

DIVERSITY OF THE GENUS EUGLENA FROM BHARATHAPUZHA RIVER, PALAKKAD DISTRICT

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ABSTRACT

The present investigation aims to assess the taxonomy and distribution of the genus *Euglena* in Bharathapuzha River, Palakkad district. During the algal study, a notable diversity of Euglenoids was observed. 26 taxa were identified belonging to the genera *Euglena*. The present study revealed that species distribution attained their maximum density during pre-monsoon, whereas minimum populations were observed during monsoon. The diversity profile was higher during pre-monsoon and lower in monsoon season. They are usually pollution tolerant and their abundance and diversity indicates the quality status of the water. The heterogeneity and diversity of phytoplankton observed in this study shows the river to be eutrophic.

Keywords: *Freshwater microalgae, Euglena, Physico chemical parameters, Diversity*

INTRODUCTION

Rivers are an essential part of the earth's water cycle; they play an efficient and prominent role in the earth's topography by carrying vast quantities of water to support life on earth. Kerala is the land of rivers. In general, the state's topography controls the length and size of rivers. Fresh water biodiversity constitutes the study of freshwater, its inhabitants and their interaction with their environment. Algae are extensive and diverse, simple to multicellular, and phototrophic. They are the most diverse and environmental assets that help to port organisms and generate oxygen into the environment utilized by organisms in all trophic levels (Barhate & Tarar 1985b, 1985c). In freshwater ecosystems, microalgae are taxonomically diverse, very resourceful, and play an important role in worldwide ecology (Ashtekar 1982). The ability of algae to tolerate polluted and unpolluted water bodies has been considered valuable bioindicators in water bodies (Philipose 1984, 1988). Phytoplankton community structure, composition, and species diversity in the aquatic ecosystem are controlled by several physico-chemical parameters (Chaudhary & Meena 2007). Phytoplankton composition and density are susceptible to environmental changes, and their documentation will give valuable information about water quality (Hegde & Bharati 1986). Discharge of pollutants from urban, agricultural and industrial sources, indiscriminate mining of construction grade materials like sand from instream and floodplain areas, damming of rivers, etc., have adversely affected the nature of these river systems (Habib & Pandey 1990b). The present study is an effort to report the diversity of genus *Euglena* in Bharathapuzha river flowing through Palakkad district of Kerala. This is the first documented report on the diversity of euglenoids from Bharathapuzha River.

MATERIALS AND METHODS

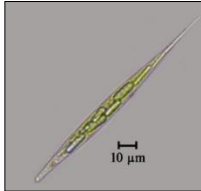
The present study was conducted on the Bharathapuzha river basin, South West Coast of India. The phytoplankton diversity and environmental characteristics were analysed during the year 2019-2020. Water samples were collected monthly from the Bharathapuzha river basin. Parameters like pH, Temperature, EC, Nitrate, Phosphate and Silicate were measured. The samples were transferred into 1000ml capacity properly labelled plastic containers and immediately preserved with 4% formalin solution. Each sample concentrated to 10ml volume in the laboratory by centrifugation and this was used for slide mount for microscopic

examination. Identification of phytoplankton organisms was done by standard literatures (Hosmani 2008, Pandey 1985, Patel & Waghodekar 1981, Shaji & Patel 1991b, Wołowski 1998).

RESULTS AND DISCUSSION

1. *Euglena acus* (O.F.Muller) Ehr.

Philipose, 1984. p.564, fig. 1f



Dimensions:

Cell length - 83µm

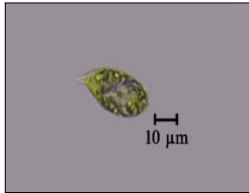
Cell breadth - 20µm

Comments:

Cells elongate, spindle shaped, posterior long, narrow and truncated.

2. *Euglena agilis* Carter

Wołowski,1998. p.27, fig. 78



Dimensions:

Cell length - 30µm

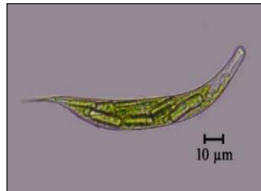
Cell breadth - 13µm

Comments:

Cells short, fusiform, chloroplast many with pyrenoids.

3. *Euglena acus* var. *acus* Starmach

Wołowski,1998. p.13, fig. 9



Dimensions:

Cell length - 125µm

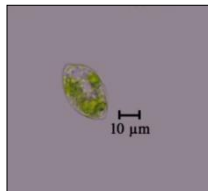
Cell breadth - 10µm

Comments:

Cells long, fusiform, narrow at the anterior end, tapering at posterior.

4. *Euglena anabaena* var. *anabaena* Mainx

Wołowski,1998. p.28, fig. 88



Dimensions:

Cell length - 30µm

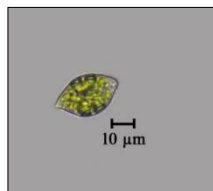
Cell breadth - 19µm

Comments:

Cells wide, fusiform, narrowing towards the anterior end.

