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Ecology of Rotifer Diversity in the Kukkarahally Lake of Mysuru, Karnataka State of India

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Filina.

A B S T R A C T

The rotifers diversity was carried out for two years (2010-2012) in the Kukkarahally lake of Mysuru. Samples of rotifers were collected from five different localities using plankton net (105 μ m mesh size). Qualitative as well as quantitative analysis was carried out using Shannon diversity index (H'), Evenness index (J) and Species Richness index (S). Totally 15 species of rotifers were identified and documented, out of which 10 species belonged to genus *Branchionus*, 3 species to genus *Keratella* and 2 species to genus *Filinia*. Out of fifteen rotifers recorded during the study period, *Brachionus* sp. were the most common genera in the lake. The percentage wise composition of Rotifera sps were, *B. plicatilis* (8%), *B. Angularis* (4%), *B. Rubens* (2%), *B. Forficula* (10%), *B. Calyciflorus* (2%), *B. Falcatus* (4%), *B. Quadridentatus* (1%), *B. Caudatus* (5%), *B. Diversicornis* (15%), *B. bidentata* (2%), *K. tropic* (16%), *K. quadrata* (17%), *K. cochlearis* (13%). *Filinia terminalis* (2%) and *Filinia longiseta* (1%). It is noteworthy to record that, the *Brachionus forficula* showed six significant positive correlation with other rotifers, such as *B. plicatilis*, *B. calyciflorus*, *B. quadridentatus*, *B. caudatus*, *K. tropica*, and *K. quadrata*. It is also interesting and noteworthy to record that *Brachionus falcatus* and *Filinia terminalis* did not show any correlation with any of the other rotifer sps.

Introduction

The "Golden period of Rotifer studies" was from 1880 to 1930 with maximum contribution to rotifer taxonom, which are pseudocoelomate group of small, aquatic microscopic organisms with the size

ranging between 100 to 1000 micro meter, coming under minor Phylum Rotifera, which comprises of about 2000 species.. The body of typical rotifer consists of head, trunk and foot. A rotifer has a transparent cylinder

shaped body, lined by a thin cuticle. In majority of rotifers cuticle thickens to form a lorica. The body can be divided into head, trunk and foot. The head bears the rotator organ or the wheel organ called corona (organ for locomotion and food collection), mouth and sense organ.

They are ubiquitous, occurring in almost all types of freshwater habitat, from large permanent lakes to small temporary puddles. Head bears the corona, mouth and sensory organs. Trunk forms the major part of the body and encloses the organs concerned with digestion, excretion and reproduction.

The foot and toes are located in the posterior region of the body and they are useful for locomotion and attachment. Rotifers have the shortest life span (12 days) and can reach their peak reproductive level in about 3.5 days (Altaff, 2004). They were first studied and described by Leuwenhock in 1703. Some rotifers are free swimmers and suspension feeders (Peter, 1980), while others are sessile (Wallace, 1980) and predacious such as *Asplanchna* (Gilbert, 2005). Their slow swimming habits, ability to tolerate a wide range of salinities, parthenogenetic mode of reproduction and ability to get enriched easily, make rotifers an ideal live feed organism (Molly Varghese, 2006). As rotifers zooplankton group is most useful for water quality monitoring, samples were enumerated until a total of at least 200 individuals of “indicator species” were recorded (Duggan *et al.*, 2008). They play a major role in these ecosystems because of extremely fast reproductive rates. Besides, rotifers are used as indicators for pollution and eutrophication because of their high reproduction rate and sensitivity to any ecological change in water bodies (Lucinda *et al.*, 2004). The rotifer community structure depends on a variety of environmental factors that include biological parameters, such as predation or competition, as well as

various physico-chemical factors (Ekhande *et al.*, 2013).

Many studies have been carried out on the species diversity of Rotifer worldwide. The important characters of rotifers are Lorica, its presence or absence, shape, size, spines, sulci, corona, its shape, structure, ciliation, location and type of the mouth, foot, shape, structure and type of trophi etc., Many researchers Edmondson (1959); Padmanabha (2010), Battish (1992), Molly Varghese (2006) were proposed different types of classification of rotifer zooplankton groups. These have a short lifespan of <14 days. Females are more common than males. In most of the species males are unknown, if known they live for few hours to three days. Edmondson (1959) has proposed a key for the identification of rotifers. A number of studies have identified the rotifer species as best indicators of different kinds of aquatic pollution (Mahajan, (1981), Padmanabha (2010), Anant Dhembare (2011), Beenamma and Yamakanamardi (2011) and Balakrishna, *et al.*, (2013).

