



ECOLOGICAL SURVEY ON CHAETOPHORALES OF TWO PONDS AT GORAKHPUR (U.P.), INDIA

S. P. M. Tripathi, J. P. Tiwari and G. L. Tiwari¹

Department of Botany M. L. K. P.G. College, Balrampur - 271 201 (Uttar Pradesh), India.

¹Department of Botany, Allahabad Central University, Allahabad (Uttar Pradesh), India.

Abstract

Physico chemical studies of two fresh water ponds at Gorakhpur showed that Chaetophorales were almost absent in polluted water. *Stigeoclonium nanum* flourished well only in polluted water and appeared as biological indicator of water pollution. *Stigeoclonium farctum* and *Pseudolvella americana* var. *indica* were found in both polluted and less polluted ponds indicating that they were pollution tolerant. Their number declined in the polluted pond.

Key words : Fresh water ponds, Chaetophorales, polluted water, Stigeoclonium.

Introduction

Studies on the ecology of Chaetophorales inhabiting Indian subcontinent in aquatic environment are scanty. (Lund, 1965; Singh *et al.*, 1970; Kumar *et al.*, 1974; Rai and Kumar, 1979; Kamat, 1981; Ramaswamy and Somasekahar, 1982; Prasad and Singh, 1983; Trivedy *et al.*, 1984 and Sahai *et al.*, 1985). An attempt was made to study the ecology of all the members of Chaetophorales besides their morphology and taxonomy and some of these observation are reported in the present study.

Materials and Methods

Occurrence of Chaetophorales members in two fresh water ponds of Gorakhpur is studied. One pond is more polluted than other pond with reference to their ecology. The ponds differ widely in their water chemistry, because they attain different types of effluents pond one received rain water, sewage canal water and run off from agricultural fields. Pond second received rain water, domestic effluent and discharge from small industries.

Water and algal samples were collected at monthly intervals from ponds. Water sample were kept in sterilised plastic containers and B.O.D. bottles. Chara, Hydrilla, Ceratophyllum and grasses were picked for collection of Chaetophorales. Water was analysed for pH, total alkalinity, alkalinity to phenolphthalein, dissolved oxygen,

total organic matter, calcium, magnesium, chlorides, total hardness, carbonates, free and saline ammonia. Identification was done mainly according to Nurul Islam (1963), APHA (1964), Printz (1964), Tupa (1974), Cox and Bold (1974).

Results and Discussion

22 taxa of Chaetophorales belonging to 8 genera were collected during the present study (table 1). These were Chaetophora, Stigeoclonium, Aphanochaete, Chaetosphaeridium, Epibolium, Leptosiroopsis, Pseudolvella and Coleochaete. In pond 2, which was more polluted blue green algae Merismopedia and Microcystis were dominant. In this pond, 3 green algae *Stigeoclonium nanum*, *Stigeoclonium farctum* and *Pseudolvella americana* var. *indica* were able to grow during September to November. *Stigeoclonium nanum* was collected during May to June. Comparison of physico chemical values of ponds showed that in pond 2, calcium, magnesium, carbonates, chlorides, total alkalinity and total organic matter were significantly high, but dissolved oxygen was quite low (table 2).

The remarkable difference in the physico-chemical characters may be reason for reduced incidence of green algae Chaetophorales. In pond 2 out of 3 *Chaetophoralean* species, *Stigeoclonium nanum*

Table 1 : Comparison of Chaetophoralean population at Pond 1 & 2.

S. no.	Chaetophoralean taxa	Pond-1	Pond-2
1.	<i>Stigeoclonium farctum</i>	P	P
2.	<i>Stigeoclonium nanum</i>	A	P
3.	<i>Stigeoclonium nudiusculum</i>	P	A
4.	<i>Stigeoclonium</i> sp.	P	A
5.	<i>Chaetophora elegans</i>	P	A
6.	<i>Cheatophora pisiformis</i> var. <i>hamata</i>	P	A
7.	<i>Chaetophora attenuata</i>	P	A
8.	<i>Aphanochaete repens</i>	P	A
9.	<i>Aphanochaete magna</i>	P	A
10.	<i>Chaetophaeridium pringsheimii</i>	P	A
11.	<i>Epibolium polysporum</i>	P	A
12.	<i>Leptosiropsis torulosa</i>	P	A
13.	<i>Pseudovella americana</i> var. <i>indica</i>	P	P
14.	<i>Coleochaete pulvinata</i> var. <i>minor</i>	P	A
15.	<i>Coleochaete scutata</i> var. <i>minor</i>	P	A
16.	<i>Coleochaete soluta</i>	P	A
17.	<i>Coleochaete solute</i> var. <i>minor</i>	P	A
18.	<i>Coleochaete pseudosoluta</i>	P	A
19.	<i>Coleochaete nitellarum</i>	P	A
20.	<i>Coleochaete</i> sp.	P	A
21.	<i>Chaetopharales</i> sp.1	P	A
22.	<i>Chaetopharales</i> sp.2	P	A

P = Present, A = Absent.

appeared as new biological indicator of water pollution. *Stigeoclonium tenue* was reported as bio-indicator of water pollution (Palmer, 1963; Mclean, 1974; Mclean and Benson, 1974; Rai 1978). *Stigeoclonium nanum* possessed pseudoparanchymatous prostrate system in comparison to *Stigeoclonium tenue*. Chaetophorales in general do not inhabit polluted habited. Some of them like *Stigeoclonium tenue* and *Stigeoclonium nanum* are very well adapted to polluted environment and can be regarded as bio-indicators of pollution.

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Table 2 : Annual range of physico chemical parameters at pond 1 & 2.

S. no.	Physico-chemical parameters	Pond-1	Pond-2
1.	pH	7.5-8.8	8.0-9.2
2.	Temperature	19.0-34.0*	19.0-33.0*C
3.	Dissolved oxygen	3.2-10.0	2.4-7.2
4.	Total organic matter	15.8-80.8	29.3-416.7
5.	Total alkalinity	56.0-152.0	120-486.0
6.	Alkalinity of phenolphthalein	ND-24.0	ND-56.0
7.	Total hardness	36.0-124.0	76.0-368.0
8.	Calcium	28.0-68.0	44.0-160.0
9.	Magnesium	1.9-16.5	7.8-50.6
10.	Chloride	20.0-76.0	72.0-140.0
11.	Carbonate	ND-24.0	ND-72.0
12.	Bicarbonate	73.2-219.6	134.0-549.0
13.	Free and saline ammonia	ND-10.8	2.2-15.1
14.	Albuminoid ammonia	ND-8.6	ND-13.0
15.	Nitrate nitrogen	1.8-10.7	1.8-11.7

Values in mg/L for items 3-15. ND = not detectable.

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