INTRODUCTION

Rotifera is an important group of soft bodied invertebrates of the zooplankton. They show wide range of morphological variations and adaptations. In most the body shape tends to be elongated and the regions of the head, trunk and foot usually are indistinguishable. The anterior end or corona of the Rotifers is ciliated. In some species the periphery is also ciliated. The movement of cilia aids both in locomotion and movements of food particles towards the mouth. The planktonic rotifers feed largely on sediment particles by the pulsating action of the coronal cilia. Feeding behavior of suspension feeding is related to the type of particles, food size, shape and density.

Rotifers constitute a group of microscopic animals, occurring as plankton in a variety of aquatic ecosystem. Over 2500 rotifer species belonging 200 genera are known by various workers in different countries. In India Dhanapathi M.V.S.S.S., Sharma are measured 0.04 to 2 mm in length and most of the body is transparent and internal organs are visible in living organisms. Rotifers have been observed to dominate the zooplankton populations, both in terms of population density and species diversity stated by Balkhi et.al. (1984).
Rotifer diversity refers to varieties of species within their community. Rotifera is one of the fascinating group of zooplankton in the aquatic ecosystem. Rotifer occurs almost universally in fresh water habitat and makes an important group of zooplankton community. The abundance of rotifer is more or less governed by the interaction of number of physical, chemical and biological processes and is related to the suitable conditions of their survival in the lake or dam.

RESULTS

In the present investigation the seasonal numerical count of rotifers varied from 50 to 100/lit at station A and 80 to 150/lit at station B, in 2008-2009 while it was in the range 120 to 200/lit at station A and 100 to 160 at station B. the Rotifers were found to be dominate than others. The monthly average and season wise analysis of Rotifers have shown in table and graphically illustrated in Figure.

DISCUSSION

Singh Kohali (1981) studied on plankton of Govind sagar reservoir, Bilasput (H.P.) and observed that the Rotifers contribute 2.4% the total zooplankton biomass. Their maximum contribution was in the month of July. Rotifers are represented by Branchious and
Asplanchna species, Keratella species are the most dominant genera of all the three species. Balkhi Masood et al. (1984) studied on Rotifers of Anchar Lake at Kashmir and found the mean population of Rotifers as 48,462 individuals/m$^3$ during the warm months, when the water was saturated with oxygen. They recorded 22 Rotifers during the study. Datta et al. (1987) studied on seasonal abundance of Rotifers in perennial fresh water pond in Calcutta and observed that the Rotifers population showed remarkable fluctuation during investigation. Their higher quantities were recorded in March, April, September and October, but the peak were in April and October while the lowest population was recorded in the month of February and June. The Rotifers here were represented by Brachionus, Phyanthra, filina, Asplanchna, Horaella, Hexantha and Keratella, were found to be dominant among them.

Singhai et al. (1989) worked on seasonal variation in Rotifers of Tawa reservoir Hoshangabad and observed 17 species of rotifer in the reservoir. Among them genus Branchionus was dominant. The highest value of Rotifers was found in the month of March and lowest in November. During the study period no correlation was established between temperature and transparency with Rotifers population but
the total alkalinity and nitrate influenced the Rotifers population. *Goel and Chavan (1991)* studied on fresh water tank at Kolhapur and observed that the species of Rotifera like Keratella, Branchionus and Monstyla are considered as pollution tolerant and indicate accumulation of organic matter. They observed 7 species of Rotifers in site I and site II respectively.

*Rao and Durve (1992)* studied on structure and dynamics of zooplankton community in lake Ranga sagar, Udaipur (India) and observed 19 species of Rotifers in the lake. Among the Rotifers Brachionus and Filinia species formed dominate plankton during summer and monsoon when the temperature was high in summer and uniform in monsoon, Keratella tropica was found throughout the year of investigation. Rao and Durve further observed that moderately high temperature and dissolved oxygen accompanied by high nutrient load of monsoon months induced the abundance of micro plankton. This in turn favored the reproductive rate of Rotifers. This observation was favored by *Hofmann (1977)*. *Subbamma D.V. (1992)* was studied on plankton of temple pond Machilipatanam (A.P.) and observed Rotifers in all the collections. The density of Rotifers varied from 2100 to 3500 units/10L in the first year and 2500 to 5000 units/10L in second
year. Rotifers showed two peaks of equal abundance in the first year of study in December 1980 and January and May 1981 during second year of study the peak was observed in October 1981 and January and June in 1982. The Rotifers were represented by Branchionus, Falcatus acharies B. diversicarnisdady, B. Quadridentatus, B.calcyciflorus, B. Calf, Asplanchna, Keratella tropica, Lacaneluna, L. Leating and polyarthra species.