Materials and Methods

For the analysis of Rotifer group, Zooplankton samples were collected every month morning (6-8 am), from October 2010 to September 2012, from the surface waters of Kukkarahalli lake, Mysore. Ten bucket full of water (one bucket = 10 liters) samples were passed through 60 µm plankton net. Finally, 50 ml of the concentrated zooplankton sample was collected from the bottle attached at the end of net. Using 4% formalin, zooplankton samples were fixed at the field itself. On return to the laboratory 1 ml from this concentrated zooplankton sample from each sampling sites, were observed under the microscope (40X) (Olympus Cx21). Identification and counting of rotifer, was done by using key given in

Edmondson (1959) and Battish (1992). For the estimation of the rotifer zooplankton abundance, the modified Sedgwick- Rafter method as given in (APHA, 1992; Kamaladasa and Jayatunga, 2007) were followed. 5 ml from the concentrated sample from five different sampling sites were transferred into Sedgwick- Rafter counting chamber (1 ml at time) and observed under Olympus binocular microscope.

Statistical analysis

Following statistical tests were carried out with the help of SPSS 19.0 version.

Students Newman Kuels Test (SNK-test) –

This is one way ANOVA post hoc test, for making multiple comparisons among the means.

Correlation –Relationship among the Rotifer group were examined using Pearson's correlation coefficient. This is calculated after \log_{10} transformation of all the calculated data.

Species diversity indices

Shanon index of general diversity (H)

$H = -\sum(\frac{n_i}{N}) \log(\frac{n_i}{N})$ or $H = -\sum P_1 \log P_1$,
Where

n_i =importance value for each species

N = Total of importance values

P_1 = importance of probability of each species = n_i/N .

Index of Dominance(C)

$C = \sum(\frac{n_i}{N})^2$, Where

n_i = number of individual for each species

N = total of important species

Evenness index (E)

$E = H/\log S$, Where

H = Shanon index

S = number of species

Simpson Dominance Index (1)

$D = \sum(n(n-1)/N(N-1))$

n = the total number of organisms for particular species

N = the total number of organism of all species

Results and Discussion

A total 15 species of rotifers belonging to three genus *Brachionus*, *Keratella* and *Filina*, were recorded from the Kukkarahally lake of Mysuru city (Table 1). These genus belong to family *Brachionidae* & *Filinidae* and class *Monogononta*. Taxonomic features of documented rotifera are given below:

Phylum: Rotifera

Class: Monogononta

Order: Ploimida

Family: *Brachionidae*

Genus: *Brachionus*

The study was carried out for a period of two years and rotifers representing two orders under the class *Monogononta* were collected from the study area. A total of 15 genera were identified and described. They are listed in Table 1. Apart from this, 10 different species under the genus *Brachionus* were also identified and described.

Family: *Brachionidae*

Most of the forms heavily loricated; corona often with several dorso-transverse prominences bearing tufts of strong cilia,

often carrying variable spines or projections and ringed foot, buccal field mostly supraoral, oblique or terminal; mouth funnel-like, situated in buccal field. This family was represented by 2 genera namely *Brachionus* and *Keratella* in the present study.

Genus: *Brachionus* Pallas, 1776

Heavily loricate forms; lorica broad and covers the trunk completely; may be one piece when it continues around the body or two pieces united through flexible cuticle dorsal piece or plate arched, ornamented in some, whereas ventral piece relatively flat; lorica in some species stippled, anterodorsal edge always with even number of spines, anteroventral edge or mental edge rigid or flexible but may be wavy or smooth with V or U-shaped notch; posterolateral spines present or absent depending upon the species and may seasonally appear or disappear even in the same species; posteromedian spines mostly present and flank the foot, anterior portion of the body projects from lorica in the form of coronal disk which bears a circle of cilia and three prominences covered with cilia of larger size; foot slender, annulated, with two toes, with no spur or spine, highly contractile and projects from the posterior-ventral edge of lorica, imparting a sub square aperture in dorsal plate and a large usually oval aperture in the ventral plate; foot sheath seldom present.

