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Qualitative and quantitative status of phytoplankton at Tamadalage freshwater tank from Kolhapur district of Maharashtra, India

S. A. MANJARE
Department of Zoology
Jaysingpur College, Jaysingpur
India

Abstract:

Present study deals with the qualitative and quantitative analysis of phytoplankton from Tamadalage freshwater tank situated in the Hatkanangle tahsil of Kolhapur district, Maharashtra, India. The study revealed that total 13 species of phytoplankton resides in the tank. Out of 13 species, 5 were belonging to chlorophyceae, 4 were belonging to Bascillariophyceae, 3 were belonging to Myxophyceae while Dianophyceae was presented by 1 member. Based on the qualitative analysis, Chlorophyceae was dominant group among all. Quantitative analysis of phytoplankton showed monthly variation in the total number of organisms. However, the highest number was noted during the months of winter season while lowest during monsoon season. The percent composition of phytoplankton revealed that Bascillariophyceae members were dominant over both the years.

Key words: Phytoplankton, quality, quantity, Tamadalge, freshwater tank.

INTRODUCTION:

Phytoplankton is an important base of freshwater ecosystem and also performs a major role in the production of organic

matter. The presence of phytoplankton in any water body can lead to productive and sustainability of that water body. The assemblage in the form of composition and distribution is dependent on the physical, chemical and biological properties of water (Patil *et al., 2015*). Plankton is the most sensitive floating community which is being the first target of water pollution, thus any undesirable change in aquatic ecosystem affects diversity as well as biomass of this community. Phytoplankton are Autotrophs and belonging to first trophic level (Mondal *et al.,* 2014). Freshwater tanks, reservoirs, lakes, etc. have characterized by the presence of phytoplankton as producer organisms, without which the ecosystem is considered to be incomplete. These freshwater bodies are regarded as life supporting systems for millions of organisms. Among which phytoplankton are microscopic organisms only those prepare their own food. Population dynamics of these phytoplankton get influenced by many physic-chemical parameters of water. Now-a-days, anthropogenic activities exerting a great pressure on these freshwater sources to fulfill the need of water for drinking, agricultural and industrial use. Indeed, these water reservoirs become the site of drainage and sewage release, due to which physical and chemical parameters get altered, ultimately leading to decline in the floral and faunal diversity. Present attempt was made to know the phytoplankton diversity from Tamadalge freshwater tank. Various workers made an attempt to study the planktonic diversity over this area are Bhosale *et al.* (2010 a) and Bhosale *et al.* (2010 b)

MATERIALS AND METHODS:

Study Area:

It is situated about 6 km west to Hatkanangle covering maximum area of about 121 ha.(300 acre) with average water spread area of about 6.5 ha. It was constructed in 1976 by Kolhapur Patbandhare mandal, Laghu Jalsinchan Vibhag,

Kolhapur. The local and other fishermen community primarily uses it as a source of drinking water and secondarily for fish production. It is auctioned on lease for the period of 3-5 years by Grampanchyat Tamdalge for fishery purpose. During the period of investigation Tamdalge tank was free of aquatic vegetation. It has only two inlets (sources) of rain water, both from hilly region. It has no other source of water. Thus exhibit more fluctuations in its water level. It was characterized by more anthropogenic activities and silt bottom and huge algal bloom throughout year. Molluscan fauna is absent in this tank.

PHYTOPLANKTON ANALYSIS:

Present investigation is made between July 2011 and June 2013. The plankton samples were collected from four different sites of each tank fortnightly by using plankton net having mesh size of 50µ. The 100 liter water sample was filtered through the plankton net in 100ml sampling bottle attached to the plankton net. The collected plankton sample was preserved in 4% formalin. The qualitative and quantitative analysis of Phytoplankton was carried out in the laboratory with the help of Sedgwick- Rafter cell counting chamber. The samples were kept for setting for a period of 48 hrs. The phytoplankton and were identified as described by Needham and Needham (1962), Adoni *et al.* (1985), Michael (1984), Tonapi (1980), Trivedy and Goel (1987).

RESULT AND DISCUSSION:

The seasonal variations in phytoplankton density were observed as maximum in winter season and minimum in monsoon. Comparatively, higher density of phytoplankton was recorded in winter and summer than the monsoon season. The qualitative analysis of phytoplankton belonging to four major

groups such as Chlorophyceae, Bascillariophyceae, Myxophyceae and Euglenophyceae were identified.

