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TAXONOMIC ACCOUNT OF EUGLENOIDS IN SELECTED SITES OF KARUVANNUR RIVER, KERALA, INDIA

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ABSTRACT

The Euglenophytes are one of the important groups of phytoplankton which is primarily freshwater inhabitants and are unicellular flagellates. The present paper is an attempt to explore the euglenoid diversity and to make a taxonomic account on it, from the selected sites of Karuvannur River, Thrissur District, Kerala. Karuvannur River is one of the major freshwater sources of Thrissur district, which is flowing through the famous Kole lands of Thrissur. The study was carried out from June 2017 to May 2018. During the period of study, 25 species of euglenophyceaen members were identified belonging to five genera, namely, *Euglena*, *Lepocinclis*, *Phacus*, *Trachelomonas* and *Strombomonas*.

Keywords:Euglenoid diversity, Karuvannur River, *Euglena*, *Lepocinclis*, *Phacus*, *Trachelomonas*, *Strombomonas*.

INTRODUCTION

Algae play a vital role in maintaining the food chain since they are the primary producers. These lower plants are used as feed, fodder, fertilizer, medicines and even as a source of restriction endonucleases (John and Francis, 2012). Also they have a noticeable role in the ecological aspects, markedly as pollution indicators (Palmer, 1969). Euglenoids are unicellular flagellates primarily occur in freshwater habitat. Although a few are sedentary, most forms are motile with one or two flagella and many of them are highly metabolic, even with an amoeboid type of motility (Prescott, 1982). They are often predominant in eutrophic waters including high organic and inorganic contents (Rahman *et al*, 2014).

Considerable work has been carried out in India about systematic survey, distribution and seasonal occurrence of euglenoids (Suxena, 1955; Munavar, 1972; Pandey and Pandey, 1980; Ratha*et al*, 2006). Philipose (1982, 1984, 1988) has done a very extensive work on euglenophytes throughout India.

Very few reports are available on the euglenoid diversity, from the freshwater habitats of Kerala. Shaji and Patel (1991), Shaji*et al* (1995), John and Francis (2012) and Arulmurugan*et al* (2010) have described euglenoids from freshwaters of Kerala. This is an attempt to explore the euglenoid diversity and to make a taxonomic account on it, from the selected sites of Karuvannur River, Thrissur District, Kerala.

MATERIALS AND METHODS

Karuvannur River is one of the major freshwater sources of Thrissur district, which is flowing through the famous Kole lands of Thrissur, with its origin at Pumalai hills in Chimmony Wildlife sanctuary. It has two main tributaries, Kurumali River and Manali River,which confluence at Palakkadavu, before Arattupuzha to form the Karuvannur River. For this study ten sampling sites were selected, which include the beginning and end region of the river, viz, Chimmony (S1), Peechi (S2), Kurumali (S3), Puthur (S4), Manali (S5), Palakkadavu (S6), Arattupuzha (S7), Karuvannur (S8), Thriprayar (S9) and Enammavu (S10). The surface water samples were collected from the sites at monthly intervals from June 2017 to May 2018. Collected samples were preserved by adding 4% formalin (APHA, 1998). Each sample was mounted on the glass slide using glycerine and observed thoroughly under research microscope for the taxonomic analysis. Identification of algal forms was made with the help of relevant and available floras and literatures (Prescott, 1982; Philipose, 1982, 1984, 1988; Wolowski, 1998). Photomicrographs of algal taxa taken with digital camera attached to the research microscope.

RESULTS AND DISCUSSION

During the period of study, 25 species of euglenoids were identified which belongs to five genera, namely, *Euglena, Lepocinclis, Phacus, Trachelomonas*and*Strombomonas* from the selected sites of Karuvannur River.

Taxonomic description:

Genus:***Euglena***Ehrenberg

***1. Euglena acus*Ehr.**

Prescott, 1982. p. 390, pl. 85, fig. 28.

Cells elongate, spindle shaped, 140-150 µm long, 10-14.6 µm broad, produced posteriorly into a long, fine tapering point, narrowed and truncate at the anterior end. [Col. Site: S5, S10]

***2. Euglena charkowiensis*Swirenko**

Islam and Irfanullah, 2005. pl. 4, fig. 47.

