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# Study of Zooplankton Diversity of Mul Lake of Chandrapur District, Maharashtra State (India)

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**Abstract:** *Zooplankton organisms play a very crucial role in the trophic dynamics and energy transfer in aquatic ecosystem. Their abundance increases in eutrophic water. They are also sensitive to pollution and many species are recognized as indicators of pollution. It is an integral component of an aquatic ecosystem. The Mul town is in the Chandrapur district of eastern part of Maharashtra and is situated between 200,07,N and 790 ,67, E. It is a taluka headquarter and commercially important town on Gondia, Chandrapur south central eastern railway line. It is popularly known as Rice city because of number of modern rice processing units in an around the town. It has also been a centre for educational facilities which culminated in progressively increasing urbanization with a population of about 30,000. The area being traditionally paddy growing, in the town there are two ponds and one lake, the water of which is primarily used for irrigation, aquaculture and for other sociocultural practices. Water samples were collected in polythene bottles (two litters capacity) once in month from the selected sampling sites of two lakes to analyze the water quality parameters for the period of 24 months i.e. from January 2011 to December 2012. Zooplankton belonged to Rotifera, cladocera, copepod and ostracoda of the lake, the two year average showed the following sequence of their abundance.*
*Mul Lake = Rotifera> Cladocera >Copepoda>Ostracoda .In the present investigation, total zooplankton was recorded maximum during summer and minimum during monsoon.*

**Keywords:** Zooplankton, Rotifera, Copepoda, Cladocera, Ostracoda& Mul lake

## I. INTRODUCTION

Fresh water ecology emphasizes mainly the study of relationship between organisms and the fresh water environment. Study of all aspects (physical, chemical, geological and biological) of fresh water is termed as Limnology (Sharma, P.D. 1995).

Lakes are characterized by distinct biotic and abiotic environment. Lakes maintain ecological balance of flora and fauna and their interrelationship regulate surrounding climate and recharge ground water, but unfortunately, they are dying. The lakes are getting polluted due to inflow of domestic effluents, apart from pollution, resulting from washing of clothes, Vehicles, Cattle, immersion of Idols during certain festivals etc. All these activities are deteriorating the quality of the water in the lake resulting in the accumulation of the toxic chemicals and other sludge leading to ecological imbalance.

Zooplankton organisms play a very crucial role in the trophic dynamics and energy transfer in aquatic ecosystem. Their abundance increases in eutrophic water. They are also sensitive to pollution and many species are recognized as indicators of pollution. It is an integral component of an aquatic ecosystem.The zooplankton can be studied from the point of view of their abundance (population density) biomass and production, secondary production (Ragonathan and Trivedy, 2002). Investigation on seasonal change in zooplankton diversity has been undertaken by various workers (Bhandarkar WR etal, 2008,Dahegaonkar et al,2012, Dekate et al 2016, Edmondson, 1995 ; Vasant et al, 2013; Vijaykumar et al, 1999 ; Kadam et al, 2014; Pradhan, 2014;Somani and Pejaver , 2003; Dhanpati, et al, 2000;Kar S and Kar D, 2016 )

Present study site , The Mul Lake was constructed about 60/70 years before by the then land lord of the area for irrigating the paddy cultivation fields. Today it is under the control of Zilla Parishad and is called as Ex-Malgujari or MAMA Talaw. It is situated in the heart of the town, near bus stand with an area of 26.11 hectare. The water of the lake

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is use for irrigation of paddy fields in the vicinity and also for washing, cleaning and other social culture practices like immersion of idol of Krishna, Ganesh and Durga etc. The unplanned urbanization and the encroachment by various people is consequently increasing the anthroprogenic wastes which may lead to eutrophication in near future.no attempts have been made to record the zooplankton diversity

## II. MATERIAL AND METHODS

The Mul town is in the Chandrapur district of eastern part of Maharashtra and is situated between $20^0$,07'N and $79^0$ ,67' E. It is a taluka headquarter and commercially important town on Gondia, Chandrapur south central eastern railway line. It is popularly known as Rice city because of number of modern rice processing units in an around the town. It has also been a centre for educational facilities which culminated in progressively increasing urbanization with a population of about 30,000. The area being traditionally paddy growing, in the town there are two ponds and one lake, the water of which is primarily used for irrigation, aquaculture and for other sociocultural practices.

