

The study of Eco-environmental Impact on Hydrobiological Algal forms of Nirguda River

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ABSTRACT

The eco-environmental factor has profound effects on the flora and fauna including fresh water and marine water aquatic algal forms. The present environmental and ecological profile is under the threat of different kind of pollution such as water, soil and air pollution. The present investigation is undertaken to evaluate and analyse the impact of ecological and environmental factors on the aquatic algal forms with respect to the Chlorophycean algal forms in the Nirguda river at Wani in Yavatmal district of Maharashtra. The 23 algal forms have been observed and analysed during the span of present study. The effect of physico-chemical parameter and ecological, environmental factors have been evaluated and found that the Chlorophycean forms grow fairly well.

Keywords:- Eco-environmental factor, Chlorophyceae, Hydrobiology, Algal forms, Nirguda.

Introduction

Wani is one of the taluka places in Vidarbha region of Maharashtra State and located at the height of 755' above sea level on eastern bank of Nirguda river on 78°-87'-30" east longitude and 20°-3'-45" north latitude under tropical region with maximum temperature around 45.5°C and minimum temperature around 8.9°C during the span of present study. The very few papers are appeared with respect to the algal flora from this region. After the span of many years, the present study of algal flora has been under taken with respect to Chlorophycean algal members. The present study has been pointed towards the influence of ecological, environmental factors and physic-chemical parameters on the growth of the Chlorophycean algal forms in the Nirguda river.

Material and Method

The 4-5 spots were selected for monthly algal collections throughout span of the present study. The algal collection was brought in the laboratory and preserved in 4% formalin in the separate bottles. The materials was subjected to the preparation of temporary slides mounted with glycerin for the observation under microscope. The camera lucida diagrams were drawn for identification while water collected in the separate 1000 ml bottles for physic-chemical characters and measured following standard method (A.P.H.A., 1971; Kodarkar, 1992) and depicted in the table 1.

Systematic Enumeration of algal forms from Nirguda river

Division-Chlorophyta

Class- Chlorophyceae

Order- Volvocales

Family- Chlamydomonaceae

Genus- *Chlamydomonas* Ehr.

- 1) *Chlamydomonas ehrenbergii* Gorosh

Order – Chlorococcales

Family- Oocystaceae

Genus- *Chlorella* Beyerinck

- 1) *Chlorella pyrenoidosa* Chick

Family- Dictyosphaeraceae

Genus- *Selenastrum* Reinsch

- 1) *Selenastrum minutum* (Naeg) Collins

Family- Scenedesmaceae

Genus- *Scenedesmus* Meyen

- 1) *Scenedesmus bijugatus* var. *bicellularis* (Chodat) com. nov. Philipose
- 2) *Scenedesmus quadricauda* var. *quadrispina* (Chodat) G. M. Smith
- 3) *Scenedesmus monomorphosus* Chadha et. Pandey

Order- Ulotrichales

Family-Ulotrichaceae

Genus- *Ulothrix* Kuetz

- 1) *Ulothrix tenuissima* Kuetz
- 2) *Ulothrix aequalis* Kuetz

Order-Chladophorales

Family-Chladophoraceae

Genus- *Chladophora* Kutz

- 1) *Chladophora glomerata* (L) Kutz

Genus- *Stigeoclonium* Kutz

- 1) *Stigeoclonium lubricum* (Dilwyn) Kutz

Genus- *Coleochaete* Brebisson

- 1) *Coleochaete scutata* Breb.

Order- Oedogoniales

Family- Oedogoniaceae

Genus- *Oedogonium* Link

- 1) *Oedogonium globosum* Nordst
- 2) *Oedogonium rugulosum* Nordstedt ex. Hirn

Order- Conjugales

Family- Zygnemaceae

Genus- *Spirogyra* Link.

- 1) *Spirogyra hyaline* Cleve

Family- Desmidaceae

Genus- *Cosmarium* Corda

- 1) *Cosmarium subtumidum* Nordst
- 2) *Cosmarium subtumidum* var. *Klebesii* Gutw
- 3) *Cosmarium tenuis* Arch.
- 4) *Cosmarium leave* Rabenhorst
- 5) *Cosmarium pseudogranatum* Nordst
- 6) *Cosmarium pseudoprotuberans* Kirchn var. *australis* Playfair
- 7) *Cosmarium norvegicum* Stroem
- 8) *Cosmarium portianum* Arch.
- 9) *Cosmarium subcrenatum* Hantzsch.