_Sinha and Sinha (1993)_ studied on zooplankton of fresh water pond of Munger (Bihar) and observed that the Rotifers were most dominant and abundant group and their density varied between 26% in November and 55.3% in May. Brachionus and Keratella were found to be most dominant and Filina were found to be in moderate number followed by Trichocera and Monostyle. _Ramesh Chauhan (1993)_ worked on seasonal fluctuations in zooplankton of Renuka lake (H.P.) and observed timodal peak of Rotifers. The first peak was in the rainy season and the numbers of organism were 283/lit. Second peak was observed in October in which 38 organisms per liter were recorded and third peak was recorded in April in whom lowest density of organisms was counted.
Bais and Agrawal (1995) studied on zooplankton of Sagar lake and military engineering lake at Sagar (M.P.) and recorded 17 genera of Rotifers in both the water bodies. The maximum density of Rotifers was recorded during summer in both the lake which might be due to lower level of water and high temperature. In both lakes the Rotifers were higher in number than the organisms of other group which indicates the healthy nature of both the water bodies. Abdus Saboor and Altaf (1995) worked on qualitative and quantitative analysis of zooplankton of tropical pond (Madras) and observed that in rainy season Rotifers were dominant on other plankton. The quantitative analysis of zooplankton species indicates that the descendant order of major dominant group were Copepoda, Cladocera, Rotifers and Ostracoda. These groups showed higher adaptability to various hydro biological conditions. Pennak (1978) studied on freshwater invertebrates of the united state and observed the first sample of species composition during rainy season which indicates that Rotifers occur more predominantly that other plankton. It is presumed that Rotifers utilize the nutrients and phytoplankton more rapidly to build up their population. Yousuf and Quadri (1980) worked on limnological studies on lake Malpur. He stated that pH and
temperature are also the main factors in appearance and abundance of different Rotifers.

*Kaushik and Saxena (1995)* studied on tropic status of Rotifers fauna of three water bodies namely Motijheel, Suraj kund and Karanital at Gwalior (MP) and observed that the Rotifers were represented by forty seven (47) species of ploima, four species of flascula riacea and one species of Bdelloidea. Out of which 39 species are observed in motijheel, 35 species in Surajkund and 31 in Ranital. Branchious was dominant in Surajkund and Ranital while Lencane was dominant in Motijheel.

*Hiware and Jadhav (1998)* studied on macrobiotic fauna of Salim Ali lake Aurangabad (MS) and observed six species of Rotifers. The population counted highest in June and lowest in the month of November during both the years of investigations. The Rotifers were represented by Branchionus, Chromatogaster, Epiphanes, Filina, Keratella and Monostyla. *Balamurugan et.al. (1999)* worked on biodiversity of zooplankton of Cauvery river at Tiruchirapalli (Tamilnadu) and recorded six species of Rotifers belonging to two families. The Lecane species were dominating at station III. Predominance of Brachipod Rotifers in the zooplankton of Canvery
river was also reported by *Kakasery (1990)*. *Kausal and Sharma (2001)* worked on limnology and productivity of Badkhal lake Haryana and found that the zooplankton was mainly represented by Rotifers, which formed 15 % of the total plankton collection. Notholca, Keatella, Brachionus and Asplanchna represented the Rotifers, *Mukhopadhyay and Leena Gosh (2001)* studied on planktonic organisms of Chinsurah (W.B) and observed that the Rotifers and second abundant zooplankton. The Rotifers were represented by Philodina citrina, Rotiria valgris, Keratella tropica and Nematoda but they were absent in the sample collected in November.

