

“THE STUDY OF SOME PHYSICO-CHEMICAL FACTORS AND EFFECT ON CHLOROPHYCEAN ALGAL FORMS”.

Girish C. Kamble

Department of Botany, SRRL Science College, Morshi, Dist-Amravati, Maharashtra, India- 444905

ABSTRACT

The environmental and physicochemical factors are significant aspect with respect to occurrence of the Chlorophycean algal members in the fresh water aquatic habitat. The fresh water stream is situated nearly 12 km away from Babhulgaon taluka of Yavatmal district in Maharashtra. The hydrobiological study has been carried out during the period of July to December 2017. A total 13 algal forms belonging to Chlorophyceae were observed in present study. The physicochemical parameters and environmental factors were observed. The relation between physico-chemical parameter, environmental factors and aquatic Chlorophycean algal flora has been evaluated qualitatively.

Keyword : - Environmental factor, Physico-chemical factor, Chlorophycean algae, Hydrobiology.

1. INTRODUCTION

Babhulgaon is one of the taluka place in Yavatmal district of Maharashtra. It is situated at 78.1664' East longitude and 20.5561 North latitude with maximum temperature around 41.50 C and minimum temperature around 160 C during the present study. The physicochemical factors and environmental factors are significantly important as the collective effect act upon the aquatic flora with respect to algal vegetation. The phytoplanktons are sensitive to these environmental factors and physicochemical parameters which, in turn, lead to change in the algal flora in a habitat (Thirugnanamoorthy and Selvaraju, 2009). The phytoplanktons play important role in the aquatic ecosystems and there is correlation between phytoplanktonic flora and aquatic environ (Dutta et al., 1954). The physico-chemical and environmental factors collectively influence the aquatic algal flora. The present work has been carried out relative to eco-environmental factors and algal flora in the aquatic habitat of the fresh water streams just 12 km away from the Babhulgaon. The agricultural fields are aligned along the both side of the stream.

2. MATERIAL AND METHOD

Monthly samplings were assessed during the period of present study. Water sample and algal material were collected in every month from 3-4 spot of the stream. The algal collections were preserved in 4% formalin and brought to the laboratory for temporary slide preparation and microscopic observation. The temporary slides of the algal collection mounted with glycerine were prepared and observed under microscope for the identification of the algal forms (Forest, 1954; Philipose, 1967; Chadha and Pandey, 1977; Ramnathan, 1964; Tiffany, 1930; Randhawa, 1959; Prasad and Mehrotra, 1977; Prescott, 1966; Saxena and Venkateshwarlu, 1968; Bruhl and Biswas, 1926; Migula, 1907). The physico-chemical and environmental factors such as pH, nitrate, hardness, turbidity, temperature of the water sample were analysed and depicted in the Table 1 and Table. 2 (APHA, 1971; Kodarkar, 1992).

2.1 Systematic Enumeration of Chlorophycean Algal Forms

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- Scenedesmaceae

Genus- *Scenedesmus* Meyen

- 1) *Scenedesmus bijugatus* var. *bicellularis* (Chodat) com. nov. Philipose
- 2) *Scenedesmus monomorphosus* Chadha et. Pandey

Order- Ulotrichales

Family-Ulotrichaceae

Genus- *Ulothrix* Kuetz

- 1) *Ulothrix aequalis* Kuetz

Order- Oedogoniales

Family- Oedogoniaceae

Genus- *Oedogonium* Link

- 1) *Oedogonium globosum* Nordst

Order- Conjugales

Family- Zygnemaceae

Genus- *Spirogyra* Link.

- 1) *Spirogyra hyaline* Cleve

Family- Desmidiaceae

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 norvegicum* Stroem

3. RESULT AND DISCUSSION

The 13 Chlorophycean algal forms were observed in the present investigation. Chlorophyceae was represented by *Cosmarium*, *Scenedesmus*, *Oedogonium*, *Ulothrix*, *Spirogyra*, *Chlorella*, *Chlamydomonas*. The alkaline water and high pH has been reported as the favourable factor for abundance growth of chlorophycean forms (Gahotri et al., 1980; Thirugnanamoorthy and Selvaraju, 2009). The present study represented the conformity with this observation. The environmental factor have a profound effect upon the determination of algal forms in water body (Ganpati, 1960). The abundance in Chlorophycean flora has been reported in summer season (Whiteford and Schumcher, 1963).

The temperature plays a very important impact on algal growth (Nazneen, 1980). The high nutrient content in aquatic habitat cause a favourable effect with respect to the presence of phytoplanktons (Ferguson and Harper, 1982). The more chloride content is also favourable component towards more growth of algal forms (Verma and Shukla, 1979; Kamble, 2015).

The present study revealed that the moderate range of temperature, high chloride content, and high pH and alkalinity favoured the luxuriant growth of algal flora and phytoplankton. (Kamble 2015). The high temperature is a favourable factor for the more desmid population in the aquatic habitat (Venkateswarlu, 1983). The turbidity has been reported to have a considerable effect on algal growth (Barhate and Kamble, 2007). The present study revealed the agreement with previous study. The pH ranged between 5-8.5 has been reported as favourable for algal growth (Umavathi et al., 2007). The similar observation has been observed in the present study.

4. CONCLUSIONS

The physicochemical parameters such as high pH, nitrate, chloride, turbidity, hardness are associated with the luxuriant growth of chlorophycean algal form. The more nutrient concentration in aquatic habitat favoured luxuriant growth of algal flora in present study. The genus *Cosmarium*, *Scenedesmus*, and *Spirogyra* are abundantly present in the water body. The environmental factor revealed also the favourable effect on the luxuriant growth of the chlorophycean members.

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Table 1. Physicochemical Parameter (in ppm).

Physicochemical Parameter	July	August	September	October	November	December
Ph	7.3	7.8	7.8	8.1	8.3	8.5
Nitrate	0.38	0.43	0.42	0.43	0.37	0.37
Total hardness	218	221	206	200	198	197
Chloride	27	28	21	20	19	17
Turbidity	1.1	1.3	1.5	1.2	1.7	1.6

Table 2. Rainfall and temperature

Sr. No	Month	Rainfall (in mm)	Temperature(in °C)	
			Maximum	Minimum
1	July	458	41.5	22.5
2	August	392	37.5	21.2
3	September	361	36.4	20.2
4	October	182	35.2	20.2
5	November	103	30.3	19.7
6	December	15	30.1	15.2



Plate1. Sample Collection Spot A



Plate 2. Sample Collection Spot B

