



ALGAL FLORA OF YAMUNA RIVER IN ALLAHABAD

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ABSTRACT

Seasonal variation was observed in the analyzed parameter at five different locations of the river Yamuna from the entry point in Kydganj Ghat to the exit point under the Naini Bridge. The results obtained in February and March shows diversity of phytoplankton at Allahabad sites. The abundance of Phytoplanktons was found in March is greater than in February. *Chlorella* was absent at Kydganj Ghat and Naini bridge sites in the month of March. While observed in the month of April *Spirogyra* was found in all the sites. The population of the genus *Hydrodictyon* was very common throughout. A single moderate peak, however, occurred during April. Genus *Hydrodictyon* was present in month of April at almost all the sampling sites. The variations in these phytoplanktonic communities indicate the natural management of primary production throughout the year. Most of the Chlorophycean members forming prominent peak in the month of March and April. Genus *Hydrodictyon* and *Cladophora* were found throughout the period at all sampling sites. *Diatoms* and *Mougeotia* was found dominant at all the sites whereas *Zygnema* and *Oedogonium* were less common. Higher population of *Hydrodictyon* species was observed during the period of March at all sites, during which the water level declined gradually from February to March.

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INTRODUCTION

River Yamuna, which flows in Allahabad region in India, is an importance wetland ecosystem of national and mythological significance. It is originated from Yamunotri Glacier situated at lower Himalayas in Utrakhand state and flow through the Allahabad region. The algal diversity from the lake is apparently well studied but similar studies of algal diversity in river are not extensively done. The temperature diversity and river and their alga are much more studied than Tropical river (Raja *et al.*, 1994, Yolanda 2002). Chakabarty *et al.*, (1959) studied the psychophysical and Physiochemical conditions of the river Yamuna at Allahabad. Algal biodiversity in river Yamuna in Agra and Allahabad was done but no work has been recorded on the seasonal diversity of algae in Allahabad region. This study is a pioneer in the seasonal physiological investigation of the river.

The phytoplankton group observed in this study is Chlorophyceae, Bacillariophyceae, Cyanophyceae and Xanthophyceae. The aim of this study was to evaluate the seasonal diversity and heterogeneity of algae at different location of the river because of the rapidly increasing sewage and industrial effluent on the aquatic ecosystem of the river Yamuna.

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MATERIAL AND METHODS

Five different collection sites in river Yamuna were selected for the study

1st site was at Gaughat

2nd site was at Kydganj Ghat

3rd site was at Kila Ghat

4th site was at Saraswati Ghat

5th site was at Nanibridge Ghat

Fifteen water Samples were collected during the month of February to April in the year 2018 from five different selected sites of river Yamuna covering the distance of more than 3 km from Kydganj to Gaughat in Allahabad. The water sample filtered through two layered muslin cloth to remove large particle and debris (Stockner *et al.*, 1990) and proceeded for microscopic studies. Studies were prepared from the filtered water sample and observed under microscope using Nikon Labaphat-2 Microscope and Nikon- 35 camera from freshly prepared slides using 12 megapixel camera attached to it. Simultaneously picture of the algal species observed under the microscope were identified with the help of standard book and monographs (Fritsch 1935, 1945, Desikachary 1959)

RESULT AND DISCUSSION

In the 15 selected sample of phytoplankton and periphyton from the five different sites of river Yamuna 11 genera were identified which composed 6 Genera of Chlorophyceae, one

genera and 2 species of Bacillariophyceae, one genera of Xanthophyceae and two genera of Cyanophyceae.

Table I List of Algal forms that were identified from water sample of Yamuna river

S.No.	Algal forms	Class
1.	<i>Hydrodictyon</i>	Chlorophyceae
2	<i>Spiragrya</i>	Chlorophyceae
3.	<i>Zygnema</i>	Chlorophyceae
4.	<i>Cladophora</i>	Chlorophyceae
5.	<i>Oedogonium</i>	Chlorophyceae
6.	<i>Mougeotia</i>	Chlorophyceae
7.	(a) <i>Navicula</i> (b) <i>Pinnularia</i>	Bacillariophyceae
8.	<i>Vaucheria</i>	Xanthophyceae
9.	<i>Scenedesmes</i>	Cyanophyceae
10	<i>Nostoc</i>	Cyanophyceae

Table II Frequency of different algal forms in different ghat of Yamuna River

S. no.	Name of Algae	Ghat 1.	Ghat 2.	Ghat 3.	Ghat 4.	Ghat 5.
1	<i>Hydrodictyon</i>	++	++	++	+	++
2	<i>Spirogyra</i>	++	+	+	++	+
3	<i>Zygnema</i>	-	-	-	-	+
4	<i>Cladophora</i>	-	+	++	-	+
5	<i>Oedogonium</i>	-	-	-	+	-
6	<i>Mougetia</i>	++	++	+	++	++
7	<i>Diatoms</i>	+++	++	++	++	++
8	<i>Vaucheria</i>	+	+	-	+	-
9	<i>Scenedesmes</i>	+	-	+	-	-
10	<i>Nostoc</i>	-	-	+	-	-