*Pathak and Mudgal (2002)* worked on zooplankton of Virla reservoir Khaargone (MP) and recorded 8 species of Rotifers. The Rotifers were dominant at station II, III and IV during the investigation. The Rotifers represented by Asplanchna, Filinia, Elogiseta, Brachionus conditus, B. falcatus, B. rubens, Keratella tropica and Lecane species. *Chavan et.al. (2004)* worked on the abundance of Rotifers in Manjara project water reservoir District Beed (MS) and observed five species of Rotifers. The highest value of Rotifers was 87.02% in winter season. The Rotifers species represented were namely Brachionus, Keratella, Enchimanius, Lecane...
and Trichocera. The amount of Branchious was dominating the whole study period. He concluded that the Rotifers population showed positive correlation with water temperature. The Rotifers were studied for their diversity and density under the influence of different physico-chemical parameters. Pulle and Khan (2003) studied on zooplanktonic community of Isapur dam water India and observed the monthly average and total number of Rotifers which varied from 5 to 21 number per liter at S1, 3 to 17 number per liter at S2 and 2 to 15 number per lit at S3 during the year 1997-98. While it varied from 2 to 19 number per lit at S2 and 1 to 13 number per lit at S3, during the year 1998-99. The Rotifers peak represented namely Brachionus, Falcatus, Filinia, Longiseta, Keratella and Serrulata, Topica, Plicetitis, Conchlaera, Vulgar is and Forficula. He concluded that the number of Rotifers liter was found maximum during summer and minimum during monsoon.

Chandrasekar (1996) observed that the factors like water temperature, turbidity, transparency and dissolved oxygen play an important role in controlling the diversity and density of Rotifers in summer and monsoon. Berde and Pai (2004) worked on seasonal fluctuation in the Rotifers community of Someshwar temple tank of
Panchalgarh Hillfort, Kolhapur District (Maharashtra) and observed that the Rotifers were found in the range of 72 individual per liter in October to 630 individual per liter in August. The highest count being in August. While during 2001 Rotifers were found in the range of 169 individual per liter in April to 743 individual per liter in December. He also observed the biomass of Someshwar temple tank in March, August, September and December. The biomass estimation of 0.05 to 0.1 m/lit in 100 ml was found with the dominant zooplankton being Rotifers. The 12 species represented from Someshwar temple tank are namely Brachionus tridentala, B. calcyciflorus, B. patulus, B. Plicatilis, B. quadricrnis, Filina longiseta, F. opoloensis, Keratella tropica, Monostyllumabulla, Polyarthra species.

Sheeba et.al. (2004) studied on qualitative and quantitative study of zooplankton in Ithikkara river, Kerala and observed the 13 species of Rotifers represented by Lecane sp., Brachinus falcatus, B. calciflorus, B. angularis, Keratella cochinearis, K. tropica, K. Valga, monostyla sp., M. quadridentala, Phylodina sp., T. longiseta, Trichocera sp., and Nothoka sp. Saha (2004) studied on net plankton diversity in coal mining areas of Jharkhand and observed the Rotifers species namely Branchionus sp., Filina sp., Keratella sp., Asplanchna
sp., Notholea sp., Platies sp., Polyarthra sp., Trichocera sp., Dorystoma sp., and Rolaria species in the study area. The 10 species of Rotifers recorded dominant belongs to group of copepoda and cladocera. Sheeba and Ramanujan (2005) worked on qualitative and quantitative study of zooplankton in Ithikkara river (Kerala) and observed that the 13 species of Rotifers. The maximum zooplankton population was observed in the region where river joins the Paravur lake. The dominant from the Rotifers were namely Lecane sp., Branchionus, Falcatus, R calciflorus, B. angularis, Keratella, Cochlearis, K. tropica, K. Vulga, Monostyla sp., M. qadridentala, Philodiana sp., T. logiseta, Trichocerca sp., and Notholca sp. annual % of Rotiers 5.09 at station VI to 41.89 at station III. Jeelani et.al. (2005) studied on distribution of Rotifers in the Dal lake, Kashmir (India) and observed the Rotifers to be dominant group in all 25 texa at the four selected sites of the Dal lake. The dominating population in the studied lake was of Anureopsis fissa, Keratella, Cocholear and Monostyla bulla at all the sites. He concluded that the lake appears to be nutrient rich. High habitation influence due to hotels, houseboats and rich growth of macrophytes enrich the nutrient content of water there by raising the tropic level of this lake.
Kamble and Meshram (2005) were recorded zooplankton from three different stations of Khatijapur tank belongs to four group, protozoa, rotifers, copepods and cladocerans among zooplankton from three stations, rotifers contributes (44.39%) dominated the pond followed by copepods (35.37%) cladocerans (11.66%) and protozoan (8.58%). Zooplankton species observed in the tank, rotifers represented by 5 species from 3 genera, from the observed zooplankton three species cyclops, moina, daphnia and rotaria are pollution indicator species and they were abundant at station II and III from Kahtijapur tank near Achalpur, Dist. Amravati. Ugale et.al. (2005) were recorded total four groups consisting of twelve genera of zooplankton in the samples throughout the study period February 1998 to January 1999 in which copepoda- 3 genera, cladocera -5 genera, rotifera-3 genera and ostracoda only one genera from Jagatuga Smudra reservoir, Kandhar Dist. Nanded.

