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Trophic status in Freshwater Lentic Ecosystem of Dhukeshwari Temple Pond Deori With Reference To Zooplanktonic Assemblage

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Abstract

The present study is primarily based on the work conducted on the cultural eutrophication in lentic ecosystem of Dhukeshwari temple pond situated at Deori. The Dhukeshwari temple pond is under unsustainable anthropogenic stress. The zooplankton assemblages were recorded qualitatively and quantitatively. Zooplanktons was represented by 83 species, and consisted of members from Rotifera (46) belonging to 15 families from 03 orders; Cladocera (27) belonging to 06 families; Copepoda (6) and Ostracoda (04). The zooplankton consisted of Rotifera, Cladocera, Copepoda and Ostracoda. The quantitative relationship amongst different groups of zooplankton in Dhukeshwari Temple pond was Rotifera > Cladocera > Copepoda > Ostracoda during the study. In Total zooplanktons the Rotifera were recorded maximum (2039/ltr) (61%) followed by Cladocera (1033/ltr) (31%), Copepoda (202/ltr) (6%), Ostracoda (84/ltr) (2%). It is disclosed that the rotifer fauna can be linked with favorable conditions and availability of abundant food in the form of bacteria, micro-phytoplankton, nano-plankton, animal waste and suspended detritus in the pond water. The Crustacean assemblage forms the major part of zooplankton community constituted by the crucial group like Cladocera, Copepoda and Ostracoda and the diversity within groups. They are sensitive to environmental accelerations, therefore these organisms used as important tool to evaluate the trophic status of ecosystems. In the present study, 27 species of order Cladocera were recorded from the 06 families, with highest diversity with 08 species in family Chydoridae and family Aloniae with 08 species.

Keywords: Zooplankton | Rotifers | Crustacea | Trophic status | Ecosystem

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Introduction

Freshwater ecology is an intriguing field because of the great diversity of aquatic habitats. The freshwater habitat exhibit huge diversity based on the genesis, geographical location, hydro-biological regimes and substrate factors. The ponds and lakes are more productive ecosystems and their importance as life supporting systems in controlling water cycles and cleaning the environment has acknowledged by wetland experts worldwide. Generally lake possessed a vast array of diversity in its faunal composition which is dynamic and responsive to deviation from normal ecological homeostasis. Unfortunately they are degrading, become polluted due to inflow of domestic effluents, washing clothes, vehicles, cattle, immersion of idols etc. resulting in the accumulation of toxic chemicals and sludge leading to ecological imbalance. A well established and balanced ecosystem has all the physicochemical factors in optimum range and support maximum diversity of biota. However due to open nature of the system, continues exchange of matter and energy goes on. Any change in the physicochemical environment has got its effect on biotic community due to fact that different species of flora and fauna show variations in their responses to the altered water quality. Hence, highly sensitive species are eliminated altogether while other, more resistant and tolerant dominate the medium.

The 'Trophic status' of any water bodies can evaluated by physicochemical and biological characteristics and also be determined by physiographical parameters. The freshwater bodies can be classified with respect to their biological productivity. Rawson (1956), Zafar (1959), Pennak (1955), Neumann (1927), Strom (1924), Rao (1953), Zafar (1964), Welch (1952) gave major contribution for the classification of water bodies. It is a process useful to characterize the 'Trophic Status' of a particular water body at any given time. A term 'Trophic status' of water body is used as a description of the water body for this purpose. The status of freshwater ecosystems can be categorized on the basis of richness of nutrients. The poor nutrient material, low productivity and when the water is clear, known as Oligotrophic state which having low concentration of plant life. Only small quantity of organic matter grows in an Oligotrophic lake or ponds; phytoplankton, zooplankton, attached algae, macrophytes (aquatic weeds), bacteria and fish are all present as small populations. There may be various kinds of plankton and other organisms but not very many of each species or type. With little the production of organic matter little accumulation of organic sediment at the bottom and therefore smaller the population of bacteria and due to very little consumption of oxygen, lots of oxygen present from surface to bottom. In Mesotrophic state, intermediate level of nutrients; production of plankton is intermediate, some loss of oxygen in lower waters, oxygen may not be entirely depleted and water is moderately clear with Secchi disc depths. Mesotrophic ecosystems usually have dispersed weed beds and weeds are sparse within bed. Fish is often good in such waters. While in Eutrophic state, higher the nutrients therefore the productivity is high and lower water clarity, resulting in good plant growth and possible algal blooms (Closs *et al*., 2004). Such waters also produce high number of zooplankton and the fish that feed on the zooplankton. Due to higher the production of organic matter provides the food for high numbers of bacteria and benthic macro-invertebrates. Eutrophic waters are often relatively shallow. Although the intensity, frequency and extent of algal blooms have tended to increase in response to human-induced eutrophication, algal blooms are a naturally occurring phenomenon. The rise and fall of algae populations, as with the population of other living things, is a feature of a healthy ecosystem (Bianchi *et al*. 2000).