Water samples were collected in polythene bottles (two litters capacity) once in month from the selected sampling sites of two lakes to analyze the water quality parameters for the period of 24 months i.e. from January 2011 to December 2012.

For qualitative analysis, the samples were collected with the help of plankton net. Sweeps were made in all directions in the littoral zones. For the collection from open water, net was thrown to some distance from peripheral zone to the centre avoiding the macrophytes and solid floating material. Collected plankton was transferred to enamel tray, inside of the net was carefully washed so as to collect any sticking plankters. Plankton was preserved in 4% formalin and were observed and identified under the Digi 2 Pro Labomed camera. Photography of plankter was taken by the same. Detailed taxanomical identification was carried out by using the keys from Edmondson (1959); Pennack (1978); Sehegal,(1983); Michael and Sharma,(1988); Tonapi,(1980); Plaskit,(1997) and Dhanapathi,(2000).

## III. RESULT AND DISCUSSION

The relative data of zooplankters of the Mul lake is given in the table No. 1and table No. 2 and selected zooplankters are shown in the plate I to II.

The zooplankton was consisted of Rotifers, Cladocerans, Ostracods, Copepods, Total 3152 ind/ltr of zooplankters were recorded in 2011 and 3097 ind/ltr during 2012.

Rotifers were recorded as 1688 ind/ltr during 2011 and during 2012 as 1703 ind/ltr. Among the zooplankters, it contributed 53.5% during 2011 and 54.9% during 2012.

In Rotifera, among different species, Brachionusfalcatus (731 ind/ltr) was dominant and followed by B. Calyciflorus (646 ind/ltr), Trichocercalongiseta (118 ind/ltr), Brachionusdiversicornis (92 ind/ltr), Keretellatropica (43 ind/ltr), Filiniapejleri (31 ind/ltr), Asplanchna spp.(27 ind/ltr) during 2011.

During 2012, Brachionusfalcatus (787 ind/ltr) was recorded highest followed by BrachionusCalyciflorus (635 ind/ltr), Trichocercalongiseta (110 ind/ltr), Brachionusdiversicornis (84 ind/ltr), Keratellatropica (40 ind/ltr), Filinia spp. (25 ind/ltr), Asplanchna spp. (22 ind/ltr).

Cladocera was recorded with 761 ind/ltr during 2011 and 733 ind/ltr during 2012. It contributed 24.1 % in 2011 and 23.66% in 2012 in zooplankton.

In Cladocera among different spp. Bosmina longirostris (646 ind/ltr) shown dominance followed by Moinamicrura (33 ind/ltr), Echiniscatriserialis (27 ind/ltr), Moinodaphniamacleayi (14 ind/ltr), Diaphanosomasarsi (12 ind/ltr), Chydorussphaericus (12 ind/ltr), Ceriodaphniacornuta (10 ind/ltr), Ceriodaphniaquadrangula (4 ind/ltr) and Macrothrix spinosa (3 ind/ltr) was shown in least appearance during 2011.

During 2012, again, Bosmina longirostris (637 ind/ltr) showed its dominance followed by Echiniscatriserialis (30 ind/ltr), Moinamicrura (30 ind/ltr), Diaphanosomasarsi (9 ind/ltr), Chydorussphaericus (9 ind/ltr), Ceriodaphniacornuta (8 ind/ltr), Macrothrix spinosa (6 ind/ltr), Ceriodaphniaquadrangula (3 ind/ltr) and least appearance was shown by macleayi (1 ind/ltr).

Ostracoda was recorded with 192 ind/ltr during 2011 and during 2012, 184 ind/ltr. It contributed 6.0 % during 2011 and 5.94 % during 2012 among total zooplankton.