5. *Euglena archeoplastidiata* Chadeffaud

Wołowski,1998. p.25, fig. 66



Dimensions:

Cell length - 26µm

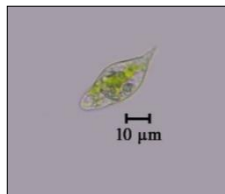
Cell breadth - 13µm

Comments:

Cells cylindrical with several chloroplasts, rounded at posterior end.

6. *Euglena chlamydotheca* Mainx

Wolowski,1998. p.23, fig. 53



Dimensions:

Cell length - 42µm

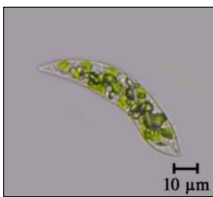
Cell breadth - 20µm

Comments:

Cells ovate, rounded at posterior end, slightly elongated anterior end.

7. *Euglena deses* fo. *deses* Pringsheim

Wolowski,1998. p.38, fig.125



Dimensions:

Cell length - 68µm

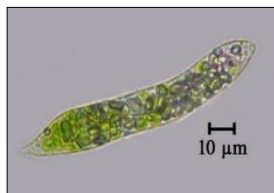
Cell breadth - 12µm

Comments:

Cells oblong cylindrical, flattened with many chloroplasts, band shaped, narrow projection at posterior end.

8. *Euglena deses* Ehrenberg

Wolowski,1998. p.39, fig.130



Dimensions:

Cell length - 102µm

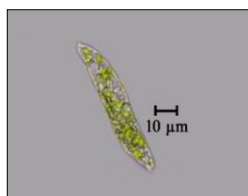
Cell breadth - 12µm

Comments:

Cells cylindrical, truncate at the anterior end.

9. *Euglena deses* f. *klebsii* (Lemmermann) Popova

Wolowski,1998. p.38, fig.128



Dimensions:

Cell length - 61µm

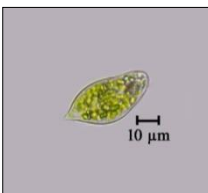
Cell breadth - 10µm

Comments:

Cells longitudinally cylindrical, flattened with many chloroplasts.

10. *Euglena ettlii* Wolowski

Wolowski,1998. p.26, fig.72



Dimensions:

Cell length - 41µm

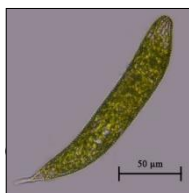
Cell breadth - 10µm

Comments:

Cells fusiform, tapering towards anterior end, posterior with short tail.

11. *Euglena fusca* (Klebs) Lemm.

Philipose, 1984. p.574, fig. 11a



Dimensions:

Cell length - 195µm

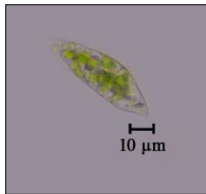
Cell breadth - 27µm

Comments:

Cells slightly bent, posterior end tapering, paramylum present.

12. *Euglena gracilis* Klebs

Prescott, 1982. p. 393, pl. 85, fig. 17; Wolowski, 1998, p.31, fig.99



Dimensions:

Cell length - 51µm

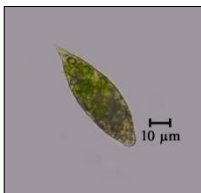
Cell breadth - 15µm

Comments:

Cells short, fusiform to ovoid, chloroplast disc shaped with pyrenoids.

13. *Euglena hemichromata* Skuja

Wolowski,1998. p.22, fig.49



Dimensions:

Cell length - 60µm

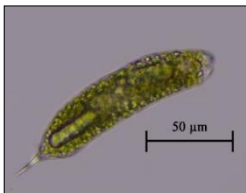
Cell breadth - 18µm

Comments:

Cells spindle-shaped, anteriorly rounded, posterior with irregular discs.

14. *Euglena oxyuris* f. *oxyuris* Popova

Wolowski,1998. p.15, fig. 21



Dimensions:

Cell length - 125µm

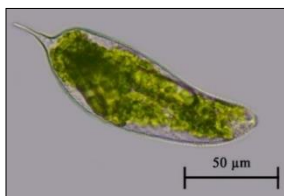
Cell breadth - 25µm

Comments:

Cells slightly twisted, rounded at anterior end, posterior with short tail.

15. *Euglena oxyuris* var. *charkowiensis* (Swirenko) Bourrelly

Philipose, 1984. p.576, fig. 12c



Dimensions:

Cell length - 137µm

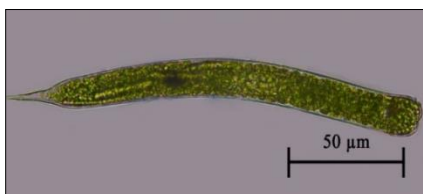
Cell breadth - 38µm

Comments:

Cells broad, posterior with short tail have 24µm in length.