The Importance of plankton communities, in the Trophic dynamics of freshwater ecosystems has long been recognized, as these organisms, not only regulate the aquatic productivity by occupying almost middle position in food chain, but also indicate environmental status in a given time. These organisms are regarded as valuable bio-indicator to depict the Trophic status of water quality of their environments within limnosaprobity (Sladecek, 1983). In India biological assessment was effectively employed as an indicator technique in a number of recent studies involving assessment of pollution impact from domestic sewage and industrial effluents (Deevey *et al*., 1941; Koul *et al*., 2000). Historically Butcher (1924) was the first to recognize the importance of biological analysis in overall assessment of aquatic environment.

Material and Method

The Zooplanktons were collected once in a month during the period of proposed work. Quantitative samples of zooplankton was collected by filtering 100 liters of sub-surface water through plankton net made of a silk bolting cloth No. 25 (mesh size 0.04m). Samples were transferred to a small enamel tray; the inside of the net was also washed so as to collect any sticking plankton to it. Few drops of formalin were put to narcotize the animal and when they become motionless and settle down, the supernatant water was discard slowly and concentrated sample were collected. All samples were preserved in 4% formalin. The quantitative zooplanktons were enumerated by Sedgwick Rafter Cell method. The average of the three counts was converted to number of individuals per liter of pond water samples. The total number of planktons present in per liter of sample is calculated by formula of Welch (1952). The quantity of each genus was calculated in U/L of Pond water. Specimens were identified according to key from Edmondson (1959), Plaskit (1997), Dhanapathi (2000), Sehegal (1998), Sharma and Michael (1988), Pennack (1978). Arvindkumar, (2015) and photographed were made with Metzer-M-Co-axial Trinocular Digital Research Microscope Vision plus-5000 DTM.

Study Site

The Dhukeshwari Temple pond was constructed before 50 years ago by impounding natural low lying areas nearby Goddesses "Dhukeshwari" Temple (N 21^0 4' 29.4405", E 80^0 21' 44.6565") along the National Highway No. 6, mainly for agricultural purposes. Expanding urbanization in the catchments area with consequent increase in anthropogenic activities, culminating in the introduction of untreated domestic sewage and immersion of idols, offerings, commercial waste and other socio-cultural practices also contributed to nutrient enrichment of this pond.

Observation and Result

Zooplanktons was represented by 83 species, and consisted of members from Rotifera (46) belonging to 15 families from 03 orders;

Cladocera (27) belonging to 06 families; Copepoda (6) and Ostracoda (04). (Table 2 to Table 4).

