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Phytoplankton diversity in back water of Shankar Sagar reservoir of river Godavari at Dhangar Takli,Tq. Purna Dist. Parbhani, Maharashtra

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Abstract

Studies on phytoplankton diversity in the back water of Shankar Sagar reservoir of river Godavari at Dhangar Takli, Tq. Purna Dist. Parbhani, Maharashtra was carried out for three years i.e. from July 2010 to April 2013. This place is well known for fishing activity because of the availability of fish in abundant quantity. This study was undertaken to record the natural source of food for fishes in this area. Detailed microscopic examination of phytoplankton collected from this locality has resulted in documentation of 25 genera of algae belonging to 3 classes in the following order: Chlorophyceae (13 genera), Bacillariophyceae (9 genera) and Cyanophyceae (3 genera) constituting 60.05%, 33.05% and 6.9% respectively of all algae put together. This study indicated high productivity of phytoplankton at Dhangartakli.

Key words: Godavari River; Phytoplankton diversity; Purna District; Shankar Sagar reservoir.

Introduction

The study of Plankton is very important for water quality assessment. They are the primary producers in food chain and their presence in any water body is considered as good indicator of water quality. Their presence is important because they quickly respond to any environmental change occur. Primary productivity also depends on population of these phytoplanktons in water body. Phytoplanktons are small, microscopic, single celled organisms and are photoautotrophs. The productivity of entire aquatic ecosystem of any water body is always depending on the presence of phytoplankton. Many herbivorous organisms consume this phytoplankton as their food. Life span of phytoplankton is very short, but their presence is more important for wellness of water body.They flourish both in highly atrophic waters while a few others are very sensitive to organic and/or chemical wastes.

Several workers have studied phytoplankton which play a crucial role in food chain (Saravanakumar *et al.*, 2008; Shashi Shekhar *et al.*, 2008 and Rajkumar *et al.*, 2009). They produce their own food with their photosynthetic activity and the latter is responsible for transfer of energy from one tropic level to another. They serve as bio-indicators with reference to water quality and thus serve as a tool for assessing the health of the aquatic ecosystems (Rajkumar *et al.*, 2009). Godavari is one of the important rivers in Marathwada region. Lift irrigation project was constructed on this river at Nanded. The back water of this project has a spread of about 40 KM. Dhangar Takali is a small village with high fishing activity. Hence, the present study was carried out for three years, covering all seasons from July 2010 to April 2013 to document the natural source of food, i.e. phytoplankton, consumed by many fishes.

Materials and methods

The present study was carried out in the back water of one of the largest lift irrigation projects in Asia, constructed on the River Godavari at Asarjan District Nanded. Dhangar Takli (Lat 19°7'12"N, Long 77°3'28"E) was selected as a study area. The water quality was assessed using standard biological method which includes collection, identification and counting of organisms present in aquatic sample. For Plankton analysis, samples were collected monthly using standard plankton net operated at uniform speed. The plankton sample was fixed in 70% ethyl alcohol. The phytoplankton genera were identified using standard manual (Edmondson, 1959). Preserved samples were mixed uniformly by gentle inversion and then 1ml of the sample was transferred into the S-R cell for analysis using a pipette. The counting of phytoplankton was done by using *Sedgwick-Rafter cell* of 50 × 20 × 1 mm. Detailed analysis of plankton and plankton population was done by estimating the numbers of each genus.

Results and discussion

Twenty five taxa of phytoplankton up to their generic level, belonging to the families Chlorophyceae, Bacillariophyceae and Cyanophyceae identified (Tables 1 and 2, Fig. 1). Phytoplankton plays an important role in regulating the atmospheric level of O_2 and CO_2, vital gases for life. Phytoplanktons help in primary production in water body and also serve as a source of food for all herbivorous animals. Detailed microscopic examination of phytoplanktons revealed the occurrence of 25 species belonging to 3 families in the following order: Chlorophyceae (13 genera), Bacillariophyceae (9 genera) and Cyanophyceae (3 genera). Following were the taxa observed: *Spirogyra sp, Oedogonium sp. Ulothrix sp., Chlamydomonas sp., Cladophora sp., Volvox sp., Eudorina sp., Pandorina sp., Chlorella sp., Microspora sp., Pediastrum sp., Tribonema sp.* and *Selenastrum sp.* (Chlorophyceae); *Synedra sp., Fragilaria sp., Amphora sp., Asterionella sp., Pinnularia sp., Nitzschia sp., Navicula sp., Cymbella sp.* and *Bacillaria sp.* (Bacillariophyceae) and *Anabaena sp., Microcystis sp. and Oscillatoria sp.* (Cyanophyceae).