Under the genus *Brachionus*, 10 species were identified and recorded in the present study. They are *Brachionus plicatilis*, *B. angularis*, *B. rubens*, *B. forficula*, *B. calyciflorus*, *B. falcatus*, *B. quadridentatus*, *B. caudatus*, *B. diversicornis*, and *B. bidentata*.

***Brachionus plicatilis* (Muller, 1786)**

Lorica smooth and flexible, lightly stippled, more or less oval, greater width about two-

thirds length of lorica from anterior end; it narrows anteriorly and not sharply separated into dorsal and ventral plates, slightly compressed dorsoventrally; anterodorsal margin with six broad based saw-toothed spines; nearly equal in length; posterior spines wanting; ventral margin four lobed; foot opening with small sub square aperture dorsally and longer V-shaped aperture ventrally. Lorica is oval, narrows anteriorly (Plate 1).

***B. angularis* (Gosse, 1851)**

Lorica firm, lightly or heavily stippled, divided into dorsal and ventral plates; dorsal plate with pattern of cuticular ridges, moderately compressed dorsoventrally; anterodorsal margin with two median spines flanking a V-shaped notch; lateral and intermediate spines usually obliterated, intermediate spines may present in some; ventral margin rigid, somewhat elevated with a shallow median notch; foot opening rather large, somewhat variable in shape; larger foot aperture in ventral plate flanked by cuticular protuberances; posterior spines wanting (Plate.1).

***B. rubens* (Ehrenberg, 1838)**

Lorica firm, oval, smooth, compressed dorsoventrally and composed of dorsal and ventral plates; anterior dorsal margin with six spines; medians longest, intermediates somewhat longer than laterals; medians and intermediates with peculiar asymmetric shape, each spine with a narrow anterior part, then rounding outwards and forming broad base; all these spines provided with strengthening ridges; ventral margin serrated and markedly elevated towards the centre with a central notch; posterior spines absent; foot opening sub square and small (Fig.1).

***B. calyciflorus* (Pallas, 1776)**

This species has many polymorphic forms. Lorica flexible, oval and not separated into dorsal and ventral plates; body is slightly compressed dorsoventrally, anterior dorsal margin with four broad-based spines of variable length, medians longer than laterals; ventral margin flexible, usually somewhat elevated, with shallow V- or V-shaped notch, unflanked; posterior spines present or absent; poster lateral spines usually absent; lorica smooth or lightly stippled (Plate.1).

***B. caudatus* (Barrois and Daday, 1894)**

Anterior dorsal margin of lorica is with six unequal spines, the intermediate spine is long and curved. Median spines are smaller than lateral spines. Lorica firm, stippled, with a pattern of cuticular ridges, divided into dorsal and ventral plates, somewhat compressed dorsoventrally; anterodorsal margin with 2 median spines separated by V- or V-shaped notch; laterals mostly longer than medians; intermediate spines reduced.

Poster lateral spines well developed; foot opening between bases of posterior spines and overhung by a triangular or rounded extension of dorsal plate (Plate.1).

***B. falcatus* (Zacharias, 1898)**

Lorica firm, lightly stippled, greatly compressed dorsoventrally and composed of dorsal and ventral plates; anterodorsal margin with six spines; intermediate spines considerably larger than laterals and medians, curve laterally outwards or ventrally towards head of the animal; median spines mostly equal to laterals but sometimes smaller. Posterior spines very long, bent inwards and in some forms almost touch each other at their tips (Plate 1).

***B. forficula* (Wierzejski 1891)**

Lorica firm, stippled, divided into dorsal and ventral plates, moderately compressed dorsoventrally; occipital margin with four spines; laterals always longer than medians; all occipital spines rounded at tips, rarely pointed (Plate 1).

***B. quadridentatus* (Hennann, 1783)**

Lorica is firm, moderately compressed dorsoventrally, and divided into dorsal and ventral plates; occipital margin with six spines; medians longest, curved outwards, and when extra long bent downwards over the head; laterals longer than intermediates; ventral margin rigid, wavy, elevated, with median notch flanked on either side by a small tooth like papilla; poster lateral spines usually present but their length varies; ventroposterior portion of lorica prolonged in form of tubular foot-sheath around base of retractile foot; sheath on dorsal side with well-defined subsquare piece (Plate 1).

***B. bidentata* (Anderson, 1889)**

Lorica firm with dorsal, ventral and basal plates. The dorsal and ventral plates soldered together for three-fifths length of lorica, where they diverge and are united to a third plate, the basal plate; dorsal margin with six spines; lateral always longer than medians, medians longer than intermediates; ventral margin flexible, elevated in the middle; posterior spines vary in length and position of origin but may be absent; foot opening with foot-sheath (Fig.1).