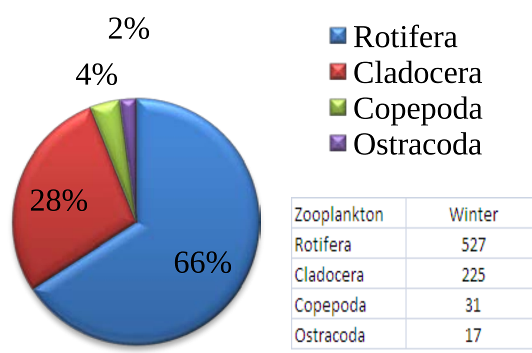
Seasonal Abundance

The representations of seasonal fluctuations in percentage of different groups of zooplanktons are shown in Table 1 and Fig. 1-5. In Total zooplanktons the Rotifera were recorded maximum (2039/ltr) (61%) followed by Cladocera (1033/ltr) (31%), Copepoda (202/ltr) (6%), Ostracoda (84/ltr) (2%). The zooplanktons were recorded maximum of 1969/ltr (58%) during summer season and minimum of 595/ltr (18%) during monsoon in the study period. In winter season, Rotifera accounted for 66%, Cladocera 28%, Copepoda 4% and Ostracoda 2%. In summer season, Rotifera accounted for 54%, Cladocera 36%, Copepoda 7% and Ostracoda 3%. In Monsoon season, Rotifera accounted for 76%, Cladocera 18%, Copepoda 5% and Ostracoda 1%. The Rotifera were recorded maximum (1059/ltr) (52%) in summer season while minimum (453/ltr) (22%) in the monsoon season. The Cladocera were recorded maxima (704/ltr) (68%) in the summer season while minimum (104/ltr) (10%) in the monsoon season. The Copepods were recorded maximum (140/ltr) (70%) in the summer season while minimum (30/ltr) (15%) and (31/ltr) (15%) in the monsoon and winter season respectively. The Ostracoda were recorded maximum (66/ltr) (72%) in the summer season while minimum (8/ltr) (9%) in the monsoon season.

Discussion

Zooplankton is an integral component of aquatic ecosystem and comprises of microscopic animal life that passively float or swim. The zooplankton in lentic environment consist of heterogenous assemblage of minute floating micro and macro-invertebrates, and their qualitative study provides good indices of water quality and the capacity of water to sustain heterotrophic communities. They act as primary consumers in aquatic ecosystem and constitute and important link between primary producers and consumers of higher order like fishes in the food chain of aquatic ecosystem.

Fig: 1. Seasonal distribution of Zooplankton in Winter



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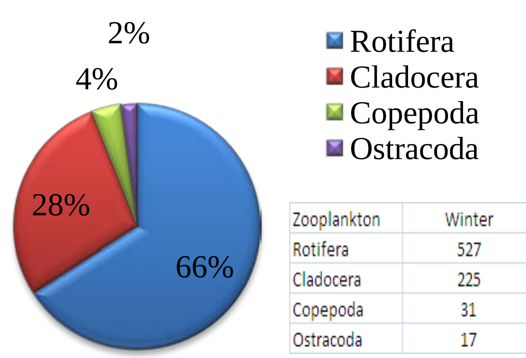
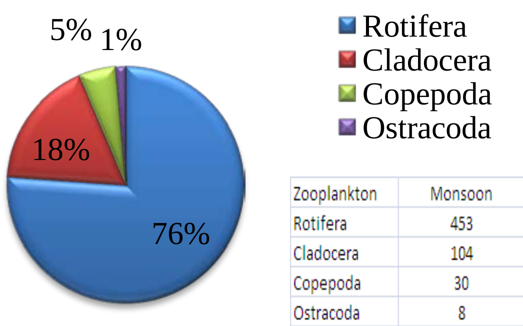


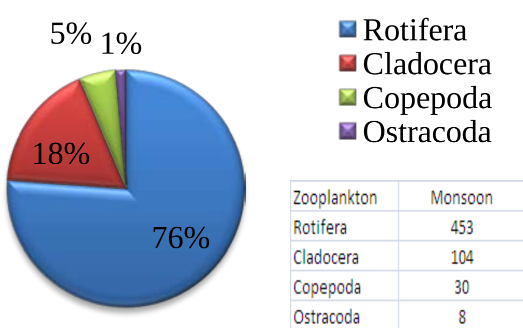
Zooplankton operations facilitate food web connectivity and cascading interactions in trophic structure of aquatic communities. The multitude of micro level transfers, transformations of biomass and energy mediated by zooplankton help to sustain stability and health of ecosystem. Zooplankton helps in Bio-monitoring of the environmental pollution as they are tolerant to adverse environmental conditions. They are capable of measuring the actual response of organisms or population to the environmental entities.

