



# Heterogeneity among the Genus – Trachelomonas Ehrenberg, 1883 District Nashik (MH) India

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## Abstract

During the investigations on the aquatic algae in and environs of the District Nashik during the period 2009-2013/14. Author recorded 14 Taxa of Trachelomonas under the division Euglenophyta. These are being reported from the first time from this locality. Among these Trachelomonas abrupta, T. abrupta var. minor, T. lacustris var. lacustris, T. armata var. longa, T. robusta and T. volvocina var. derephora are reported for the first time from Maharashtra.

**Keywords:** Heterogeneity, Aquatic algae, Trachelomonas, Euglenophyta, Nashik

## 1. INTRODUCTION:

Algae are most common and widespread primitive group of autotrophic plants and global in occurrence. They are the most ancient of the organisms thriving from Pre-Cambrian period and today has successfully established almost in every kind of habitats including aquatic as lakes, ponds, pools, paddles, rivers and oceans. They are ubiquitous in their distribution and can survive even in the extremities of the environmental conditions. They are one of the most successful and important part of the aquatic food chains in the form of primary producers of organic matter in nature, thus, playing a major role as a basic constituent of a living community.

Euglenoids are unicellular dark green in colour. (They impart the colour to the water body), occurs in fresh water habitats as ponds puddles, streams and lakes: particularly waters contaminated by animal pollution or decaying organic matter (Buetow 1968). They consist two basal bodies and one or two flagella. Euglenoid cells are surrounded by pellicle

. some euglenoids have a flexible pellicle that allows the cells to flowing movement known as euglenoid movement. Euglenoid has unique eyespot and pyramylon

Trachelomonas is a large Genus of free swimming green euglenoid. It is surrounded by a lorica. Lorica with circular pores at the anterior end and may or may not have the portion adjacent to the pore elevated into a collar. Flagellum very long emerges through an apical pore. Lorica or envelope become thicker and ornamented yellow in colour and under unfavorable condition it turn to brown. The lorica smooth or with spines, warts, reticulations, or combinations of these. Cell consist pyrenoid, flagella, red eye spot and numerous ovoid discs chloroplast with many pyrenoids. It is found in shallow turbid waters, on moist soil, ditches, puddles, ponds. The plants were collected and identified in live conditions only so as to observe its motility, number of flagella and other details with treatment of dilute iodine.

## 2. RESEARCH METHODOLOGY:

The study is based on field, laboratory work and literature surveys, Samples were collected during Jan.2009 to Dec.2013. Collection were made with help of phytoplankton net and manually. Algal samples were preserved

in 4% formalin. For the detailed studies of algae, Photomicrography has been done under Labomade electric microscope with digital camera.

### 2.1 Collection of algal samples:

The collections of algae from various habitats are made during the period from 2009- 2013. The algae are collected by hand or with a knife, forceps etc. including part or entire substrates. They are also collected from stones in fast flowing water, aquatic plants, on dam walls and from any floating objects. Algae are also obtained by simply squeezing bryophytes and other aquatics. The phytoplanktons are collected by using a fine mesh phytoplankton net, with 25-30 $\mu$  pores. Sufficient quantity of sample is concentrated by simply scooping a jar through the water for several times.

### 2.2 Storage and preservation of samples:

The algal samples are collected in bottles, jars or plastic bags of different sizes with some water from the collection sites. After collection the containers are kept open. Algae can be kept alive for short periods for one or two days in open petridishes, in a cool place with reduced light for their continuous growth and further observations.

For long term storage samples are preserved in preservative solutions, dried or as permanent microscope mounts. Samples are preserved in commercial formations like 4 % formalin and FAA.

The observations are based on living materials which are essential for its identification. The simplest method is to prepare a cavity glass slide by placing a drop of sample on to the slide with cover slip carefully over it and avoiding any air bubbles and observing the specimen under lower magnification of microscope. Observations are made more sequentially at under 4 x, 10x, 40x, 100 x magnification. India ink is also used to observe the flagella of motile organisms. This technique is also very useful for observing sheaths of individual cells or of mucilaginous organisms.

### 2.3 Measurements:

The measurements of the specimens are taken and used for its identification and sub-sequent classification. The metric units cm, mm, and  $\mu$  are utilized. Stage and eyepiece micrometers are used for measuring the length and breadth of the organism.