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Copepoda was recorded with 511 ind/ltr during 2011 and 477 ind/lit during 2012. It contributed 16.21 % and 15.4% during 2011 and 2012 respectively.

During 2011, Diaptomus spp. 245 ind/ltr was dominant and followed by Eucyclop spp. (110 ind/ltr), Cyclops spp.(87 ind/ltr) and least appearance was shown by Mesocyclop spp. (69 ind/ltr).

During 2012, again Diaptomusspp (233 ind/ltr) was dominant and followed by Eucyclop spp. (100 ind/ltr), Cyclops spp (80 ind/ltr) and least appearance was shown by Mesocyclopspp (64 ind/ltr).

### 3.1 Seasonal Abundance

Fig. 1 and Fig. 2 represented the seasonal fluctuation in percentage of different groups of Zooplankton.

The Zooplankters were recorded maximum 1555 ind/ltr during summer of 2011 and minimum 778 ind/ltr during winter of the same year.

During 2011, in summer season, Rotifera accounted far 58%, Cladocera 25%, Ostracoda 3% and Copepoda 14%. During 2012, the above classes were respectively represented as 58%, 25%, 3% & 14%.

During Monsoon season of 2011, Rotifera accounted far 53%, Cladocera 33%, Ostracoda 3% and Copepoda 11%. During 2012, the above classes were respectively represented as 54%, 33%, 2% & 11%.

During winter season of 2011, Rotifera accounted far 45%, Cladocera 14%, Ostrocoda 16% and Copepoda 25%. During 2012, the above classes were respectively represented as 50%, 13%, 15% & 22%.

Maximum Rotifers were recorded with 899 ind/ltr during summer season of 2011 and minimum of 355 ind/ltr during winter season of 2011. It contributed with 53% in summer, followed in monsoon with 26% and in winter 21% during 2011. During 2012, they were again dominant during summer by contributing with 51% followed in monsoon with 25% and 24% in winter.

Cladocera recorded maximum 386 ind/ltr during summer season of 2011 and minimum of 105 ind/ltr during winter season of 2012. It contributed maximum of 51% in summer followed in monsoon with 35% and 14% in winter of the year 2011. During 2012, it showed dominance during summer by contributing 51% followed in monsoon by 35% and 14% during winter.

Ostracoda recorded maximum of 122 ind/ltr during winter season of 2011 and minimum of 20 ind/ltr during monsoon season of 2012. Seasonally, Ostracoda was dominant in winter with 64% followed by 24% in summer and 12% during monsson of 2011. During 2012, again, it showed dominance in winter with 65%, followed in summer by 24% and 11% during monsoon.

Copepoda was recorded maximum 223 ind/ltr during summer season of 2011 and minimum 87 ind/ltr during monsoon season of 2012. It has shown highest percentage i.e. 44% in summer followed by 38% winter and 18% during monsoon of 2011. During 2012, it was recorded maximum with 45% during summer followed by 37% in winter and 18% in monsoon.