Result and Discussion

The environmental factor such as temperature nutrient present in the water determine the algal flora (Ganpati, 1960) the abundant chlorophycean flora has been reported during the summer season (Whiteford and Schumacher, 1963). The temperature has considerable effect on algal growth (Moor, 1977; Nazneen, 1980). The presence of algal flora depend on the nutrient present in aquatic habitat (Ferguson and Harper, 1982). Verma and Shukla (1970) reported high growth of phytoplankton to high value of chloride. Hickman(1979) correlated Chlorophyceae with high value of temperature. The result obtained in the present study revealed that the growth of Chlorophycean algal forms was influenced by moderate temperature, high value of chloride and high pH. Desmids were observed more during the March to July when temperature was high as has been reported by Rao (1975) and Venkateswarlu (1983). The *Cosmarium* has been reported more tolerant to varying chemical condition (Woelkerling and Gouch, 1976). The low concentration of nitrate influenced the growth of desmids (Hosmani and Bharati, 1980). The fairly good growth of algal forms was favoured by the turbidity. The similar observation has been reported about the growth of algal forms (Kamble and Tayde, 2002; Barhate and Kamble, 2007). The observation of present study revealed the conformity with the previous observation.

References

- [1] A. P. H. A. (1971), Standard methods for the examination of water and waste water (13th Edn.) Amer. Pub. Health Assoc., New York.
- [2] Barhate, V. P. and Kamble, G. C. (2007), The study of environmental effects on the aquatic Cyanophycean forms of Nirguda River, Urban Planning and Environment Strategies and Challenges(Ed. L.Vyas), Macmillan India Ltd., pp 300-302.
- [3] Ferguson, A. J. D. and Harper, D. M. (1982), Rutland water phytoplankton, the development of an asset or a nuisance, *Hydrobiologia*, 88, pp 117-133.
- [4] Ganpati, S. V. (1960), Ecology of tropical water, *Proc. Sm. Algology*, ICAR, New Delhi, pp 204-218.
- [5] Hickman, M. (1979), Seasonal succession standing crop and determinant of primary productivity of the phytoplankton of Ministic lake, Alberta, Canada, *Hydrobiologia*, 64 (2), pp 105-121.
- [6] Hosmani, S.P. and Bharati, S.G. (1980), Limnological studies in ponds and lakes of Dharwar Comparative phytoplankton ecology of our water bodies, *Phykos*, 19 (1), pp 27-43.
- [7] Kamble, G. C. and Tayde, D.T. (2001), Studies of some physicochemical parameters and hydrobiological algal pollutants of water sources in Revasa, *Oriental Journal of Chemistry*, 17(3), pp 493-496.
- [8] Kodarkar, M. S. (1992), Methodology of water analysis, Indian Association of aquatic Biologists Publication No. 2, pp 1-50.
- [9] Moor, J.W. (1977), Seasonal succession of algae in eutropic stream in Southern England, *Hydrobiologia*, 53 (2), pp 181-192.
- [10] Nazneen, S. (1980), Influence of hydrobiological factors on the seasonal abundance of phytoplankton in Kinjhar lake, Pakistan, *Int. Rev. Ges. Hydrobiologia* 65 (2), 269-282.
- [11] Rao, V. S. (1975), An ecological study of three fresh water ponds of Hyderabad, India III, The Phytoplankton (Volvocales, Chlorocpccales and Desmids).
- [12] Venkateswarlu, V. (1983), Ecology of Desmids I *Staturastrum tetracerum* Ralf., *Indian J. Botany*, 6(1), pp 68-73.
- [13] Verma, S. R. and Shukla, G.R. (1970), The physic-chemical condition of 'Kamla Nehru Tank' Muzaffernagar, U. P. in relation to biological productivity, *Environmental Health*, 12, pp 110-128.

- [14] Whiteford, L. A. and Schumacher, G. J. (1963), Communities of algae in North Carolina streams and their seasonal relation, *Hydrobiologia*, 22(1 and 2), pp 133-196.
- [15] Woelkerling, W. J. and Gouch, S.B. (1976), Winsconsin desmids III Desmids community composition and distribution in relation to lake type and water chemistry, *Hydrobiologia*, 51 (1), pp 3-32.

Table 1: The Environmental factors and Physico-chemical parameters

Sr. No.	Months	pH	Nitrate in ppm	Total Hardness in ppm	Chloride in ppm	Turbidity in ppm	Rainfall in mm	Temperature	
								Maximum	Minimum
1	January	7.5	0.33	192	19	1.9	11	33.5	9.0
2	February	7.4	0.33	188	18	1.9	4	35.3	12.5
3	March	7.5	0.34	192	18	1.8	9	39.1	13.1
4	April	7.7	0.22	199	20	1.6	60	43.8	20.2
5	May	7.4	0.34	189	19	1.9	4	45.5	21.5
6	June	8.2	0.35	212	25	1.0	425	44.6	22.1
7	July	8.3	0.42	217	27	0.9	456	36.9	22.1
8	August	8.0	0.36	209	22	1.3	262	36.4	22.1
9	September	7.9	0.30	204	20	1.6	191	36.4	22.2
10	October	7.8	0.22	201	21	1.8	121	36.3	15.5
11	November	7.7	0.33	200	19	1.8	55	36.3	13.8
12	December	7.5	0.32	198	18	1.9	7	32.1	8.9