***B. diversicornis* (Daday, 1883)**

Lorica is elongate with four occipital spines, of which the laterals are longer than medians. Right posterior spine is longer than

the left. Foot long and toes with characteristic claws (Plate 1).

Genus: *Keratella* (Bory de St. Vincent, 1822)

Lorica composed of dorsal and ventral plates; dorsal plate convex, sculptured with varying pattern for different species; ventral plate flat or slightly concave; both plates of lorica usually covered with fine areolation network and postulated; anterodorsal margin mostly with six (sometimes four) spines; mental margin rigid and rounded, with median notch; one or two posterior spines often present, when single usually median in position; head retractile and illoricate; foot wanting. Under the genus *Keratella* three species were identified and recorded in the present study. They are -

***Keratella tropica* (Apstein, 1907)**

Anterodorsal margin of lorica has six spines. Median spines are curved and longest. intermediate spines are shortest. Posterior end has two unequal spines. The right posterior spine is longer than left posterior spine. Three hexagonal plaques are present on dorsal plate of lorica. A small four sided plaque is present between the posterior border of lorica and the last hexagonal plaque (Plate 1).

***K. quadrata* (Muller, 1786)**

Anterior margin of lorica with six spines, medians longest and curved ventrally, laterals shortest. Posterior spines are almost equal. Dorsal plate of lorica with three median plaques and one pentagon terminates in to a short median line (Plate 1).

***K. cochlearis* (Gosse, 1851)**

Body transparent and vase shaped. Corona circular, lateral antenna fused proximally.

Trophi asymmetric. Foot slender and wrinkled in contracted forms.

Order: Flosculariacea

Family: Filinidae

Body illoricate, two anterior and one or two posterior setae are present, foot is absent.

Genus: *Filinia* (Bory de St. Vincent, 1824)

Lorica thin, flexible, fusiform, barrel-shaped or cup-shaped; appendages/spines long setiform extensions of cuticle, movable; two anterolateral spines and one posterior spine, may be terminal or lateral, and additional posterior small spine present in some; foot wanting. Under the genus: *Filinia* two species were identified and recorded in the present study.

***Filinia terminalis* (Plate, 1886)**

Lorica thin, flexible and barrel shaped when contracted. Two anterolateral spines equal in length; with one terminal posterior spine (Plate 1).

***F. longiseta* (Ehrenberg 1834)**

Body oval and transparent with very long anterior skipping spines. Spine base not bulged, foot absent. Lorica with two equal anterior spines and posterior spine on ventral side.

The distribution of rotifer fauna, both qualitative and quantitative studies are presented here. The rotifers were studied upto generic level. Special emphasis was given to the genus *Brachionus* and its species composition. The biodiversity indices of rotifers are dealt with separately.

Total 15 species of rotifers are recorded during this study period (2010-2012) form

the Kukkarahalli lake of Mysore city. Out of which, *Brachionus plicatilis*, *B. angularis*, *B. rubens*, *B. forficula*, *B. calyciflorus*, *B. falcatus*, *B. quadridentatus*, *B. caudatus*, *B. diversicornis*, and *B. bidentata* (10 species) belong to genus *Brachionus*. *Brachionus* is by far the best known genus from India. *Keratella tropica*, *Keratella quadrata* and *Keratella cochlearis* (3 species) belonged to genus *Keratella*. These two genera (*Brachionus* and *Keratella*) belong to Family Brachionidae. The members of Brachionidae family are dorsoventrally flattened, heavy loricated planktonic forms. These carry variable number of spines on the antero lateral margin. The posterior margin may or may not have spines. The lorica may be made up of single or two plates. This Brachionidae family belongs to Ploimida order. *Filinia longiseta* and *Filinia terminalis* belong to genus *Filinia*, family Filinidae, and order Flosculariacea. Ploimida and Flosculariacea orders belong to class Monogononta of Phylum Rotifera.