### 2.4 Illustrations:

All the drawings are drawn with the help of Mirror- type and Prism type - Focus CLM-8 S.no.4647 Camera Lucida at the stage level using 10x, 40x 45x, 100x, objectives

and 6x, 10x eye-pieces. The measurements were made by ocular and 45x, 100x objectives. Sketches were drawn on plain paper with the help of Rotering pen using black water proof India ink. The thickness of each sketch was maintained uniform.

### 2.5 Microphotographs:

The microphotographs are taken by camera by using "Lobo"- Trinocular microscope unit. Sony Cyber Shot DSC-W80 camera is used for all microphotographs.

### 2.6 Identification:

The identification of algae was done by using standard monographs and research papers

## 3. RESULT AND DISCUSSION:

Division: Euglenophyta

Class: Euglenophyceae

Order: Euglenales

Genus – *Trachelomonas* Ehrenberg, 1883:

Smith – 1950; 356:

**3.1 *Trachelomonas abrupta* Swirenko, 1914:****PL.1-F.-9 PP. -1.**

Prescott-1951; 410: Pl.-83, Fig.-18, 19.

Cell oval to sub cylindrical, truncate at the anterior end, very wide flagellum aperture, wall coarsely punctate, light red in color, test 17.16 $\mu$  in dia., 26.4 $\mu$  long. It seems a first report of the alga from this locality and Maharashtra.

**Habitat**-Ghodegaon (18/08/2011), Dugarwadi (10/06/2012), Dental College (22/06/2012).

**Distribution**-Karnataka (Hedge and Bharati, 1982), Tamilnadu (Mayakkannam, 2010).

**3.2 *Trachelomonas abrupta* var. *minor* Deflandre, 1926:****PL.1-F.-11, PP. -1.**

John-2002; 173: Pl.- 42, Fig.- Q.

Cells smaller than the species, walls densely punctate and without spines. Yellow or reddish brown chloroplast without pyrenoid. Cells 13.2 $\mu$  in dia., 19.8 $\mu$  long. Rare in occurrence. It seems a first report of the alga from this locality and Maharashtra.

**Habitat** - Gangapur dam (25/03/2011), Someshwar (7/06/2012).

**Distribution**- Europe: Britain (Wołowski 2002, Whitton et al. 2002), Germany (Stutz & Mattern et al. 2018), Romania (Caraus 2002), Spain (Alvarez Cobelas 1984).

North America: Alabama (AL) (Wołowski & Walne 2007), Mississippi (Wołowski & Walne 2007), North Carolina (Wołowski & Walne 2007), Virginia (Wołowski et al. 2011). South America: Argentina (Tell 1985).

Asia: Japan (Hirose, Yamagishi & Akiyama 1977).

**3.3 *Trachelomonas armata* (Ehrenberg) F. Stein, 1878:****PL.1-F.-5, PP.-1**

Prescott-1959; 410: Pl.83, fig.32.

= *Chaetophla armata* Ehrenberg 1833.

Test 19.8 $\mu$  broad, 28.05 $\mu$  long, broadly ovate, flagella long, flagella aperture surrounded by a circle of erect spines. Wall spiny in the anterior region with the spirally scattered, spines over the median region and with long backwardly directed spines in the posterior part.

**Habitat**-Waghera Dam (04/04/2009), Niphad (10/06/2009), Salher (11/07/2009), Peint-Surgana (12/08/09), Pimpri Trimbak (18/09/2009), Nasardi-bridge (30/04/10),

Pimpalgaon Bhor (14/09/2010), Ghodegaon (18/08/2011), Dugarwadi (10/06/2012), Tapovan (22/06/2012).

**Distribution**- Maharashtra (Deore, 1978). Karnataka (Hosmani, 2008), Tamilnadu (Mayakkannam, 2010),

**3.4 *Trachelomonas armata* var. *longa* Deflandre, 1926:****PL.1-F.-3,4.**

Hueber-Pestalozzi-1955: 310.

Testa 29-30.5 $\mu$  broad, 41-43 $\mu$  long, broadly ovate, flagellar apertures surrounded by a circle of erect spines. Wall spiny in the anterior region with spirally scattered, spines over the median region and with long backwardly directed spines in the posterior part. Rare in occurrence.

