IRJSE *Int. Res. J. of Science & Engineering,* 2020; Special Issue A7: 467-470 SJIF Impact Factor 6.68
ISSN: 2322-0015
RESEARCH ARTICLE **OPEN ACCESS**

Studies on phytoplankton diversity in river Wardha near, Ballarpur, Maharashtra, India.

Imran Mithani[1] and Dahegaonkar NR[2]

[1]Deptt. of Zoology, Dr. Ambedkar college of Arts, Commerce and Science Chandrapur, Maharashtra, India
[2]Deptt. of Zoology, Arts Commerce and Science College Tukum, Distt. Chandrapur. Maharashtra, India
Email**:** ***Imran.mithani@redifmail.com***

Manuscript Details
Available online on http://www.irjse.in
ISSN: 2322-0015

Cite this article as:
Imran Mithani[1] and Dahegaonkar NR. Studies on phytoplankton diversity in river Wardha near, Ballarpur, Maharashtra, India., *Int. Res. Journal of Science & Engineering,* February, 2020, Special Issue A7 : 467--470.

ABSTRACT

phytoplankton being the main producers in an aquatic ecosystem, not only provide an estimation of standing crop but also represent the biological index of the environmental conditions in the vicinity. The quantitative analysis of phytoplankton helps in understanding the basis of primary productivity of fresh water ecosystem. A year round investigation during October - 2009 to September - 2010 has been made on the river Wardha near Ballarpur town in order to characterize the phytoplanktonic status of it. In the present investigation, phytoplankton were represented by 51 species, which include Cynophyceae (13), Euglenophyceae (2), Bacillariophyceae (13) and Chlorophyceae (23).

Keywords: Phytoplankton, chlorophyceae, river Wardha, Ballarpur.

INTRODUCTION

The plankton are sensitive to environmental changes and their spatial and temporal distribution is governed by a number of environmental factors. Phytoplankton are the planktonic plants involved in photosynthesis and are grazed upon by other aquatic organisms. Their density, species diversity, and succession have been largely influenced by a number of abiotic factors, like morphology of water body, sewage discharge and anthropogenic activities.

The maintenance of proper community structure and functioning of phytoplankton assemblage in lotic ecosystems faces threats of human encroachments and climate change. Many workers across the country. [1-5] made relevant studies on various aspects of phytoplankton. Ballarpur town, a Tehasil place, situated on the bank of River Wardha, The industrialization, urbanization and related anthropogenic activities have resulted in increased waste discharge in the nearby rivers. By considering ecological, economical and recreational promise for river, the present work, studies on phytoplankton diversity in river Wardha near Ballarpur was undertaken.

METHODOLOGY

Samples for qualitative analysis of plankton were collected from the river from for sampling stations. The four sampling stations were selected along the downstream stretches of river near Ballarpur town. The sampling stations selected as S1 (Filtration Plant Site), S2 (Fort Site), S3 (Bridge Site) and S4 (Temple Site). The samples were collected in the morning hours between 8.30 to 10.30 am. 50 liter of water sample was filtered through the plankton net made of bolting silk number 25 with mesh size 50µ. The collected samples were allowed to settle down by adding Lugol's iodine. Sample was concentrated up to 50 ml depending on the number of plankton and preserved in 5% formalin. Individual phytoplankters were observed and identified using pertinent literature (Saxena, APHA, and IAAB [6-8].

RESULTS AND DISCUSSION

In the present investigation, the phytoplankton were represented by 51 species, which include Cynophyceae (13), Euglenophyceae (2), Bacillariophyceae (13) and Chlorophyceae (23) (Table 1). Kumar et al.,[9] reported 48 species of phytoplankton, among which 21 specie sof chlorophyceae, 13 species of Bacillariophyceae, 11 species of cyanophyceae and 3 species of euglenophyceae. Perumalasamy and Thangamani (2004)[10] recorded 43 species of phytoplankton, of these 11 species belonging to Bacillariophyceae, 18 species to Chlorophyceae, 11 to Cyanophyceae and 3 species to Charophyceae. Negi et al. [5] reported 53 genera belonging to 5 classes with dominance of green algae, chlorophyceae (26), followed by Bacillariophyceae (12) Cyanophyceae (10) euglenophyceae (4) and Xanthophyceae (1).