Among various genera of rotifers, the *Brachionus* was found to be dominant, followed by *Keratella*. The percentage wise distribution of *Brachionus* is - *B. plicatilis* (8%), *B. angularis*(4%), *B. Rubens* (2%), *B. forficula* (10%), *B. calyciflorus* (2%), *B. falcatus* (4%), *B. quadridentatus* (1%), *B. caudatus* (5), *B. diversicornis* (15%), *B.bidentata* (2%) and genus *Keratella* - *K. Tropic* (16%), *K. quadrata* (17%), *K. cochleari* (13%). *Filinia longiseta* (1%) and *Filinia terminalis* (2%) belong to genus *Filinia* (Fig.2).

Under the genus *Brachionus*, 10 species are reported during the present study. It is worthwhile to mention that Gopakumar (1998) reported 12 species while Padmanabha B (2010) documented 16 species of rotifers from Mysore. The species from *Brachionus* family is considered to be

as ecological indicators for presence of more amount of nutrient content in an aquatic ecosystem Reshma *et al.*, (2015).

Anitha (2003) documented 14 species under the genus *Brachionus* from southern part of Kerala. The abundance of *Brachionus* species in rotifer fauna has been pointed out by Green (1972), Fernando (1980) and Shumka (2014). Moreover seventeen varieties of rotifers were recorded from Debashri Mondal *et al.*, (2012) during the whole study period *Brachionus* sp. were the most common genera in the Mirik Lake in Darjeeling Himalaya. According to Sharma (2009) 120 species belonging to 36 genera and 19 families were reported of Loktak lake, Manipur, North-eastern India. The interrelationships among rotifer groups were calculated by Pearson-co-efficient test (Table 1.1).

It is interesting to record that the *Brachionus forficula* showed six significant positive correlation with *B.plicatilis*, *B calyciflorus*, *B. quadridentatus*, *B. caudatus*, *K. tropica*, and *K. quadrata*. However, *B. bidentata* showed significant negative correlation with both *B. angularis* and *B. diversicornis*. *Keratella tropica* showed five significant positive correlation with *B. forficula*, *B calyciflorus*, *B. quadridentatus*, *B.Caudatus* and *B.plicatilis*. *B quadridentatus* showed five significant positive correlation with *B. forficula* , *B calyciflorus*, *B. quadridentatus*, *B. plicatilis*, *B. rubens*.

Moreover, *Brachionus falcatus* and *Filinia terminalis* were did not show any correlation with any other rotifer groups (Table: 1).

Maximum species richness in terms of Margale's index ($R_1=2.1$) and Menhinick index ($R_2=0.4$) was recorded at site-5 while minimum ($R_1=1.6$ and $R_2=0.1$) was at site-3, respectively.

Table.1 Interrelationships between Rotifer Zooplankton Groups in the surface water of Kukkarahalli Lake Mysore, 2010 to 2012

| Rotifers | B.forficula | B.calyciflora | B.falcutus | B.quadridentatus | B.caudatus | B.diversicornis | B.plicatilis | B.augularis | B.rubens | B.bidentata | K.tropica | K.quadrata | K.cochlearis | F.terminalis |
|-------------------------|---------------|---------------|---------------|------------------|---------------|-----------------|--------------|---------------|--------------|--------------|-----------|------------|--------------|--------------|
| <i>B.forficula</i> | NS | | | | | | | | | | | | | |
| <i>B.calyciflora</i> | .862** | NS | | | | | | | | | | | | |
| <i>B.falcutus</i> | NS | NS | NS | | | | | | | | | | | |
| <i>B.quadridentatus</i> | .970** | .916** | NS | NS | | | | | | | | | | |
| <i>B.caudatus</i> | .874** | .753** | NS | .844** | NS | | | | | | | | | |
| <i>B.diversicornis</i> | NS | NS | NS | NS | .748** | NS | | | | | | | | |
| <i>B.plicatilis</i> | .810** | .737** | NS | .797** | .655* | NS | NS | | | | | | | |
| <i>B.augularis</i> | NS | NS | .674* | NS | NS | NS | NS | NS | | | | | | |
| <i>B.rubens</i> | NS | NS | .816** | NS | NS | NS | NS | .818** | NS | | | | | |
| <i>B.bidentata</i> | NS | NS | NS | NS | .748** | 1.00** | NS | -.644* | NS | NS | | | | |
| <i>K.tropica</i> | .907** | .901** | NS | .936** | .808** | NS | .688* | NS | NS | NS | NS | | | |
| <i>K.quadrata</i> | .599* | .683* | NS | .640* | NS | NS | NS | NS | .589* | .689* | NS | NS | | |
| <i>K.cochlearis</i> | NS | NS | .809** | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | |
| <i>F.terminalis</i> | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| <i>F.longista</i> | .809** | NS | NS | NS | NS | NS | NS | .881** | NS | NS | NS | NS | NS | NS |

Values are Pearson correlation coefficient, a 2-tailed test was applied and calculated after Log₁₀ transformation of all variables after scaling so that all values were 1>, *P <0.05, **P <0.005, and NS= Non significant.

