



Checklist of Free-living Protozoa from Fresh water bodies of Pravara River at Ahmednagar Regions

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Abstract:

The current research work covers the checklist of free-living ciliated protozoa from freshwater bodies of Pravara River of Ahmednagar regions, Maharashtra (India). 54 samples were collected during one year from January to December 2021. A total of 14 species of ciliates were recorded. The identification has been made mainly on the basis of body shape, size, arrangements of cilia, and the structure of macro- and micronucleus. In this year, the maximum prevalence of ciliates was observed in class Oligohymenophorea, which constituted (75.92%) and class Heterotrichea, accounted for (48.14%) respectively of the total rate of the samples. Moreover, the

minimum prevalence of ciliates was observed in class Spirotichea, which constituted (22.22%), and the least percentage in class Prostomatea (i.e. 5.55%).

Keywords: *Ciliated protozoa, Pravara River, Oligohymenophorea, Heterotrichea, Spirotichea Prostomatea.*

Introduction

Protozoa are considered single-celled organisms, yet they possess all the characteristics common to living things. The protozoa in the freshwater environment are incredibly diverse in terms of both appearance and lifestyle, ranging in size. Although some are colonial or form loose aggregates, most live and function as separate cellular individuals. Most protozoa are chemo heterotrophs and some are heterotrophs. Free-living protozoa are ubiquitous in natural freshwater bodies and unicellular heterotrophic eukaryotes, which feed mainly on bacteria. The water quality and temperature affects the abundance and richness of free-living protozoa.

Protozoans are the ultimate decomposers; they play an important role in control of pollution and are useful in the treatment of polluted water bodies.

Lynn (2008) states that the Ciliate group of Protozoa is one of the most species-rich and can be found in a wide range of environments, including water and land. According to Foissner et al. (2008), there are estimated to be over tens of thousands of ciliate species, and over 80% of them are still unidentified, making them diverse species. Bindu L., et. al (2013) studied protozoan and zooplankton diversity in sewage systems of Kolkata. They discovered five species of zooplankton, three species of rhizopods under two genera, ten species of ciliates under ten



genera, and ten families. These 13 species of protozoa comprised 7 orders and 13 families. Somasundaram, S. et. al., (2015) described and reported a few Spirotrich freshwater ciliate species From the Delhi region, namely *Oxytricha granulifera*, *Aponotohymena* sp., *Paraurostyla coronata*, *Gastrostyla* sp., *Tetmemena* sp., *Laurentiella* sp., *Euplotes aediculatus*, *Aspidisca*, *Pseudourostyla cristata*, and *Urostyla* sp. Pawar S. B. (2015) studied the occurrence of free living protozoa from the reservoir at Makani Dist. Osmanabad (M. S.) India. She collected a total of 127 samples during 24 months, out of which 78 were positive and the percentage of prevalence of protozoa was 61.04%. The maximum occurrence was in the month of November (91.66%) and the minimum was in the month of May (16.66%).

Materials and Methods

Freshwater samples were collected from different geographic locations of Nevasa, Toka Pravara River (19°37'36"N, 75°01'28"E) 807m. Pravara River selected as a freshwater body for the present investigation, is an important tributary of Godavari, rises on the eastern slopes of the Sahayadris between Kulang and Ratangad mountains in the Ahmednagar District of Maharashtra. For taxonomic identification of the ciliates were immediately observed on the day of collection, because as time goes, population is changing radically both in terms of number of individuals and species composition. Methyl cellulose has been found to have many advantages, as it arrests the movement, ciliates can be identified by their appearance. The species identification has been made mainly on the basis of arrangement of cilia, size and shape of body and structure of macro and micronucleus (T.T. Shaikh 2006). During a period of twelve months (January to December 2021) 14 species of ciliates were obtained from 54 samples from river water which collected monthly at varying intervals in plastic bottles and jars and brought to the laboratory. When ciliates are less abundant in the water sample, the population can be increased by raising them using Hay infusion, Wheat infusion and Rice infusion culture methods (T. T. Shaikh 2006).

Results

A total of 14 species of ciliates species from four classes were recorded from water sample of Pravara River of Ahmednagar regions. During the period of one year a total of 54 samples of fresh water bodies were examined. A total of 14 species of ciliate were observed, which were four species of Heterotricheida, six species of Oligohymenophora, one species of Prostomatea, and three species of Spirotrichea have been found from Nevasa, Toka, Pravara River.