**Habitat**- Someshwar (08/02/2012).

**Distribution** - Romania (Caraus 2002).

**3.5 *Trachelomonas dybowskii* Drezepolski, 1921:****PL.1-F.-10, PP.-1.**

Prescott-1951; 412: Pl.- 83, Fig.-21; Pl.- 84, Fig.- 10.

Lorica broadly ellipsoidal to ovoid, no collar, flagellum opening without a collar, sometimes with an inner thickening of the wall about the aperture, surface smooth, test 16.8 $\mu$  in dia., 21.12. $\mu$  long.

**Habitat** – Ozar (22/03/2011), Ozarkhed Dam (30/03/2012).**Distribution** – Maharashtra (Ashtekar, 1982), Tamilnadu (Mayakkannam, 2010).**3.6 *Trachelomonas hispida* (Perty) F.Stein, 1878:****PL.1-F.-12**

Prescott -1951; 414: Pl. - 83, Fig.- 35.

Lorica ovate or ellipsoidal narrowed anteriorly. Lorica without or with short collar flagellum aperture slightly raised, wall uniformly beset with short spines minute and sharp-pointed warts. Cells 19.8-24 $\mu$  in dia., 26.4-29 $\mu$  long. Most commonly found members

**Habitat** – Waghera Dam (04/04/2009), Pimpalgaon Bhor (14/09/2010), Someshwar (8/02/2012), Dental College (22/06/2012).**Distribution**– Maharashtra (Kamat, 1974), Karnataka (Hegde and Bharati, 1983), Tamilnadu (Mayakkannam, 2010).**3.7 *Trachelomonas lacustris* var. *lacustris* Drezepolski, 1925:****PL.1-F.-2,13**

John-2002; 176: Pl.42, Fig.-B.

= *T. cylindrica* var. *punctate* Skvortzow

Lorica elongated cylindrical, broadly rounded both ends, posteriorly and anteriorly, golden yellow brown in colour. Lorica wall covered with dots, coarsely and densely punctate. Flagellum aperture without collar. Cell 19.8 $\mu$  in dia., 33 $\mu$  long. Rare in occurrence.

**Habitat**–Gangapurfarm (25/01/2012), Dindori (30/03/2012), Makhmalabad (05/09/12).**3.8 *Trachelomonas robusta* Swirenko emend Deflandre, 1926:****PL.1-F.-7, PP. -1.**

Prescott-1951; 416: Pl.-83, Fig. - 29.

Lorica ellipsoidal to oval, yellowish brown, flagellum aperture without a collar. Apical pore surrounded by circle of spines, wall dark brown, rare strong, short, sharp spines. Lorica 19.47-26.4 $\mu$  in dia., 20.4-36.3 $\mu$  long. It seems to be first in Maharashtra.

**Habitat** – Gangapur Dam (15/01/2011), Ashawadi (1/10/2012).**Distribution** – Karnataka (Bharati and Hegde, 1982; Hosmani and Bharati, 1983; Hosmani 2008), Tamilnadu (Mayakkannam, 2010).**3.9 *Trachelomonas sydneyensis* var. *minima* Play fair 1915:****PL.1-F.-1, PP.-1**

Hueber: Pestalozzi, 1955; 301.

Cells 19.8 $\mu$  in dia., 26.4-28.05 $\mu$  long, elongate–ellipsoidal, rounded at both anteriorly and posteriorly end. Flagellar aperture in a short collar with short spines in the posterior and anterior region but with only sharp granules in the mid region, brown in colour.

**Habitat**- Gangapur Dam (11/10/2012).

**Distribution**- Maharashtra (Deore, 1978).

**3.10 *Trachelomonas volvocina* var. *punctata* Playfair, 1915:**

**PL.1-F.-8, PP.-1.**

Lorica spherical, brown in colour 9.9 $\mu$  dia. flagellar aperture without a rim or collar. Smooth. Lorica surface thickly and strongly punctate.

**Habitat** – Rajurgoan (26/01/2011), Ghodegaon (18/08/2011), Dugarwadi (10/06/12).

**Distribution** – Maharashtra (Kamat, 1974), Karnataka (Bharati and Hegde, 1982), Orissa (Ratha *et al.*, 2006), Tamilnadu (Mayakkannam, 2010).

**3.11 *Trachelomonas volvocinopsis* Swirenko, 1914:**

**PL.1-F.-6**

Hueber-Pestalozzi - 1955; 253.

Cell body 24-28 $\mu$  in dia., brownish wall, collar absent, flagellum very long, eyespot distinct, chloroplast without pyrenoid.

