



# **COMPARATIVE ACCOUNT OF PLANKTONIC COMMUNITY OF MANAR RIVER NEAR DEGLOOR, DIST. NANDED (MAHARASHTRA) INDIA**

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## **ABSTRACT**

The present paper is prepared from the data collected during different seasons from June 2004 to May 2005. An attempt is made to enumerate the planktonic diversity of the Manar river Dist. Nanded. The result shows that the zooplanktonic diversity was lesser as compared to phytoplankton. Although highly polluted, the Manar river contains a considerable number of both phyto and zooplankton species. The plankton community showed seasonal variations. The phytoplankton community was consisting of members of Chlorophyceae, Myxophyceae, Bacillariophyceae and Chlorophyceae were represented by species of Oedogonium, Volvox, Eudorina, Microcystis, Oscillatoria and Anabaena including certain diatoms. The zooplankton community was consisting of members of Cladocerans, Copepods, Ostracode and Rotifers and were represented by species of Daphnia, Moina, Cereodaphina, Cyclops, Cletocampus, Brachionus Keratella, and Metapidia. The ecological significance of the plankton diversity and the seasonal variation in total plankton volume is discussed in the light of available literature.

**Key words:** Physico-chemical, Phytoplankton, Zooplankton, Manar river

## **INTRODUCTION**

The biodiversity of phytoplankton and zooplankton in the river water shows a correlation with reference to their occurrences and the physico-chemical factors. The phytoplankton serves as the producers in the food chain in the aquatic ecosystem and the productivity depends upon the quality of water. The zooplanktonic world depends upon the availability of phytoplankton and they form the second trophic level in the aquatic food chain. The phyto and zooplanktonic world provides food for fishes and therefore, they play a key role in the fisheries.

D.O. content fluctuated between 0.75 to 2.4 mg/L, which is inversely proportional to temperature at a given time.

pH serves as an index for pollution, which ranges between 6.3 to 7.4. The factors like photosynthesis, exposure to air, disposal of industrial wastes and domestic sewage affect pH<sup>2</sup>. High chlorides indicate organic pollution particularly from domestic sewage<sup>3</sup>. The chloride values fluctuated between 190-365 mg/L and these values showed positive correlation with total hardness. These values also showed positive correlation with phytoplankton<sup>4</sup>. Goel et al.<sup>5</sup> showed that the concentration of chlorides increases with the degree of eutrophication. The presence of chlorides indicates availability of organic matter. Remarkable variations of T.D.S. range between 1278 to 1630 mg/L and the T.D.S values found to be higher in monsoon due to high erosion and in summer due to evaporation<sup>6</sup>.

In the present work, 20 genera of algae and 12 genera of diatoms among phytoplanktons, while 6 genera of Cladocera, 2 genera of Ostracoda, 4 genera of Copepoda and 5 genera of Rotifera among zooplankton were identified and recorded in list.

The variation in the abundance of total phytoplankton and zooplankton (org/L) of Manar river is given in Table 2 on the basis of survey. Euglenophyceae group of algae and Rotifer group of zooplankton were found to be dominant.

Abundance of phytoplankton population decreases in the order Bacillariophyceae, Euglenophyceae, Chlorophyceae, Cyanophyceae and Chrysophyceae.

Little work has been done till date on the plankton, especially in Nanded district and therefore, the present work is undertaken for an extensive survey of phyto and zooplankton community of Manar river Dist. Nanded (M. S.) India. The variation in the biodiversity of planktonic world is studied with reference to seasonal changes. Sporadic work is done on physico-chemical parameters of water bodies by Lohar and Patel<sup>7</sup>.

## EXPERIMENTAL

### Material and methods

Manar river is one of the subtributaries of river Godavari in Nanded district.

Physico-chemical parameters viz., temperature of air and water, Transparency, O.D., pH, total hardness and chlorides were estimated by usual standard methods prescribed by APHA (1985)<sup>8</sup> and are given in Table 1. The water samples from Manar river were collected at monthly intervals by usual plankton net and preserved in formaline (3-5%) with glycerin and were studied under compound microscope. For identification of plankton standard monographs by Desikachary<sup>9</sup>, Philipose<sup>10</sup>, Patel et al.<sup>11</sup>, Tonapi<sup>12</sup>, Venkatraman<sup>13</sup>,

Victor and Fernando<sup>14</sup>, Sharma<sup>15</sup>, Reddy<sup>16</sup>, Sehgal<sup>17</sup>, Sharma and Michael<sup>18</sup>, as well as other published articles were used.

## RESULTS AND DISCUSSION

Considerable variations in the air and surface water temperature of Manar river was observed. The temperature values of water river fluctuated between 23<sup>0</sup>C to 35<sup>0</sup> C depending upon the season. solar radiation's and other climatic conditions. Seasonal variations were observed in the water temperature values, which also exhibited a correlation with air temperature. The transperncy was poor during July and maximum in the month of April.

### List of phytoplankton

Class: Cyanophyceae : Gleocapa punctata, Microcystis spp., Spirulina sp., Oscillatoria spp., Nostoc sp. and Anabaena sp.

Class : Euglenophyceae : Euglena sp.

