ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 4(B), pp. 25650-25651, April, 2018

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

STUDY OF SPIROTRICHA CILIATES FOR THEIR OCCURRENCE IN AN ARTIFICIAL WATER BODY IN THE CAMPUS OF KISAN VEER MAHAVIDYALAYA, WAI, DURING JUNE 2017 TO FEBRUARY 2018

Shubhangi Supekar[1] and Savita Nalawade[2]

[1]Department of Zoology, Kisan Veer Mahavidyalaya, Wai, District: Satara, 412803
[2]Department of Zoology, Y. C. I. S. Satara, (Dist-Satara), PIN 415002

DOI: http://dx.doi.org/10.24327/ijrsr.2018.0904.1900

ARTICLE INFO

Article History:

Received 8th January, 2018
Received in revised form 21st February, 2018
Accepted 05th March, 2018
Published online 28th April, 2018

Key Words:

Protozoa ciliata spirotricha spirostomum stentor

ABSTRACT

The species composition population and diversity of protozoans in an artificial water body in the campus of Kisan Veer Mahavidyalaya, Wai, Dist. Satara, Maharashtra, during June 2017 to February 2018 has been studied. Strikingly in comparison to other protozoan species so far studied Spirotricha representatives of class ciliate found to be overpopulated throughout the period of study. Three varieties of the genus Spirostomum and three varieties of genus Stentor found and are discussed here. Live recording also have been made to observe movements and behavioral patterns. Abbott 5MP digital eyepiece and objectives of 10X and 40X were used for the purpose. Ecological role of spirotrichs discussed.

INTRODUCTION

Artificially maintained water tanks provide a very stable and safe environment for phytoplankton and zooplankton growth as there is almost zero disturbance and no chance of desiccation as water level is maintained from another consistent source. When the water body is exposed to the direct or diffused sunlight and some water weeds and submerged plants like water lily are present in the medium provide a plenty of food source to the microorganisms. An old water tank of about 10 years is available in the campus gave us a chance to work for an ideal water storage body for the study of different protozoans. While studies on protozoans population as usual varieties of Flagellates, Sarcomastigophora and Ciliates were seen. It is also known that by population and by types always ciliates dominates mostly in the given water body. Among ciliates a good varieties of *Paremecia, Fontonia, Euplotes, Coleps, Lacrymeria, Litonotus, Euplotes, Stylonichia, Vorticella* and so many other ciliates were seen but surprisingly during the confined period of the year overpopulation of Spirotrichs viz. *Spirostomum and Stentor* varieties were seen. Therefore Spirotrichs occurrence has been discussed in the current research article.

Order Spirotricha (Butschli) included ciliates with free and uniformly distributed cilia further classified in suborders Heterotricha (Stein); Oligotricha (Butschli): Ctenostomata (Lauterborn) and Hypotricha (Stein). Specimen from suborders Heterotricha (Stein) were seen overpopulated in the artificial water tank in the campus of Kisan Veer Mahavidyalaya, Wai and are discussed in this research paper. Chiefly seen heterotrichs are three varieties of Spiristomum viz. *Spiristomum ambiguum, Spiristomum minus* and *Spiristomum teres*. Three varieties of genus Stentor were seen viz. *Stentor coeruleus, Stentor mulleri* and *Stentor igneus*. It is worth to note that all these varieties are seen overpopulated in the month of December and further in the month of January and February also. Previously free living freshwater protozoan biodiversity in seasonal and perennial wate rbodies around Wai has been studied by Bakare and Nalawade (2014).

Sampling and Identification

Freshwater samples along with some green matter, decaying vegetation algae, bottom ooze and flocculent matter arising out of washing water weeds and aquatic plants from the tank was collected and brought to the laboratory; stored in wide mouthed

Corresponding author:* **Shubhangi Supekar
Department of Zoology, Kisan Veer Mahavidyalaya, Wai, District: Satara, 412803

specimen glass jars. Temperature and pH of water at the collection site was recorded. Then observed for occurrence of protozoon under low and high power of compound microscope. It is necessary to keep the collected sample in laboratory for at least fifteen days so as to allow less populated protozoan to increase its number by division and to study progressive and retrogressive changes in varieties due course. Frequent observations were made to ensure coverage of most of the varieties under observation. Photographs and videos of movements of spirotrichs were recorded with Abbot digital eyepiece 5 MP as per required by magnification of 4X, 10X and 40X. Protozoan observed were identified using taxonomic criteria given by Hyman (1940), Westphal (1976), Jahn (1979) and Kudo (1977) and online references. Food preferences of various species are defined according to Kudo (1977), Pratt and Cairns (1985) and Finlay (1988).