Fig: 3. Seasonal distribution of Zooplankton in Monsoon



Zooplankton	Monsoon
Rotifera	453
Cladocera	104
Copepoda	30
Ostracoda	8

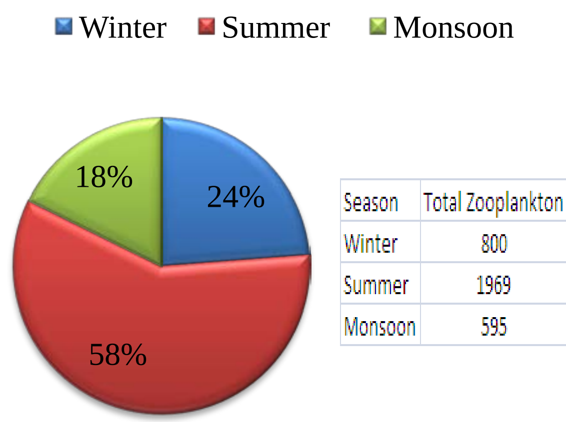
Fig: 3. Seasonal distribution of Zooplankton in Monsoon



Zooplankton	Monsoon
Rotifera	453
Cladocera	104
Copepoda	30
Ostracoda	8

The zooplankton consisted of Rotifera, Cladocera, Copepoda and Ostracoda. The quantitative relationship amongst different groups of zooplankton in Dhukeshwari Temple pond was Rotifera > Cladocera > Copepoda > Ostracoda during the study.

Fig: 5 Season wise distribution of Total Zooplankton



Season	Total Zooplankton
Winter	800
Summer	1969
Monsoon	595

In the present investigation as far as seasonal fluctuation is concerned the rotiferans dominated during summer season followed in winter season while minimum during monsoon season. 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 during winter, it may be coincides with a substantial decrease in temperature in the pond. Similar observation was reported by Arvind Kumar (1994). Similar findings were reported by Kaushik and Sharma (1994). Jorge *et al*., (2009) reported highest density and diversity of Rotifers during summer months in Valle de Bravo reservoirs, Mexico, due to increase in temperature. The rotifers invariably constitute a dominant component of freshwater zooplankton and contribute significantly to their dynamics and production (Sharma, 1991).

S. No.	Zooplankton Group	Seasonal Total Number			
		Winter	Summer	Monsoon	Total
1	Rotifera	527	1059	453	2039
2	Cladocera	225	704	104	1033
3	Copepoda	31	140	30	202
4	Ostracoda	17	66	8	84
5	Total	800	1969	595	3358
		Table: 1. Seasonal variation of Total Zooplankton 2014-2015			

S. No.	Systematic Position	Rotifer Spp
1	Phylum: Rotifera Family: Brachionidae	*Brachionus calyciflorus*
2		*Brachionus falcatus*
3		*Brachionus durgae*
4		*Brachionus plicatilis*
5		*Branchionus quadrientatus*
6		*B. quandridentatus var entzi*
7		*B. quandridentatus var melhini*
8		*B. quandridentatus v. brevispinus*
9		*Brachionus ureceolaris*
10		*Platyas quadricornis*
11		*Platyas quadricornis andhraensis*
12	Family:Euchlanidae	*Beauchampiella eudactylotum*
13	Family:Epiphanidae	*Epiphanes macrourus*
14	Family:Colurellidae	*Lepadella patella*
15		*Lepadella lepadella ovalis*
16		*Colurella adriatica*
17	Family:Lecanidae	*Lecane bidentata*
18		*Lecane cornuta*
19		*Lecane decipiens*
20		*Lecane donnerianus ventral*
21		*Lecane hamata*
22		*Lecane obtuse*
23		*Lecane pyriformis*
24	Family:Trichocercidae	*Trichocerca rattus*
25		*Trichocerca tigris*
26	Family:Trichotriidae	*Trichotria tetractis*
27		*Trichotria similis*
28	Family:Trichosphaeridae	*Horaella brehmi*
29	Family:Asplanchnidae	*Asplanchna intermedia*
30		*Asplanchnopus bhimnavaramensis*
31		*Asplanchna brighwelli*
32	Family:Gastropodidae	*Ascomorpha ecaudis*
33	Family:Notommatidae	*Cephalodella forficula*
34		*Cephalodella gibba*
35		*Cephalodella panarista*
36		*Scaridium longicaudatum*
37		*Esophora anthadis*
38	Family:Mytilinidae	*Mytilina ventralis*
39	Family:Testudinellidae	*Testudinella patina*
40		*Testudinella semiparva*
41		*Testudinella mucronata*