Cells 140–153.0 µm long, 14.6–20.9 µm broad, posterior end with a straight tail-piece. [Col. Site: S3, S5]

***3. Euglena oblonga*Schmitz.**
Khondker*et al*., 2008. Figs. 15a–c.
Cells elongated, ovoid-spindle, 22–25.5 µm broad, 72.2–82 µm long, anterior narrowed to a rounded end, posterior suddenly narrowed to a blunt end. [Col. Site: S2, S8, S10]
***4. Euglena proxima*Dangeard**
Prescott, 1982. p. 394, pl. 85, fig. 25.
Cells fusiform, 48.0–57.3 µm long, 14.5–23.3 µm broad, cells, narrowed posteriorly to blunt hyaline tip. [Col. Site: S7, S8, S10]
***5. Euglena spathirynchа*Skuja**
Khondker*et al*., 2008. Figs. 19a–c.
Cells 109–124.5 µm long, 21.4–35 µm broad, cells elongated, spindle, mid-region bulged out, posterior gradually narrowed to a sharp pointed end [Col. Site: S10]
6. Euglena sp.1
Wolowski, 1998.
Cells 61.2–67.0 µm long, 20.7–23.5 µm broad, cell slightly extending and rounded at the anterior end, narrowing to short tail-piece at the posterior end. [Col. Site: S7]
Genus: ***Phacus*** Dujardin
7. Phacusanacoelus Stokes
Prescott, 1982. p. 397, pl. 87, figs. 7, 8 and pl. 88, fig. 11.
Cells broadly ovoid, posterior end abruptly narrowed to a short caudus, cells 41.2–56.6 µm long, 33.2–41.2 µm broad. [Col. Site: S7]
***8. Phacushelikoides*Pochmann**
Prescott, 1982. p. 400, pl. 87, fig. 9.
Cell spirally twisted, elongate pyriform, markedly broad in the anterior third, and with a straight hyaline tapering tail at the posterior end, 49.2–52.5 µm broad, 112–128.3 µm long. [Col. Site: S5]
***9. Phacus s*p. 1**
Philipose, 1984.
Cells elongate-ellipsoid, posterior end with a short straight tail, cells 18.3–20.5 µm broad, 28.8–31.0 µm long, periplast with longitudinal rows of small forwardly pointed spines. [Col. Site: S10]
***10. Phacus sp*.2**
Wolowski, 1998.
Cells 50.2–55.7 µm long, 36.0.5–38.0 µm wide, oval, corrugated at the rim, with a long curved cauda at the posterior end. [Col. Site: S5]
Genus: ***Lepocinclis***Perty
***11. Lepocinclisacuta*Prescott**
Prescott, 1982. p. 405, pl. 89, figs, 8, 9.
Cells ovoid-pyriform, tapering posteriorly to a long, sharply pointed caudus, slightly narrowed anteriorly, 15–18.1 µm in diameter, 34–38.8µm long. [Col. Site: S1]
***12. Lepocinclisacicularis*Francé**
Wolowski, 1998, p.68, figs. 218, 219
Cell 18.0-25.0 µm long, 8.0-8.5 µm wide, fusiform, pellicle with a few spiral striae. [Col. Site: S5, S7]
***13. Lepocinclis fusiformis* (Carter) Lemm.**
Prescott, 1982. p. 406, pl. 89, fig. 1-4.
Cells broadly pyriform, slightly produced posteriorly to form a blunt basal point, 17-25 µm in diameter, 33-36 µm long. [Col. Site: S7, S10]
***14. Lepocinclis ovum* (Ehrenb.) Lemm.**
Prescott, 1982. p. 407, pl. 89, figs. 5, 6.
Cells broadly ovate with a short blunt caudus, 15.0–22.0µm wide, 26.0–30.5µm long, rounded both anteriorly and posteriorly. [Col. Site: S5, S7, S10]
Genus: ***Trachelomonas*** Ehrenberg
15. Trachelomonasabrupta (Swir.) Defl.
Prescott, 1982. p. 410, pl. 83, figs. 18, 19.
Lorica cylindrical, 16.0–17.5 µm broad, 25.5–28.0 µm long, wall coarsely punctate, covered by small blunt spines. [Col. Site: S3, S7, S10]
***16. Trachelomonasarmata* (Ehr.) Stein. var.*longispina*(Playf.) Defl.**
Prescott, 1982. p. 411, pl. 83, fig. 27.
Test 28.2–30.6 µm broad, 32.0–41.5 µm long, broadly obovate, flagellum aperture with a circle of erect spines at the margin, anterior margin with short and posterior with both short and long stout spines. [Col. Site: S5, S7, S10]
17. Trachelomonasdubia (Swiremend) Defl.
Prescott, 1982. p. 412, pl. 85, figs. 1, 2
Lorica cylindrical, smooth, anterior end abruptly narrowed to form a short cylindrical neck, 10.5–12.6 µm broad, 23.5–28.0 µm long. [Col. Site: S3]
18. Trachelomonashispida (Perty) Stein. var. duplex Playf.
Prescott, 1955. pl. 2, fig. 8.
Test ovate, cells 24.5–27.0 µm long, 17.5–20.4 µm in diameter, narrowed anteriorly, flagellum aperture slightly raised, wall uniformly covered with minute sharp spines. [Col. Site: S3]
***19. Trachelomonaslacustris*Drez.**
Prescott, 1982. p. 415, pl. 83, figs. 14, 15.
Lorica 13.0–15.0 µm broad, 22.0–24.0 µm long, cylindrical, flagellum aperture with slightly raised rim, wall densely punctate. [Col. Site: S9, S10]
***20. Trachelomonasplanctonica*fo. *ornata*Skvortzov**
Wołowski, 1998. p.62, Fig. 199.
Test 17.0–21.5 µm wide, 20.0–32.0 µm long, elliptical, verrucose and covered with pores, collar with irregular rim. [Col. Site: S6, S10]
***21. Trachelomonasrobusta*Swirenko**
Prescott, 1982. p. 416, pl. 83, fig. 29.
Test subglobose, 15.5–17.2 µm broad, 20.3–25.2 µm long, flagellum aperture with a thickened rim, wall dark brown, evenly beset with short sharp spines. [Col. Site: S3, S4, S5]
***22. Trachelomonassuperba*(Swir.) Defl. var.*swirenkiana*Defl.**
Prescott, 1982. p. 418, pl. 84, figs. 8, 9 and pl. 83, fig. 34.
Test subglobose, 29.5–32 µm broad, 39.3–41.5 µm long, flagellum aperture low ring like collar, anterior and posterior wall spiny, posterior spines longer and stouter than anterior region. [Col. Site: S5]