OBSERVATIONS AND DISCUSSION

In the selected water body some botanical specimens like Hydrilla and water lily has been purposely added. These afterwards flourish along with other aquatic biota including zooplankton and phytoplankton, some insect larvae, earthworm varieties etc. As there is a very stable and favorable environment. Leaves of water lily covers almost the entire surface with very scanty exposure to direct sunlight. Stalks of leaves are under water, plants like Hydrilla, some floating algae, and algae grown to the wall of the tank provide anchoring and food to the fauna of the water body. Decaying leaves and stalks also enhance the bacterial growth and a substantial food to the protozoans. pH of the water brought to the laboratory found to be 7.5 and it remains stable throughout the period of the observation.

Spirostomum and *Stentor* are heterotrichous free living fresh water ciliates. They are cosmopolitan in distribution available in lentic zones of streams and rivers and still waters, prefers decaying plant material as food. *Spirostomum* has elongated cylindrical body length ranging from 1-3 mm length to width ratio is about 10:01. *Stentor* is also elongated but having wide funnel like mouth. Both are highly contractile and can be distinguished with unaided eyes. They have uniform ciliation in longitudinal rows, a peristome at the two third of the body length in *Spirostomum* and Apical in *Stentor*. Terminally present a large contractile vacuole with long canal close to the dorsal side in *Spirostomum* and anteriorly towards the funnel single large is present. Both are binucleate having a long about 24 beaded macronucleus and many scattered micronuclei. In crowded cultures they are seen attached to decaying vegetation in clusters. *Spirostomum and Stentors* graze voraciously on swimming bacteria and other small unicellular organisms. Spirostomum shows a very remarkable behavior of hibernation during autumn.

Table 1 *Systematic position of spirotrichs under study is as below*

	Spirostomum	***Stentor***
Class	Ciliata	Ciliata
Order	Spirotrichida	Spirotrichida
Suborder	Heterotricha	Heterotricha
Family	Spirotrichaedae	Stentoridae
Genus	*Spirostomum*	*Stentor*

Table 2 Species wise description of observed spirotrichs under study

Sr. No.	Name of the Variety	Shape and Size
1.	*Spirostomum ambiguum* (Kahl)	1-3 mm long, macronucleus composed of many beads; many micronuclei: peristome 2/3 the body length.
2.	*Spiristomum minus* (Roux)	500-800micron long; macronucleus chain form
3.	*Spiristomum teres* (Kahl)	150-400 micron long; macronucleus oval;
4.	*Stentor coeruleus*	Fully extended body 1-2 mm long; anterior end greatly expanded; the beautiful blue color is due to pigment stentorian; macronucleus moniliform.
5.	*Stentor mulleri*	Colorless with Zoochlorellae, 2-3 mm long; macronucleus beaded; anterior end expanded.
6.	*Stentor igneus*	200-400 micron long; macronucleus oval; ciliation uniform.

Ecological Role of spirotrichous ciliates: It is known that protozoan devour a large quantities of bacteria and almost 50% of bacteria in the habitat may be water or soil are finished by them. Thus they keep control on bacterial population and keep circulating free nutrients which is made free to the phytoplankton, algae and zooplankton. Protozoa are food of many zooplanktons making the food available to the secondary consumers. Heterotrichus ciliates are the largest of the protozoan communities and play better role in the ecosystem.

References

1. Albert Westphal (1976): Protozoa, published by Blakieand Son Ltd.
2. Bakare R. V. and Nalawade S. P. (2014): Study of free living freshwater protozoan biodiversity in seasonal and perennial waterbodies around Wai (Dist. Satara), M. S. India. Golden Research Thoughts, 3:11, 1-9
3. Finlay, B. J. *et al* (1988): On the abundance and distribution of protozoans and their food in a productive freshwater pond. *Europ. J. Protistol*., 23:205-217.
4. Gude, H. (1979): Grazing by protozoa as selection factorfor activated sludge bacteria. *Microbial Ecology*, 5: 225-237
5. Hyman (1940): The Invertebrates: Protozoa through Ctenophora. Vol 1, Mc Graw Hill Book.
6. Kudo, R. R. (1977): Protozoology, 5th edition, Charles C. Thomas, Illinois.
7. Pratt, J. R. and Cairns J. Jr. (1985): Functional groups in the protozoa: Roles in different ecosystems. *J.Protozool.,* 32: 415-423.
8. Theodore Louis Jahn *et al,* (1979): How to Know the Protozoa, second edition, Wim C. Brown Company Publishers, Dubuque, Lowa.