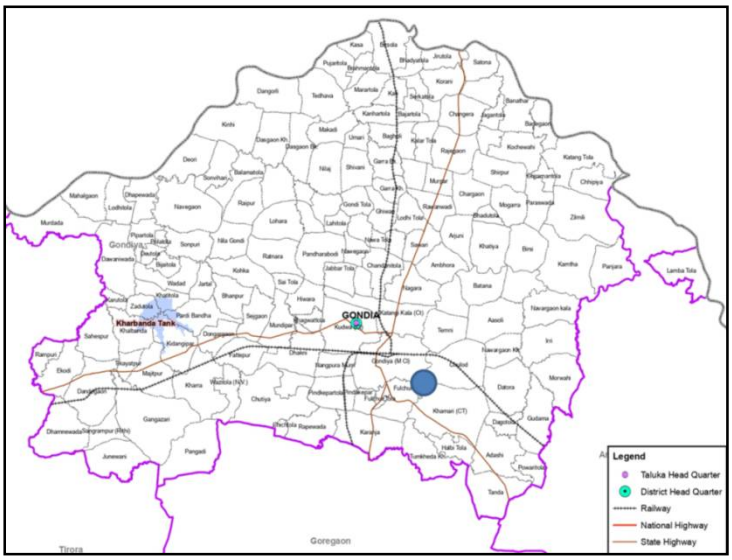


**Fig.1:** Map of Gondia city showing the blue circle as a Shivdham Temple Pond, Fulchur.

**Fig. 2:** Shivdham Temple Pond (Left), Collection of Zooplankton (middle and right)

## RESULT AND DISCUSSION

Rotifers are primary freshwater Metazoan which is divided into two major groups i.e. Monogononta and Bdelloidea. The class Monogononta comprised of 1570 species level taxa, of which a majority 1488 species are free living fresh water taxa [26]. Monogonont rotifers are found in nearly all types of water bodies particularly from littoral zone of stagnant water bodies with slightly acidic waters which may be oligotrophic to mesotrophic in condition. They can populate vacant niches with extreme rapidity and convert primary production into a form, usable for secondary consumers producing up to 50% of the total plankton biomass [27]. In the present study, all the recorded rotifers were belongs to Class Monogononta. Total of 30 species were recorded from the two orders of Class Monogononta of phylum Rotifera (Table 1).

| SN | Classification | Family | Genus and Species |
|---|---|---|---|
| 1 | Phylum: Rotifera | Brachionidae | *Brachionus calyciflorus* |
| 2 | Class: Monogononta | | *Brachionus calyciflorus v. hymani* |
| 3 | Order: Ploima | | *Brachionus angularis* |
| 4 | | | *Brachionus falcatus long spined* |
| 5 | | | *Brachionus forficula* |
| 6 | | | *Brachionus quadratus* |
| 7 | | | *Brachionus quadridentatus var. melhini* |
| 8 | | | *Brachionus quadridentatus post spine bowed* |
| 9 | | | *Brachionus diversicornis* |
| 10 | | | *Brachionus ureceolaris* |
| 11 | | | *Brachionus budapestinesis* |
| 12 | | | *Brachionus caudatus apesteine* |
| 13 | | | *Platyias quadricornis* |
| 14 | | | *Keratella tropica* |
| 15 | | | *Keratella taurocephala* |
| 16 | | | *Keratella cochlearis* |
| 17 | | | *Anuraeopsis fissa* |
| 18 | | | *Plationus patulus* |
| 19 | | | *Trichotria tetractis* |
| 20 | | Lecanidae | *Lecane papuana* |
| 21 | | | *Lecane species* |
| 22 | | | *Monostyla decipiens* |
| 23 | | | *Monostyla species* |
| 24 | | Trichocercidae | *Trichocerca species* |
| 25 | | Asplanchnidae | *Asplanchna brightwelli* |
| 26 | | | *Asplanchna intermedia* |
| 27 | | Synchaetidae | *Polyarthra multiappendiculata* |
| 28 | Ord.: Floscullariacea | Testudinellidae | *Testudinella species* |
| 29 | | | *Filinia longiseta* |
| 30 | | Gastropodidae | *Gastropus hyptopus* |