Cyanophyceae is one of the most abundant and significant algal group among phytoplankton. The Cyanophyceae or blue green algae exists either as a unicellular individual or as chain or filaments called as trichon. The Cyanophyceae are generally found on rocks or soil forming a blackish crust when dry. The freshwater blue greens occuring in clean or polluted water body generally exhibits a characteristic cyclic growth.

In the present investigation Cyanophyceae comprises mainly the species of *Anabaena, Anacystis, Nostoc, Oscillatoria, Scytonema, Spirulina* etc.

Euglenophyceae are commonly found in small water bodies having rich organic matter. demonstrated that Euglenophyceae are the key species of biological indicator of organic pollution.

In the present investigation, Euglenophyceae was mainly represented by Euglena and Phacus species only. Rai [11] also recorded only two species i.e. euglena and phacus from river Ganges at Waranasi and found that the polluted water of Rajghat sustain the growth of these forms. A relatively high prevalence of euglenophyceae from originally polluted habitant has also been reported by Munawar [12]. Venkateshwarlu *et al.,* [13] reported euglenoid blooms in sewage infested polluted water. In the present investigation less appearance of euglenophyceae may be due to less pollutant load in the river

Bacillariophyceae or diatoms are wide spread and occur in abundance. Basically they are autotrophs but can also utilize organic substance as nutrients. The water quality in terms of levels of organic matter, dissolved oxygen, pH and physical factors play an important role in the ecological distribution of Bacillariophyceae (Sabata and Nair, [14].
In the present investigation, Bacillariophyceae was represented by *Cyclotella spp., Cymbella spp., Diatoms*

spp., Fragilaria spp., Gomphonema spp., Gyrosigma spp., Navicula spp., Nitzschia spp., etc. The abundance of *Diatoma spp* and *Naviculla spp*, in Bacillariophyceae as indicators of contamination recorded by Naz *et al.*,[15] in river Padma in Bangladesh.

Lowe and Gale [16] opined that diatoms are the most important colonizers of rivers in their species composition, depending upon temperature, current pattern, substrate type and water quality.

Chlorophyceae was the most dominant group among all the phytoplankton. It was represented by *Ankilodesmus spp., Chara spp., Chlorella spp., Cladophora spp., Colostrums spp., Cosmarium spp., Hydrodictyon spp., Nitella spp., Oedogonium spp., Pediastrum Tetras, Scendesmus spp., Spirogyra spp., Ulothrix spp., Volvox spp., Vorticella spp.* and *Zygnema spp.* The abundance of species *chlorella, zygnema, spirogyra, ulothrix* in chlorophyceae recorded by Waghmare and Kulkarni [17] in Lendi river district Nanded maharasthra.

The dominance of Chlorophyceae was also recorded by Dahegaonkar [18] in river Erai near Chandrapur and Arvindkumar and Singh [19] with high fluctuation at different sites in river Mayurakshi. Somashekhar [20] reported the dominance of Chlorophyceae at unpolluted stations of river Cauvery and Kapila while the dominance of Cyanophyceae at polluted stations.

Table 1. Phytoplankton diversity in River Wardha near Ballarpur

Cyanophyceae	**Euglenophyceae**	**Bacillariophyceae**	**Chlorophyceae**
Agmenellum spp.	*Euglena spp.*	*Anomoeoneis spp.*	*Ankistrodesmus spp.*
Anabaena spp.	*Phacus spp.*	*Cocconeis spp.*	*Chara spp.*
Anacystis spp.		*Cyclotella spp.*	*Chlamydomonas spp.*
Aphenocapsa spp.		*Cymbella spp.*	*Chlorella spp.*
Gleocapsa spp.		*Diatoma spp.*	*Chlorococcum spp.*
Gleotrichia spp.		*Fragilaria spp.*	*Cladophora spp.*
Lyngbya spp.		*Fructulies spp.*	*Coelastrum spp.*
Microcystis spp.		*Gomphonema spp.*	*Cosmarium spp.*
Nostoc spp.		*Gyrosigma spp.*	*Cylindrospermum spp.*
Oscillatoria spp.		*Navicula spp.*	*Gloeocystis gigas*
Phormadium spp.		*Nitzchia spp.*	*Goniochloris spp.*
Scytonema spp.		*Pinnularia spp.*	*Hydrodictyon spp.*
Spirulina spp.		*Synedra spp.*	*Micrasterias spp.*
			Netrium spp.
			Nitella spp.
			Oedogonium spp.
			Pediastrum tetras
			Scenedesmus spp.
			Spirogyra spp.
			Ulothrix spp.
			Volvox spp.
			Vorticella spp.
			Zygnema spp.