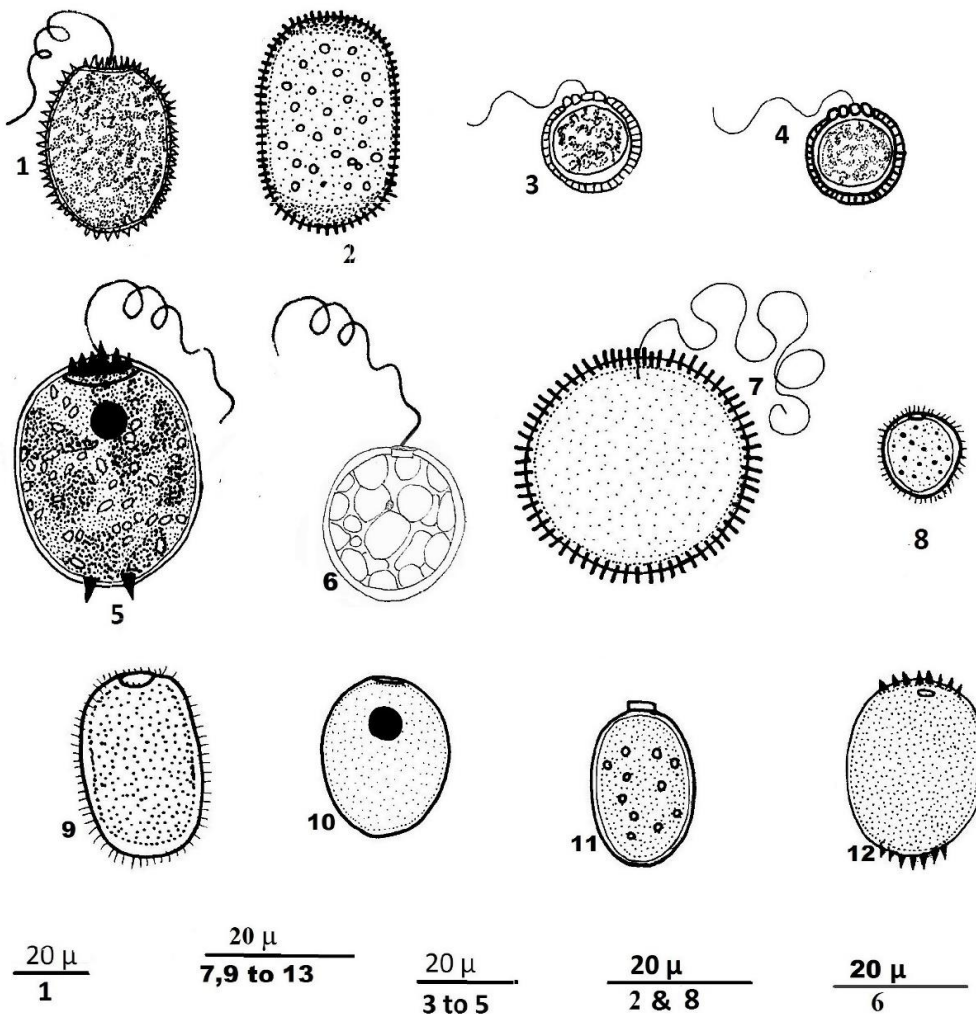
**Habitat**- Makhmalabad (05/09/2012).

**Distribution**- Maharashtra (Deore, 1978).





## PLATE- 1



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- Fig. 1 *Trachelomonas sydneyensis* var. *minima* Play fair.
- Fig. 2,13. *Trachelomonas lacustris* var. *lacustris* Deezepolski
- Fig. 3,4 *Trachelomonas armata* var. *longa* Deflandre.
- Fig. 5 *Trachelomonas armata* (Ehrenberg) F. Stein.
- Fig. 6 *Trachelomonas volvocinopsis* Swirenko.
- Fig. 7 *Trachelomonas robusta* Swirenko Emend Deflandre
- Fig. 8. *Trachelomonas volvocina* var. *punctata* Play
- Fig. 9 *Trachelomonas abrupt* Swirenko

- Fig. 10 *Trachelomonas dybowskii* Drezepolski  
Fig. 11 *Trachelomonas abrupta* var. *minor*. Deflandre  
Fig. 12 *Trachelomonas hispida* (Perty) F. Stain

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