Total thirteen species of phytoplankton, belonging to four orders and five families were recorded. During the study period 5 Chlorophyceae members, 4 members were belonging to Bascillariophyceae, 3 species were Myxophyceae and one species was of Dinophyceae. The Chlorophyceae member includes *Spirogyra*, *Hydrodyctyon, Oedogonium, Pediastrum* and *Ankistrodesmus.* The Bascillariophyceae comprises *Coscinodiscus sp., Navicula, Cyclotella* and *Surirella,* among these former three were noted dominant. The Myxophyceae members were represented by *Nostoc, Anabaena,* and *Microcystis.* Among these *Nostoc* and *Anabaena* were observed as abundant in the plankton samples of these tanks. The only Dianophyceae member represented during study period was *Ceratium*.

The quantitative results for total number of phytoplankton during the year 2011 and 2012 are given in Figure 1. The total numbers of phytoplankton during 2011 were fluctuated from 1156 Unit/l to 3093 Unit/l. The numbers of planktons were lower in the month of August while higher in the month of February. The total number of planktons during 2012 were ranged between 1271 Units/l and 3595 Units/l. There was decline in the number of phytoplankton in the month of August while incline in the month of January. The study revealed that the total number of phytoplankton were declined in the months of monsoon due to increased water level and decreased transparency. Low light may also be another cause for the decrease in the level of planktons during monsoon season. There was incline in the number of phytoplankton during the months of winter season might be due to clear water transparency, intense sunlight and increased light penetration.
Monthly variation of plankton with reference to classes in noted in the Figure 2 and Figure 3. The numbers of Chlorophyceae members were fluctuated from 188 Units/l to 1198 Units/l

during the year 2011 while during 2012, members of Chlorophyceae were fluctuated from 194 Units/l to 1435 Units/l. There was decline of Chlorophyceae members in the month of August during both the years while the maximum Chlorophyceae members were noted in the month of February and January during the year 2011 and 2012 respectively.

Monthly variation of plankton with reference to classes in noted in the Figure 2 and Figure 3. The numbers of Bascillarophyceae members were fluctuated from 0 Units/l to 1474 Units/l during the year 2011 while during 2012, members of Bascillarophyceae were fluctuated from 0 Units/l to 1658 Units/l. There was decline of Bascillarophyceae members in the month of August and July-August during 2011 and 2012 respectively while the maximum Bascillarophyceae members were noted in the month of February during both the years.

Monthly variation of plankton with reference to classes in noted in the Figure 2 and Figure 3. The numbers of Myxophyceae members were fluctuated from 0 Units/l to 1002 Units/l during the year 2011 while during 2012, members of Myxophyceae were fluctuated from 0 Units/l to 1140 Units/l. There was decrease of Myxophyceae members in the month of December during both the years while the maximum Myxophyceae members were noted in the month of July during both the years.

The total composition of planktons includes the members of Chlorophyceae, Bascillarophyceae and Myxophyceae. The total composition of the planktons (Figure 4 and 5) revealed that Bascillarophyceae was a noted dominant during both the years with holding percentage of 37.98% and 38.55% during 2011 and 2012 respectively. The Bascillarophyceae was followed by Chlorophyceae and the total composition of this group indicated by 37.72% and 36.78% during 2011 and 2012 respectively. The percent composition of Chlorophyceae members during the year 2011 was noted parallel with Bascillarophyceae members. The percent

composition of Myxophyceae in lower among other groups and it holds 25.29% during the year 2011 and 24.65% during the year 2012.

Anitha and Singara found phytoplanktons belonging from classes Chlorophyceae, Bacillariophyceae, Cyanophyceae and Euglenophyceae during July 1999 to June 2001 from Lower Manar Dam and Kakatiya canal, Karimnagar, Andhra Pradesh, India.

The population condition was stable during the months of April and May. The density slowly declined during June and the lowest value was observed during the month of July 2011 and 2012. In the present study, the phytoplankton production was coinciding with the optimum water depth of 1 m. This is an agreement with the earlier works of Sukumaran and Das (2001) in some freshwater reservoir of Karnataka.

CONCLUSION:

The present study can be concluded that the qualitative status of phytoplankton was medium rich while the quantitatively it is rich. Seasonal variations in total number of planktons were noted and found that the winter season was favourable season for the growth and development of phytoplankton.

REFERENCES:

Anitha U. Devi and Singara M.A. Charya, Phytoplankton in Lower Manar Dam and Kakatiya Canal, Karimnagar, Andhra Pradesh, *Nat. Environ. Pol. Technol.*, 6(4), 643-648, (2007).

Bhosale Leela J., S. M. Patil, Surekha N. Dhumal and S. S. Sathe (2010 a). Occurrence of phytoplankton in the water bodies of MirajTaluka of Maharashtra. *The Ecoscan.* 4(1): 73-76.