Pawar and Pulle (2005) were recorded four species of ostracoda, twenty species of rotifers, and sixteen species of copepoda and twenty species of cladocera. The rotifer and cladocera were found to be dominant. The total number of zooplankton and monthly average of zooplankton number per liter were recorded and noted that
zooplankton varied from 21 to 44 per liter at S1, 24 to 50 per liter at S2 and 19 to 41 per liter at S3 stations from Pethwadaj dam Nanded district. *Sankarsan Shoo and James Daniel Jameson (2006)* were recorded about 33 species of zooplankton 25 species of rotifer, 4 species copepoda, 3 species of cladoceran and one species of ostracoda from the treatment pond and control pond, out of which a maximum of 31 zooplankton genera were detected in the treatment pond and 24 genera of zooplankton were detected in control pond in cattle waste fed fish pond of two earthen fish ponds each of size 0.15 ha and 1.5 m depth located of fisheries college of research institute Thoothukudi, Tamil Nadu during 2005-06.

*Mahananda et.al. (2005)* studied on the physico-chemical and biological parameters of a fresh water pond ecosystem as an indicator of water pollution and observed that the Rotifers group of zooplankton showed a clear seasonal pattern of distribution. They produced a peak of 128 units per liter during February and fall 43 unit/lit. during December. The 7 species of Rotifers were namely Arachinous calcyflorus, A. rachinus rubens, Brachius forficula, Keratalla tropica, K. procurya, Polyathr sp. and Rolabria vulgairs. *Kudari et.al. (2006)* worked on limnological studies of Attavery and Bachanki reservoirs.
of Uttar Kannada District Karnataka, (India) and observed that Rotifers density was minimum in both reservoirs.

*Rajan et.al. (2007)* were recorded three species of zooplankton of which two belongs to copepoda one to cladocera out of which cladoceran species, Moina, micrura was found to be dominant during pre-monsoon period. During monsoon period four species were found out of which three belonged to copepoda and one to cladocera. During post monsoon period ten species were recorded out of which five belonged to rotifera, three to cladocera and two copepoda out of these brachionus calyciflorus was found to the dominant during post monsoon period from station ‘A’ and three species of zooplankton were observed out of which two belonged to cladocera and two copepoda, among which Moina micrura was found dominant species. During post monsoon period seven species were observed out of which three belonged to rotifera two belonged to copepoda and one belonged to cladocera and one belonged to ostracoda among which Mesocyclops leukarti was found to be dominant species from station ‘B’ while station C was investigated six species of zooplankton out of which three belonged to rotifera and three belonged to copepoda and ostracoda, among which Moina micrura was found to be a dominant
species in the period. During monsoon period three species were observed out of which two species belonged to cladocera and one belonged to copepoda. But during post monsoon period seven species of zooplankton were observed out of which two belonged to rotifera, two copepoda and one from ostracoda among which mesocyclops leukarti was found by a dominant species in this period from three polluted water bodies of Virudhunagar district, Tamil Nadu. The Rotifers taxonomic richness was common in tropical freshwaters. The Rotifers families with the greatest number species were the Bracionidea and Lecaniae which are considered typical for the most tropical environments. The Rotifers were represented by 17 species namely Branchionus falcatus, B. froficula, B. candata, B. Urecolaris, B. Diverssicornis, B. quadridentotatus, B. Bidentala, B. Phicatils, Keretall tropica, K. Cohiearies, Luna, monostyla bulla, Callidina bidens, Plasyias quadricomis, Educhlants dilatuta, fillinia longiseta and F. opoliensis. He concluded that the Rotifers dominated in both the reservoirs, indicating that, Bachani reservoir appears to be progressing towards the eutrophication slightly ahead than that a Attaeri reservoir.
Bhandarkar et al. (2008) recorded 7 species of family Brachionidae from Kalikar pond, Kedar et al. (2007) recorded total 25 species of rotifer belonging to 14 different genera. The most diversified genera were Branchionus represented by 5 species. The genera which are represented by 3 species of the Lecane and Lecane (M). While by 2 species were cephall odella, Lepadella and Trichocerca. The least dominant genera which were represented by a single species of Asplanchna, calurella, Dicranophorus, Filinia, Keratella, Notomata, Testudinella and Tripleuchlanis etc. from Yedshi lake during October 2006 to September 2007. Seasonal rotifer biodiversity study of Yedshi lake showed the peak in density and diversity during summer indicating the influence of various physico-chemical factors which was supported by positive correlation between summer temperature, high pH, alkalinity, nutrients and rotifer population. Maximum density of rotifer was noticed at pH range 8.83 in summer season. According to Dhanapathi (2000) showed many species of rotifers are having preference for more alkaline water. The species like Brachionus, Keratella, Mytilina and platyals bail high or population during period when density is high. Yadav et al. (2003)
noticed high density as well as diversity of rotifers both in summer and winter in Fatehpur Sikri pond, Agra, Uttar Pradesh.

