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ORIGINAL ARTICLE

SPECIES OF GENUS: TETRAHYMENA (T. PYRIFORMIS) FOUND IN RESERVOIR AT MAKNI, OSMANABAD (MS), INDIA.

PAWAR S. B. AND SHEMBEKAR V. S.

Department of Zoology and Fishery Science,
Rajarshi Shahu Mahavidyalaya, Latur.

Abstract:

Tetrahymena is a non- pathogenic free-living ciliated Protozoa, which have been the best known and most 'plastic' of a 'pivotal group' of ciliates. In the present investigation, author has identified and re-described a species of genus Tetrahymena. T. pyriformis and it is first time reported from Osmanabad region.

KEYWORDS:

ciliated protozoa, Tetrahymena, T. pyriformis.

INTRODUCTION:

Tetrahymena are free-living, non-pathogenic ciliated protozoa. In biomedical research Tetrahymena species used as model organism are T. pyriformis and T. thermophila (David and James, 2000). A widely studied on ciliated protozoans, several morphologically different filamentous structure have been identified (Sattler and Stachelin, 1979; Jerka- Dziadosz, 1981) and characterized biochemically (Numata et al., 1980; Williams et al., 1979). The present study included the identification and re-description of a species of genus Tetrahymena namely T. pyriformis.

MATERIAL AND METHODS:

The water samples were collected from reservoir at Makni, Osmanabad (MS). The observations on ciliates were done after their movements were slowed down with methyl cellulose. For fixation Schaudinn's fluid was used and permanent preparation was made by Dry sliver impregnation (Klein, 1928, 1958) and tungsto phosphoric for Haematoxylene method.

RESULT AND DISCUSSION:

Description of the Genus:

Genus Tetrahymena was frist reported by Furgason (1941). Tetrahymena is a member of class Oligohymenophora and subclass Hymenostomatia. Tetrahymena are non-pathogenic and free-living ciliated protozoa. They are common in freshwater. In Biomedical research the Tetrahymena species used as model organism are T. pyriformis and T. thermophila. The Danish Zoologist Muller saw them in the 18th century. Many workers of 1800s reported these organism under various labels these great Protozoologists such as Butschli (1887-1889), Claparede Lachamnn (1841), Dujardin Ehrenberg (1833), Maupas (1886, 1888, 1889), Roux (1901), Schewiakoff (1983), Stein (1867) and Stokes, Corliss (1952), Thompson

(1958), Elliott (1959) had at least passing familiarity with these small ciliates.

Tetrahymena usually used to demonstrate the level of organization and cortical features that are characteristic of the ciliate taxa. The figure below is of a silver nitrate stained specimen of genus Tetrahymena. The cilia of the species do not stain but can be identified because the region between cilium and the kinetosome takes up sliver ions. All the kinetosomes in a row represent a kinety although the other structures in a kinety have not stained. The kineties of the somatic region of the cell constitute the kinetome and the polykineties of the oral area constitute the oral apparatus.

T. pyriformis Ehrenberg (1830).

Description of the species:

Tetrahymena pyriformis was first reported by Ehrenberg (1830). T. pyriformis is a pyriform ciliate. Body is bluntly pointed at posterior end whereas rounded in posterior end. Body is measured about 39 to 62µm in length and 23 to 33µm in width. Body is covered by uniform coat of Ciliation which are almost of equal in length. Cytostome or oral apparatus is located on the anterior end of ventral side of the body. Cytostome is pyriformis in shape which possess an undulating membrane on the right side and an adoral zone of three membranelle on the left (Tetrahymena complex).

There are 17 to 20 ciliary meridians. The primary meridian is a line of kineties with basal bodies, while the secondary meridian is the next meridian over with no kineties (Alveolar boundaries). There is a single macronucleus which is spherical, medially situated and is usually accompanied by single micronucleus. There is a single contractile vacuole situated near the posterior end of the body.

T. pyriformis is cosmopolitan in distribution found in freshwater containing plants and decaying materials in which bacterial decomposition has commenced, particularly in water which is polluted with manure and sewage grains. Species of Tetrahymena however apparently parasitic and free-living at different times.

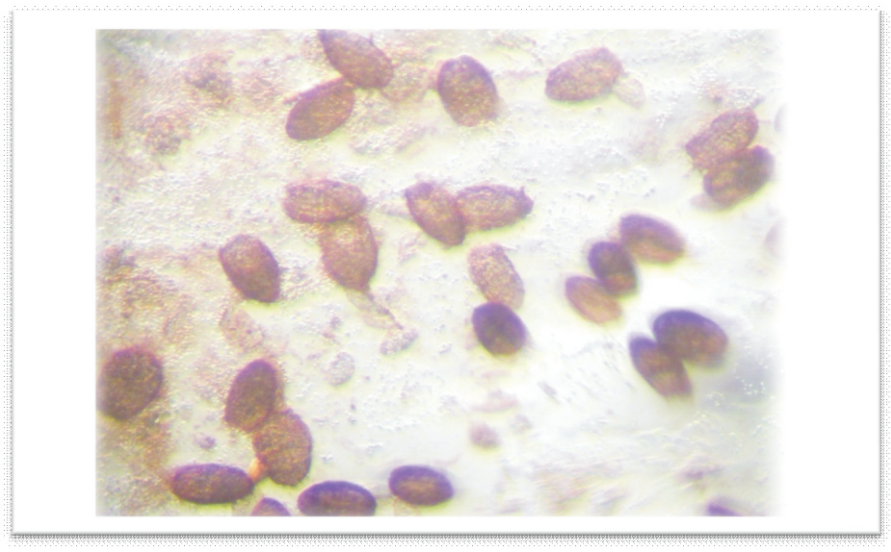

Figure : *T. pyriformis*

COMMENTS:

The genus Tetrahymena was first reported by Furgason (1941). The commonness small freshwater hymenostome ciliates of the genus Tetrahymena or at least of the family Tetrahymenidae allows one to suspect that Antony Van Leeuwenhoek “Father of Protozoology” observed them on more than one occasion on their centuries ago. The synonym of Tetrahymena in following list by Corliss (1961): Lambornella, Leptoglena, Leucophrydium, Leucophrys, Paraglaucoma, Patobalantidium, Ptyxidium Trichoda etc. Many workers of 1800s reported these organism under various labels these great Protozoologists such as Butschli (1887-1889), Claparede Lachamnn (1841), Dujardin Ehrenberg (1833), Maupas (1886, 1888, 1889), Roux (1901), Schewiakoff (1983), Stein (1867) and Stokes, Corliss (1952),

Thompson (1958), Elliott (1959) had at least passing familiarity with these small ciliates.

The genus Tetrahymena was firstly reported by Furgason (1941) the species of this genus are having uniform Ciliation on body and they are small forms. Ciliary rows or meridians seventeen to forty two and two posterior meridians. Cytostome is small and close to anterior end. Species of this genus having single contractile vacuoles. Macronucleus is ovoid in shape and micronucleus is absent in some species.
The present spice has bluntly pointed at posterior end where as rounded at posterior end. Body is covered by uniform coat of Ciliation which are almost of equal in length. Cytostome is on anterior end of ventral side of the body and it is pyriformis in shape and hence it is member of genus Tetrahymena. This genus also reported by Shaikh (2006) from Maharashtra and many workers as mentioned above they are also recorded different species of this genus from freshwater as well as in parasitic forms.

In other species of this genus T. vorax body shape is elongated pyriformis. T. paravorax which is oval to reniform with anterior beak shaped, T. patula is broadly pyriformis and T. setifera is small form rounded at the posterior end hence the present species is resemble to T. pyriformis but differs from all above species of this genus.

Present species is without caudal cilium but in T. vorax and T. paravorax which having caudal cilium and T. setifera having long caudal cilium Shaikh (2006) also reported this species without caudal cilium; hence the present species is similar to T.pyriformis. in present species ciliary meridian from 17-20 shaikh (2006) reported 12- 17 meridian and in T. vorax it is 17-28 meridians. In T. paravorax it is up to 20-30 meridians, in T. patula it is about 32-45 meridians and T. setifera having 23-24 meridians therefore the present species is closely related to T. pyriformis.

Macronucleus in present species it is single, spherical medially situated. In T. vorax it is single, ovoid and centrally placed. T. paravorax macronucleus is ovoid or irregularly ovoid. In T. patula it is irregular and ovoid in shape hence present species is resembles to T. pyriformis. The contractile vacuoles is situated near to posterior end of the body in all species of this genus and micronucleus is with or without in some species but present species is with or without micronucleus as reported by Shaikh (2006).

Present species is of the genus Tetrahymena it is seen that it resemble with T. pyriformis. Present author observed this species (39-62µ by 23-33µ) and Shaikh (2006) reported this species (42-62µ by 26-35µ) Other workers who had also described the same species of this genus Kidder (1941), Loefer et al., (1952), Elliot and Hayes (1955), Roth and Munick (1961), Ray (1956), Elliot and Clark (1956, 1958), Nanney (1959), Kudo (1966) and Carey and Curds (1992). After the dimension and comparison the present species is more close to T. pyriformis and hence it is rediscribed here as T. pyriformis

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TABLE: comparison of the present species with the species of the genus of Tetrahymena.

Partic-ulars	T. pyriformis Ehrenberg, 1830	T. vorax Kidder, Lilly & Claff	T. paravora x	T. patula Ehrenberg, 1830	T. setifera Furgason, 1941	T. pyriformis Shaikh, 2006	Present species
Body-shape	Pyriform rounded in posterior end, body Ciliation uniform	elongate pyriform, body Ciliation uniform	oval to uniformwi th anterior beak in shape body Ciliation uniform	Brodly pyriform occasionally small form, body Ciliation uniform	pyriform rounded in posterior end, body Ciliation uniform	Bluntly pointed or rounded at posterior end, body Ciliation uniform	Bluntly pointed or rounded at posterior end, body Ciliation uniform
Body-dimension s	40-60µ	50-75	……	80-160µ	40µ	42-62µ by 26-35µ	39-62µ by 23-33µ
Macro-nucleus	**1,** spherical medially situated	1, ovoid centrally placed	1, ovoid or irregularly ovoid	Irregularly ovoid	1**,** spherical medially situated	**1,** spherical medially situated	**1,** spherical medially situated
Micronuc leus	With or without	present	present	With or without	With or without	With or without	With or without
No. of meridians	17-21	17-28	20-30	32-45	23-24	12-17	17-20
Caudal cilium	Absent	Present	Present	Present	Long caudal cilium	Absent	Absent
Contractil e vacuoles	1, Near to posterior end of the body	1, Near to posterior end of the body	1, Near to posterior end of the body	1, Near to posterior end of the body	1, Near to posterior end of the body	1, Near to posterior end of the body	1, Near to posterior end of the body
Habitat	Freshwater	Pond water	Freshwate r	Freshwater	Freshwate r	Freshwater	Freshwater

SHARDA BALAJI PAWAR
Department of Zoology and Fishery Science, Rajarshi Shahu Mahavidyalaya, Latur.