**Table 1:** Monthly Variations in Zooplankton in MUL Lake during 2011

| | Zooplankton / Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A** | **ROTIFERA** | | | | | | | | | | | | | |
| | **Family: Brachionidae** | | | | | | | | | | | | | |
| 1 | Brachionusdiversicornis | 8 | 6 | 15 | 11 | 11 | 10 | 6 | 2 | 2 | 0 | 8 | 13 | 92 |
| 2 | B. calyciflorus | 34 | 58 | 93 | 103 | 79 | 76 | 68 | 51 | 39 | 26 | 18 | 1 | 646 |
| 3 | B. falcatus | 85 | 90 | 106 | 120 | 88 | 83 | 39 | 15 | 8 | 32 | 58 | 7 | 731 |
| 4 | Keratellatropica | 14 | 20 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |
| | **Family: Trichocercidae** | | | | | | | | | | | | | |
| 5 | Trichocercalongiseta | 1 | 5 | 11 | 23 | 28 | 9 | 6 | 6 | 7 | 11 | 10 | 1 | 118 |
| | **Family: Asplanchnidae** | | | | | | | | | | | | | |
| 6 | Asplanchna spp. | 0 | 1 | 4 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 9 | 6 | 27 |
| | **Family :Filinidae** | | | | | | | | | | | | | |
| 7 | Filiniapejleri | 0 | 5 | 7 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 9 | 4 | 31 |
| | **TOTAL** | 142 | 185 | 245 | 260 | 209 | 181 | 123 | 74 | 56 | 69 | 112 | 32 | 1688 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **B** | **CLADOCERA** | | | | | | | | | | | | | |
| | **Family: Sididae** | | | | | | | | | | | | | |
| 8 | Diaphanosomasarsi | 0 | 0 | 0 | 3 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| | **Family :Daphnidae** | | | | | | | | | | | | | |
| 9 | Ceriodaphniacornuta | 0 | 0 | 5 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 10 | C. quadrangula | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 4 |
| | **Family: Moinidae** | | | | | | | | | | | | | |
| 11 | Moinamicrura | 0 | 0 | 0 | 0 | 16 | 10 | 2 | 0 | 0 | 0 | 5 | 0 | 33 |
| 12 | Moinidaphniamacleayi | 0 | 0 | 0 | 0 | 7 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 14 |
| | **Family :Macrothricidae** | | | | | | | | | | | | | |
| 13 | Macrothrix spinosa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 |
| 14 | Echiniscatriserialis | 0 | 1 | 4 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 9 | 6 | 27 |
| | **Family: Bosminidae** | | | | | | | | | | | | | |
| 15 | Bosmina longirostris | 34 | 58 | 93 | 103 | 79 | 76 | 68 | 51 | 39 | 26 | 18 | 1 | 646 |
| | **Family: Chydoridae** | | | | | | | | | | | | | |
| 16 | Chydorussphaericus | 0 | 1 | 3 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 12 |
| | **TOTAL** | 34 | 60 | 105 | 110 | 111 | 100 | 78 | 51 | 39 | 28 | 34 | 11 | 761 |
| **C** | **OSTRACODA** | | | | | | | | | | | | | |
| 17 | Cypris spp. | 55 | 17 | 6 | 8 | 16 | 11 | 6 | 6 | 0 | 0 | 28 | 39 | 192 |
| **D** | **COPEPODA** | | | | | | | | | | | | | |
| 18 | Mesocyclop spp. | 15 | 13 | 8 | 0 | 0 | 0 | 0 | 0 | 8 | 8 | 6 | 11 | 69 |
| 19 | Eucyclop spp. | 11 | 16 | 26 | 18 | 11 | 8 | 3 | 0 | 0 | 7 | 7 | 3 | 110 |
| 20 | Cyclop spp. | 16 | 0 | 0 | 0 | 7 | 0 | 4 | 0 | 4 | 13 | 19 | 24 | 87 |
| 21 | Diaptomus spp. | 5 | 12 | 13 | 25 | 74 | 31 | 19 | 6 | 11 | 26 | 14 | 9 | 245 |
| | **TOTAL** | 47 | 41 | 47 | 43 | 92 | 39 | 26 | 6 | 23 | 54 | 46 | 47 | 511 |