Mediha Shafiqet et.al. (2006) were recorded 8 species of rotifers from Ranjit sagar reservoir seasonal variations in rotifers population has also been reported by Vasishht and Dhir (1970), Moitra and Mukherji (1972), Jyoti and Sehgal (1979), Gupta and Sudan (1985) find the similar for Bantalab and Kherwanda ponds, contrary to the observations of Jyoti and Sehagal (1979) recorded maximum qualitative diversity in the month of July and August. Moreover maximum rotifers diversity was observed in the month of July, October and November for Ranjit Sagar reservoir which happens to be in line with the studies made by Gupta and Sudan (1985) for different ponds of Jammu region. Total absence of rotifers and population was observed in the month of January, February, April, May, June and September is a very unique observations and does not match any of the earlier investigation made by Sehgal (1980), Kumar (1990) Depatia (1998), Sharma (2001), Sharma (2002), Sewhney (2004), Pradhan and Chakraborty (2006) on different water bodies lakes, ponds and even running streams. Gupta and Sudan (1985) were observed 3 species of brachionus in Bantalab, Kherwanda and

*Sabu Thomas and Abdul Aziz (1999)* worked on zooplankton community characteristics in the Peppara reservoir, Kerala and observed that the Rotifers were maximum density index richness and evenness index during the pre-monsoon and post-monsoon. The Rotifers were represented five species namely Branchious faleatus, B. donneri, Keratella tropica, Fillinia longiseta and F. opoliensis. *Padmanabha and Belagali (2006)* worked on population dynamics of Rotifers and water quality index in the lakes of Mysore and found that the Rotifers in summer season Kamana lake has highest species number (10) and lowest population density 20/lit. But Dalvoi lake has lowest species 4/lit. and highest population density 28/lit. *Bhandarkar et.al. (2008)* were recorded 7 species of family Brachionidae from Kalikar pond.

*Charjan et.al. (2008)* were recorded 7 species of Rotifers belonging to two genera viz. Branchionus and Keretella belonging to the family Branchionidae were recorded in wetlands of Ambora lakes in Yewatmal District of Maharashtra. *Patil et.al. (2008)* were studied
zooplankton biodiversity of Rishi lake and was represented by 70 species consisting of 34 species of rotifera. *Bhandarkar et.al (2008)* was recorded Branchionus Rotifers from old eutrophic Kalikar pond. *Kedar et.al. (2008)* was recorded total 25 species of Rotifers belonging to 14 different genera. The most diversified genera were Branchionus represented by 5 species. *Patil et.al. (2008)* Rishi lake was represented by 17 species consisting of 34 species of Rotifers. The total count of different group of zooplankton of Rishi lake was counted as 1375/lit through the study. *Jorge et.al. (2009)* was counted a total 20 Rotifers species, from trophical high altitude reservoir. This suggested that Valle de Bravo is high dynamic with reference to its rotifer density.

In the present investigation the species of Rotifers found during the period of investigation the minimum number of Rotifers was observed in monsoon and maximum in summer season.