Research Paper

Volume : 4 | Issue : 4 | April 2015 • ISSN No 2277 - 8179

Diversity of Planktons in Kham river ,Aurangabad

Environmental Science

KEYWORDS : Zooplanktons ,trophic ,status , eutrophication.

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ABSTRACT

Present work focused on the taxonomic composition of zooplankton in Kham river of Aurangabad during the year October 20011 to 2012 in the present investigation 20 species of zooplankton were to the different groups i.e ,,Rotifera ,Copepoda ,Cladocera, Ostrocoda. During study period in the Kham river zooplanktons was composed of taxa Rotifera ,four taxa of Copepoda ,four taxa Cladocera and four taxa of Ostrocoda . The total zooplankton composition is significantly change in all the water bodies .Comparison of diversity and density in Kham river was studied with diversity indices . The study result clearly indicates intensified eutrophication river .These fragile ecosystems have to prevent from further eutrophication .

Introduction

Biodiversity is the variety of organisms considered at all level and includes genetic and ecosystem variants, which comprised arrays of species genera ,and families ,as well as communities of organism within particular habitat and the physical conditions under which they live because of intensive exchange of nutrients between their water columns and sediments ,shallow lakes are sensitive to eutrophication. Under the influence of eutrophication usually associated with a loss of structural diversity and as a result ,a decrease in biodiversity at the higher trophic level takes place .while oligotrophic lakes are generally clear and hypertrophic lakes frequently turbid .shallow lakes at intermediate nutrient concentration may exhibit dear water or turbid states .Biological studies have been increasingly employed in monitoring water quality in lakes .Phytoplanktons , Zooplanktons , macrophytic plants and fishes were used considerably in bio monitoring of lake ecosystem .Indian lentic ecosystems were investigated extensively for planktons from mid 20 th century .These studies show that the dominant plankton and their seasonality are highly variable in different water bodies according to their nutrient status ,age ,morphometry and other locational factors . However ,zooplanktons was investigated in Indian lentic ecosystems . These studies reveal different group of zooplankton have their own peak period periods of density ,which is also affected by local environment condition prevailing at the time .Zooplankton by their heterotrophic activity plays a key role in the cycling of organic materials in aquatic ecosystems and used as bioindicators .

Material and Methods :-

Zooplanktons samples were collected from Kham river .The sample collected was made during the period of October 2011 – September 2012 .The collection was made with hand plankton (standard- WP2 pattern net of 68 µm mesh) by horizontal net towing (5 m distance / spot) Samples were fixed in 4 % formaldehyde. Organisms were identified to the greatest possible taxonomic level (Genus / species), using an Stero microscopic .Only qualitative analysis of zooplankton was done . Philodinidace species were Identified using fresh samples .Trophic status was analyzed using Q_{ST} quotient .In comparing the faunastic composition of zooplankton we used the Sorenson similarity index (S) .

S=2C/A+B. Where A is the numbers of species present ion one population ,B is the number of species present in the other population ,and C is the number of species present in both populations . As control we used Jaccard index (CJ) . CJ=J/a+b-J Where a is yhe number of species present in one population , B is the number of species present in the population , and J is the number of species present in both populations. The data which was generated by our survey between 2001 – 2012 was compared with the earlier species composition list (Vijaykumar 1986 -87) for three lake .

Results :-

On the basis of the results presented in the Table no 1 , it can be easily explain that the changes have occurred in the total zooplankton composition in all Kham river .Out of 102 species which were recorded by earlier workers only 73 species were registered during study period . Among rotifera group out of 50 species ony 31 species were listed in the present study ,while in the caldocera group out of the 30 reported species 21 recorded again and in the copepod out of 12 species reported earlier 12 species recorded .Among the ostracoda group out of 10 species reported earlier 9 species were recorded again. Kham river a total of 22 taxa of zooplankton were recorded in the present investigation where as 31 taxa were reported earlier (Table no 1) .During 1986 – 87 this lake was reported 16 taxa of rotifera ,9 taxa of cladocera and 3 taxa of copepod and 3 taxa of ostracoda but now the composition presenting 9 taxa of rotifera ,06 taxa of cladocera ,4 taxa of capepoda and 3 taxa of ostracoda .The lower values of Jaccard index (19%) and Sorenson index (32%) were recorded for rotifera group and higher values Jaccard index (50 %) and Sorenson index (66.6%)of these indices were recorded for the group ostracoda (Table 2) . Bosga lake , 35 species of zooplankton was recorded in this lake by earlier workers where as in the study period only 24 species were recorded (Table no 1) .During 1986 – 86 this lake was included 17 taxa of rotifera ,10 taxa of cladocera , 5 taxa of copepod and 3 taxa of ostracoda, but the present composition has changed to 10 taxa of rotifera ,7 taxa of cladocera , 4 taxa of copepod and 3 taxa of ostracoda .The lower values of Jaccard index (21.4 %) and Sorenson index (35.2%) were recorded for cladocera group and higher values of these indices for group copepod and ostracoda (Soreson index = 66.6 and CJ=50) (Table 2) . Gobbur lake 36 species of zooplankton was recorded in this lake by earlier workers where as in the present study only 27 species were recorded (Table 1) . During 1986 – 87 this lake was with 17 taxa rotifera , 11 taxa of cladocera , 4 taxa of copepod and 4 taxa of ostracoda but the composition has changed to 12 taxa rotifera , 8 taxa of cladocera , 4 taxa of copepod and 3 taxa of ostracoda. The lower values of Sorenson index (48.2 %) and Jaccard index (31.87 %) were recorded for rotifera group and higher values of these indices for group ostracoda (S=85.7% and CJ =75%) (Table 2) .