42	Family:Filinidae	*Filinia species*
43	Family: Philodinidae	*Rotaria neptunia*
44		*Rotaria rotatoria*
45		*Macrotrachela quadricornifera*
46		*Philodina spp*

Table: 2. Rotifer species in Dhukeshwari Temple pond

S. No.	Systematic Position	Cladocera spp
1	Order: CLADOCERA Family: Sididae	*Diaphanosoma sarsi*
2	Family: Bosminidae	*Bosmina longirostris*
3		*Bosminopsis deitersi*
4	Family: Chydoridae	*Pleuroxus denticulatus*
5		*Pleuroxus trionellus*
6		*Pseudochydorus globossus*
7		*Chydorus latus*
8		*Chydorus ovalis*
9		*Chydorus sphaericus*
10		*Dunhevedia serrata*
11		*Acroperus harpae*
12	Subfamily: Aloniae	*Allona affinies*
13		*Alona davidi punctata*
14		*Alona quadrangularis*
15		*Allona Monacantha*
16		*Alona rectangula richardi*
17		*Bipertura karua*
18		*Kurzia longirostris*
19		*Leydigia acanthocercoides*
20	Family:Daphniidae	*Ceriodaphnia cornuta*
21		*Scapholebris kingi*
22		*Simocephalus exspinosus*
23		*Simocephalus vetulus*
24	Family:Macrothricidae	*Ilyocryptus sordidus*
25		*Ilyocryptus spinifer*
26		*Macrothrix laticornis*
27		*Macrothrix rosea*

Table : 3: Cladoceran species in Dhukeshwari Temple pond

S. No.	Systematic Position	Copepods and Ostracods spp
1	Order: Calanoida Family: Diaptomidae	*Diaptomus nudus*
2		*Diaptomus oregonensis*
3		*Heliodiaptomus viduus*
4		*Spicodiaptomus chlospinus*
5	Order: Herpacticoida Family: Canthocamptidae	*Canthocamptus staphylinoids*
6	Order:Cyclopoida Family:Cyclopidae	*Mesocyclops leuckart*
7	Class:OSTRACODA Family: Cypridae	*Cypris dentata*
8		*Cypris reticulata*
9		*Cypris subglobossa*
10		*Herpetocypris barbatus*

Table 4: Copepodes and Ostracodes in Dhukeshwari Temple Pond

In the present study 46 species of freshwater rotifers belonging to 15 families from 03 orders were recorded from the lentic ecosystem of Dhukeshwari temple pond, Deori District Gondia. These organisms are regarded as valuable bioindicator to depict the trophic status of water quality (Pejler 1989). Arora (1963) reported that species of *Brachionus* have a wide range of occurrence and found from potable water to diluted sewage tanks. In much polluted water they occur in small number but abundant in moderately polluted waters. He recorded *B. calyciflorus, B. caudatus, B. falcatus* and *B. quadridentatus* from heavily polluted Jumma Tank and *B. urceolaris* from oxidation ponds of NEERI Nagpur.

In the present findings the family Brachionidae was dominant with 11 species; of which genera *Brachionus* with 09 species and two species of *Platyas* is recorded. Some species of *Brachionus* were considered as indicators of mesotrophic and eutrophic conditions in several Central Indian waters by Unni (1985). Bhandarkar *et al*., (2008) reported 07 species of *Brachionus* from the highly Eutrophic Kalikar pond in Bramhapuri. Bhandarkar and Paliwal, (2012) reported 09 species of rotifers from the different productive water bodies of Lakhani. Bhandarkar and Bhandarkar (2008) Likewise 19 species of rotifers were also recorded from the various water bodies in Bramhapuri. High rotifer population in the lake waters indicate pollution due to direct entry of untreated domestic sewage from input area (Arora, 1966). A number of studies have evaluated *Brachionus sp.* as indicator of eutrophication (Mahajan *et al*., 1981, Sladeck 1983). Chandrashekhar and Kodarkar (1995) described six species of Brachionus from Saroornagar lake Hyderabad and reported that *B. calyciflorus* was most dominant followed by *B. caudatus* in term of seasonal occurrence and biomass and un-uniform occurrence of *B. forficula*, *B. durgae, B. bidentata* and *B. angularis* in monthly collections due to changes in water quality associated with nutrient concentration in summer. Somani & Pejawar (2003) in Lake Masunda Thane reported the dominance of these tolerant genera as an indication of onset of eutrophication in the ecosystem.