16. *Euglena oxyuris* var. *playfairii* Bourrelly

Philipose, 1984. p.575, fig. 12b



Dimensions:

Cell length - 300µm

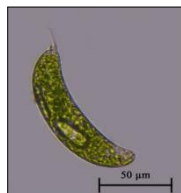
Cell breadth - 24µm

Comments:

Cells with anterior end truncate, posterior with tail.

17. *Euglena oxyuris* var. *minor* Deflandre

Prescott, 1982. p. 393, pl. 85, fig. 18



Dimensions:

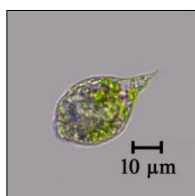
Cell length - 120μm

Cell breadth - 25μm

Comments: Cells elongate, cylindrical and twisted, anterior end truncate, posterior end tapering to form short tail.

18. *Euglena polymorpha* Dangeard

Wolowski,1998. p.31, fig. 98



Dimensions:

Cell length - 42μm

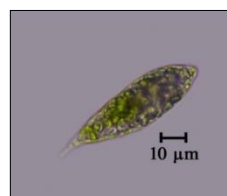
Cell breadth - 23μm

Comments:

Cells fusiform, narrowing and rounded at anterior, short tail at posterior.

19. *Euglena proxima* Dangeard

Prescott, 1982. p. 394, pl. 85, fig. 25



Dimensions:

Cell length - 61μm

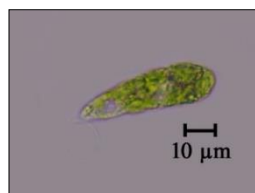
Cell breadth - 15μm

Comments:

Cells fusiform, narrowed posteriorly to form a blunt tip, irregularly shaped chloroplasts scattered throughout the cell.

20. *Euglena rustica* var. *rustica* Huber-Pestalozzi

Wolowski,1998. p.21, pl. V11, fig. 45



Dimensions:

Cell length - 45μm

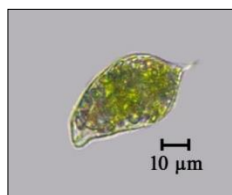
Cell breadth - 12μm

Comments:

Cells wide, sac like, elongated at anterior end, rounded at posterior.

21. *Euglena sanguinea* Ehrenberg

Wolowski,1998. p.34, fig. 113



Dimensions:

Cell length - 55μm

Cell breadth - 28μm

Comments:

Cells fusiform, rounded at anterior end, tapering at posterior end.

22. *Euglena spirogyra* var. *spirogyra* Klebs

Wolowski,1998. p.17, fig. 28



Dimensions:

Cell length - 140µm

Cell breadth - 19µm

Comments:

Cells elongated, curved, longitudinally cylindrical and narrowed.

23. *Euglena spirogyra* Ehrenberg

Prescott, 1982. p. 394, pl. 86, fig. 15



Dimensions:

Cell length - 108µm

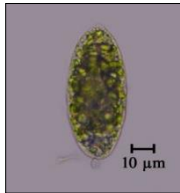
Cell breadth - 19µm

Comments:

Cells cylindrical and twisted, narrowed posteriorly and form a sharp bend tail, spirally striated with alternating rows of granules.

24. *Euglena splendens* Dangeard

Wolowski,1998. p.33, pl. V11, fig. 110



Dimensions:

Cell length - 65µm

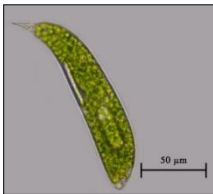
Cell breadth - 23µm

Comments:

Cells cylindrical, rounded at anterior end, tapering towards posterior with short projection.

25. *Euglena tripteris* var. *tripteris* Klebs

Wolowski,1998. p.19, fig. 337



Dimensions:

Cell length - 147µm

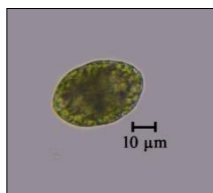
Cell breadth - 26µm

Comments:

Cells narrowed at anterior end, slightly rounded at posterior end, tapering into a short sharp tail.

26. *Euglena texta* var. *texta* (starmach) Hubner

Wolowski,1998. p.35, pl. V11, fig. 116



Dimensions:

Cell length - 35µm

Cell breadth - 16µm

Comments:

Cells elongate-cylindric and rounded at anterior end.

DISCUSSION

This paper summarizes the distribution of the Genus *Euglena* community at the Bharathapuzha river basin. Variations in water's physicochemical properties can bring about changes in the composition and abundance

of aquatic organisms. This study clarifies that temperature, nitrate, silicate, and DO played a significant role in phytoplankton growth and abundance. Biological monitoring is beneficial for assessing the ecological value of aquatic ecosystems that results from the integrative approach of both biological guild and physicochemical attributes of water (Hosmani & Bharati 1983). The comprehensive research provides a good framework for the relationship between phytoplankton distribution and physico-chemical parameters.

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