Table no 1
Diversity of Plankton in Kham river

Species	No . of Species found 2011 -2012
Rotifera	10
Cladocera	04
Copepoda	03
Ostracods	03

2) The zooplankton were preserved in 5% formalin .Zoolplakton were identifiifed folloeing the taxonomic keys ,provide by Pennak ,(1978) Tonapi ,(1980)Battish ,(1992) Dussart and Delaye (1995) , and MAurugan et al (1998) .

Table no 2

Sr. no	Group	Species
1	Copepoda	*Cyclops bicolour spp Nauplius larvae*
2	Cladocera	*Daphina spp Diaphenosoma spp*
3	Rotifera	*Brachionus urceolaris (Muller) spp*

Rotifera	No . of Species found 2011 -2012
Brachionus calyciflour	+
B.rubens	+
B.angularis	+
B.forcula	+
B.falcatus	+
K.chohelaris	+
F.terminalis	+
Lapedella bicrornis	+
Lecane luna	+
T.cylindrical	+
Cladocera	
Daphnia pules	+
Monia brachiata	+
Daphanosoma sarsi	+
Daphanosoma excisum	+
Copepoda	
Mesocyclops leukerri	+
Neoiaptomus strigilips	+
Cyclopodia	+
Ostracods	
Eucypris bispinosa	+
Posptomocypris	+
Sprirocypris	+

Discussion :-

The present study the evidence for the changes in the composition of zooplankton (Table 1) .the total zooplankton composition has significantly changed in all three lakes (Table 2) . The Lower values if Sorenson and Jaccard's indicies for total zooplankton composition reveal the change in community structure in lake Sharanabasaveshwara total zooplanktons composition has significantly change compared to earlier report (Table 2) Since during 1986 -87 this tank has recorded total 32 species ,however in the present study only 24 species were registered .The condition of Bosga and Gobbur lakes was also found similar (Table 2) .Eutrophicaation leads to changes in community structure (20) . A similar trend was also reported by (23) while studying Grosinca reservoir (Serbia ,Yugoslavia) According to (15. 31) biotic community respond to pollution or to eutrophication on three main ways first one is biomass alters but community structure (species composition and relative abundance) does not . Second one is species remain the same but relative abundance alter and biomass may alter and third one is species composition and relative abundance alter and biomass alter .Lake Sharanabasaveshwara gradually loosing its cathment area by increasing urbanization and due to pollution loading changes in the composition of zooplankton .Rotifers are prominent group among the zooplankton of a water body irrespective of its trophic status .This may be due to the less specalialized feeding ,parthenogenetic reproduction and high fecundity (31) .Among the zooplankton rotifers respond more quickly to the environment changes and used as a change in water quality (13) .Rotifera diversity is effected in all three lake .

On the basis of the result presented in Table it can easily explain that changes have occurred in the total plankton composition in Kham river .Among rotifers ,10 species ,were recorded .Among cladocera , copepdoda and ostracods ,4,3 and 3 respectively . Rotifers are prominent group among the zooplankton of a water body irrespective of trophic status .Among the zooplankton rotifers respond more quickly to the environment total change and quality of water . Kirk . K. V and Gilbert .J.J (1990) represent the D.excisum is more abundant in high organic content water bodies .In the present study the presence of D.excisum in river also be considerable as are indication of increased organic content in the Kham river .

Jana and Pal (1984) reported the Diaphanosoma excisum is more abundant in high organic content water bodies . The increase in the anthropogenic activities and urbanized cathment area and agriculture run off are major cause for eutrophication in Kham river .

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