1. Class Spirotrichea Bütschli, 1889

Order Euplotida Small & Lynn, 1985

Family Aspidiscidae Ehrenberg, 1830

Genus *Aspidisca* Ehrenberg, 1830

Aspidisca costata Dujardin 1841

Family Euplotidae Ehrenberg, 1838

Genus *Euplotes* Ehrenberg, 1830

Euplotes aediculatus Pierson, 1943

Euplotes eurytomus Wrzeźniowski, 187

2. Class Heterotricheida Stein, 1859

Order Heterotrichida Stein, 1859

Family Spirostomidae Stein, 1867

Genus *Spirostomum* Ehrenberg, 1833

Spirostomum ambiguum

Spirostomum teres Claparède and Lachmann, 1858

Spirostomum minus Roux, 1901

Family Stentoridae Carus, 1863

Genus *Stentor* Oken, 1815

Stentor coeruleus Ehrenberg, 1830

3. Class Prostomatea Schewiakoff, 1896

Order Prorodontida Corliss, 1974

Family Colepidae Ehrenberg, 1838

Genus *Coleps* Nitzsch, 1817

Coleps birtus O . F Muller 1786

Paramecium multimicronuleatum Powers and Mitchell, 1910

4. Class Oligohymenophorea, de Puytorac et. al 1974

Paramecium caudatum Ehrenberg, 1833

Order: Hymenostomatida, Delage and Herouard 1896

Order Peniculida Fauré-Fremiet in Corliss, 1956

Colpidium coploda Losana 1829

Family Parameciidae Dujardin, 1840

Genus *Paramecium* O. F. Müller, 1773

Order Sessilida Kahl, 1933

Paramecium aurelia Kang et al., 1962

Family Vorticellidae Ehrenberg, 1838

Paramecium bursaria Ehrenberg, 1831

Vorticella campanula Ehrenberg, 1831

Table.1 Checklist of Ciliates from Fresh Water

Months	No. of Samples examined	Ciliphora			
		Heterotrichea Stein, 1859	Oligohymenophorea de Puytorac et al., 1974	Prostomatea Schewiakoff, 1896	Spirotichea Bütschli, 1889
January	5	1	5	0	1
February	4	3	4	0	0
March	5	2	6	1	2
April	4	2	2	0	1
May	5	1	1	0	3
June	2	1	1	0	0
July	5	3	3	1	0
August	4	2	2	0	1
September	5	4	5	0	0
October	6	4	5	1	1
November	4	1	3	0	1
December	5	2	4	0	2
Total	54	26	41	3	12