**Table 2:** Monthly Variations in Zooplankton in MUL Lake during 2012

| | Zooplankton / Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A** | **ROTIFERA** | | | | | | | | | | | | | |
| | **Family: Brachionidae** | | | | | | | | | | | | | |
| 1 | Brachionusdiversicornis | 7 | 5 | 14 | 10 | 10 | 11 | 6 | 1 | 1 | 0 | 7 | 12 | 84 |
| 2 | B. calyciflorus | 33 | 57 | 92 | 102 | 78 | 75 | 67 | 50 | 38 | 25 | 17 | 1 | 635 |
| 3 | B. falcatus | 86 | 91 | 105 | 119 | 87 | 82 | 38 | 14 | 7 | 31 | 57 | 70 | 787 |
| 4 | Keratellatropica | 13 | 19 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| | **Family: Trichocercidae** | | | | | | | | | | | | | |
| 5 | Trichocercalongiseta | 1 | 4 | 10 | 22 | 27 | 8 | 5 | 5 | 8 | 10 | 9 | 1 | 110 |
| | **Family: Asplanchnidae** | | | | | | | | | | | | | |
| 6 | Asplanchna spp. | 0 | 1 | 3 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 8 | 5 | 22 |
| | **Family :Filinidae** | | | | | | | | | | | | | |
| 7 | Filiniapejleri | 0 | 4 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 8 | 3 | 25 |
| | **TOTAL** | 140 | 181 | 238 | 255 | 204 | 178 | 119 | 70 | 54 | 66 | 106 | 92 | 1703 |
| **B** | **CLADOCERA** | | | | | | | | | | | | | |
| | **Family: Sididae** | | | | | | | | | | | | | |
| 8 | Diaphanosomasarsi | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| | **Family :Daphnidae** | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Ceriodaphniacornuta | 0 | 0 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 10 | C. quadrangula | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| | **Family: Moinidae** | | | | | | | | | | | | | |
| 11 | Moinamicrura | 0 | 0 | 0 | 0 | 15 | 9 | 2 | 0 | 0 | 0 | 4 | 0 | 30 |
| 12 | Moinidaphniamacleayi | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | **Family :Macrothricidae** | | | | | | | | | | | | | |
| 13 | Macrothrix spinosa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 6 |
| 14 | Echiniscatriserialis | 0 | 1 | 5 | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 10 | 5 | 30 |
| | **Family: Bosminidae** | | | | | | | | | | | | | |
| 15 | Bosmina longirostris | 33 | 57 | 94 | 102 | 78 | 75 | 67 | 50 | 38 | 25 | 17 | 1 | 637 |
| | **Family: Chydoridae** | | | | | | | | | | | | | |
| 16 | Chydorussphaericus | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 2 | 9 |
| | **TOTAL** | 33 | 59 | 105 | 108 | 101 | 91 | 76 | 50 | 38 | 27 | 34 | 11 | 733 |
| **C** | **OSTRACODA** | | | | | | | | | | | | | |
| 17 | Cypris spp. | 54 | 16 | 5 | 7 | 17 | 10 | 5 | 5 | 0 | 0 | 27 | 38 | 184 |
| **D** | **COPEPODA** | | | | | | | | | | | | | |
| 18 | Mesocyclop spp. | 14 | 12 | 7 | 0 | 0 | 1 | 0 | 0 | 8 | 7 | 5 | 10 | 64 |
| 19 | Eucyclop spp. | 10 | 15 | 25 | 17 | 10 | 7 | 2 | 0 | 0 | 6 | 6 | 2 | 100 |
| 20 | Cyclop spp. | 15 | 0 | 0 | 0 | 6 | 0 | 3 | 0 | 3 | 12 | 18 | 23 | 80 |
| 21 | Diaptomus spp. | 4 | 11 | 12 | 24 | 73 | 30 | 18 | 5 | 10 | 25 | 13 | 8 | 233 |
| | **TOTAL** | 43 | 38 | 44 | 41 | 89 | 38 | 23 | 5 | 21 | 50 | 42 | 43 | 477 |