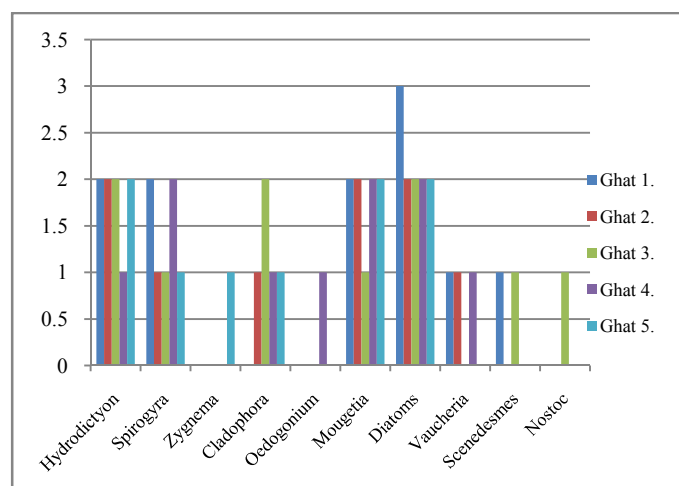


Fig 1 Frequency of different algal forms in different ghat of Yamuna River.

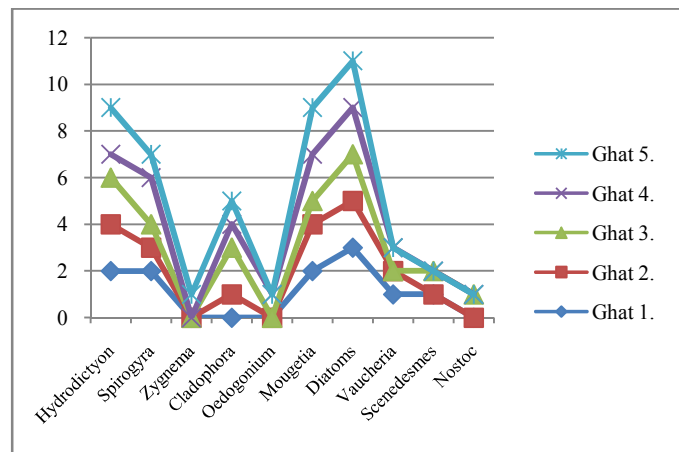


Fig 2 Frequency of different algal forms in different ghat of Yamuna River

Previously, Tare *et al.*, (2003) studied algal diversity near Kannauj Kanpur stretch of river Ganga. Jafari *et al.*, 2006 observed 18 species belonging to Chlorophyceae 2 species of Bacillariophyceae 6 genera of Cyanophyceae and 3 genera belonging to Eugleneaceae from river Matha Pune. Solanki and Shukla (2016) collected and identified 30 algal taxa from river Narmada. Algal biodiversity in River Yamuna was done but no work has been recorded on the seasonal diversity of algae in Allahabad region. In the present study the highest no. of species was recorded in March with as compared to April.

This show that the seasonal diversity of algal species varies with The members of Chlorophyceae were dominated at site 1 and site 2 where at least at the site 4 and five. *Diatom* are dominated at the site 2 followed by site one. Algae in the Yamuna river inhabitant all the aquatic habitat of the water column and are most dominated in the illuminated surface zone. During the present study fresh water algal biodiversity of river Yamuna in different surface was recorded and it was observed that the number of algal species was highest in summer.

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References

1. Chakrabarty, R.D., Roy, P. and Singh, S.B. (1959). A quantitative study of the plankton and the physico-chemical conditions of the River Jumna at Allahabad in 1954-55. *Indian J. Fish.*, 6(1): 186- 203.
2. Desikachary, T.V. (1959). *Cyanophyta-ICAR Monograph on Algae*. Indian Council of Agricultural Research (ICAR), Pusa, New Delhi, 686 pp.
3. Fritsch, F.E. (1935). *The Structure and Reproduction of the Algae*. Vol. I. Cambridge Univ. Press. Cambridge, London, pp. 791.
4. Fritsch, F.E. (1945). *The Structure and Reproduction of the Algae*. Vol. II. Cambridge Univ. Press. Cambridge, London, pp. 939. Guiry, M.D. 2010. *Algaebase*. World-Wide Electronic Publication. National University of Ireland, Galway (1996-2010). [http:// www.algaebase.org/1996-2010](http://www.algaebase.org/1996-2010).
5. Jafari, N.G. and Gunale, V.R. (2006). Hydrobiological study of algae of an urban freshwater river. *J. Appl. Sci. Environ. Mgt.*, 10(2): 153- 158. Mahadik, B.B. and Jadhav, M.J. 2014. A preliminary study on algal biodiversity of Ujani reservoir (MS) India. *Bioscience Discovery*, 5(1):123-125.
6. Raja, C., Cobelas, M.A. and Arauzo, M. (1994). An elementary, structural analysis of river phytoplankton. *Hydrobiologia*, 289: 43-55.
7. Stockner, J.G., Klut, M.E. and Cochran, W.P. (1990). Leaky filters a warning to aquatic ecologists. *Can. J. Fish. Aquat. Sci.*, 47: 16-23.
8. Tare, V., Yadav, A.V.S. and Bosec, P. (2003). Analysis of photosynthetic activity in the most polluted stretch of river Ganga. *Water Res.*, 37: 67-77.
9. Yolanda, Z.D.(2002). Structure and variation of the Paraguay River phytoplankton in two periods of its hydrological cycle.