In the present observation too, *Brachionus spp* was most dominant. The occurrence of these species indicates the water of this pond is polluted. Some species flourish in highly eutrophic waters while others are very sensitive to organic or chemical wastes (El-Enany, 2009). In addition to the above described species, some others rotifers were also considered as indicators of eutrophy. The species like *B. quadridentatus, Lepadella* have better tolerance for alkalinities, *Platyas quadricornis, epiphanus, and Rotaria rotatoria* have been recorded from Eutrophic and heavily polluted waters (Pattnaik, 2014). Dominance of rotifers further confirmed the Eutrophic nature of the lake (Pejler, 1965; Arora, 1961, 1966; Unni, 1985; Sharma, 1987). However further detailed studies on seasonal variation in diversity and biomass would be helpful in evaluation their bio-indicator role in eutrophication.

Rotifers comprise major community in the zooplankton assemblage of the Dhukeshwari Temple pond. *Brachionus* formed the dominant and diversified genus among the rotifers throughout the study period. *Lecane* also formed second dominant and are often present in tropical aquatic body. From the present study it is disclosed that the rotifer fauna can be linked with favorable conditions and availability of abundant food in the form of bacteria, micro-phytoplankton, nano-plankton, animal waste and suspended detritus in the pond water.

In the present investigation, the Crustacean assemblage forms the major part of zooplankton community constituted by the crucial group like Cladocera, Copepoda and Ostracoda and the diversity within groups. These groups are most important and useful as food for fishes. They are sensitive to environmental accelerations, therefore these organisms used as important tool to evaluate the trophic status of ecosystems. In the present study, 27 species of order Cladocera were recorded from the 06 families, with highest diversity with 08 species in family Chydoridae and family Aloniae with 08 species. In subclass Copepoda, 04 species were recorded from order Calanoida, 01 species with order Herpacticoida and 01 species with Cyclopoida. 04 species from single family for Class Ostracoda were also observed.

In the present investigation the Cladoceran were more during the summer season followed by winter and minimum in the monsoon season. Kotangle (1988) reported highest peak of Cladocera during summer months. Similar report was given ZSI (1991) and Bohara (2004). In the present investigation Dhukeshwari Temple pond showing more Cladoceran diversity presumably may be due to important bio-ecological relationship between macrophytes and zooplankton and its conformity with Venkatraman *et al*., (2000). Burns and Schallenberg (2001) made some observations on the consumer effects of protozoa by Cladoceran and Copepods in the lakes of Newzealand reported that copepods are more effective consumers of protozoa than Cladocersns, particularly in Eutrophic conditions. Many works done India on Crustacea, some of them are Shah and Pandit (2013), Ghantaloo *et al*., (2012), Gulam Mohideen (2006), Gulam Mohideen *et al*., (2008), Ahmad and Parveen, (2013), and so on. Michael (1973) and Murugan (1989) carried out an extensive study on the ecology of cladoceran species from Madurai. Bhat *et al*., (2015) reported 11 spp of Cladocera, 5 species of Copepoda and 3 species of Ostracoda during ecological investigation of zooplankton abundance in the Bhoj Wetland at Bhopal.

Planktons are considered as indicator of the trophic status of a water body because of their specific qualitative features and their capacity to reproduce in large number under environmental conditions that are favorable to them. (Vollenweider and Frei, 1953). Zooplankton represents the link between primary producers and secondary consumer, so it significantly influencing the food web structure (Marazzo and Valentin, 2001). Zooplankton occurrence, distribution and abundance are of extreme importance in aquatic systems since they are sensitive to disturbances including eutrophication due to anthropogenic impacts such as urbanization, domestic, and industrial pollutants and sewage disposal which can alter ecosystem components (Vidjak *et al*., 2006).