During the study period of three years, members of the Chlorophyceae recorded amount to 60.05% of all members recorded. Then the members of the Bacillariophyceae and the Cyanophyceae accounted 33.05% and 6.9% respectively. It was reported that, phytoplankton was high in summer season thereafter number was decreased during winter and monsoon respectively. This high percentage of phytoplankton in summer might be due to decreased level of water due to its use in farming activities and subsequent evaporation. Water was also

Table 1: Phytoplanktons of river Godavari at Dhangar Takli from July 2010 – June 2011, July 2011 – April 2012 and July 2012 – April 2013.

Year	July 2010 – June 2011			July 2011– April 2012			July 2012– April 2013			
Species	**July–Oct**	**Nov–Feb**	**Mar–Jun**	**July–Oct**	**Nov–Feb**	**Mar–Apr**	**July–Oct**	**Nov–Feb**	**Mar–Apr**	**Total**
					Chlorophyceae					
Spirogyra sp.	4	20	24	7	18	20	9	17	24	143
Oedogonium sp.	2	12	15	4	8	11	4	12	14	82
Ulothrix sp.	7	11	16	8	10	19	10	14	15	110
Chlamydomonas sp.	8	8	9	0	12	10	2	9	13	71
Cladophora sp.	8	10	16	6	9	8	4	10	8	79
Volvox sp.	10	15	19	9	12	19	6	9	11	110
Eudorina sp.	0	2	5	2	7	6	8	4	15	49
Pandorina sp.	6	9	12	8	6	12	5	10	9	77
Chlorella sp.	8	14	16	0	10	8	4	7	10	77
Microspora sp.	2	3	3	0	4	5	4	3	4	28
Pediastrum sp.	4	10	12	4	6	10	3	5	7	61
Tribonema sp.	0	0	2	0	1	4	0	1	3	11
Selenastrum sp.	2	2	6	2	4	9	0	3	0	28

Table 2: Phytoplanktons of river Godavari at Dhangar Takli from July 2010 – June 2011, July 2011 – April 2012 and July 2012 – April 2013.

Year	July 2010 – June 2011			July 2011– April 2012			July 2012– April 2013			
Name of Taxa	**July– Oct**	**Nov–Feb**	**Mar–Jun**	**July–Oct**	**Nov–Feb**	**Mar–Apr**	**July–Oct**	**Nov–Feb**	**Mar–Apr**	**Total**
					Bacillariophyceae					
Synedra sp.	4	3	8	0	3	5	1	3	4	31
Fragilaria sp.	8	**7**	10	8	13	12	4	10	9	81
Amphora sp.	3	4	7	2	3	4	5	5	7	40
Asterionella sp.	4	6	12	3	4	8	2	4	5	48
Pinnularia sp.	0	2	3	0	1	1	0	0	2	09
Nitzschia sp.	4	3	7	3	2	6	7	6	11	49
Navicula sp.	3	3	5	2	3	6	4	4	9	39
Cymbella sp.	0	0	2	0	0	1	0	0	1	04
Bacillaria sp.	3	1	4	2	2	3	0	1	4	20
					Cyanophyceae					
Anabaena sp.	6	5	9	4	3	8	4	2	4	45
Microcystis sp	3	4	4	1	1	4	1	1	1	20
Oscillatoria sp.	2	1	5	3	3	5	4	1	5	29

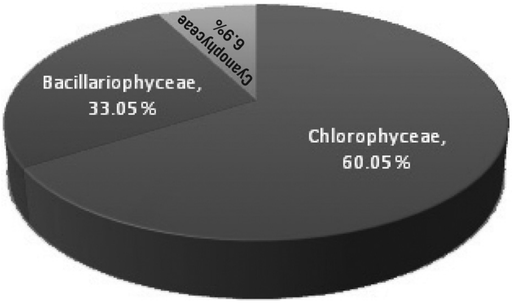

Fig. 1: Percentage (%) of Phytoplankton of river Godavari at Dhangar Takli from July 2010 to April 2013.

clear and photosynthetic process was rapid during those days. These findings are close to the findings of Krishnamoorthy *et al.* (2007) and Shinde *et al.* (2012). Banakar *et al.* (2005) also recorded more phytoplankton in the month of April i.e. in summer and their minimum occurrence in the month of July and August in Vidisha, central India. Laskar and Gupta (2009) documented the least number of phytoplankton during rainy season and peak during summer season in Chatla Lake, Assam. Similar observation has also been noted in Harsool-Savangi dam, Aurangabad, India (Shinde *et al.*, 2012). Our results are similar to the findings of above mentioned researchers. Based on the present study, it is concluded that the seasons affect the presence of phytoplankton in water body.

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