Table.2 Variations of Rotifer zooplanktons and biodiversity indices in the surface water of Kukkarahalli Lake Mysore, 2010 to 2012

| Indices | Index | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 |
|-------------------|-------------------|--------|--------|--------|--------|--------|
| Species Richness | (N ₀) | 3159 | 5851 | 2603 | 4037 | 918 |
| | (R ₁) | 1.74 | 1.6 | 1.78 | 1.68 | 2.05 |
| | (R ₂) | 0.36 | 0.26 | 0.34 | 0.23 | 0.49 |
| Species Diversity | (I) | 0.89 | 0.90 | 0.8 | 0.89 | 0.82 |
| | (H') | 2.37 | 2.45 | 2.39 | 2.39 | 2.09 |
| Species Evenness | (E) | 0.71 | 0.77 | 0.72 | 0.73 | 0.54 |

(R₁) – Margalefs index
(R₂) -- Menhinik Index

(N₀) -- No. of species
(I) – Simpson’s index

(H') -- Shannon – Weaver index
(E) – Evenness index

Fig.1 Percentage of species richness of Rotifer groups in the surface water of Kukkarahalli Lake Mysore, 2010 to 2012

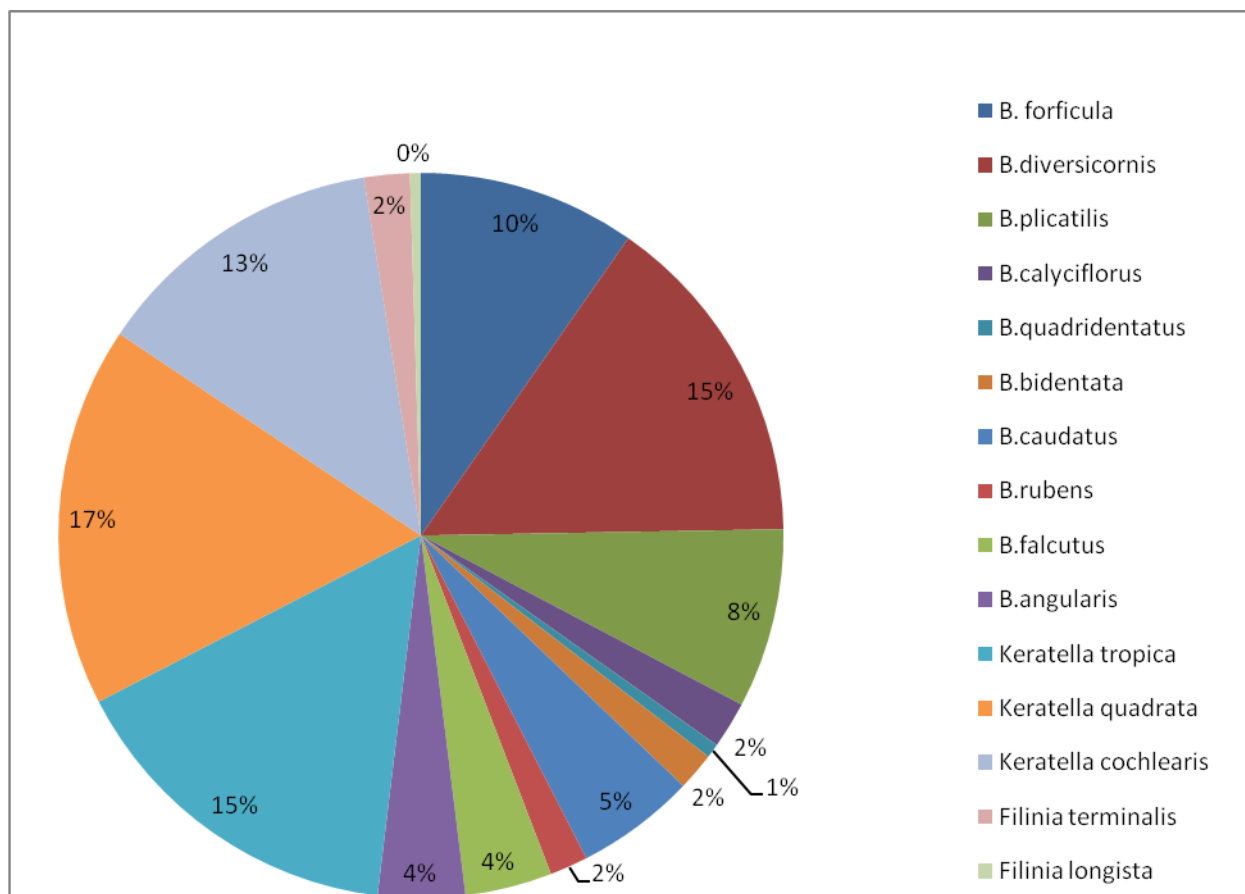
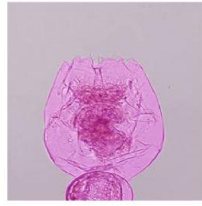


