

Seasonal Protozoan Diversity in Agniar Estuary, Tamil Nadu, India

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ABSTRACT

The present study was aimed at identifying the free living protozoans during the four seasons of the year in Agniar estuary (Lat.10° 20' N Long.79° 23'E), Adirampattinam, Thanjavur, Tamil Nadu, India. A total of 18 species were recorded during the four seasons. Among the four seasons, the pre-summer and post-summer seasons recorded 16 species each while the rainy season, 15 species and summer season, only 14 species. Of the 18 species that were recorded, only 8 species were perennial. Among the various species, *Diffugia corona* dominated in all the seasons.

Key words: Free living protozoans, Estuary, Seasons, India

INTRODUCTION

The importance of Protozoa as bioindicators of pollution and environmental biomonitoring has long been recognised especially in water purification plants and activated sludge processes⁵. In addition, protozoans are common predators on bacteria and fungi⁴. They feed and regulate the abundance of most types of aquatic microbes and are an integral part of all aquatic microbial food webs⁹; while many protozoans form a useful link in the food web, some are harmful as they cause dreaded disease in man and other organisms while some interfere with the production of nitrate

reducing the soil fertility⁹. In spite of their importance, the occurrence and distribution of protozoans in different wetlands of India have not been seriously analysed and hence an attempt has been made to identify the free living protozoans in an estuarine system in Tamil Nadu, India during the four different seasons of the year.

MATERIALS AND METHODS

The collection of the free living protozoans was from Agniar estuary of Pattukkottai, Thanjavur, Tamil Nadu.

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The collection was done on a seasonal basis (pre-summer / summer / post-summer / rainy season) during 2016. The water samples were collected during the early morning hours using a 63 µm mesh sized plankton net. Water samples were brought to the laboratory in wide mouthed plastic bottles, lids removed and were kept in open in a place where adequate light was available. Rice bran was given as feed for these protozoans. The samples were examined under the microscope from time to time. The free living ciliates were observed in both 10x and 40x magnification, photographs taken and identified using standard references^{1,3,6,7,10,11,13}.

RESULTS AND DISCUSSION

The protozoans that were identified in the system numbered 18 belonging to eight families during the four seasons of the year (Table-1). As seen from the table, the family *Diffflugia* was represented by six species while Centropyxidae by five species and Arcellidae by two species. The remaining families (Nebelidae, Euglyphidae, Euplotidae, Colepida and Oxytrichidae) were represented by one species each.

A season-wise comparison reveals that the pre-summer season recorded 16 species. During the season, the most dominant species in terms of count was *Diffflugia corona* followed by *Cryptodiffugia collaris* while *Centropyxis aculeata* and *Nebela collaris* were absent. During the summer season, a total of 14 species were recorded of which the most dominant species in terms of number was *Diffflugia corona* followed by *D. binucleata*. However, during this season *C. aculeata*, *C. spinosa*, *D. lobostoma* and *D. globulosa* were absent. A comparison of the post-summer season reveals that 16 species were recorded with the dominant species again being *D. corona* followed by *Arcella hemispherica*. During this season *Euglypha*

tuberculata and *Tachysoma* sp. were absent. During the rainy season, a total of 15 species were recorded of which *D. corona* again dominated followed by *Centropyxis ecornis*; *Plagiopyxis declivis*, *D. lithophila* and *Coleps hirtus* were absent. Thus, in terms of diversity, the pre-summer season and the post-summer season recorded maximum diversity (16 species each), while the minimum diversity was noticed in the summer season (14 species). However, a perusal of total protozoan count reveals that the maximum count was noticed in the rainy season (1720) and the minimum in the summer season (1190). A perusal of literature reveals that Saraswathi and Sumithra¹² recorded maximum diversity during the rainy season followed by the pre-summer and post-summer seasons in Kottaiappattinam estuary in Tamil Nadu.

Among the 18 species that were recorded during the period of study, only eight species were perennial. Further, among the perennial species, *D. corona* was the most dominant one during all the seasons. A perusal of literature reveals that Bindu² revealed a total of 1567 species of free living protozoa in India including estuarine, marine and moss dwelling forms. Mukherjee and Das⁸ recorded the presence of five protozoans in Renuka wetland in Himachal Pradesh and Bindu² reported species ranging from 11 (Darjiling District) to 102 (Kolkatta district). Radhakrishnan and Jayaprakash⁹ while monitoring the Vembanand estuary in Kerala reported the presence of 19 species and Saraswathi and Sumithra¹² reported the presence of 14 species. Thus the diversity of protozoans appeared to be in line with those of others in various systems in India.

The present system recorded the presence of species belonging to the genus *Diffflugia*, *Tachyoma* and *Euplotes* which according to Radhakrishnan and Jayaprakash⁹

are clear signs of polluted waters. Nevertheless, the above authors also suggested that the presence of *Euplotes* sp. and

Tachymonas sp. can be used for bioremediation of industrial waste water as they possess heavy metal uptake properties.

Table 1: Seasonal Occurrence of Protozoan Population in the Estuary (i/l)

S. No.	Species	Rainy (Oct-Dec)	Pre-summer (Jan-Mar)	Summer (Apr-Jun)	Post-summer (Jul-Sep)
I. Arcelledae					
1.	<i>Arcella discoides</i>	60	30	40	80
2.	<i>Arcella hemisphaerica</i>	140	120	160	140
II. Centropyxidae					
3.	<i>Lesqueresia spiralis</i>	50	30	30	40
4.	<i>Centropyxis aculeata</i>	70	0	0	40
5.	<i>Centropyxis ecornis</i>	240	160	160	200
6.	<i>Centropyxis spinosa</i>	90	80	0	80
7.	<i>Plagiopyxis declivis</i>	0	60	40	70
III. Diffflugidae					
8.	<i>Diffflugia corona</i>	360	200	280	300
9.	<i>Diffflugia binucleata</i>	100	120	240	60
10.	<i>Diffflugia lithophila</i>	0	80	40	40
11.	<i>Diffflugia lobostoma</i>	90	10	0	10
12.	<i>Diffflugia globulosa</i>	160	140	0	80
13.	<i>Cryptidifflugia oviformis</i>	140	180	60	40
IV. Nebelidae					
14.	<i>Nebela collaris</i>	80	0	20	40
V. Euglophidae					
15.	<i>Euglypha tuberculata</i>	20	40	10	0
VI. Colepidae					
16.	<i>Coleps hirtus</i>	0	40	60	20
VII. Euplotidae					
17.	<i>Euplotes mutabilis</i>	40	60	30	20
VIII. Oxytrichidae					
18.	<i>Tachysoma</i> sp.	80	30	20	0
		1720	1380	1190	1260

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