Studies on Zooplankton Diversity of River Kolar, Saoner, Dist. Nagpur, Maharashtra

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Abstract—The present paper deals with study of monthly variations in the zooplankton population during January 2010 to December 2010. The diversity and population dynamics of zooplankton is under the control of numerous physic-chemical factors, pollution influence, etc. A study revealed that 28 species of zooplanktons belonging to five major groups were observed. Highest zooplankton populations were recorded in November and December.

I. INTRODUCTION

The aquatic ecosystem covers a vast area and the organisms occurring in this area are under the influence of its physic-chemical properties [1], [2], [3]. Its interaction occurs between living and non-living components. The occurrence and abundance of zooplankton depends on its productivity, which in turn is influenced by abiotic factors and the level of nutrients in the water [4]. Zooplankton forms the microscopic animals that play an important role in an aquatic food chain as they are largely consumed by fishes and other higher organisms in food chain. Equally, results of several studies have shown that physic-chemical properties of aquatic ecosystems determine the occurrence, diversity and density of both flora and fauna I any given habitat, which may change with season of the year [5], [6]. The present study was undertaken to investigate the zooplankton diversity in river Kolar through different months and season during the period January 2010 to December 2010 in order to assess the species composition, population density and seasonal fluctuation of this faunal group.

II. MATERIALS & METHODS

Kolar river is in the vicinity of Saoner town, located at 21.3858107° North latitude and 78.9201379° East longitude, in Nagpur district of Maharashtra state. For the study of zooplanktons, samples were collected on monthly basis for a period of one year from January 2010 to December 2001. For qualitative and quantitative studies of zooplankton 100 lits. of surface water was passed through the plankton net number 120µ. The collected samples were preserved in 4% formalin solution. These samples were observed and identified under microscope using keys and monographs of [7], [8], [9], [10] and [11]. Zooplanktons were counted with the help of Sedgwick Rafter Cell method. The following are the specific volumes used for the identification of different groups of zooplankton like Rotifers [12] Copepods [13], Cladocerans [14] and Ostracods [15]. For their numerical estimation, the organisms were observed under light microscope using “Sedgwick Rafter Cell” as per procedure given in standard methods [16]. Average 5 to 10 counts for each sample were taken and results were expressed in number of organisms/litre.

III. OBSERVATIONS

As shown in Table I For Month wise population density (no./lit) of different zooplankton groups. (Jan. 2010 to Dec. 2010).

IV. RESULTS & DISCUSSION

In the present study, total 28 species of zooplanktons were recorded. 5 species of Protozoa were found as follows; Laxodes, Urocentrum, Vorticella, Coleps and Sarcodina. Belonging to Rotifera 9 species Asplanchna, Brachionus durgae, B. angularis, B. bidentata, B. falcatus, B. pallas, Filinia bory, F. longiseta and Keratella vulga were recorded. 6 species of Copepods were recorded as Cyclops sternuus, C. viridis, Diaptomus edax, D. minutes, Heliodiaptomus viduus, Mesocyclops leuckarti. Belonging to Ostracods 3 species Cyclocypris globosa, Cypris subglobosa and Stenocypris fontinalis were recorded. 5 species belonging to Cladocerans were recorded as Alona intermedia, A. pulchella, Ceriodaphnia cornuta, Monia micrura, M. brachiata. The monthly variations of zooplankton are illustrated in Table I. Species richness was high in the winter season and it was minimum during monsoon.

Zooplankton is the intermediate link between phytoplankton and fish, which are the secondary producers in the aquatic environment. Zooplanktons are good indicators of changes in water quality, because they are strongly affected by environmental conditions and responds quickly to change in environmental quality. Hence, qualitative and quantitative study of zooplanktons is of great importance.
Protozoa: As components of the micro and macro fauna protozoa are an important food source for micro invertebrates. Thus, the ecological role of protozoa in the transfer of bacterial and algal production to successive trophic levels is important. As predators, they prey upon unicellular or filamentous algae, bacteria and micro fungi. Protozoa are both herbivores and consumers in the decomposer link of the food chain. They also control bacteria populations and biomass to some extent [17]. All the 5 species had been reported from the river Kolar where density was maximum in winter, i.e. 165/lit in December, while it was minimum in monsoon, i.e. 32/lit in June.

Rotifers: The rotifers are being considered as the most important soft bodied invertebrates [18]. They play a significant role in aquatic food chain and thereby constitute an important food item to fishes. Taxonomic dominance of rotifers was reported in several water bodies. This pattern is common in tropical and sub tropical freshwater, whether in lakes, ponds, reservoirs, rivers or streams [19] and [20]. In the present study population density of rotifers was maximum in winter, 278/lit in December and minimum in monsoon, 54/lit in June [21].

Cladocera: They are popularly called as ‘water flea’ prefers to live in deep water and constitute a major item of food for fish. Thus they hold key role in food chain and energy transformation [22]. During the present study 5 species out of 110 species recorded in India [23], were recorded. The Cladoceran population showed minimum in monsoon, i.e. in June 58/lit and maximum in winter, i.e. in December 180/lit. The maximum population of cladoceram in summer and winter may be due to favourable temperature and availability of food, while in monsoon the factors like temperature, turbidity, and transparency play an important role in controlling the diversity and density of cladocera [24].

Copepods: Freshwater copepods occur in all types of water bodies. They serve as food to several fishes and play a major role in ecological pyramids. During the present investigation, copepods were found to be maximum during summer, i.e. 131 in April and minimum during winter, 89/lit in October. Similar trend was observed in Renuka lake, Himachal Pradesh [25].

Ostracods: They are bivalve and have shape like small seeds. They occur in all kinds of freshwater and marine environments. The abundance of these provides a good food for aquatic organisms. In the present investigation 3 species of ostracods were recorded. Maximum ostracods population was recorded in summer, 87/lit in March month while minimum in monsoon, i.e. 11/lit in July. Similar observations were also made in Fort lake of Belgaum, Karnataka [26].

V. CONCLUSION

The zooplankton analysis showed that, the total zooplankton density was more in winter season due to low temperature, favourable for phytoplanktonic growth as an abundance of food.

REFERENCES


### Table I. Month-Wise Population Density (No./lit) of Different Zooplankton Groups (January 2010 to December 2010).

<table>
<thead>
<tr>
<th>Zooplankton Component</th>
<th>Monsoon Season</th>
<th>Winter Season</th>
<th>Summer Season</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protozoa</td>
<td>32</td>
<td>45</td>
<td>57</td>
<td>127</td>
</tr>
<tr>
<td>Rotifera</td>
<td>54</td>
<td>64</td>
<td>58</td>
<td>194</td>
</tr>
<tr>
<td>Cladocera</td>
<td>58</td>
<td>106</td>
<td>117</td>
<td>123</td>
</tr>
<tr>
<td>Copepoda</td>
<td>106</td>
<td>114</td>
<td>122</td>
<td>107</td>
</tr>
<tr>
<td>Ostracoda</td>
<td>22</td>
<td>11</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>Total Zooplankton</td>
<td>255</td>
<td>360</td>
<td>405</td>
<td>594</td>
</tr>
</tbody>
</table>


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