**Table1:** Diversity of Rotifer species from Fulchur pond Gondia

The maximum 19 species were recorded from the family Brachionidae belongs to order Ploima in which, 12 species of Brachionus species, 03 species of Keratella, 01 species each of Platyias, Anuraeopsis, Plationus and Trichotria. 04 species were recorded from the family Leanidae belongs to order Ploima, in which 02 species each of Lecane and Monostyla. 01 species of Trichocerca from the family Trichocercidae, 02 species of Asplanchna from the family Asplanchnidae and 01 species of Polyarthra fom the family Synchaetidae belongs to order Poima. The order Floscullariacea comprised of 03 species from family Testudinellidae with 01 species of Testudinella and 01 species of Filinia while family Gastropodidae consists of only 01 species of Gastropus (PLATE I AND II). In the present study the Brachious species were dominant. The organisms considered as bioindicator which depict the trophic status of water [9-14**,** 28]. As per the observation by Arora, [29] reported Brachionus species from potable water of diluted sewage tanks to polluted water; occur abundant in moderately polluted water while occur in small number in highly polluted water. Being a heterotrophic in nature, Rotifers contributes significantly in transferring energy from lower trophic level to higher trophic level and play part as connecting link in aquatic ecosystem. They play a vital role in trophic dynamics of water body [30] and which are acts as a measure of current environmental conditions of the habitat [31]**.** The Studies of Mahajan *et al.*, [32]; Sladeck, [12] suggested that the Brachionus species are the indicator of eutrophication as well as Somani and Pejawar [33] reported the dominance of Brachionus and considered as the tolerant genera as an indication of onset of eutrophication in the Lake Masunda. 06 species of Brachionus from Saroornagar Lake Hyderabad in which B. calyciflorus was dominant, also described the un-uniformity of occurrence of B. bidentata, B. angularis, B. forficula and B. durgae in monthly collections due to changes in water quality related with nutrient concentration in summer. 07 species of Brachionus were reported by Bhandarkar *et al.,* [34] from highly eutrophic Kalikar Pond in Bramhapuri. 09 species of rotifers were recorded by Bhandarkar and Paliwal [16] from different productive water bodies of Lakhani. Bhandarkar, [18] recorded 46 species of rotifers belonging to 15 families from the highly eutrophic Dhukeshwari Temple Pond of Deori concluded that the rotifer fauna can be lined with favorable conditions and availability of abundant food in the form of bacteria, microphytoplankton, animal waste and suspended detritus [18]**,** direct entry of untreated domestic sewage from input area [35]**.** Rotifers respond rapidly to changes the

ecological condition [2]. Some species flourish in highly eutrophied water while others are very sensitive to organic and chemical waste. *B. angularis, F. bidens, B. calyciflorus, B. calyciflorus, F. amphicerus* and Trichocerca occur in eutrophic water [36]. According to Thunmark, [37], B. angularis, Trichocerca, Polyarthra are the indicator species of eutrophy while B. quadridentatus, Keratella quadrata, Trichocerca, Filina longiseta, are found in eutrophic water [38]. Pejler, [39], reported Brachionus species, Keratella cochlearis, Trichocerca, Polyarthra, Filinia longiseta in mesotrophic to eutrophic waters. Dhanapathi [6] observed that the species with well developed lorica such as Brachionus, Keratella, Mytilina, Platyas and Asplanchana species build higher population in high alkaline water simultaneously high alkalinity influence the growth and abundance of loricate forms, cannot act as limiting factor for others. Alkaline water contains few species but large number of individuals and diversity in acid water [40]. The present Rotifer diversity from the Fulchur Pond in Gondia is a glimpse of research work carried out to know trophic nature of the pond. However further thorough studies on seasonal fluctuation, species diversity, richness and evenness would be helpful in evaluating the role of organism in trophic nature of pond.