**Fig. 1 : Seasonal Distribution of Zooplankton during Summer in Mul Lake.**

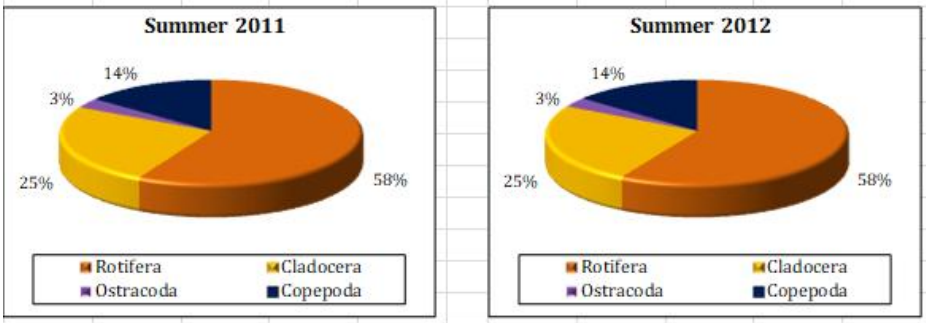


**Fig. 2 : Seasonal Distribution of Zooplankton during Monsoon in Mul Lake.**

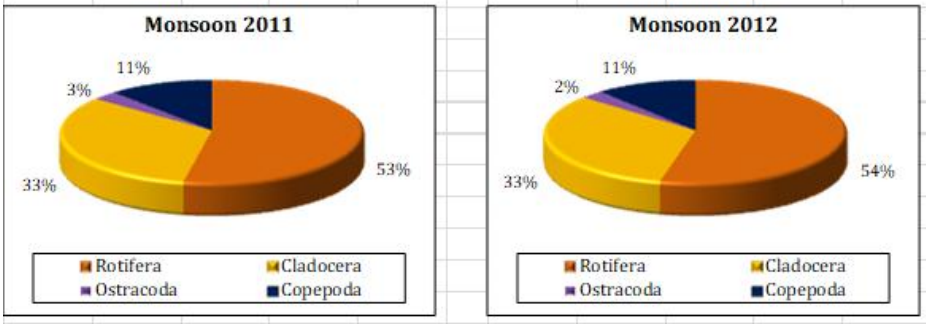

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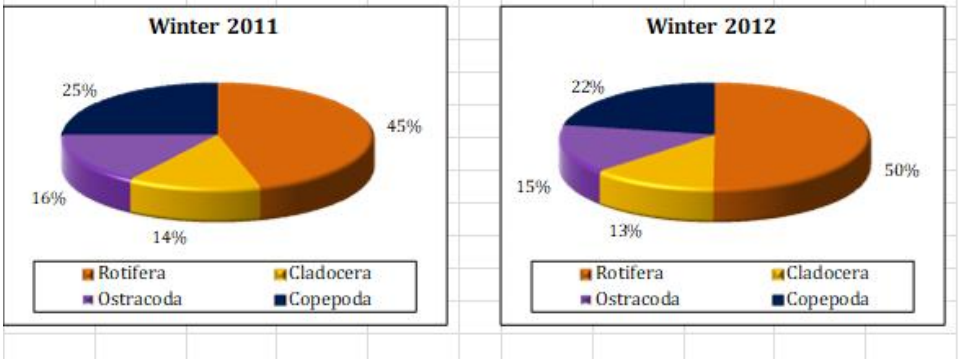
Fig. 3 : Seasonal Distribution of Zooplankton during Winter in Mul Lake.




Zooplankton diversity is one of the most important ecological parameters in water quality assessment. The zooplankton study has been a fascinating subject for a long time. Water bodies rich in phytoplankton are also rich in zooplankton diversity and biomass. Vijaykumar (1999) stated that in an aquatic ecosystem, zooplanktons play an important role not only in converting plant food into animal food but also provide an important food source for other higher organisms including fish.

The zooplankton consisted of Rotifers, Cladoceran, Copepods and Ostracods in both the lakes. The quantitative relationship amongst different groups of zooplankton in Mul lake was Rotifera> Cladocera >Copepoda> Ostracoda during both the years. seasonal fluctuation of zooplanktons in Mul lake during the study period shows that, rotiferans dominated during summer season followed by monsoon season, and minimum density was recorded during winter season. Among the two lakes the maximum Rotifers density was recorded in the Mul lake during the summer season of 2011. High density of Rotifers during summer season might be due to high temperature which is suitable for their growth, reproduction and development and availability of nutrients due to bacterial decomposition. Low density of Rotifers during monsoon season may be attributed to dilution effect, cloudy weather and low temperature while minimum density may coincide with substantial decrease in temperature in the lakes during winter season. Similar observation was reported by Arvind kumar (1994).