***23. Trachelomonasvolvocina*Ehr.**
Prescott, 1982. p. 419, pl. 83, figs. 1, 7, 8.
Lorica globose, smooth, 14.5–20.4 µm in diameter, collar usually absent. [Col. Site: S1, S2, S3, S5, S7, S8, S9, S10]
24. Trachelomonas sp.1
Philipose, 1988.
Lorica spindle-shaped, cells 17.0–20.0 µm broad, 50.0–58.8 µm long. [Col. Site: S5, S10].
Genus: ***Strombomonas***Deflandre
***25. Strombomonasfluviatilis*(Lemm.) Defl.**
Islam and Irfanullah, 2005. pl. 3, fig. 44
Lorica fusiform, cells 21.5–26.0 µm broad, 46.0–50.6 µm long, anterior end narrowed, with slightly widened cylindrical neck; narrowed at the posterior end into conical appendix. [Col. Site: S9].

Out of the 25 species, *Trachelomonas* represents more number with 10 species, followed by *Euglena* with 6 species in it. *Lepocinclis* and *Phacus* have 4 species each. *Strombomonas* is represented by single species *S. fluviatilis*. It is *Trachelomonasvolvocina* seen to be present in most of the selected sites.

CONCLUSION

This study was to explore the euglenoid diversity of some selected sites from Karuvannur River, Thrissur District. 25 species of euglenoids were observed in the study period which belongs to 5 genera, *Euglena* (6 sps.), *Phacus* (4 sps.), *Lepocinclis* (4 sps.), *Trachelomonas* (10 sps.) and *Strombomonas* (1 sp.).

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