Leela J. Bhosale, Surekha N. Dhumal and Anjali B. Sabale (2010 b). Phytoplankton diversity of in four lakes of Satara District, Maharashtra state. *The Ecoscan.* 5(3): 449-454.

Sachinkumar R. Patil, S.S. Patil and T. V. Sathe (2015). Occurrence of phytoplankton in major freshwater bodies of Ajara tahsil, Kolhapur district (MS), *India. Asian Academic Research Journal of Multidisciplinary,* 1 (31): 35-45.

Sukumaran, P.K. and A.K. Das: Distribution of plankton in some freshwater reservoirs of Karnataka. J. Inland. Fish. Soc. India, 33, 29-36 (2001).

Needham, J. G. and Needham, P. R. (1962). A guide to freshwater biology. Holden Day Ins., San Francisco (USA). PP. 108.

Adoni, A. D., Gulwant, J, Chourasia,S. K., Vaidya,A.K., Yadav,M. and Verma ,H.G.(1985). Work book of Limnology, Prabha Publishers, C-10, Gour Nagar, Sagar (India).

Michael, R. G. (1984). Ecological methods for laboratory and field investigations. Tata McGraw Hill publishing Company Ltd. New Delhi. PP. 4-11.

Tonapi, G. T. (1980). Freshwater animals of India an ecological approach. Oxford and IBH Publishing Company, New Delhi. PP 314-315.

Trivedy, R. K., Goel, P. K. and Trisal, C. L. (1987). Practical methods in ecology and environmental science.

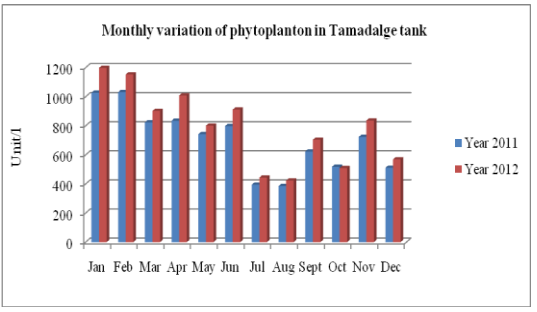

Figure 1: Monthly variation of phytoplankton in Tamadalge tank

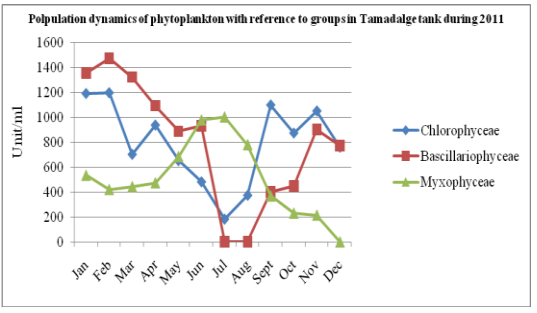

Figure 2: Population dynamics of phytoplankton with reference to groups in Tamadalge tank during 2011

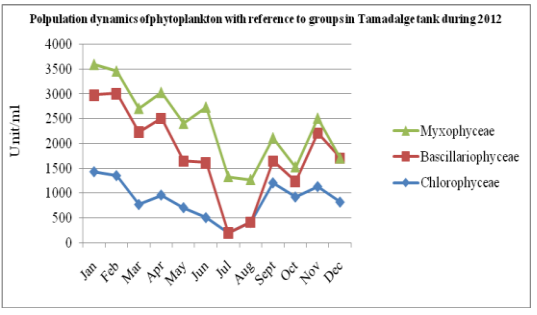

Figure 3: Population dynamics of phytoplankton with reference to groups in Tamadalge tank during 2012

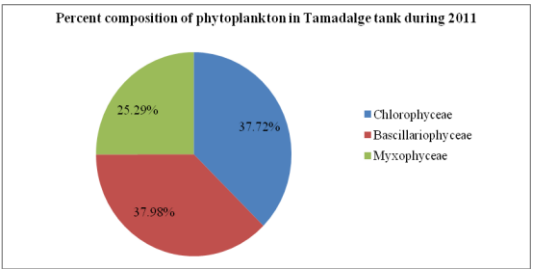

Figure 4: Percent composition of phytoplankton in Tamadalge tank during 2011

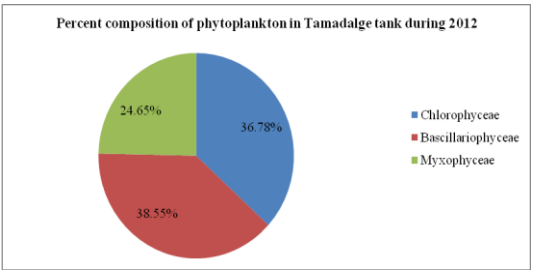

Figure 5: Percent composition of phytoplankton in Tamadalge tank during 2012