Class : Bacillariophyceae : Achnanthes minutissima, Pinnulria acrosphaeria, Melosira granulata, Neidium iridis, Surirella capronioides. Hantzschia elonagata. H. lineares, Navicula reinhardtii, N. radiosa, Nizschia obstusa, N. irremissa, Fragilaria rumpens, Diatoma spp., Synera spp. and Asterionella spp.

Class: Chlorophyceae : Chlamydomonas spp., Pandorina sp., Dudorima sp.. Volvox sp.. Hydrodictoyon sp., Ulothrix sp., Oedogonium spp., Spirogyra sp., Zygnema spp. and Pediatrum spp..

Class: Chrysophyceae : Ocleromonas sp. and Botridum spp.

### List of zooplankton

Cladocera : Daphnia spp., Moina spp., Cereodaphnia sp. Simocephalus sp., Acroperus spp. and Sida spp.

Ostracoda : Cypris spp. and Stenocypris spp.

Copepoda : Mesocyclops sp., Diaptomus spp., Apus sp. and Cyclops spp.

**Table 1. Monthly Values of various physico-chemical parameters of Manar river (Year 2004-2005)**

Parameter	Period											
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Air Temp (°C)	39.0	35.0	35.0	35.5	34.0	32.0	32.0	28.0	36.0	30.0	41.0	46.0
Water Temp (°C)	32.5	30.0	30.4	29.0	28.0	26.0	27.0	23.0	31.0	32.0	35.0	35.0
Transparency (Cm)	14.5	11.0	13.5	13.0	14.5	15.5	17.0	17.0	17.5	17.0	18.3	13.0
DO (mg/L)	0.8	0.9	0.9	10.1	2.4	2.3	1.9	1.7	1.8	0.9	0.8	0.8
pH	6.7	7.3	7.4	7.3	6.8	6.8	6.7	6.5	6.3	6.3	6.3	6.5
Total hardness	147.0	145.0	146.0	137.0	130.0	118.0	127.0	117.0	113.0	114.0	116.0	114.0
Chlorides (mg/L)	360.0	360.0	365.0	356.0	345.0	315.0	285.0	185.0	240.0	232.0	210.0	190.0
Total dissolved solid (mg/L)	1423.0	1630.0	1630.0	1576.0	1560.0	1450.0	1373.0	1340.0	1327.0	1278.0	1380.0	144.0

Table 2. Monthly occurrence of phyto and zooplankton of Manar river (Year 2004-2005)

Parameter (Litre <sup>-1</sup> )	Period											
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
<b>Phytoplankton</b>	9	8	5	6	6	4	3	0	1	0	15	13
Class: Euglenophyceae	12	115	15	15	0	1	1	4	8	7	8	9
Class: Bacillariophyceae	8	7	25	23	6	3	23	32	36	42	10	8
Class: Chlorophyceae	5	5	25	23	13	6	3	58	2	3	23	3
Class: Chrysophyceae	0	3	7	6	2	2	0	2	2	0	0	0
<b>Zooplankton</b>												
Class: Cladocera	11	14	13	8	7	7	7	4	4	5	8	11
Class: Ostracoda	0	3	4	4	6	2	1	2	4	3	1	0
Class: Copepoda	11	8	6	13	13	52	8	17	32	5	12	21
Class : Rotifera	10	343	198	84	63	41	48	58	18	63	29	19
<b>Total plankton individuals</b>	<b>66</b>	<b>506</b>	<b>298</b>	<b>182</b>	<b>116</b>	<b>116</b>	<b>93</b>	<b>177</b>	<b>137</b>	<b>128</b>	<b>106</b>	<b>84</b>

Rotifera : Asplanchna spp., Brachionus spp., Keratella spp., Rotaria spp. and Philadena spp.

To summarise, the present investigation indicates that the Manar river is subjected to higher degradative impact and it is essential to take immediate steps for protection of this valuable natural resource.

The members belonging to Bacillariophyceae, Navicula, Nitschia, Flagellaria, Pinnularia, Melorira and Synedra were dominant. The members of Euglenophyceae represented by Euglena and Desmids were next to the members of Bacillariophyceae, Chlorophyceae was represented by Chlamadomonas, Eudorina, Volvox and Spirogyra. The members of Cyanophyceae were Oscillatoria, Anabaena, Nostoc and Spirulina. Chrysophyceae was represented mostly by Botridium and Ocliromonas.

Abundance of zooplankton was in decreasing order of Rotifera. Copepoda, Cladocera and Ostracoda. Rotifera was represented by species belonging to genus Brachionus, Asplanchna, Keratella, Rotaria and Philodena. The Copepods were the species of Daphnia, Moina, Sida, Cerodaphnia and Acroperus. Ostracoda was represented by the species belonging to Cypris and Stenocypris.

The seasonal variations of total planktonic world is shown in the Table 2, which shows correlation with effect of physico-chemical factors changing during different months of the year. The seasonal changes in phytoplankton in lake were noted by Whitton<sup>19</sup>. In the present study, the maximum number of phytoplankton were recorded in the month of July 2004 especially due to the crowding of the members of Euglenophyceae. Zooplankton population showed depletion in the month of June, 2004, while there is a great increase in the number of zooplankton in July, 2004 (maximum) while it was greatly reduced in the month of May 2005. Copepodes declined in March 2005 and their population increased in November, 2004. The number of Cladocerans was high in July, 2004 and low in January, 2005.

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