Sukand et. al. (2000) reported Rotifer richness and diversity in fort lake, Belgaum, North Karnataka and recorded maximum density during summer season and attributed to the influence of temperature. Similar results were also reported by Kaushik and Sharma (1994) and Singh (2007). Jorge et. al. (2009) reported highest density and diversity of Rotifers during summer months in Valle de Bravo reservoir, Mexico, due to increase in temperature.

In the present investigation, Brachionus species is very commonHutchinson (1967) observed that Brachionus species are very common in temperate and tropical waters which indicate alkaline nature of water bodies. (Schindler and Noven1971) reported enormous growth of Rotifers in lakes and reservoirs indicating eutrophic conditions. In the present study also Mul lake shows the higher numbers of Rotifers throughout the study period indicating its eutrophic nature.

In the present investigation, the cladocerans were more during the summer of the year 2011 and 2012 in Mul lake and minimum in the winter of the year 2011 and 2012. In the present investigation, Mul lake showing more cladoceran diversity presumably may be due to important bio-ecological relationship between macrophytes and zooplankton and is in conformity with Venkataraman et. al. (2000); Proctar et. al. (1967) and Ghosh and Chattopadhhyay (1994).

The Ostracoda dominated during winter season in Mul lake during both the years. Ostracoda play an important role in transferring the energy from producers to the consumers and they occupy an intermediate position in aquatic food web by being live food for fishes. The diversity, abundance and seasonal fluctuations of ostracods have direct link with water quality(Padmanabha and Belagali, 2008).

The copepod diversity was represented by four species and found more in number during summer in Mul lake, minimum number was recorded during monsoon season in Mul lake. Mul lake shows maximum number of copepods among the two lakes due to receiving of domestic sewage. Verma et. al. (1987); Kulshrestha et. al. (1992) and Kumar

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and Singh (1994) observed that the Cyclops are sensitive to pollution and increased with an increase in nutrients and is in agreement with our observation.

In the present investigation, total zooplankton was recorded maximum during summer and minimum during monsoon in Mul lake in 2012. Mul lake shows winter minima during year 2011.

## IV. CONCLUSION

In the present investigation, Mul lake was investigated for the limnological profiles, for two years i.e. from January 2011 to December 2012. 21 species of zooplankton were recorded. Zooplankton belonged to Rotifera, cladocera, copepod and ostracoda of the lake, the two year average showed the following sequence of their abundance.

Mul Lake = Rotifera> Cladocera >Copepoda>Ostracoda .In the present investigation, total zooplankton was recorded maximum during summer and minimum during monsoon.

Limnological studies have immense values in sustainable development of any ecosystem and also from the point of view of future environment impact assessment programmes. In this context, the present investigation deals with the limnological profile of two lentic ecosystems in Mul.

The higher density of some phytoplanktonic and zooplanktonic bioindicator species from Mul lake also indicates its mesosaprobity.

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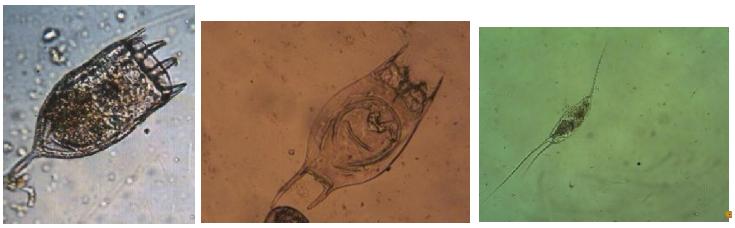

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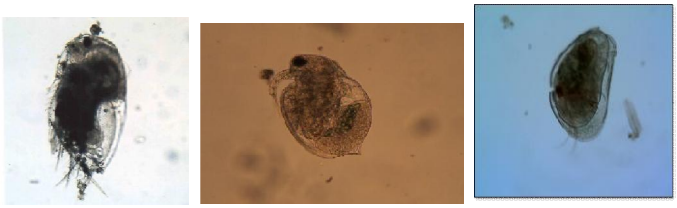

Macrothrix spinosa Cladocersa Ceridaphniacornuta Cypris spp

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