In the present investigation the crustacean faunal assemblage was subdominant in zooplankton population. A high diversity of Cladocerans can be found in the littoral zone of stagnant waters. The habitat is often negatively influenced by human activities, and especially the loss of temporary waters may lead to a decrease of diversity or even local extinction of some species (Forro *et al*., 2008). Patil and Gouder (1989) Michael (1973), and Mustaq (1990) observed that some Cladoceran species can flourish well in polluted waters and hence serves as good biological indicators of water pollution. According to sensitivity of organism to water sewage pollution *Bosmina longirostris*, *Chydorus sphearicus* and *nauplius larvae* (Copepods) are pollution tolerant groups of zooplankton (Saad *et al*., 2013). Crustacean species like *Ceriodaphnia corunata and Cypris spp* can survive in high abundant macrophytes environment (Ahmad, 2012).

Crustaceans of freshwater ecosystems play an important role in the aquatic food web. They contribute to a high reduction of the phytoplankton biomass since the majority of them are filter feeders and hence they may in this way greatly improve the water quality. Crustaceans are able to consume great quantities of phytoplankton from the open water zone thereby influencing the primary production (Gonzalez, 2000). The abundance of Cladocera in the vegetated areas was higher than un-vegetated areas (Benkurt and Guven, 2009). Cladocerens are able to utilize bacteria as food source efficiently (Wylie and Currie, 1991).

Cyclopoids and Cladocerans were found to be associated with increasing productivity. The ratio of Calanoids to Cyclopoids plus Cladocerans was found to be good indication of trophic condition and valuable index of pollution (Khan and Rao, 1981). The abundance of Copepoda is due to the decreasing of eutrophication level (El Enany, 2009). Balamurugan *et al*., (1999) reported six species of copepods belonging to order Cyclopoida from water body with heavily loaded organic enrichment due to influx of sewage. Species of Cyclops recorded more due to the abundance of diatoms and blue green algae (Meshram, 1996). Kurasawa (1975) noticed the dominance of Copepoda in oligotrophic lakes but Cyclopoid Copepods were dominant in Eutrophic lakes of tropical region. Bhandarkar and Paliwal (2010) reported 9 species of copepods from various water bodies in Lakhani, in which 1 species of Diaptomidae and 8 species of Cyclopidae reveals that the water bodies of Lakhani are Eutrophic. Harpacticoid Copepods are almost exclusively littoral inhabiting macro vegetation, mosses in particular, and the littoral sediments (Sharma, 2001). Gulati (1978) stated that if the food supply is high or increasingly up for stretch of time, Cladocera build up in high number and biomass to dominate Lake Zooplankton.

Anil Kumar *et al*., (2004) observed that copepods were mainly dominated by Mesocyclops species and Cladocerans, the pre-dominancy of rotifer and copepods indicate the nutrient availability in some ponds of Durg-Bhillai city, CG. Ostracods are important indicators of the structure and function of freshwater ecosystems and their ecological status (Mezquita *et al*., 1999). Ostracod diversity is one of the most important ecological parameters in water quality and meiobenthic biodiversity assessment, because it is strongly affected by environmental conditions (Selcuk Altinsacli *et al*., 2015). They have received much less attention than the Claodcerens and Copepods (Pennak, 1978). They inhabit a wide variety of environments and found almost everywhere in all types of freshwaters, like lakes, ponds, swamps, cave water and even heavily polluted areas etc.

In the present investigation, summer maxima of Ostracoda may be attributed to higher water temperature, decrease in water level and increased availability of its food. Similar result was reported by Padmanabha *et al*., (2008) in Dalvoi Lake Mysore. Ostracoda is represented by Cypris sps. Ramulu *et al*., (2011) observed and indicate that the increase in water quality increases the population density of Ostracods in perennial tank Warangal due to pollution load of domestic sewage. Further studies on diversity of these species would be helpful in evaluating their bio-indicator role.

Crustacean faunal assemblage was subdominant in zooplankton population. From the present study it is disclosed that the higher the diversity of Crustaceans may be due to higher the organic matter and nutrient availability in the habitat of lentic ecosystem of Dukeshwari Temple Pond Deori. The Crustaceans diversity indicates trophic status of the water body as they have specific qualitative features and capacity to reproduce under favorable ecological conditions. The species diversity of Crustaceans in general and Cladoceran diversity in particular can be linked with natural purifying system in fluctuated water.

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