Conflicts of interest: The authors stated that no conflicts of interest.

REFERENCES

1. Venkateshwarlu, V. (1969): An ecological study of the algae of the river Moosi Hyderabad (India) with special reference to water pollution., I physico-chemical complexes, Hydrobiologia. 22 (1): 117-143.
2. Sreenivasan, A.; Sampath, V.; Ananthanarayan, R. and Paramasivam, M. (1979). Limnological survey of Cauvery river system with particular reference to pollution indicators (1976-1979). *MAB Project, Final report, Dte. Fish. Tamilnadu, Madras. Memio.*:371.
3. Bhowmick, B. N. and Singh A. K. (1985): Phytoplankton population in relation to physico-chemical factors of river Ganga at Patna, Record 11 of 37, Life science 1986-1989, Ecology Abstract, Accession No. 1572137.
4. Biswas, B.K. and Komar, S.K. (2001): Influence of hazardous industrial wastes on planktons in the river Damodar at Durgapur in West Bengal, *Pollut. Res.* 20(IV): 583-588.
5. Nagi R.K, Joshi P.C. and Negi Tarana (2012): seasonal variation and species composition of phytoplankton in Ganga river and its tributary at Garhwal region, Uttarakhand, India. International Journal of Zoology and Reasearch (IJZR) 2:19-30.
6. Saxena, M.M. (1987): Environmental analysis, water, soil and air., *Agro Botanical Publishers, India.,*: 1- 176.
7. APHA (1992): Standard Methods of the examination of water and waste water. *APHA (American Public Health Association), Washington DC.*
8. IAAB Pub. No. 2 (1998): Methodology for water analysis, Hyderabad (A. P.).
9. Kumar Rita N., Solanki Rajal and Kumar Nirmal J. (2012): Spatial variation in phytoplankton diversity in the Sabarmati river at Ahmadabad, Gujarat India. *Annuals of Environmental science*. 6: 13-28.
10. Perumalsamy, K. and Thangamani, A. (2004): Species diversity in indices of phytoplankton richness and evenness and pollution indicators in Perennial ponds in Tamil Nadu. *J. Aqu. Biol.* 19(2): 23-27.
11. Rai, L.C. (1978): Ecological studies of algal communities of Ganga river at Varanashi., *Indian J. Ecol.*, 5: 1-6.
12. Munawar, M. (1972): Ecological studies of euglenaceae in certain polluted and unpolluted environments. *Hydrobiologia,* 39: 307-320.
13. Venkateshwarulu, V. (1981): Taxonomy and ecology of algae in the river Moosi. Hyderabad -11 Bacillariophyseae. *Novahedwigia.*
14. Sabata, B.C. and Nayar, M.P. (1987): Water pollution studies in river Hoogly with relation to phytoplankton. Jan. 16-18th, *Proc. Con. Env. Impact on Biosystem*: 1-5.
15. Naz, Sabrina., Azam S.M.G.G. and Diba N.J. (2014) Diversity and abundance of the algal flora of River Padma. *Plant Environ. Dev*. 3(1): 6-14.
16. Lowe, R.L. and Gale W.F. (1980): Monitoring river periphyton with artificial benthic substrate., *Hydrobiologia*, 69: 235-244.
17. Waghmare B.D. and Kulkarni A.N. (2015): An Assessment of phytoplankton population and seasonal variation in Lendi river, District Nanded, Maharashtra, India. International *Jounal of Science and Research (IJSR)* 4(12): 936-940.
18. Dahegaonkar, N.R.; Telkhade, P.M.; Dhamani, A.A. and. Bhandarkar. W.R. (2010): Preliminary study on seasonal variation phytoplankton in river Erai near Chandrapur, Maharashtra. *India J. Hislapia.,* 3(I): 41-46
19. Arvind, Kumar and Singh A. K. (2002) : Ecology, Conservation and Management of the River Mayurakshi in Santhal Pargana (Jharkhand State) with special reference to effect of sewage pollution on abiotic and biotic potentials., Ecology and Conservation of Lakes, Reservoirs and Rivers., ABD publishers, Rajasthan, India.1- 43.
20. Somashekar, R.K. (1988): On the possible Utilization of Diatoms as Indicators of Water Quality - A Study of River Cauvery., *Ecology and Pollution of Indian rivers, (Ed. Trivedy R. K.), Ashish Publishing House, New Delhi.*: 375-382.