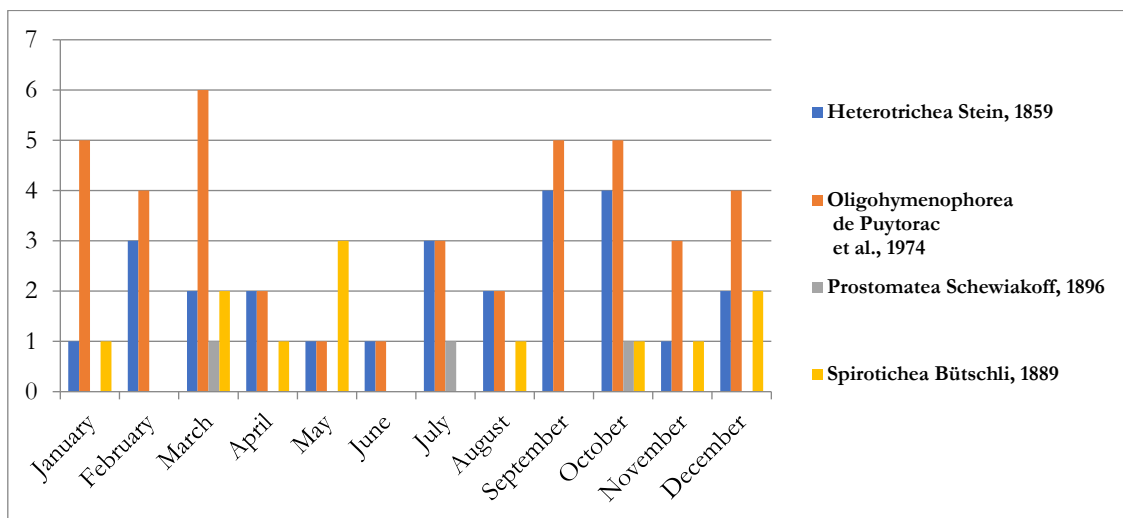


Figure 1. Checklist of Ciliates from Fresh Water

The results revealed that class **Oligohymenophorea**, were more abundant in January, February, March, September, October, November, and December. The class

Prostomatea, were less abundant in January, February, April, May, June, August, September, November, and December. The class **Spirotichea**, were found abundantly in May.

Table.2 Percentage of Prevalence of Ciliates

Ciliphora	Total of Samples examined/ 54	Percentage of prevalence
Heterotrichea Stein, 1859	26	48.14%
Oligohymenophoreade Puytorac <i>et al.</i> , 1974	41	75.92%
Prostomatea Schewiakoff, 1896	3	5.55%
Spirotichea Bütschli, 1889	12	22.22%

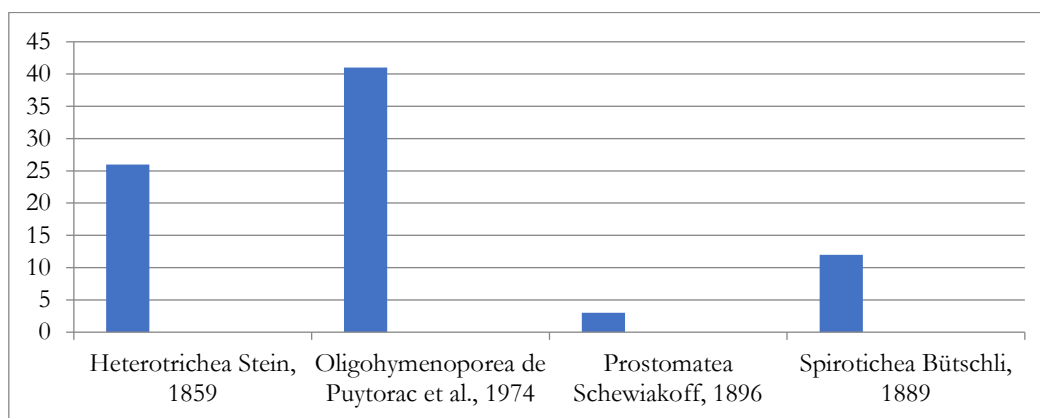


Figure 2. Percentage of Prevalence of Ciliates

In this year, the maximum prevalence of ciliates was observed in class Oligohymenophorea, which constituted (75.92%) and class Heterotrichea, accounted for (48.14%) respectively of the total rate of the samples. Moreover, the minimum prevalence of ciliates was observed in class Spirotichea, which constituted (22.22%), and the least percentage in class Prostomatea (i.e. 5.55%) as shown in (Table 1 and 2).

The structure, density, and distribution of ciliates, which are primarily found in free-living form in a variety of aquatic habitats (Foissner, 2006; Foissner et al., 2008), reflect the biotic, physical, and chemical aspects of the environment in which they live (Zhou et al., 2008; Almeida et al., 2009; Bagatini et al., 2013; Nawrot & Mieczan, 2014). According to SantaFerrara and Alder (2009), the density and

biomass of ciliates are distributed both spatially and seasonally, and they typically correspond with changes in the production of phytoplankton and bacteria. There were some studies done in free living protozoa from freshwater with the aim to survey ciliated protozoa species. Sripoorna, et. al., (2015) studied the diversity of freshwater Spirotrich ciliate fauna from Okhla Bird Sanctuary, Delhi. They reported a total of 12 species belonging to 10 different genera. Taís Rondello Bonatti¹, et.al. (2016) worked on a survey of the ciliated protozoa .

Conclusion

The relative proportions of all four classes of Ciliophora are varied in different site and also in different season. Fluctuations of the population

in ciliated protozoa have been seen at the three sampling stations is due to hydro biological conditions and the effect of physical-chemical properties of water bodies.

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