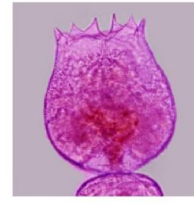
Photo.1 Rotifer Zooplankton of Kukkarahally Lake, Mysuru.



Brachionus plicatilis



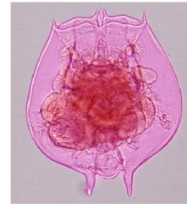
Brachionus angularis



Brachionus rubens



Brachionus calyciflorus



Brachionus caudatus



Brachionus falcatus



Brachionus forficula



Brachionus quadridentatus



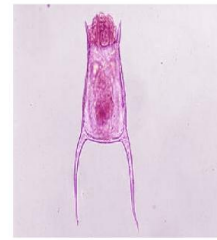
B. bidentatus



Brachionus diversiconis



Keratella tropica



Keratella quadrata



Keratella cochlearis



Filinia terminalis



Filinia longiseta

Similarly, maximum species diversity in terms of Simpsons index (I) and Shannon index (H') was 0.9 and 2.4 at site 2 and minimum (0.82 and 2.1) at site-5, respectively. Maximum species evenness was recorded at site-2 and minimum at site-5, respectively (Table1.2). Shinde *et al.*, (2012) studied the seasonal variations and biodiversity of zooplankton in Harsool-Savangi dam, Aurangabad, India and reported that Shannon index values $0 < 1$ at north site showed that the habitat was under pollution stress; $1 > 3$ at south, east and west sites showed less pollution. Rotifer can be useful for effective management of water bodies as it acts as effective pollution indicators. *Keratella*, *Filinia*, and *Brachionus* became more abundant with increase in eutrophication.

The same genus had also been reported from Manchar Lake (Mahar *et al.*, 2000). *B. quadridentatus* and *B. calyciflorus* are regarded as indicators of eutrophication. (Gajanan, 2014), Sulehria *et al.*, (2014) Shumka (2014), Reshma *et al.*, (2015). The *Filinia longiseta* is also considered as an indicator of eutrophication (Maemets, 1983; Baloch *et al.*, 2000; Sulehria *et al.*, 2012). These diversity indices indicated that the lakes under study have a well balanced rotifer community that protected an even representation of several species indicating the dynamic nature of this fresh water ecosystem. Patrick *et al.*, (1950) made extensive surveys of many streams and lakes with high pollution and suggested that rotifers play a major role in water pollution. Studies of fauna in lakes and streams polluted by drainage generally indicate reduced species diversity in polluted relative to unpolluted waters (Sulehria *et al.*, 2012). However, remedial measures should be undertaken to minimize the impact of pollution load as revealed by the ecological indicators. All the Brachionidae families of

the rotifer group showed numerical superiority over other zooplankton groups. It is interesting to note that the Brachionidae family have a high adaptive radiation capacity to grow well in different environments and as such they usually dominate among the other rotifer groups. Green (1972), Fernando(1980), Gopakumar (1998), Padmanabha B (2010), Sulehria *et al.*, (2012), Gajanan (2014), Shumka (2014), Reshma *et al.*, (2015), Sudhir (2015) were also reported about dominance of Brachionidae family rotifer groups in various freshwater ecosystems. The *Brachionus* exhibit a very wide range of morphological variations and adaptations. The occurrence of these species indicates the water of the lake is polluted.

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