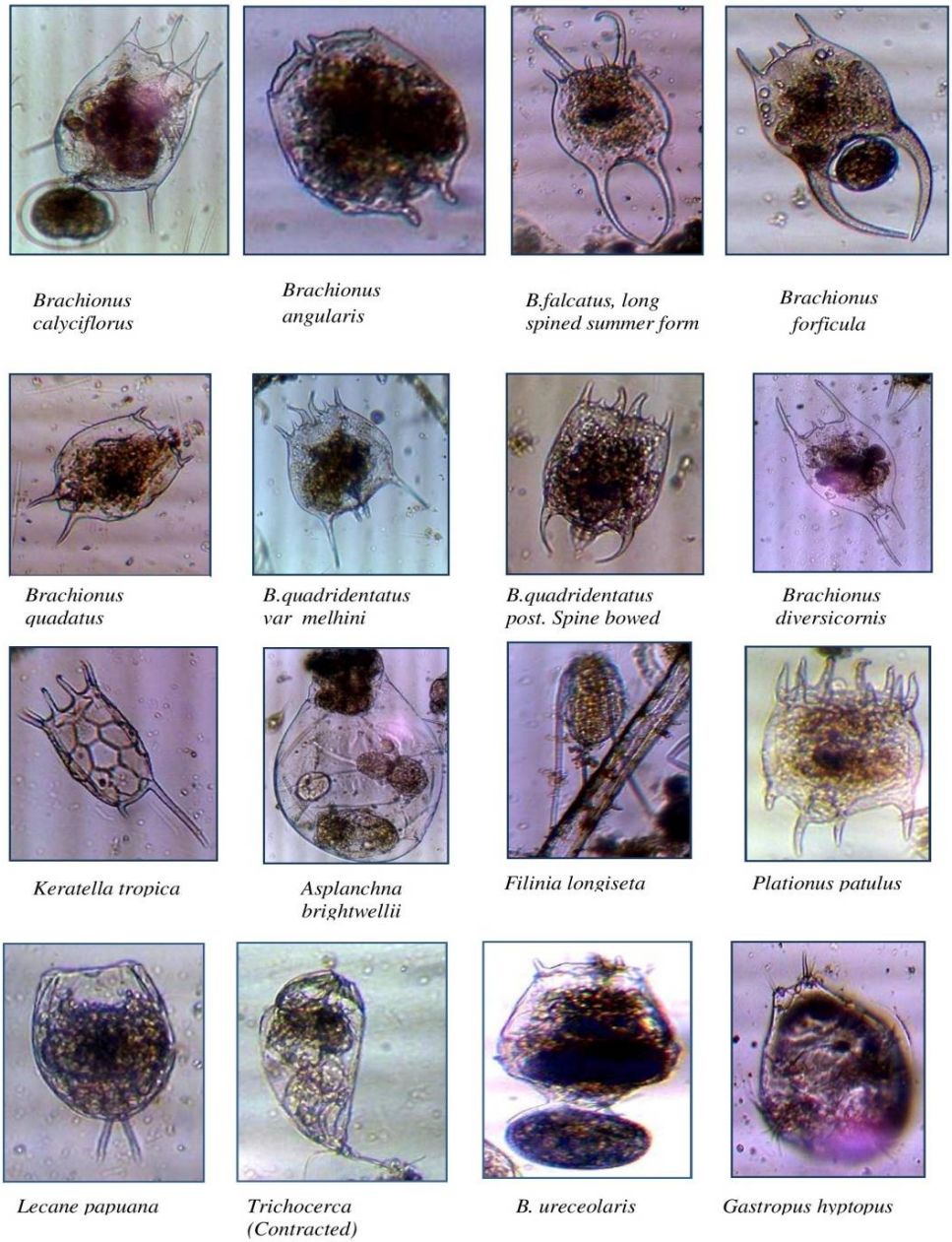


**PLATE-I:** Rotifer Diversity in Shivdham Temple Pond

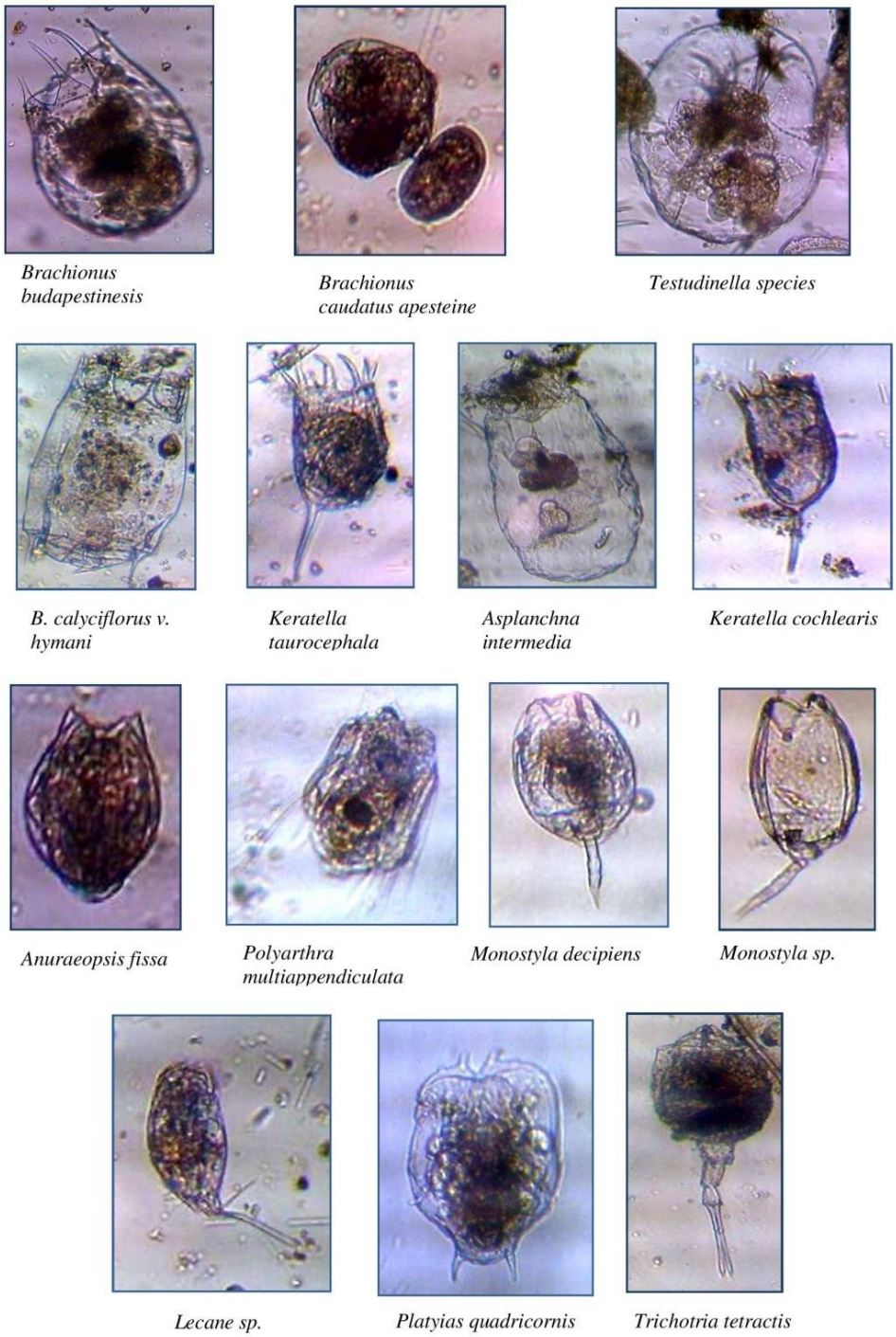


**PLATE-II:** Rotifer Diversity in Shivdham Temple Pond

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**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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